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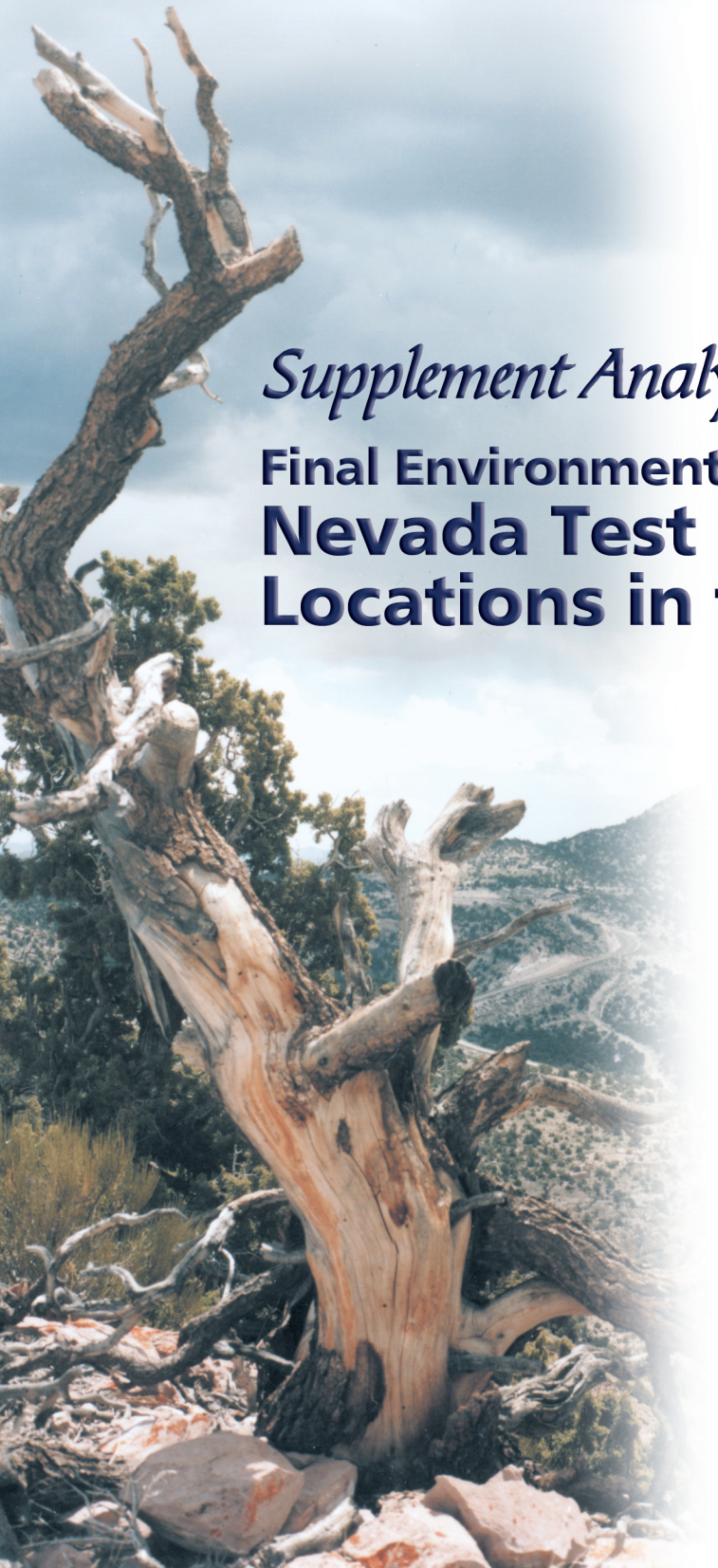

Supplement Analysis for the

Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada

July 2002

U.S. Department of Energy
National Nuclear Security Administration
Nevada Operations Office

Pictured on the front cover is a bristlecone pine in Rainer Mesa on the Nevada Test Site

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Prepared by Tetra Tech NUS, Inc.
Task Order DE-AT08-01NV14088

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ACRONYMS AND ABBREVIATIONS

ACEC	Area of Critical Environmental Concern
AEC	U.S. Atomic Energy Commission
AIWS	American Indian Writers Subgroup
ALARA	As low as reasonably achievable
BCO	Battelle Columbus Operations
BEEF	Big Explosives Experimental Facility
BLM	Bureau of Land Management
BMI	Battelle Memorial Institute
BN	Bechtel Nevada
CAIRS	Computerized Accident/Incident Reporting System
cfm	cubic feet per minute
CFR	Code of Federal Regulations
CGTO	Consolidated Group of Tribes and Organizations
CO	Carbon monoxide
DAF	Device Assembly Facility
dB	decibel(s)
DoD	U.S. Department of Defense
DOE	U.S. Department of Energy
DOE/NV	U.S. Department of Energy Nevada Operations Office
DOJ/OSLDPS	U.S. Department of Justice/Office of State and Local Domestic Preparedness Support
DU	Depleted uranium
DUF_6	Depleted uranium hexafluoride
EA	Environmental Assessment
EIS	Environmental Impact Statement
EMAC	Ecological Monitoring and Compliance Program
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ERPG	Emergency Response Planning Guideline
ESA	Endangered Species Act
ETTP	East Tennessee Technology Park
FAA	Federal Aviation Administration
FEIS	Final Environmental Impact Statement
FR	Federal Register
FWS	U.S. Fish and Wildlife Service
FY	Fiscal Year
g	gram(s)
GIS	Geographic information system
GREP	Global Renewal Energy Partners
HAP	Hazardous air pollutant
HAZMAT	Hazardous materials
HCl	Hydrogen chloride
HE	High-explosive

HF	Hydrofluoric acid
HSC	Hazardous Materials Spill Center
ICE	Isentropic Compression Experiments
IPABS	Integrated Planning, Accountability, and Budgeting System
JASPER	Joint Actinide Shock Physics Experimental Research
KLF	Kistler Launch Facility
LANL	Los Alamos National Laboratory
lb	pound(s)
LLNL	Lawrence Livermore National Laboratory
LLW	low-level waste
LOS	Level of Service
LWC	Lost Work Cases
LWD	Lost Work Days
m^3	cubic meters
MCL	Maximum contaminant level
$\mu g/m^3$	micrograms per cubic meter
MLLW	mixed low-level waste
MSL	mean sea level
NAAQS	National Ambient Air Quality Standards
NAC	Nevada Administrative Code
NAFR	Nellis Air Force Range (now NTTR)
NCCT	National Center for Combating Terrorism
NELA	Nuclear explosives-like assembly
NEMOF	Nevada Energetic Materials Operations Facility
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NHPA	National Historic Preservation Act of 1966
NO_2	Nitrogen dioxide
NO_x	Nitrogen oxides
NNSA	National Nuclear Security Administration
NNSA/NV	NNSA/Nevada Operations Office
NRC	U.S. Nuclear Regulatory Commission
NTTR	Nevada Test and Training Range (formerly NAFR)
NTS	Nevada Test Site
NTSDC	NTS Development Corporation
OEL	Occupational exposure limit
PCB	Polychlorinated biphenyl
PM_{10}	Particulates having a diameter of less than 10 microns (e.g., fugitive dust)
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act
RDT&E	research, development, testing, and evaluation
RMP	Resource Management Plan
ROD	Record of Decision
RTG	radioisotope thermoelectric generator

SA	Supplement Analysis
SAR	Safety Analysis Report
SEZ	Solar Enterprise Zone
SF_4	Sulfur tetrafluoride
SNL	Sandia National Laboratories
SO_2	Sulfur dioxide
SO_x	Sulfur oxides
TAP	Toxic air pollutant
TRC	Total Recorded Cases
TRU	Transuranic
TSCA	Toxic Substances Control Act
TTR	Tonopah Test Range
U-235	Uranium-235 isotope
UF_6	Uranium hexafluoride
USAF	U.S. Air Force
USC	United States Code
USCB	U.S. Census Bureau
VOC	Volatile organic compound(s)
WIPP	Waste Isolation Pilot Plant
WMPEIS	Waste Management Programmatic Environmental Impact Statement
WMD	weapons of mass destruction
YMP	Yucca Mountain Project
yr	year

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EXECUTIVE SUMMARY

This Supplement Analysis (SA) was prepared in accordance with the U.S. Department of Energy's (DOE's) requirements for implementation of the National Environmental Policy Act (NEPA) [10 Code of Federal Regulations Part 1021.330(d)]. This Nevada Test Site (NTS) Environmental Impact Statement (EIS) SA collects and analyzes sufficient information for the U.S. Department of Energy's National Nuclear Security Administration Nevada Operations Office (NNSA/NV) to determine whether: (1) The *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE/EIS-0243) issued in 1996 should be supplemented; (2) a new EIS should be prepared; or (3) no further NEPA documentation is required.

Based on the analysis in this SA, NNSA/NV has determined that there are no substantial changes to the NTS EIS or Record of Decision or significant new circumstances or information relevant to environmental concerns, and that no supplemental EIS is needed.

In the 1960s and 1970s beryllium was used extensively at the NTS in a number of experimental nuclear reactors, nuclear weapons tests, and other applications. A recent review of NTS historical documents indicates that some beryllium contamination remains in surface and sub-surface soils and at some facilities. However, based on the evaluation of a few facilities at the NTS where beryllium was present, surface and airborne contamination levels are below the established regulatory levels. An effort is underway to identify historic beryllium sites and to retrieve historical beryllium monitoring data.

DOE regulations require that site-wide environmental impact statements such as the 1996 NTS EIS be evaluated at least every five years "to determine whether the existing EIS remains adequate or whether to prepare a new site-wide EIS or supplement the existing EIS." NNSA/NV is required to notify the public of its decision, termed a "determination," and provide the public, upon written request, copies of the SA.

This SA examines potential changes since the 1996 NTS EIS and Record of Decision (ROD) in the following areas: (1) current and proposed programs and activities from now through 2006; (2) direct or indirect environmental releases; (3) new regulatory requirements, DOE Orders, and guidelines regarding significance of impacts; and (4) institutional changes relevant to impact areas.

Findings

- No supplemental EIS for the 1996 NTS EIS is needed.
- No changes from actions foreseen in 1996, nor new and modified proposals and projects, present a seriously different picture of the likely consequences of continued operation of the NTS than was presented in the 1996 NTS EIS.
- Technical disciplines that did not require detailed analysis included: occupational safety and health, noise, traffic and transportation, geology and soils, land use, visual resources, biological resources, groundwater, socioeconomics, environmental justice, cultural resources, and American Indian resources.
- Further detailed consequence analysis was required for the following technical discipline areas: radiological impacts (normal operations), accident analysis, air resources, waste management, and cumulative impacts. The environmental consequences for each of these technical discipline areas are within the impact analysis of the 1996 NTS EIS.

In the ROD for the 1996 NTS EIS (*61 FR 65551, December 13, 1996*), DOE decided to implement a combination of three alternatives:

No Action, Expanded Use, and Alternate Use of Withdrawn Lands. Most activities would be carried out at levels described by the Expanded Use Alternative. However, low-level waste (LLW) and mixed LLW (MLLW) management activities would be conducted at levels described by the No Action Alternative, pending decisions by DOE on the *Waste Management Programmatic Environmental Impact Statement* (WMPEIS) (DOE/EIS-0200), then being prepared. Also, DOE committed itself to certain public education activities analyzed under the Alternate Use of Withdrawn Lands Alternative.

In the fourth ROD under the WMPEIS (*65 FR 10061, February 25, 2000*), DOE announced that it had decided to establish regional LLW and MLLW disposal sites at the Hanford Site in Washington and the NTS. At the same time, DOE amended the ROD for the NTS EIS to reflect its final decision on LLW and MLLW management.

Analytical Approach

A three-step review and analysis approach was used in developing this SA. These steps are summarized as follows:

1. Perform initial screening analyses of new or modified projects or proposals, changed circumstances, and new regulations. This screening analysis determined, without further detailed analysis, which specific impact areas clearly remain within the limits of environmental consequences established in the 1996 NTS EIS (i.e., that adverse impacts are not more adverse than or beneficial impacts are not more beneficial than those discussed in the 1996 document).

2. Perform more detailed analyses of impact areas that did not pass the screening criteria (Step 1) to determine whether the combined impacts remain within the envelope of consequences established in the 1996 NTS EIS.

3. For those impacts that were outside the envelope of consequences established in the 1996 NTS EIS, determine whether the incremental change in environmental consequences is significant, as defined in NEPA regulations.

As a result of the initial screening review, NNSA/NV determined that the following technical disciplines meet the screening criteria and thus do not require detailed analysis: occupational safety and health, noise, traffic and transportation, geology and soils, land use, visual resources, biological resources, groundwater, socioeconomics, environmental justice, cultural resources, and American Indian resources. For each of these technical discipline areas, the 1996 NTS EIS remains an adequate description of potential NTS sitewide impacts and no supplementation of the 1996 NTS EIS is needed.

New and/or Modified Projects and Information

A requirement for additional NEPA analysis could be prompted by changes in site activities (new or modified site missions) that could result in changes in environmental impacts, changes in the characteristics of the NTS or its environs, or changes in regulatory requirements or guidance. Therefore, this SA describes the current status of those areas and identifies any changes since the 1996 NTS EIS.

The SA identifies changes in existing NTS missions/facilities (from those analyzed in the 1996 NTS EIS) and any new missions/facilities in the following six areas: defense programs, waste management programs, environmental restoration programs, non-defense research and development programs, work-for-others programs, and miscellaneous programs.

Defense programs

The scope of this SA includes the full range of high-explosive-driven experiments with special

nuclear material, ranging from subcritical experiments to full-scale nuclear tests. New defense programs missions and facilities are described in Section 3.1.1 of the SA and include:

- Joint Actinide Shock Physics Experimental Research (JASPER) Facility
- Nevada Energetic Materials Operations Facility (NEMOF)
- Glovebox work and other Stockpile Stewardship Programs at the Device Assembly Facility (DAF)
- Big Explosives Experimental Facility (BEEF)
- Atlas Facility
- Infrastructure improvements at the U1a Complex
- Stockpile Stewardship and Management Program activities, including:
  - Subcritical experiments at the U1a Complex
  - Subcritical experiments in emplacement holes
  - Isentropic compression experiments (ICE)
- Damaged nuclear weapons program in G-Tunnel
- Open burn experiments
- Potential future projects at the NTS
  - Advanced accelerator applications
  - Advanced Hydrotest Facility
  - Modern pit facility
  - Proposed Relocation of Technical Area 18 Capabilities and Material at the Los Alamos National Laboratory

Waste management programs

After issuance of the 1996 NTS EIS, DOE issued the fourth ROD for the Department's Waste Management Programmatic EIS (*65 FR 10061, February 25, 2000*). This ROD established the NTS as one of two regional LLW and MLLW disposal sites. Taking that decision into account, NNSA/NV has calculated revised estimates of the volumes of LLW and MLLW that would be disposed at the NTS. In addition, this SA considers additional waste streams, beyond those considered in the 1996 NTS EIS, that may be generated at or sent to the NTS for management from 2002 through 2011.

From all of these actions, the total volume of LLW that is projected to be disposed at the NTS over the next ten years is 517,753 cubic meters, compared to a projection of 1,041,422 presented in the 1996 NTS EIS for the Expanded Use Alternative. The new projected volume of mixed LLW to be disposed at the NTS over the next ten years is 22,000 cubic meters, compared to a projection of 300,500 cubic meters presented in the 1996 NTS EIS for the Expanded Use Alternative.

Environmental restoration programs

The overall environmental restoration program strategy is the same as that described in the 1996 NTS EIS (and the Federal Facility Agreement and Consent Order), with the only difference being that closure of several sites has been completed.

Non-defense research and development programs

The SA addresses the NNSA capability at the NTS to implement non-defense research and development programs, and includes the following three new programs. Section 3.1.4 provides further details on these new programs.

- Green Energy Futures Park
- Kistler Launch Facility (KLF)

Work-for-others programs

NNSA/NV provides management, direction, and oversight of work-for-others activities at the NTS. The SA addresses the following three new work-for-others federal programs. Section 3.1.5 provides further details on these new programs.

- Weapons of mass destruction work for the U.S. Department of Justice
- Defense Threat Reduction Agency Hard Target Defeat Tunnel Program
- U.S. military development and training in tactics and procedures for counter terrorism threats and national security defense

Miscellaneous new missions and facilities

The SA addresses the proposed National Center for Combating Terrorism. Section 3.1.6 provides further details on this new program.

Environmental conditions

The SA identifies changes in the environmental conditions on and around the NTS since the issuance of the 1996 NTS EIS. The results of SA analysis indicates that there have been no substantive changes in the conditions of the natural environment on or around the NTS that would cause the envelope of consequences established in the 1996 NTS EIS to be exceeded.

In the 1960s and 1970s beryllium was used extensively at the NTS in a number of experimental nuclear reactors, nuclear weapons tests, and other applications. A recent review of NTS historical documents indicates that some beryllium contamination remains in surface and sub-surface soils and at some facilities. However, based on the evaluation of a few facilities at the NTS where beryllium was present, surface and airborne contamination levels are below the established regulatory levels. An effort is underway to identify historic beryllium sites and to retrieve historical beryllium monitoring data.

Detailed Consequence Analysis

For technical disciplines that did not pass the screening criteria, further analysis is required. This detailed analysis was required for the following technical discipline areas: radiological impacts (normal operations), accident analysis, air resources, waste management, and cumulative impacts.

Radiological impacts (normal operations)

Airborne emissions of radioactivity

Radiological impacts to workers and members of the public may occur in the course of normal site activities involving radioactive materials. NNSA/NV reviewed the potential changes since the 1996 NTS EIS that could result in increased radiological impacts from normal operations.

Impacts to members of the public from routine airborne emissions of radionuclides were analyzed by evaluating current and planned airborne emissions of radionuclides and the resulting dose to the offsite maximally exposed individual. Impacts to the maximally exposed off-site individual from all sources of airborne emissions of radionuclides in 2000 were less than 2 percent of the 10 millirem annual limit. New emissions from new missions and projects would have a negligible impact on the total off-site dose from routine emissions.

Radiological impacts from exposure to groundwater

The 1996 NTS EIS indicated that any radiological impacts to members of the public from transport and ingestion of contaminated groundwater resulting from past underground testing of nuclear weapons would not be expected to occur. No underground testing has been conducted since the 1996 NTS EIS was completed and no new sources of groundwater contamination have been introduced. In addition, the Underground Test Area (UGTA) Project is evaluating the extent of radionuclide migration in the groundwater in accordance with the Federal Facility Agreement and Consent Order. The UGTA project has drilled 24 new wells since 1996 and has not detected any contamination beyond the NTS land withdrawals. As a result, the conclusions of the 1996 NTS EIS have not changed.

Radiation exposure to NTS workers

The exposure to any individual during routine operations would be administratively maintained within current DOE limits (5 rem per year), a

limit that has not changed since the 1996 NTS EIS was issued.

The volumes of LLW generated by or shipped to the NTS would be within the volumes projected in the 1996 NTS EIS. LLW contributes the bulk of exposures to waste management workers. The collective dose to such workers would be within the limits established in 1996 NTS EIS.

While a number of defense programs with the potential for occupational exposures during normal operations have been added or their missions expanded since the 1996 NTS EIS, these additions are offset by the elimination of (or decision not to locate at the NTS) other radiological programs considered in the 1996 NTS EIS. Occupational doses from changes in defense-related programs would be within the limits considered in the 1996 NTS EIS.

Accident analysis

Available accident scenario, impact, and risk information for the future new planned or proposed activities at the NTS activities were compared to the evaluations presented in the 1996 NTS EIS. Proposed activities with a potential for accidental release of nuclear and chemical materials and thus, a potential for impacts are discussed. The potential impacts of accidents are compared with those presented in the 1996 NTS EIS.

For each of these facilities or activities, the risks to the offsite population from postulated accidents is low and the accident impacts of future NTS activities would be within the accident impacts considered and presented in the 1996 NTS EIS.

Air quality

Impacts associated with construction and operation of current facilities and new or modified projects and missions at the NTS were analyzed with respect to the criteria pollutants. Pollutant sources assessed include major stationary sources, fugitive emission sources, and mobile sources. Criteria pollutant emissions data presented in the 1996 NTS EIS were assumed to represent potential emissions based on 8,760 hours of full time operation. However, the actual NTS criteria pollutant emissions in 2001 and those projected emissions listed in the 2002 air emissions permit application are far below those estimated in the 1996 NTS EIS for the Expanded Use Alternative. This indicates that the criteria pollutant emissions listed for the Expanded Use Alternative represent conservative estimates of potential emissions.

Some of the metallic targets (including lead and beryllium) and solvents that would be used at the Atlas facility are classified as hazardous air pollutants and are regulated by the state of Nevada. Annual emissions of these materials would be within applicable standards.

In summary, addition of emissions from the planned future missions and facilities to those presented for in the 1996 NTS EIS is not expected to increase air quality impacts above those presented for the Preferred Alternative.

Waste management

The waste management assessment focused on changes to waste management facilities and capabilities at the NTS since issuance of the 1996 NTS EIS. For all waste types, the impact analysis in the 1996 NTS EIS is sufficient.

For LLW and MLLW, the estimated volume of LLW to be disposed at the NTS is less than the amount analyzed in the 1996 NTS EIS under the Expanded Use Alternative. The projected volume is also less than the available disposal capacity.

For transuranic waste, the waste projection in this SA takes into account transuranic waste anticipated from the JASPER Facility.

The projected volume of hazardous waste to be treated is well under the limit set by the Resource Conservation and Recovery Act permit and less than the volume evaluated in the 1996 NTS EIS.

For non hazardous wastes, the waste projections and estimated remaining capacity volumes show

that only the sanitary solid waste projection is beyond the projected waste volume of the 1996 NTS EIS. Construction of a new Class I or II landfill with a capacity of approximately 420,000 cubic meters was included under the Expanded Use Alternative. The impact to current remaining capacity at the Area 23 landfill is estimated at 16 percent; therefore, the need for a new landfill before 2011 is not indicated. The impact to remaining capacity is estimated to be 12 percent for the Hydrocarbon Disposal Site and 14 percent for the Area 9 landfill.

Cumulative Impacts

The cumulative impact analysis for the SA includes: (1) an examination of the cumulative impact analysis in the 1996 NTS EIS; (2) a review of past, present and reasonably foreseeable actions for other federal and non-federal agencies; (3) a summary of impacts identified in this SA; and (4) a summary of the cumulative impacts and changes since the 1996 NTS EIS was issued.

Past and present actions associated with activities of the NNSA/NV in the state of Nevada are described in the 1996 NTS EIS, and updated with new and modified projects described in this SA. Reasonably foreseeable future actions of the NTS are described in Chapter 3 of this SA. Reasonably foreseeable future actions for the region impacted by the NTS were also reviewed and included in the analysis.

The result of this analysis indicated that the NTS EIS cumulative impact analysis is sufficient for past and present programs at the NTS and region of influence. An increase in noise levels from the F-22 Beddown Project at the Nevada Test and Training Range and the KLF at the NTS are expected in the future. The occasional sonic booms would be considered annoyance but would have a minor impact on the public.

CHAPTER 1
BACKGROUND AND INTRODUCTION

1.1 Overview of the Nevada Test Site

The Nevada Test Site (NTS) occupies approximately 1,375 square miles (approximately 880,000 acres) in southern Nevada (Figure 1-1), making it one of the largest restricted-access areas in the United States. This remote site is surrounded by more than 3 million additional acres of land withdrawn from the public domain for use as a military gunnery range (Nevada Test and Training Range [NTTR], formerly known as Nellis Air Force Range [NAFR]) and as a protected wildlife range (Desert National Wildlife Range). The NTS is approximately 65 miles northwest of the city of Las Vegas.

Established as the U.S. Atomic Energy Commission's (AEC's) on-continent proving ground, the NTS was used from 1951 to 1992 for nuclear weapons testing. The United States conducted 804 underground and 100 atmospheric tests at the NTS during this period to study weapons designs, weapons effects, weapons safety and reliability, and the peaceful uses of underground nuclear explosives (the AEC's Plowshares Program). The United States and the United Kingdom jointly conducted 24 underground tests at the NTS during this time. The last test, an underground detonation, was conducted on September 23, 1992.

After the nuclear weapons testing moratorium was imposed in 1992, the U.S. Department of Energy (DOE) pursued greater diversification of the NTS mission, which now includes stockpile stewardship testing and management, hazardous chemical spill testing and training, terrorist and emergency response training, conventional weapons testing, waste management, and environmental technology studies. Numerous offices, laboratories, and support buildings are spread across the NTS. Key facilities (Figure 1-2) include the Device Assembly Facility (originally built for high-explosive and nuclear explosive assembly operations, and now being considered for various other operations), the Hazardous Materials (HAZMAT) Spill Center (used for hazardous materials testing and training), the Big Explosives Experimental Facility (BEEF) (used for hydrodynamic testing of high explosives), the U1a complex (where high explosives are detonated in the presence of aging nuclear materials to test their dynamic properties), the Joint Actinide Shock Physics Experimental Research (JASPER) Facility (which uses high explosives in research and development experiments using special nuclear material), and others as noted on Figure 1-2.

The DOE's National Nuclear Security Administration Nevada Operations Office (NNSA/NV) Strategic Plan for 2002 defines four NTS mission elements:

National Security – support the DOE Stockpile Stewardship and Management Program through subcritical and other weapons physics experiments, maintain underground test resumption readiness, emergency management, training and demonstration for defense systems, advanced high hazard operations, and other national security experimental programs

Environmental Management – support environmental restoration, groundwater characterization, and low-level radioactive waste (LLW) management

Stewardship of the NTS – manage the land and facilities at the NTS as a unique and valuable natural resource

Technology Diversification and Economic Diversification – support traditional and non-traditional departmental programs and commercial activities that are compatible with the Stockpile Stewardship Program.

The primary mission element at the NTS continues to be national security, ensuring the safety and reliability of the Nation's nuclear weapons through the Stockpile Stewardship and

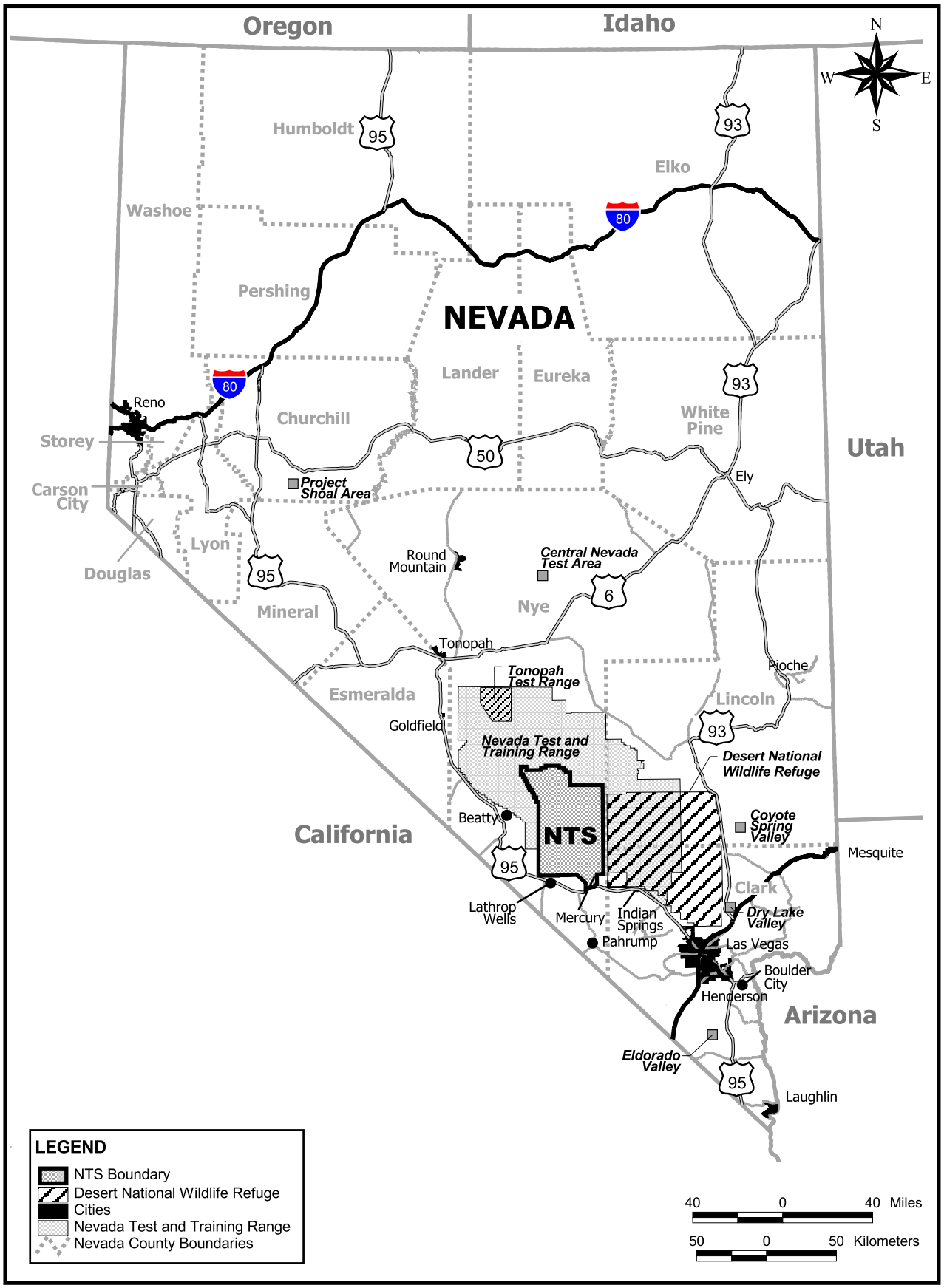

Figure 1-1. NTS location.

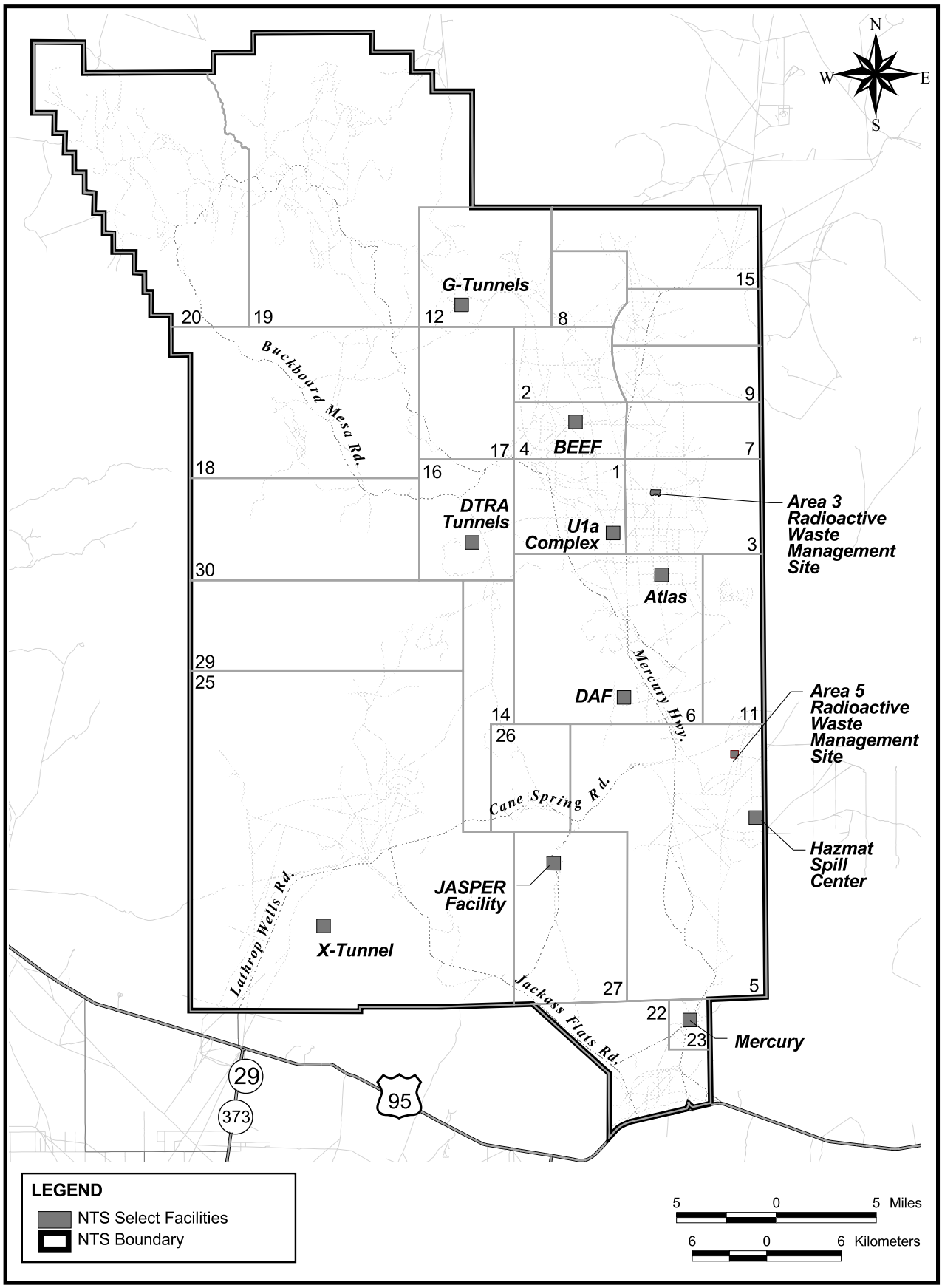

Figure 1-2. Selected NTS facilities.

Management Program. This program includes maintaining the readiness and capability to conduct underground nuclear weapons tests and conducting such tests, if directed by the President. Other aspects of stockpile stewardship include the previously mentioned conventional high-explosives tests and dynamic experiments. Formerly a DOE Defense Programs mission, stockpile stewardship is now carried out under the auspices of the NNSA, a separately organized agency within DOE with responsibility for the nation's nuclear weapons.

In recent years, other missions have become increasingly important. Environmental management activities have expanded since DOE decided, in February 2000, to make the NTS and the Hanford Site in Washington its two regional LLW and mixed LLW disposal facilities. Technology diversification has become more important since the creation of the NTS Development Corporation in 1995. The NTS Development Corporation, a non-profit entity funded by DOE, continues to seek out potential projects that would contribute to the economic diversification of southern Nevada. Stewardship of the NTS and its natural resources has been, and continues to be, an important mission, as evidenced by the Ecological Monitoring and Compliance Program, which monitors sensitive plants, animals, and habitats in order to assess impacts of existing facilities and operations and make informed decisions about proposed facilities and operations.

1.2 Description of the 1996 Nevada Test Site Environmental Impact Statement

The *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE 1996) evaluated impacts from four possible alternatives for managing DOE activities at the NTS, the Tonopah Test Range (TTR), the Project Shoal Area, the Central Nevada Test Area, and portions of the NAFR complex. Three additional sites in southern Nevada (Coyote Spring Valley, Dry Lake Valley, and Eldorado Valley) were evaluated as possible sites for a solar enterprise zone that would include a 1,000-megawatt solar generating facility.

The four alternatives considered in the Environmental Impact Statement (EIS) were:

- No Action (Alternative 1) - continue to operate at the level maintained for the previous five years
- Discontinue Operations (Alternative 2) - discontinue operations and interagency programs and close the NTS
- Expanded Use (Alternative 3) - maximize use of the NTS and its resources to support defense and non-defense programs
- Alternate Use of Withdrawn Lands (Alternative 4) - discontinue all defense-related activities at the NTS, continue waste management and environmental restoration efforts, expand non-defense research, and establish public education and recreation uses of the NTS.

DOE's preferred alternative included elements of two alternatives, the management and operations activities described in Alternative 3 (Expanded Use) and the educational activities described in Alternative 4 (Alternate Use of Withdrawn Lands) (e.g., educational tours of the NTS, promoting the creation of a nuclear era museum). Alternative 3 was selected in part because it represented "the maximum potential activities identified for the Nevada Test Site" (*61 FR 54425, October 18, 1996*). The preferred alternative was regarded as the most comprehensive alternative in terms of supporting statutory mission responsibilities, while providing for a diversification of the NTS use to include non-defense, interagency, public, and private uses of the NTS human and natural resources.

Under the preferred alternative, defense programs activities at both the NTS and the TTR were expected to expand, primarily in the areas of stockpile stewardship and management, materials disposition, and nuclear emergency response. Waste management activities were expected to increase for LLW and mixed LLW generated by DOE research and environmental cleanup programs within the state of Nevada and

by DOE and U.S. Department of Defense sites outside the State. The environmental restoration program was expected to continue at a potentially accelerated pace at the NTS and off-site locations under the preferred alternative. The non-defense research and development program was expected to continue its support of ongoing program operations and pursue new initiatives, including construction and operation of a solar power production facility. Under the preferred alternative, military use of airspace over the NTS and TTR (work-for-others program) was expected to increase, and use of certain NTS lands by the military for training, research, and development were also expected to increase.

In the 1996 NTS EIS, DOE analyzed potential impacts to land use (including airspace), geology and soils, air quality, water resources, biological resources, cultural resources, visual resources, socioeconomics, and human health. DOE also considered the potential impacts of facility accidents and the transportation of radioactive materials. Impacts were described by alternative, location, program, and resource. For example, the potential impacts to air quality from Defense Program activities under Alternative 3 (Expanded Use) at the NTS were evaluated. Impacts were discussed in considerable detail in Chapter 5 and summarized in Table 3-5 of the EIS.

The Record of Decision

In the Record of Decision (ROD) for the EIS (*61 FR 65551, December 13, 1996*), DOE indicated that it had decided to implement a combination of three alternatives: No Action, Expanded Use, and Alternate Use of Withdrawn Lands. Most activities would be carried out at levels described by the Expanded Use Alternative. However, LLW and mixed LLW management activities would be conducted at levels described by the No Action Alternative, pending decisions by DOE on the *Waste Management Programmatic Environmental Impact Statement*, then being prepared. Also, DOE committed itself to certain public education activities analyzed under the Alternate Use of Withdrawn Lands Alternative. This decision was intended to continue the multi-purpose, multi-program use of the NTS and off-site locations, while pursuing further diversification of interagency, private industry, and public education uses of the site in accordance with defense program, waste management, and environmental restoration mission requirements.

The Final Waste Management Programmatic Environmental Impact Statement and the Amendment of the Record of Decision for the NTS

The Final Waste Management Programmatic Environmental Impact Statement (WMPEIS); (DOE 1997) was concerned with DOE management of four types of radioactive waste (LLW, mixed LLW, transuranic waste, and high-level waste) and non-wastewater hazardous waste. Four RODs were published under the WMPEIS. The first (*63 FR 3629, January 23, 1998*) dealt with the management of transuranic waste. The second (*63 FR 41810, August 5, 1998*) was concerned with non-wastewater hazardous waste. The third (*64 FR 46661, August 26, 1999*) dealt with the management of high-level waste.

In February 2000, DOE published the fourth ROD (*65 FR 10061, February 25, 2000*) under the WMPEIS, this one concerned with the management of LLW and mixed LLW. In this ROD, DOE announced that it had decided to establish regional LLW disposal sites at the Hanford Site in Washington and the NTS:

> "Specifically, the Hanford Site and NTS will each dispose of its own LLW on-site and will receive and dispose of LLW that is generated and shipped (by either truck or rail) by other sites that meet the waste acceptance criteria…Use of the term "regional" disposal does not impose geographical restrictions on which DOE sites may ship waste to a disposal site; the term is used only to be consistent with the WMPEIS analysis of regionalized alternatives."

DOE also announced in the same ROD that it had decided to establish regional mixed LLW disposal operations at the Hanford Site and the NTS, with similar charters and stipulations on the use of the word "regional".

As a result of these decisions on the management of LLW and mixed LLW, DOE in February 2000 amended the ROD for the NTS EIS (*65 FR 10061, February 25, 2000*). In the 1996 ROD, DOE stated its intention to manage LLW and mixed LLW at levels described by the No Action Alternative, pending decisions by DOE on the WMPEIS. DOE amended the ROD for the NTS to reflect its final decision on LLW and mixed LLW management:

> "Inasmuch as DOE is now making complex-wide decisions for its LLW and mixed LLW waste management program, which includes continuing to use the NTS for disposal of LLW and initiating use of NTS for disposal of mixed LLW, as addressed in the WMPEIS, DOE is also hereby amending its December 9, 1996, NTS EIS ROD. DOE will implement the Expanded Use Alternative for waste management activities at the NTS, including LLW and mixed LLW disposal. This amendment is based on the analysis in the NTS EIS and is tiered from the WMPEIS and the associated programmatic decisions for LLW and mixed LLW."

1.3 Scope of the NTS EIS Supplement Analysis

The ROD for the 1996 NTS EIS defined the focus and level of ongoing or future planned activities at the NTS. Appendices A-F and classified Appendix J of the 1996 NTS EIS define the types of activities that were considered appropriate ongoing activities for both the NTS and the TTR. The 1996 NTS EIS analyzed the impacts from DOE programs, including ongoing activities for stewardship of the Nation's nuclear weapons stockpile, management of radioactive waste, environmental restoration, non-defense research and development programs, work-for-others programs, and site support activities. The scope of this NTS EIS Supplement Analysis is the same.

One additional activity on or near the NTS, the proposed geologic repository at Yucca Mountain, has an ongoing EIS. Therefore, this activity is considered in the Cumulative Impacts analysis (Section 5.4).

1.4 Public involvement

In support of its public involvement effort, NNSA/NV provided briefings to the Consolidated Group of Tribes and Organizations on October 31, 2001 and to the Community Advisory Board Nevada Test Site Programs on December 5, 2001. A fact sheet entitled "Environmental Impact Statement for Nevada Test Site and Off-Site Locations in the State of Nevada Supplement Analysis, November 2001 was sent to more than 300 interested individuals, special interest groups, American Indian tribes, as well as federal, state and local officials.

CHAPTER 2
PURPOSE AND NEED

The U. S. Department of Energy's (DOE) National Nuclear Security Administration Nevada Operations Office (NNSA/NV) has prepared this Supplement Analysis (SA) as mandated by DOE policy. DOE National Environmental Policy Act (NEPA) Implementing Procedures at 10 Code of Federal Regulations (CFR) Part 1021.330(d) require that site-wide environmental impact statements such as the Nevada Test Site Environmental Impact Statement (NTS EIS), released in 1996, be evaluated at least every five years "to determine whether the existing EIS remains adequate or whether to prepare a new site-wide EIS or supplement the existing EIS."

The SA collects and analyzes "sufficient information for NNSA/NV to determine whether: (1) the existing EIS should be supplemented; (2) a new EIS should be prepared; or (3) no further NEPA documentation is required." NNSA/NV is required to notify the public of its decision, termed a "determination," and provide the public, upon written request, copies of the SA.

This SA examines potential changes since the 1996 NTS EIS and Record of Decision in the following areas: (1) current and proposed programs and activities from now through 2006; (2) direct or indirect environmental releases; (3) new regulatory requirements, DOE Orders, and guidelines regarding significance of impacts; and (4) institutional changes relevant to impact areas. New and modified projects examined in this SA are discussed in Chapter 3 followed by a screening review and a detailed consequence analysis in Chapters 4 and 5, respectively. Conclusions and recommendations for further action are presented in Chapter 6.

DOE regulations at 10 CFR Part 1021.314 require that a supplemental EIS be prepared "if there are substantial changes to the proposal or significant new circumstances or information relevant to environmental concerns" are found to exist.

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CHAPTER 3
NEW AND/OR MODIFIED PROJECTS AND INFORMATION

3.0 Introduction

The purpose of this Nevada Test Site (NTS) Environmental Impact Statement (EIS) Supplement Analysis (SA) is to determine the need for additional National Environmental Policy Act (NEPA) analysis beyond that presented in the 1996 NTS EIS. A requirement for additional NEPA analysis could be prompted by changes in site activities (new or modified site missions) that could result in changes in environmental impacts, changes in the characteristics of the NTS or its environs, or changes in regulatory requirements or guidance. Therefore, this chapter describes the current status of those areas and identifies any changes since the 1996 NTS EIS, and provides the technical bases for the analyses presented in Chapters 4 and 5.

3.1 Missions, facilities, and projects

The purpose of this section is to identify changes in existing NTS missions/facilities (from those analyzed in the 1996 NTS EIS) and to identify any new missions/facilities. This information will serve as the basis for the analyses in Chapters 4 and 5.

3.1.1 Defense programs

The U. S. Department of Energy's (DOE's) National Nuclear Security Administration Nevada Operations Office (NNSA/NV) provides management, direction, and oversight to various defense and national security programs, projects, and experiments.

3.1.1.1 Status of defense programs activities from the 1996 NTS EIS

Table 3-1 lists each of the defense programs activities evaluated in the 1996 NTS EIS, (derived from Table S-1 of the 1996 NTS EIS) and provides the current status of each activity. As noted in Table 3-1, the ongoing key NTS defense programs-related missions include maintaining readiness to conduct full-scale nuclear testing, conducting underground nuclear weapons testing (if directed by the President), handling damaged or foreign nuclear weapons, and conducting dynamic experiments (including subcritical experiments). Thus, the scope of this SA includes the full range of high-explosive-driven experiments with special nuclear material, ranging from subcritical experiments to full-scale nuclear tests. Section 3.1.1.2 describes the new NTS defense programs missions and facilities, including stockpile stewardship activities and experiments.

3.1.1.2 New defense programs missions and facilities

Joint Actinide Shock Physics Experimental Research (JASPER) Facility

The JASPER Facility conducts shock physics experiments on special nuclear materials and other actinide materials. JASPER uses a two-stage, light-gas gun to shoot projectiles at actinide target materials located in a secondary confinement chamber. The first stage of the gun consists of a breech containing propellant and a pump tube filled with low-molecular-weight gas, such as hydrogen, helium, or nitrogen. The second stage consists of an evacuated barrel used for guiding the high-velocity projectile to its target. During operation, a high-energy electrical pulse ignites the propellant in the breech. Hot gases from the burning propellant drive a heavy piston down the pump tube, compressing the low-molecular-weight gas. At a predetermined pressure, the gas breaks a rupture valve and enters the narrow barrel, propelling a projectile housed in the barrel toward the target. The projectile exits the barrel and flies unguided until it impacts the target, producing a high-pressure shock wave. In a fraction of a microsecond, the shock wave excites and propagates through the target. Diagnostic equipment, triggered by the initial wave, measures properties of the shocked material inside the target during this extremely

Table 3-1. Status of defense programs activities from the 1996 NTS EIS (derived from Table S-1 of the 1996 NTS EIS).

Activity	Status	Remarks
Stockpile Stewardship		
- Maintain readiness to test	Ongoing	NTS capabilities unique; annual assessment of readiness performed
- Conduct underground nuclear weapons testing (if directed)	Ongoing	Would require Presidential directive to resume
- Conduct dynamic experiments, including subcritical experiments	Ongoing	Active, with multiple experiments per year
- Conduct conventional high-explosive testing	Ongoing	Active, with multiple tests per year
- Construct nuclear weapons simulators	Ongoing	Active planning ongoing
- National Ignition Facility	Not slated for the NTS	Stockpile Stewardship and Management Programmatic EIS Record of Decision selected Lawrence Livermore National Laboratory for the location of this facility
- Destroy damaged nuclear weapons	Ongoing	Active; capability maintained current
Stockpile Management		
- Store nuclear weapons	Ongoing	Active; capability maintained current
- Disassemble nuclear weapons	Ongoing	Active; capability maintained current
- Assemble nuclear weapons	Ongoing	Active; capability maintained current
- Modify and maintain nuclear weapons	Ongoing	Active; capability maintained current
- Test weapons components for quality assurance	Ongoing	Active; capability maintained current
- Provide interim storage of pits	Ongoing	Active; capability maintained current
Nuclear Emergency Response		
- Nuclear Emergency Support Team	Ongoing	Active current capability
- Consequence Management	Ongoing	Active current capability
- Aerial Measuring System	Ongoing	Active current capability
- Accident Response Group	Ongoing	Active current capability
- Radiological Assistance Program	Ongoing	Active current capability
- Internal Emergency Management Program	Ongoing	Active current capability
Storage and Disposition of Weapons-usable Fissile Materials		
- Store weapons-usable fissile materials	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission
- Disposition weapons-usable fissile materials	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission
- Construct new or modify existing tunnel complexes	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission
- Increase robotic technology experiment	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission

Table 3-1. Status of defense programs activities from the 1996 NTS EIS (derived from Table S-1 of the 1996 NTS EIS). (Continued)

Activity	Status	Remarks
- Construct new or modify existing structures	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission
- Heavy industrial facility	Not slated for the NTS	Weapons-usable Fissile Material EIS Record of Decision did not select the NTS as the location for this mission
Tonopah Test Range (TTR)		
- Impact tests	Ongoing	The types of experiments at the TTR are expected to remain the same, but the frequency at which they are conducted is anticipated to increase
- Passive tests	Ongoing	The types of experiments at the TTR are expected to remain the same, but the frequency at which they are conducted is anticipated to increase
- Chemical tests	Ongoing	The types of experiments at the TTR are expected to remain the same, but the frequency at which they are conducted is anticipated to increase

Source: DOE 1996.

brief period. The project will support the Stockpile Stewardship and Management Program in providing key physics data.

The JASPER Facility is located in the Able site in the NTS Area 27, which is described in Appendix A of the 1996 NTS EIS. The Able site consists of three major buildings that were previously used to support the nuclear test program. Construction and facility modifications at the Able site to support the JASPER project started in April 1999 and were completed in September 1999. The gas gun and the secondary confinement chamber were installed in early 2000. The facility's first inert shot occurred in March 2001, and the expected life cycle for the facility is at least 10 years. Multiple shots per year are planned. JASPER will generate small quantities of transuranic waste (see Section 3.1.2.2).

Nevada Energetic Materials Operations Facility (NEMOF)

The NEMOF is a staging and storage facility for explosives used at the Big Explosives Experimental Facility (BEEF) and JASPER Facility. NEMOF is located at the Baker site in the NTS Area 27, which is described in Appendix A of the 1996 NTS EIS.

Glovebox work and other Stockpile Stewardship Programs at the Device Assembly Facility (DAF)

The DAF is a multi-structure facility in which nuclear devices and high explosives can be assembled, disassembled or modified, staged, and component tested. Nuclear devices and high explosives activities might also include maintenance, repair, retrofit, and surveillance. Other activities in support of the Stockpile Stewardship Program or other national security requirements may be considered at the DAF. Construction is primarily of heavy steel-reinforced concrete. The facility is earth-covered leaving only one exterior wall. The facility contains assembly cells, assembly bays, high bays, bunkers, mechanical and electrical support areas, and administrative offices. The environmental impacts of operations at the DAF were evaluated in an Environmental Assessment (EA) issued in May 1995 (DOE 1995). DOE

subsequently published a Finding of No Significant Impacts for DAF operations.

NNSA has identified the need to locate a glovebox system capable of handling plutonium and other special nuclear materials at the DAF because of the DAF's high security features and remoteness and its capability to stage and receive special nuclear materials. The glovebox systems consists of two separate glovebox assemblies, a nitrogen gas purifier, and nitrogen circulation piping that connects the gloveboxes to the gas purifier. The target preparation glovebox consists of three workstations for sample introduction, preparation, and inspection. Equipment such as a granite table, surface analyzer, and ultrasonic cleaner would be provided. No machining or other mechanical or chemical processing of the material would be allowed in this glovebox. A double-door sealed transfer system on one end of the box accepts a transfer canister that is used to transfer material manually to the second glovebox.

The second glovebox is a recirculating downdraft glovebox connected to an open-front air hood. The downdraft glovebox has a built-in gas circulation/filtration system that established an ultraclean vertical laminar flow region within the glovebox. The introductory hood can function as either an air hood or as a glovebox depending on the door position. The hood contains a slide mechanism and pneumatically actuated gate valve that allows a target holder to be inserted into the laminar flow region of the downdraft glovebox without inserting air into the inert environment. Several ongoing programs at the NTS that support DOE's Stockpile Stewardship Program would benefit from the glovebox system.

Big Explosives Experimental Facility

The BEEF is located in Area 4 of the NTS. It is one of the nation's premier hydrodynamic research and development testing facilities. It consists of two underground bunkers, one aboveground structure containing primary diagnostic facilities (including radiography), and three blast-protective enclosures allowing for diagnostic assessment equipment. The facility is capable of up to a 70,000-pound-TNT-equivalent physics experiment providing for the study and investigation of explosive characteristics, impacted materials, and high-explosives pulsed power.

The two earth-covered, two-foot-thick, steel-reinforced concrete bunkers were built to monitor atmospheric tests at Yucca Flats in the 1950s. They were found to be ideally configured to accommodate a control and camera bunker. The BEEF has been used to conduct several conventional high-explosives experiments, using a test bed that provides sophisticated diagnostics (such as high-speed optics and x-ray radiography), while operating personnel are present in the bunker.

To conduct large conventional high-explosive experiments while operating personnel are present in the control bunker, it first had to be certified as safe. To achieve this, scientists conducted *Popover*, a series of high-explosive (up to 7,800 pounds) tests in which the explosives were detonated 27 feet from the bunker's buried outer wall.

The test data was used to develop an effects profile that defined the relationship of the high-explosive charge size and detonation point to blast effects, such as overpressure, bunker wall strain, dynamic response (acceleration), and noise amplitude. Together, these results demonstrated that the bunker would provide a safe working environment.

The BEEF was analyzed in Appendix F of the 1996 NTS EIS. Since the EIS was published, new missions at the BEEF have been identified and are described below.

- Increased diagnostic capabilities, including (1) a linear accelerator and/or (2) a one-stage gas gun. The proposed linear accelerator would be an approximately two million-electron-volt commercially available accelerator. The gas gun proposed for use at the BEEF is currently located at Site 300 at the Lawrence Livermore National Laboratories (LLNL).

- New experiments involving nuclear explosive-like assemblies. Experiments at BEEF involving nuclear explosive-like assemblies could include such operations as (1) drop testing in various configurations and temperatures, or (2) using a nuclear explosive-like assembly for shaped-charge testing.

Atlas Facility

NNSA plans to disassemble the Atlas pulsed-power machine located at Los Alamos National Laboratory (LANL) and transport it to the NTS. At the NTS, Atlas would be reassembled in a new building located within Area 6. Atlas would be recommissioned to ensure proper operation and used to conduct approximately 40 pulsed-power experiments each year, with a potential to increase to approximately 100 experiments per year, should the Stockpile Stewardship and Management Program require it and if appropriate funding were available. At full operation, the Atlas Facility is estimated to employ 15 people.

The Atlas Facility is designed to perform pulsed-power experiments on macroscopic targets. The Atlas pulsed-power system is designed to deliver a pulse of very high electrical current through a high-precision cylindrical metal liner that surrounds the sample of interest. The current produces a brief (but powerful) magnetic force on the liner, which implodes upon the sample. The behavior of the target material would be observed by the use of diagnostic x-rays and lasers beamed through line-of-sight, evacuated tubes that connect to ports on the target chamber.

At the NTS, the Atlas Facility would be housed in a newly constructed, 26,000 square foot pre-engineered building. The Atlas system requires a heavy industrial, high-bay building equipped with a heavy-duty gantry crane to house the capacitor bank and user support facilities. Atlas would require security-approved electro-magnetically shielded rooms for classified and unclassified data acquisition and rooms for machine control. Buildings or trailers adjacent to the facility could be modified to provide support services for Atlas. These services include, but are not limited to: vacuum, electronics, and machine shops; a laser backlighter area; pulse generator maintenance shop; an optics shop; darkrooms; and a diagnostics shop.

The expected lifetime of the Atlas Facility at the NTS, assuming a maximum rate of 100 shots per year, is 10 years without major refurbishing. Assuming an average shot rate of 50 shots per year, the expected lifetime of the facility would be 20 years. Construction of the NTS Atlas Facility began in November 2001. Facility construction is scheduled to be completed by August 2002. Machine relocation and start-up is scheduled to be completed by July 2003. Relocation of the Atlas Facility was the subject of an EA (DOE 2001a) and subsequent Finding of No Significant Impact.

Infrastructure improvements at the U1a Complex

The U1a Complex is an underground laboratory of horizontal tunnels about one-half mile in length, mined at the base of a vertical shaft approximately 960 feet beneath the surface. The U1a complex includes three mined shafts: U1a, U1g, and U1h; U1h is under construction. The U1a vertical shaft is equipped with a mechanical hoist for personnel and equipment access, while another vertical shaft about 1,000 feet away provides cross-ventilation, instrumentation, utility access, and emergency egress. Aboveground are several temporary buildings and instrumentation trailers. Vessels containing the explosive assemblies for the experiments are placed in small, permanently sealed alcoves mined in the sidewalls of the underground U1a Complex. The complex provides a high degree of safety for NTS workers and the public and minimizes environmental impacts. The shaft was originally excavated in the 1960s, and a nuclear test was conducted in 1990 in a horizontal tunnel mined from its base.

NNSA/NV plans a series of infrastructure upgrades, scheduled to be implemented over the next 10 years, including the following activities: replacement of aging equipment (e.g., air

building, existing office trailers, etc.); communication equipment upgrade; ventilation improvements underground; ground support/remediation of tunnels, drifts, and alcoves; and power upgrades. In addition, NNSA/NV is constructing an additional shaft at the U1a complex, called the U1h shaft, which will provide access and hoisting capabilities.

Stockpile Stewardship and Management Program activities

Through an active Stockpile Stewardship and Management Program, the United States is ensuring the safety and reliability of the nuclear deterrent, without using nuclear testing. United States nuclear scientists use the program to understand the fundamental physics and chemistry that govern a nuclear weapon's performance. By careful measurement of the materials that make up a nuclear weapon and by understanding how those materials interact and age, scientists will be able to predict changes in safety, reliability, and performance.

To understand key aspects of weapons function, scientists are replicating extreme temperatures and pressures in the laboratory and conducting subcritical experiments at the NTS to measure important dynamic material properties of plutonium and other materials. Results from these experiments are then combined with computer simulations to detect and predict the unique changes that will occur in the aging stockpile.

Subcritical experiments are scientific experiments performed to obtain technical information in support of the Stockpile Stewardship and Management Programs. The experiments use chemical high explosives to generate high pressures that are applied to nuclear weapon materials, such as plutonium. The configurations and quantities of explosives and nuclear materials are calculated so that no nuclear explosions take place. Thus, the experiments are consistent with the Comprehensive Test Ban Treaty. They are called "subcritical" because there will be no critical mass formed (i.e., no self-sustaining nuclear fission chain reaction will occur). Scientific data is obtained on the behavior of nuclear weapons materials by the use of complex, high-speed measurement instruments.

Subcritical experiments at the U1a Complex

On July 2, 1997, the first subcritical experiment conducted in the U1a Complex was *Rebound,* a LANL experiment. The purpose of the experiment was to obtain information on the response of plutonium to shock-wave compression at different pressures. Since that time, 16 total to date subcritical experiments have been conducted in the U1a Complex. Both LANL and LLNL have long-range plans to continue their respective subcritical experiments; the resulting information will play a large role in certifying the safety and reliability of the nation's nuclear stockpile. In addition to traditional single subcritical experiments executed in an alcove, the operational concept for subcritical experiments has changed to include other operations. LLNL has introduced vessels to contain a subcritical experiment and LANL has introduced racklettes.

LLNL conducts a predetermined number of subcritical experiments in an alcove based on its' size. LLNL plans to conduct all but the last of the subcritical experiments inside of a vessel which contains all the materials when the subcritical experiment is executed. The vessel is then moved to the back of the alcove and entombed in concrete. The last subcritical experiment in the alcove is then planned to be a larger subcritical experiment that would result in the dispersal of special nuclear material into the alcove, thereby expending it. After that last subcritical experiment is executed, the alcove is filled with grout.

LANL uses racklettes (small cylindrical racks) that are lowered into a five-foot diameter, 35-foot deep hole augered into the invert of an alcove. The racklette contains the associated experimental equipment. The hole above the rack is stemmed with five-foot long, high-strength grout plug and alternating layers of course and fines materials. Experimental equipment materials are expended into the media as in traditional subcritical experiments.

LANL will still conduct some subcritical experiments in individual alcoves which will be grouted after the experiment is conducted.

The experiments could become more complex and potentially use larger quantities of special nuclear material. Appendix J (classified) of the 1996 NTS EIS provides limits for the amount of special nuclear material that could be present at the U1a Complex (then called the Lyner Complex). These material quantity limits *would not* be exceeded during anticipated future subcritical experiments at the U1a Complex.

Subcritical experiments in emplacement holes

These experiments would be similar to the types of experiments conducted in the U1a Complex described above, but would be performed in emplacement holes, like those used in underground testing.

Isentropic compression experiments (ICE)

ICE would be experiments on plutonium, above ground and in a contained capability, as a new method of experimentation. Magnetic ICEs, first developed by Sandia National Laboratories (SNL) in 1999, produce unique regimes for studying dynamic properties and acquiring equation of state data for weapon-like materials (solids and liquids).

SNL is now exploring the feasibility of performing such experiments on special nuclear material. SNL is currently engaged in a feasibility study, the goals of which are to (1) determine the Stockpile Stewardship mission need to perform special nuclear material experiments, (2) determine if there is a viable containment scheme for performing special nuclear material experiments under both normal and pre-heated conditions, (3) develop a plan including cost estimates to perform the certification of pulsed power facilities and technology demonstration of containment technology, and (4) conduct a review of the findings to determine the path forward. SNL's desire is to conduct the first special nuclear material ICE by Fiscal Year 2003.

The facility in which the ICE would be performed is proposed to be built next to the Atlas Facility in Area 6 and would share the Atlas control room, if feasible. Approximately 50 shots per year would be expected over a 10-year experiment lifetime. Wastes generated would be similar to, but of less volume than generated by JASPER.

Damaged nuclear weapons program in G-Tunnel

As part of this project, the NNSA/NV would perform sufficient rehabilitation work in the U12g Tunnel (G-Tunnel) to make the tunnel safe for human entry and further characterization. The ultimate objective is to prepare this tunnel for staging and minimal assessment of a damaged nuclear weapon, should one occur. Rehabilitation work will include repair of the ventilation system and electrical upgrades to meet code.

Open burn experiments

NNSA has identified the need to develop the capability to conduct thermal tests, including open pool fire testing and radiant heat testing on full-scale test units in support of the Stockpile Stewardship and Management Program. Field data from such open pool fire experiments is needed for the development of advanced computational models, and to assist in the validation and verification of predictive analytical and computational models. To fulfill this need, NNSA would construct and operate a fire and thermal testing facility at the NTS.

Open pool fire experiments are usually used to simulate transportation accidents that may involve pooling and burning of spilled motor oil, gasoline, or aviation fuel. Aviation fuel is typically used to fuel the fire experiments because it produces the same test conditions as an actual accident. Prior to a test, the burn pool would be filled to a specified depth with water. The water allows the distance from the test object to the surface of the fuel to be controlled, and also shields the pool structure itself from high testing temperatures. When all test preparations have been made, fuel is pumped

from the storage tanks to the pool. The fuel floats on the water because it is lighter than water. When the test is ready to begin, the fuel is remotely ignited.

NNSA has previously analyzed the environmental consequences of constructing and operating the Fire Experiment Facility at the TTR (DOE 1999). NNSA could also construct this facility at the NTS, near the Hazardous Materials Spill Center (HSC) on Frenchman Flat. Frenchman Flat is a dry lake bed in Area 5. Operation of the facility at the NTS would be the same as that described by NNSA for the facility at the TTR (DOE 1999).

Potential future projects at the NTS

The following projects could be located on NTS. NTS is one potential location for these projects, along with other DOE sites. Appropriate NEPA review would be performed for each of these projects. Sites other than the NTS would also be evaluated as part of these NEPA reviews.

Advanced accelerator applications

Advanced accelerator applications would involve the construction of an Accelerator-Driven Test Facility at the NTS (in either Area 22 or Area 25). This facility would comprise two components, an advanced high-energy accelerator that would provide protons to experimental facilities, and a subcritical multiplier that would include a spallation target.

Advanced Hydrotest Facility

The Advanced Hydrotest Facility is proposed to incorporate advanced technology that is needed to infer the nuclear performance (criticality, cavity shape, and mix) of primaries from non-nuclear tests. The facility would include a broad array of diagnostics for dynamic testing with special nuclear materials and would broadly support national security concerns, including the disablement of potential proliferant or terrorist weapons.

Modern pit facility

The central core of a nuclear weapon is referred to as a "pit." This facility would provide manufacturing capabilities to temporarily store and fabricate new pits, to modify existing pits, and to recertify or requalify pits as part of the Stockpile Stewardship and Management Program.

Proposed Relocation of Technical 18 Capabilities and Material at the LANL

NNSA is responsible for operations at Technical Area 18 (TA-18) at the LANL. Principal TA-18 operational activities involve research in and the design, development, construction, and application of experiments on nuclear criticality. NNSA wishes to maintain the capabilities currently provided at TA-18 in a manner that reduces the long-term costs for safeguards and security. NNSA proposes to accomplish this by relocating the TA-18 security capabilities and materials to new locations.

NNSA is preparing an EIS that addresses the impacts associated with the TA-18 relocation (DOE 2001b). That EIS evaluates four separate locations for this proposed action: (1) a different site at LANL (the Preferred Alternative), (2) the SNL, (3) the NTS, and (4) the Argonne National Laboratory-West. The Draft EIS was issued in August 2001 and a Final EIS is expected to be issued in 2002. Table 3-2 presents a summary of the environmental impacts of relocating this capability to the NTS.

3.1.2 Waste management programs

3.1.2.1 Status of waste management activities in the 1996 NTS EIS

Table 3-3 lists each of the waste management activities evaluated in the 1996 NTS EIS, (derived from Table S-2 of the 1996 NTS EIS) and provides the current status of each activity.

Table 3-2. Summary of environmental impacts for the relocation of TA-18 capabilities and materials to the NTS.

Resource Material Categories	NTS Alternative	
Land Resource		
- Construction/Operations	2.2 acres/no impact	
Air Quality		
- Construction	Small temporary impact	
- Operations	10 curies per year of argon-41 released	
Water Resource		
- Construction	Small temporary impact	
- Operations	Small impact	
Socioeconomics		
- Construction	No noticeable changes; 60 workers (peak)	
- Operations	20 people relocated or new hires	
Public and Occupational Health and Safety		
Normal Operations	Dose	LCF
- Population dose (person-rem per year)	0.000070	3.5×10^{-4}
- MEI (millirem per year)	0.000087	4.4×10^{-11}
- Average individual dose (millirem per year)	3.9×10^{-4}	1.9×10^{-12}
- Total worker dose (person-rem per year)	10	0.0040
- Average worker dose (millirem per year)	100	0.00004
Hazardous Chemicals	None	
Accidents (Maximum Annual Cancer Risk, LCF)		
- Population	7.7×10^{-10}	
- MEI	2.5×10^{-12}	
- Noninvolved worker	4.0×10^{-9}	
Chemical Accidents	None	
Environmental Justice	No disproportionally high and adverse impacts on minority or low-income populations	
Waste Management (cubic meters of solid waste per year):	Waste would be disposed of properly with small impact	
- Low-level radioactive waste	145	
- Mixed low-level radioactive waste	1.5	
- Hazardous waste	4	
Transportation		
- Incident-free	Person-rem	LCF
- Population	0.33	0.00016
- Workers	0.25	0.00010
Accidents		
- Population[a]	0.000028	1.4×10^{-8}

a. LANL intrasite SNM and material transportation impacts would be bounded by the normal operation and accident impacts evaluated for the various LANL alternatives.

Table 3-3. Status of waste management activities from the 1996 NTS EIS (derived from Table S-2 of the 1996 NTS EIS).

Activity	Status	Remarks
Area 3		
Disposal:		
- Nevada-generated Low-Level Waste	Ongoing	
- Non-Nevada-generated Low-Level Waste	Ongoing	
Closure:		
- Disposal Crater Complex UE3ax/bl	Complete	Facility closure has been completed
- Disposal Crater Complex UE3ah/at	Ongoing	Facility continues to be used for low-level waste disposal
Construction		
- Future Low-Level Waste Disposal Pit	Ongoing	May not be a "pit," but the facility is slated for construction
- Building 3-302 (expansion)	Possible	
- Area 3 Truck Decon Station	Cancelled	
Area 5		
Disposal:		
- Nevada-generated Low-Level Waste	Ongoing	
- Non-Nevada-generated Low-Level Waste	Ongoing	The management of high-specific-activity low-level waste (formerly known as greater-than-Class C equivalent waste) will be determined on a case-by-case basis
- Mixed Low-Level Waste -	Pending	The Nevada Operations Office has applied for a RCRA Part B permit to provide for the receipt and disposal of mixed low-level waste from out of state DOE approved generators and on-site sources up to a volume of 20,000 m^3
- Greater Confinement Waste	Ongoing	No new waste will be disposed in Greater Confinement Disposal; performance assessment has been completed
- Asbestiform Low-Level Waste	Ongoing	
Storage:		
- Nevada-generated Mixed Waste	Ongoing	
- Transuranic Waste	Ongoing	
- Mixed Transuranic Waste	Ongoing	
- Hazardous Waste	Ongoing	
Facility Construction Activities:		
- Breaching and Sampling Facility	Cancelled	
- Real-Time Radiography	Ongoing	
- Transuranic Waste Certification Facility	Completed	Also known as the Waste Examination Facility
- Transuranic Waste Handling and Loading Facility	Completed	Also known as the Waste Examination Facility
- Mixed Waste Storage Pad	Ongoing	
- Mixed Waste Disposal Units	Ongoing	
- Low-Level Waste Disposal Units	Ongoing	

Table 3-3. Status of waste management activities from the 1996 NTS EIS (derived from Table S-2 of the 1996 NTS EIS). (Continued)

Activity	Status	Remarks
- Greater Confinement Disposal Units	Cancelled	No new waste will be disposed in Greater Confinement Disposal; performance assessment has been completed
- Hazardous Waste Storage Pad (expansion)	Possible	
- Water Supply Line	Completed	
- Access Control Building	Completed	
- Maintenance Building	Possible	
- 5-01 Road Reconstruction (may not be necessary)	Cancelled	
- 5-07 Road Reconfiguration (may not be necessary)	Cancelled	
- 500-Year Flood Protection	Cancelled	
- Low-Level Waste Storage Facility	Possible	
- Fire Protection Utilities	Cancelled	
- Telephone System	Completed	
Closure Activities:		
- Close Designated Low-Level Waste Disposal Units	Ongoing	
- Close Designated Mixed Waste Disposal Units	Ongoing	
- Close Designated Greater Confinement Disposal Units	Ongoing	
Treatment Facility:		
- Cotter Concentrated Mixed Waste	Cancelled	Waste recycled
Area 6		
Storage Activities:		
- Polychlorinated biphenyl (PCB) Waste	Cancelled	
Treatment Activities:		
- Low-Level Liquid Waste Treatment Facility	Cancelled	
- Mixed Liquid Waste Treatment Facility	Cancelled	
Disposal Activities:		
- Hydrocarbon Landfill	Ongoing	
Area 11		
Treatment Activities:		
- Explosive Ordnance Disposal Unit	Ongoing	

As described in Section 1.2, after issuance of the 1996 NTS EIS, DOE issued the fourth Record of Decision for the Department's Waste Management Programmatic EIS: (*65 FR 10061, February 25, 2000*). This ROD established the NTS as one of two regional low-level waste (LLW) and mixed LLW disposal sites. Taking that decision into account, NNSA has calculated revised estimates of the volumes of LLW and mixed LLW that would be disposed at the NTS. Table 3-4 presents LLW disposal volumes reported in the 1996 NTS EIS (for Alternative 3), along with the recalculated current volume estimates.

3.1.2.2 New waste management missions and facilities

This section describes additional waste streams, beyond those considered in the 1996 NTS EIS, that may be generated at or sent to the NTS for management from 2002 through 2011.

Table 3-4. Ten-year low-level waste NTS disposal volumes.

Generator Site	1996 NTS EIS Alternative 3 waste disposal		NTS EIS Supplement Analysis[b]	
	Cubic meters[a]	Number of Shipments	Cubic meters[a]	Number of Shipments
Aberdeen Proving Ground	790	21	283	7
Ames Laboratory	1,232	32	-	
Argonne National Laboratory-East	11,265	296	-	
Ashtabula Environmental Management Project	-	-	37	1
Battelle-West Jefferson			1,678	44
Bettis Atomic Power Laboratory	9,775	257	-	
Brookhaven National Laboratory	3,264	86	-	
East Tennessee Technology Park	-	-	11,894	313
Energy Technology Engineering Center	614	16	552	15
Fermi Laboratory	2,165	57	-	
Fernald Environmental Management Project	84,177	2,213	71,177	1,873
General Atomics Corporation	-	-	566	15
Hanford Site	170,891	4,492	-	
Idaho National Engineering and Environmental Laboratory	106,934	2,811	5,010	132
Kansas City Plant	-	-	4	0
Knolls Atomic Power Laboratory-Kesselring	15,554	409	-	
Lawrence Berkeley Laboratory	5,099	134	-	
Lawrence Livermore National Laboratory	1,928	51	4,430	117
Los Alamos National Laboratory	41,773	1,098	-	
Loveless Respiratory Research Institute[c]	344	9	342	9
Mound	60,027	1,578	12,020	316
Nevada Test Site	150,000	14,000	25,998	2,000
Oak Ridge National Reservation	26,607	699	37,451	986
Paducah Gaseous Diffusion Plant	16,996	447	35,772	941
Pantex Plant	769	20	377	10
Portsmouth Gaseous Diffusion Plant	63,512	1,670	-	
Princeton Plasma Physics Laboratory	187	5	809	21
RMI Extrusion Plant	5,528	146	-	
Rocky Flats Environmental Technology Site	13,759	2,012	237,646	33,949
Sandia National Laboratories, CA	219	6	127	3
Sandia National Laboratories, NM	351	9	1,358	36
Savannah River Site	243,901	6,411	3,262	86
Stanford Linear Accelerator	3,694	97	-	
West Valley Demonstration Project	67	2	2,549	67
Uranium oxides from DUF_6 Conversion[d]	-	-	60,000	1,579
Stockpile and Disposition Project[e]			4,410	116
Total	1,041,422	39,084	517,752	42,636

DUF_6 = Depleted uranium hexafluoride.
m^3 = cubic meters.

a. To convert cubic meters to cubic feet, multiply by 35.316.
b. Based on Bechtel Nevada generator forecasts and DOE Integrated Planning, Accountability, and Budgeting System data, except as noted.
c. Loveless Respiratory Research Institute was formerly named Inhalation Toxicology Research Institute.
d. Source: Guevara 2001.
e. Source: Enyeart 2001.

U.S. Department of Defense waste streams

Waste from accidents involving nuclear weapons

The U.S. Air Force (USAF) has proposed sending waste from "accidents involving nuclear weapons" to the NTS, contending that the waste is owned by the NNSA under the Atomic Energy Act, Section 91(b). Eleven sites have been identified by the U.S. Department of Defense (DoD) as radioactively contaminated from these accidents. The precise volumes and characteristics of this waste stream are unknown at this time. Therefore, this SA does not quantitatively assess the impacts of this waste stream.

Strontium-90 radioisotope thermoelectric generators (RTGs)

The USAF and DOE have joined to find a storage solution for 10 strontium-90 RTGs scheduled to be removed from the Burnt Mountain Seismic Array Observatory in Alaska in summer 2002. These were used as remote power sources for instrumentation at the Burnt Mountain Seismic Array Observatory. In preparation for this activity, the USAF and DOE are developing an EA to address the removal, transport, and storage of the 10 RTGs at 1 of 9 potential DOE storage sites, including the NTS.

RTGs use heat generated by the decay of radioactive isotopes to produce electrical power. This is used as a power supply where frequent maintenance, refueling, or battery recharging or replacement is expensive or impossible, such as in the ocean, remote locations, or outer space. A strontium-90 RTG consists of three main parts: (1) a radioactive source (sealed capsule) of strontium-90, which generates heat from decay; (2) a thermocouple array that generates a small amount of electric current when heated; and (3) a shielding and cooling radiator assembly surrounding the source and thermocouple array.

Strontium-90 RTGs range in height from 18 to 66 inches, in diameter from 14 to 52 inches, and weigh from 800 to almost 8,000 pounds. The RTGs contain 4,000 to 500,000 curies of strontium-90 and the average is about 50,000 curies per unit. All RTGs being considered for storage are extremely resistant to damage, and each RTG is its own Type B shipping container, which means that commercial carriers can transport RTGs without additional packaging and remain in compliance with U.S. Department of Transportation regulations.

In addition to the 10 RTGs from the USAF to be addressed in the EA and considered in this SA, there are up to 40 additional RTGs from other sources that DOE might be asked to accept in the future. DOE is not aware at this time that organizations holding these additional RTGs have any specific plans to ask DOE to accept them. Nevertheless, to ensure that the EA addresses the maximum impacts that could result from DOE acceptance of RTGs, the EA will analyze the potential acceptance of up to 50 RTGs.

Generation of transuranic waste from the JASPER Facility

NNSA/NV anticipates that the JASPER Facility would generate transuranic waste from the use of target materials containing plutonium or other actinides. These targets would be used in approximately one to two shots per month. The transuranic waste would be generated in a primary target chamber. The waste would be packaged in standard waste containers for the Waste Isolation Pilot Plant (WIPP) (in accordance with WIPP Waste Acceptance Criteria), and each would contain two primary target chambers.

Waste generated by Battelle Columbus

Since 1943, Battelle Memorial Institute (BMI) has continuously performed research and development work at its facilities under contract to DOE and its predecessor agencies. The Battelle facilities, comprising three buildings, JN-1, JN-2, and JN-3 (or portions thereof), are located at BMI's Battelle Columbus Operations (BCO) in West Jefferson, Ohio.

Nuclear research performed in JN-1 (or the Hot Cell Building) included: the evaluation of both power and research reactor fuels; post-

irradiation examination of fissile, control rod, source and structural materials, and components; and examination of irradiation surveillance capsules. The former Critical Assembly Laboratory, JN-2, was used for reactor critical assembly experiments, direct energy conversion experiments, experiment assembly, special nuclear materials handling, and plutonium research. Active nuclear experimentation in this building terminated in 1970. The Battelle Research Reactor, located in JN-3, was used from 1956 to 1974. It was then partially dismantled. The pool liner, reactor core, and hardware were removed and most of the building was decontaminated.

These facilities contain residual radioactive materials resulting from the performance of work under the Government contract and for commercial clients and are to be decontaminated and released to Battelle under the DOE's Surplus Facilities Management Program. The buildings and associated grounds are owned by Battelle and the facility maintains an active U.S. Nuclear Regulatory Commission (NRC) license. The LLW generated during the decontamination and decommissioning process would be shipped to the NTS for disposal.

The maximum projected volume of waste to be sent to the NTS for the life of the project (through FY 2006) would be approximately 1,600 cubic meters. This waste would be packaged in either 6×6×4-foot metal boxes, Sealand containers, or soil bags.

Depleted uranium hexafluoride

Depleted uranium hexafluoride (DUF_6) results from the process of making uranium suitable for use as fuel in nuclear reactors or for military applications. The use of uranium in these applications requires increasing the proportion of the uranium-235 (U-235) isotope found in natural uranium, which is approximately 0.7 percent (by weight), through an isotopic separation process. A U-235 enrichment process called gaseous diffusion has historically been used in the United States. The gaseous diffusion process uses uranium in the form of uranium hexafluoride (UF_6), primarily because UF_6 can conveniently be used in the gaseous form for processing, in the liquid form for filling or emptying containers, and in the solid form for storage. Solid UF_6 is a white, dense, crystalline material that resembles rock salt.

Over the last five decades, large quantities of uranium were enriched by using gaseous diffusion. DUF_6, a product of the process, was stored at the three uranium enrichment sites at Paducah, Kentucky; Portsmouth, Ohio; and the East Tennessee Technology Park (ETTP, formerly known as the K-25 Site) in Oak Ridge, Tennessee. DUF_6 is uranium that, through the enrichment process, has been stripped of a portion of the U-235 that it once contained so that it has a lower U-235 proportion than the 0.7 weight-percent found in nature. The uranium in most of DOE's DUF_6 has between 0.2 to 0.4 weight-percent U-235.

DOE has management responsibility for approximately 700,000 metric tons of DUF_6 contained in approximately 57,700 steel cylinders at the Portsmouth, Paducah, and ETTP sites, where it has stored such material since the 1950s. The characteristics of DUF_6 pose potential health and environmental risks. In light of such characteristics, DOE stores DUF_6 in a manner designed to minimize the risk to workers, the public, and the environment.

DOE needs to convert its inventory of DUF_6 to a more stable chemical form for storage, use, or disposal. To accomplish this objective, DOE intends to chemically process the DUF_6 (at sites other than the NTS) to create products that would present both a lower long-term storage hazard and provide a material that would be suitable for use or disposal. DOE is preparing an EIS for the conversion of the DUF_6. In that EIS, the NTS is a potential location for disposal of this material. The resulting product material is presented in Table 3-3.

Thorium nitrate

Thorium nitrate is owned by the DoD and stored in two secure storage depots. This material has been declared surplus to the needs of the Army; thus, a strategy for management of this material

must be determined. This material consists of 3,200 metric tons of thorium nitrate, stored in 21,000 55-gallon drums.

The potential management options for this material include (1) disposal as thorium nitrate, (2) long-term storage as thorium nitrate, (3) processing the material to convert it to a form suitable for disposal, and (4) processing the material to convert it to a form suitable for long-term storage. Under potential management options 1 and 3, the thorium nitrate would be shipped to the NTS for disposal. Option 1 has the lowest life-cycle cost; however, this conclusion is predicated on the material exhibiting no Resource Conservation and Recovery Act (RCRA) hazardous characteristics.

The volume of thorium nitrate under Option 1 (assuming 7.35 cubic feet/drum) would be 154,350 cubic feet, or 4,370 cubic meters. The shipments would probably begin in three to five years and last approximately one year.

3.1.3 Environmental restoration programs

Table 3-5 lists each of the environmental restoration activities evaluated in the 1996 NTS EIS, (derived from Table S-3 of the 1996 NTS EIS) and provides the current status of each activity. As is shown in Table 3-5, the overall environmental restoration program strategy is the same as that described in the 1996 NTS EIS (and the Federal Facility Agreement and Consent Order), with the only difference being that closure of several sites has been completed.

3.1.4 Non-defense research and development programs

NNSA maintains the capability at the NTS to implement non-defense research and development programs.

3.1.4.1 Status of non-defense research and development program activities from the 1996 NTS EIS

Table 3-6 lists each of the non-defense research and development program activities evaluated in the 1996 NTS EIS, (derived from Table S-4 of the 1996 NTS EIS) and provides the current status of each activity.

3.1.4.2 New non-defense research and development missions and facilities

Kistler Launch Facility (KLF)

Under this proposed action, the Federal Aviation Administration (FAA) would issue a license to Kistler Aerospace (a commercial entity) to conduct commercial launch and reentry operations at the NTS. The FAA has prepared an EA and issued a Finding of No Significant Impacts (67 FR 22479, May 3, 2002) for the KLF. These operations would include pre-flight processing activities and launch/flight operations, as well as landing operations. To conduct these operations, Kistler proposes to construct a base of operations consisting of a private launch site (including a vehicle process facility), a vehicle reentry, landing, and recovery area, and a payload processing facility.

DOE provided a general use permit to the NTS Development Corporation (NTSDC), which will provide the necessary land area on which Kistler would construct the facilities and conduct its operations. The NTSDC issued a subpermit to Kistler for Kistler's use of the site. Characteristics of the NTS (remoteness, low population, open range, restricted airspace, security, and elevation) are advantages for launching satellites.

Kistler intends to operate its launch vehicle service, using a fleet of five K-1 vehicles, at a maximum rate of 52 launches per year once the system is fully operational. Kistler also plans to have the capability to launch two vehicles within three days of each other, if the need arises. The proposed schedule of missions from the NTS would begin following a successful series of launches in Australia over a 12-month period, and build to a capability to support a maximum flight rate of 52 launches and reentries per year from Kistler's facility in Nevada.

The K-1 vehicle is designed to carry commercial payloads, such as satellites, into low earth orbit, which is generally 200 to 1,000 kilometers

Table 3-5. Status of environmental restoration program activities from the 1996 NTS EIS (derived from Table S-3 of the 1996 NTS EIS).

Activity	Status	Remarks
Underground Test Area Corrective Action Unit - Continue groundwater monitoring - Continue drilling characterization wells - Evaluate and implement remediation strategies - Intensify groundwater monitoring - Accelerate, evaluate, and implement remediation strategies - Alternate uses may require stricter cleanup levels	Ongoing	
Soils Media Corrective Action Unit and Part of Nellis Air Force Range (NAFR) Complex - Continue studies to identify, etc., alternate remedial measures - Remove contaminated soils on NTS and NAFR lands - Dispose of contaminated soils in permitted facilities - Activities would accelerate above present levels - After studies, select alternate remedial action method and implement - Alternate uses may require stricter cleanup levels	Ongoing	
Industrial Sites Corrective Action Unit - Characterize and disposition environmental restoration sites - Continue field program to identify sites - Continue to characterize and remediate the RCRA industrial sites - Activities would accelerate above present levels - Alternate uses may require stricter cleanup levels	Ongoing	
Decontamination and Decommissioning Facilities - Accelerate remedial actions - Alternative may require clean closure, not closure in place	Ongoing	
Defense Threat Reduction Agency (formerly Defense Nuclear Agency) Sites - Accelerate operations to stop radiation and hazardous contaminant migration - Select and implement alternate remedial action or redesign - Alternate uses may require stricter cleanup levels - Characterize and remediate contaminated muck piles and ponds	Ongoing	
Tonopah Test Range - Accelerate characterization and remediation of site	Ongoing	
Central Nevada Test Area - Accelerate characterization and remediation	Completed/ Ongoing	Surface remediation has been completed; subsurface remediation is ongoing
Project Shoal Area - Accelerate characterization and remediation of site	Completed/ Ongoing	Surface remediation has been completed; subsurface remediation is ongoing

Table 3-6. Status of non-defense research and development program activities from the 1996 NTS EIS (derived from Table S-4 of the 1996 NTS EIS).

Activity	Status	Remarks
- Establish solar enterprise zone (SEZ)	Complete	SEZ has been established; however, there is currently no activity ongoing in this zone
- Construct and operate solar production facilities	Ongoing	The NTSDC, a non-profit entity funded by the NNSA to facilitate commercial interaction between the Nevada business community and the NTS, is seeking to cooperate with Boulder City, Nevada in establishing a "Green Energy Futures Park" demonstration program to be located within a limited portion of the 2,500-acre Eldorado Valley Energy Zone in Boulder City. Boulder City obtained ownership of 107,500 acres in the Eldorado Valley via a federal land transfer and a $1.23 million purchase by the City in 1995. Approximately 2,500 acres were subsequently designated by Boulder City for energy development purposes. The core technologies to be demonstrated at the park would encompass solar applications via the display of existing and prototype systems.
- Hazardous Materials Spill Center	Ongoing	Expect program to expand. A Draft EA is under preparation.
- Alternate fuel demonstration project (16 vehicles plus fueling station)	Ongoing	Has been expanded to: • Hydrogen/electricity co-production system • Hybrid electric/hydrogen-fueled internal combustion engine transit bus • Heavy-duty engine development for hydrogen-enriched natural-gas-powered internal combustion engine (to be demonstrated in six dedicated City of Las Vegas buses) • Conversion of light-duty fleet vehicles to hydrogen-enriched natural gas (up to 18 fleet vehicles) • Fuel-cell-powered shuttle bus
- Technology development (expanded)	Ongoing	
- Environmental research park	Ongoing	

above the earth. They have also developed maintenance capabilities to provide support for constellation systems already in orbit. The altitude reached would be determined by the requirements of the payload.

The KLF operations and activities would be located in Area 18 and an adjacent location in Area 19. The proposed launch site is on the southern slopes of Pahute Mesa, south of Rattlesnake Ridge and north of Stockade Wash, at an elevation of about 5,800 feet.

3.1.5 Work-for-others programs

NNSA/NV provides management, direction, and oversight of work-for-others activities at the NTS.

3.1.5.1 Status of work-for-others activities from the 1996 NTS EIS

Table 3-7 lists each of the work-for-others activities evaluated in the 1996 NTS EIS (derived from Table S-4 of the 1996 NTS EIS), and provides the current status of each activity.

Table 3-7. Status of work for others activities from the 1996 NTS EIS (derived from Table S-4 of the 1996 NTS EIS).

Activity	Status	Remarks
Treaty Verification		
- Threshold Test Ban Treaty	Ongoing	
- Peaceful Nuclear Explosion Treaty	Ongoing	
- Chemical Weapons Convention Treaty	Ongoing	
- Treaty on Open Skies	Ongoing	
Nonproliferation Projects		
Counterproliferation Research and Development		
- Dipole Hail	Ongoing	
- Big Explosives Experimental Facility	Ongoing	See "Defense Programs" heading for information concerning new missions at the BEEF facility.
- Cut and cover	Ongoing	
Conventional Weapons Demilitarization		
Nondefense Research and Development		
- Conduct munitions research and development	Ongoing	
- Training exercises	Ongoing	

3.1.5.2 New work-for-others missions and facilities

NNSA/NV is supporting new work-for-others federal programs.

Weapons of mass destruction work for the U.S. Department of Justice

The 2001 Appropriation Law established the NTS as a U.S. Department of Justice/Office of State and Local Domestic Preparedness Support (DOJ/OSLDPS) Center of Excellence for Training and Exercises. The mission of the OSLDPS is to develop and implement a national program to enhance the capacity of state and local agencies to respond to weapons of mass destruction terrorist incidents through coordinated training, equipment acquisition, technical assistance, and support for state and local exercise planning. As a result, NTS personnel have been involved in providing training to state and local first responders at the NTS.

Defense Threat Reduction Agency Hard Target Defeat Tunnel Program

The purpose of this program is to develop and demonstrate capabilities and technologies to hold at risk and defeat military missions protected in tunnels and other deeply buried hardened facilities. The purpose of the multi-year testing program is to demonstrate the capability to detect, identify, and characterize the target and then disrupt, neutralize, or destroy the tunnel target. The Defense Threat Reduction Agency will evaluate alternative capabilities with various platforms against a variety of different tunnel complexes representing different world geologic compositions constructed at the NTS.

U.S. military development and training in tactics and procedures for counter terrorism threats and national security defense.

NNSA/NV supports the DoD in requirements for developing methodologies for engaging or neutralizing an adversary in a desert environment.

DoD organizations take advantage of the NTS restricted access and remote high desert terrain in the west and northwest for developing realistic scenarios expected to be encountered in specific mission profiles and include:

- Direct action live-fire take down of high fidelity target test beds
- Low altitude fixed and rotary wing desert flight training and technique development
- Remote area advanced personnel over-land navigation techniques
- Development and field-testing of special use military hardware including new ordnance and vehicles
- Development and field testing of unmanned air vehicles
- Overland movement through rugged terrain to assess fatigue and war-fighter capability.

In addition to the military operations that occur on the NTS, the U.S. Air Force conducts military operations in the restricted air space above the NTS. There has been no significant change in numbers of military flights over the NTS since 1996. However, NNSA/NV has given permission to the USAF to conduct major military exercises such as Red Flag, below 2,500 feet above ground level in western areas of the NTS. At the same time, altitude restrictions greater than 19,000 feet above mean sea level (MSL) in the eastern part of the NTS are also in place for these exercises. Outside major exercise periods, normal altitude restrictions are in place, and the NTS is used by the USAF primarily as a transition corridor for Nevada Test and Training Range air traffic above 14,000 feet MSL.

3.1.6 Miscellaneous new missions and facilities

National Center for Combating Terrorism

The purpose of the National Center for Combating Terrorism (NCCT) is to provide a comprehensive, coordinated, and integrated venue for combating terrorism, including research, development, testing, and evaluation (RDT&E); exercises; training; and intelligence support. The NCCT will provide a comprehensive, fully integrated system of facilities and capabilities to meet a wide range of combating terrorism requirements. Users of the NCCT will include federal, state, and local agencies, institutions, and private entities involved in all aspects of combating terrorism. The NCCT will take advantage of the NTS' unique capabilities to provide:

- Comprehensive capabilities to support a broad range of user needs across all categories of combating terrorism
- A variety of testbeds for RDT&E
- A variety of facilities and scenarios for training and exercises
- The technology to capture data and develop lessons learned
- High-technology, field-ready products and services
- Remote location with restricted access.

3.2 Environmental conditions

The purpose of this section is to identify changes in the environmental conditions on and around the NTS since the issuance of the 1996 NTS EIS. In this context, the term "environment" is taken to mean both the natural environment (e.g., soil, water, ecological resources) and the human environment (e.g., population, demographic).

3.2.1 Natural environment

The NTS is located about 65 miles northwest of Las Vegas, NV. The site is approximately 1,375 square miles in a remote and arid region, surrounded by federal installations, with strictly controlled access, and public lands that are open to public entry. The NTS environment is characterized by desert valley and Great Basin mountain terrain and topography, with a climate, flora, and fauna typical of the southern Great Basin deserts. Restricted access and extended wind transport times are notable features of the remote location of the NTS and adjacent USAF lands.

Also characteristic of this area is deep, slow-moving groundwater and little or no surface water. These features afford protection to the inhabitants of the adjacent areas from potential exposure to radioactivity or other contaminants resulting from operations on the NTS. Population density within 80 kilometers of the NTS is only 0.2 persons per square kilometer versus an average of approximately 30 persons per square kilometer in the 48 contiguous states. The predominant use of land surrounding the NTS is open range for livestock grazing with scattered mining and recreational areas.

NNSA/NV regularly monitors the natural environment on and around the NTS and reports the results of this monitoring annually. Radiological environmental monitoring of the NTS and surrounding land is described in the December 1998 Routine Radiological Environmental Monitoring Plan (BN 1998). This radiological monitoring plan brings together site-wide environmental surveillance, and site-specific effluent monitoring conducted by various organizations on the NTS. The plan provides an approach to identifying data and conducting routine radiological monitoring on and off the NTS, based on integrated technical, scientific, and regulatory compliance data requirements for various media. This monitoring includes analysis of the characteristics and quality of environmental media such as air, surface water, groundwater, soil, biota, and direct (external) radiation.

The Ecological Monitoring and Compliance program monitors the ecosystem of the NTS and ensures compliance with laws and regulations pertaining to the NTS biota. The results of this program are published annually. (For example, [BN 2001a] summarizes the program's activities during fiscal year 2001). Program activities include: (1) biological surveys at proposed construction sites, (2) compliance with regulations protecting desert tortoises, (3) ecosystem mapping and data management, (4) sensitive species and unique habitat monitoring, and (5) biological monitoring at the HSC.

The results of these monitoring activities indicate that there have been no substantive changes in the conditions of the natural environment on or around the NTS that would cause the envelope of consequences established in the 1996 NTS EIS to be exceeded.

In the 1960s and 1970s beryllium was used at the NTS in a number of experimental nuclear reactors, nuclear weapons tests, and other applications. A recent review of NTS historical documents indicates that some beryllium contamination remains in surface and sub-surface soils and at some facilities. The beryllium contamination was frequently associated with radioactivity debris and, at some locations, the surface contaminated soil was removed and disposed in approved NTS waste management facilities.

A number of facilities at the NTS where beryllium was present have been evaluated for residual beryllium contamination. Surface and airborne contamination levels in the facilities examined to date are below the established regulatory limits for beryllium. An effort is underway to identify historic beryllium sites and to retrieve historical beryllium monitoring data. This effort includes the following activities:

1. The development of sampling plans for evaluating potential residual beryllium contamination of identified buildings and sites, in coordination with ongoing programmatic operations and environmental remediation activities.

2. The identification of all buildings and sites at the NTS where beryllium containing materials have been machined, processed, assembled, stored, explosively dispersed, etc.

3. The establishment and approval of posting and access controls for facilities and areas where beryllium was present .

3.2.2 Human environment

The major change in the condition of the man-made environment near the NTS has been the rapid growth of the population of southern Nevada, particularly the Las Vegas metropolitan area. During the decade of the 1990s, Las Vegas was the fastest growing metropolitan area in the United States. The population of Clark County grew from 741,459 in 1990 to 1,375,765 in 2000, a increase of 85.5 percent (U.S. Census Bureau 2001). Further discussion of the implications of this change on this SA is provided in Section 4.2.9, Socioeconomics.

3.3 Regulations

This section presents changes in federal laws and regulations and state of Nevada regulations and agreements that have occurred since the 1996 the NTS EIS and that are applicable to the NTS and off-site Nevada locations. Also, new missions and projects were examined to determine if they caused requirements issued before the final 1996 NTS EIS (that were not applicable to the NTS and off-site Nevada locations) to become applicable. This examination did not identify newly applicable requirements.

3.3.1 Federal environmental statutes and regulations

Resource Conservation and Recovery Act of 1976, 42 U.S. Code (U.S.C.) 6901, enacted by Public Law 94-580 as amended

In February 1997, the U.S. Environmental Protection Agency (EPA) finalized regulations that clarify when conventional and chemical military munitions become a hazardous waste under RCRA. The following regulations were amended: 40 Code of Federal Regulations (CFR) 260, 261, 262, 263, 264, 265, 266, and 270. These clarified regulations may require some munitions waste to be managed as hazardous waste.

Clean Air Act, 42 U.S.C. 7401, enacted by Public Law 90-148 as amended

Since the 1996 NTS EIS, states including Nevada have been engaged in permitting emission sources under Title V of the Clean Air Act amendments. Current permits for the NTS and off-site Nevada locations are listed in Section 3.3.5.

Safe Drinking Water Act of 1974, 42 U.S.C. 3001 et. seq., enacted by Public Law 93-523 as amended

EPA established maximum contaminant levels for radium-226, radium-228, and gross alpha particle radioactivity in community water systems in 40 CFR 141.15. EPA also established maximum contaminant levels for beta particle and photon radioactivity from man-made radionuclides in community water systems in 40 CFR 141.16. The drinking water standards in 40 CFR 141 are used as groundwater protection standards. Thus, these new maximum contaminant levels affect the performance objectives for the radiological performance assessments conducted under DOE Order 435.1, "Radioactive Waste Management."

Military Lands Withdrawal Act of 1999, Public Law 106-65

The act renewed the withdrawal of lands known as "Pahute Mesa" that are an integral part of the NTS and provided the site of nuclear weapons testing activities. Pursuant to the Act, these lands were transferred from DoD to DOE, thus aligning jurisdictional responsibilities consistent with DOE's retention of environmental safety and health responsibilities at the NTS.

Comprehensive Guideline for Procurement of Products Containing Recovered Materials (40 CFR Part 247)

This guideline was issued under the authority of Section 6002 of RCRA and Executive Order 12783, which set forth requirements for federal agencies to procure products containing recovered materials for use in their operations, using guidelines established by the EPA. The purpose of these regulations is to promote recycling by using government purchasing to expand markets for recovered materials. RCRA Section 6002 requires that any purchasing agency, when using appropriated funds to procure an item, shall purchase it with the highest percentage of recovered materials practicable. The procurement of materials to be used at the NTS and off-site Nevada locations will be conducted in accordance with these regulations.

Environmental Radiation Protection Standards for Management and Disposal of Spent Nuclear Fuel, High-Level, and Transuranic Radioactive Wastes (40 CFR 191)

This regulation establishes radiation protection standards for the storage and disposal of spent nuclear fuel, high-level, and transuranic wastes.

Small amounts of transuranic wastes were disposed in greater confinement disposal boreholes and one shallow disposal unit in Area 5 at the NTS. According to DOE Manual 435.1-1, transuranic waste is to be disposed in accordance with 40 CFR 191. NNSA/NV will comply with these regulations during closure of these portions of Area 5, as part of its compliance with DOE Order 435.1 and Manual 435.1-1 regarding radioactive waste management.

3.3.2 Regulations and orders

Through the authority of the Atomic Energy Act, DOE is responsible for establishing comprehensive health, safety, and environmental programs for its facilities. The regulatory mechanisms through which DOE manages its facilities are regulations and orders.

The regulations address such areas as energy conservation, administrative requirements and procedures, nuclear safety, and classified information. For purposes of this SA, relevant regulations include 10 CFR Part 820, *Procedural Rules for DOE Nuclear Facilities*; 10 CFR Part 830, *Nuclear Safety Management, Contractor and Subcontractor Activities*; 10 CFR Part 835, *Occupational Radiation Protection*; and 10 CFR Part 1021, *Compliance with NEPA*. Occupational radiation protection standards to protect NNSA and its contractor employees are set forth in 10 CFR Part 835, *Occupational Radiation Protection*; the rules in this part establish radiation protection standards, limits, and program requirements for protecting individuals from ionizing radiation.

DOE Order 435.1, *Radioactive Waste Management*, issued in 1999 (Change 1 was added to the Order on August 28, 2001), and its associated Manual (DOE M 435.1-1) establish requirements for managing radioactive waste (including mixed waste) to provide radiological protection related to facilities, operations, and activities. An Implementation Guide (DOE G 435.1-1) has also been issued. This Guide is a crosswalk of tables to assist in understanding how the requirements that are in DOE Order 5820.2A are addressed in DOE Order 435.1 and in DOE M 435.1-1. LLW disposal facilities, including the NTS LLW disposal facilities, are required to have the following specific waste management controls: performance assessment, composite analysis, disposal authorization statement, closure plan, waste acceptance requirements, and monitoring plan. NNSA/NV compliance with this order is ongoing. Performance assessments and composite analyses have been conducted for the radioactive waste disposal facilities in Areas 3 and 5.

3.3.3 State of Nevada requirements

Hazardous Materials

The state of Nevada codified its Regulation of Highly Hazardous Substances (Nevada Administrative Code [NAC] 459.952 to 459.95528) in January 2000. The regulation requires facilities having listed highly hazardous

substances in threshold quantities to conduct a hazardous assessment, implement prevention and emergency response programs, and submit assessment and annual compliance reports.

The NTS and off-site Nevada locations manage their hazardous materials in accordance with federal, state, and NNSA requirements.

Storage Tank and Cleanup of Discharged Petroleum

In January 2000, the state of Nevada promulgated storage tank regulations (NAC 459.9921 to 459.9995). The new regulations adopted federal regulations at 40 CFR 280. Regulations addressing the cleanup of discharged petroleum (NAC 590.700 to 590.810) were promulgated in March 2000.

The NTS and off-site Nevada locations will continue to operate, maintain, and close storage tanks and clean up any discharged petroleum in accordance with these regulations.

Environmental Audits

In November 1998, the state of Nevada promulgated regulations (Chapter 445C) for the conduct of environmental audits by regulated facilities under agreement with the Nevada Division of Environmental Protection.

These regulations allow the NTS and off-site Nevada locations to choose this environmental management tool as a means of assessing compliance.

Settlement Agreement

The Settlement Agreement, which was signed by DOE and Nevada Division of Environmental Protection in June 1992, authorizes the temporary storage of only its current inventory of mixed transuranic waste. The storage of additional mixed transuranic waste would require a permit. Mixed transuranic waste is not normally generated at the NTS; the majority of mixed transuranic waste stored at the NTS was generated offsite.

Federal Facility Agreement and Consent Order

This agreement is a tri-party agreement with DOE, the state of Nevada, and the DoD. The agreement, effective in May 1996, addresses environmental restoration of inactive contaminated sites at the NTS and other sites in Nevada. Parties agreed to negotiate to address needed environmental restoration.

The Order outlines a process for identifying, prioritizing, investigating, and remediating contaminated sites. It also establishes a technical strategy for cleanup activities, maximizes the opportunity to complete multiple corrective actions, and provides a mechanism for public involvement.

Federal Facility Compliance Act-Consent Order

The state of Nevada and DOE approved the Order and its associated NTS Site Treatment Plan in March 1996. The Order and Plan address treatment of legacy mixed waste streams on the NTS. Under a June 1998 revision to the Order, new milestones and deadlines for mixed waste treatment must be proposed through annual updates to the Site Treatment Plan.

Mutual Consent Agreement

The Mutual Consent Agreement was signed by DOE and the state of Nevada in January 1994 and modified in June 1995 and 1998. The Mutual Consent Agreement authorizes the storage of newly identified mixed waste at the NTS Area 5 radioactive waste management facility. State of Nevada approval of a Treatment and Disposal Plan is required for mixed waste stored for greater than nine months.

Agreement in Principle

This agreement includes commitments with regard to Nevada Operations Office technical and financial support to Nevada for environmental, safety, and health oversight and associated monitoring activities. The DOE - state of Nevada Joint Low-Level Waste

Oversight Agreement was incorporated as an appendix to the Agreement in Principle. This appendix is a cooperative over-sight arrangement between DOE and the state of Nevada and grants the state an increased role in monitoring the management of LLW generated at the NTS, as well as LLW generated elsewhere and disposed at the NTS. By entering into the agreement, DOE and the state of Nevada agree to share information concerning waste types and quantities, in addition to general information that allows the state to conduct detailed oversight of waste disposal operations.

3.3.4 Permits

Current environmental permits for the NTS and off-site Nevada locations are presented annually in the NTS Annual Site Environmental Report (e.g., BN 2001b).

CHAPTER 4
SCREENING REVIEW

The purpose of this Nevada Test Site Environmental Impact Statement Supplement Analysis (NTS EIS SA) is to determine the need for additional National Environmental Policy Act (NEPA) (40 Code of Federal Regulations [CFR] Part 1508.27) analysis beyond that presented in the 1996 NTS EIS (DOE 1996a). Chapter 3 provides a discussion of changes in site activities (new or modified site missions) that could result in changes in environmental impacts, changes in the characteristics of the NTS or its environs, and changes in regulatory requirements or guidance. This chapter describes the process for performing the initial screening analysis and discusses those technical discipline areas for which detailed analysis is not necessary to determine if the potential impacts of new and modified projects are within the scope of the impacts analysis of the 1996 NTS EIS.

4.1 Methodology

A three-step review and analysis approach was used in developing this SA. These steps are illustrated in Figure 4-1 and are summarized as follows:

1. Perform initial screening analyses of new or modified projects or proposals, changed circumstances, and new regulations, as described in Chapter 3. This screening analysis has determined, without further detailed analysis, which specific impact areas clearly remain within the scope of environmental consequences established in the 1996 NTS EIS (i.e., that adverse impacts are not more adverse than or beneficial impacts are not more beneficial than those discussed in the 1996 document). This chapter presents those impact areas that meet screening criteria and thus require no further consideration.

2. Perform more detailed analyses of impact areas that do not pass the screening criteria (Step 1) to determine whether the combined impacts remain within the envelope of consequences established in the 1996 NTS EIS. These detailed analyses are presented in Chapter 5.

3. For those impacts that are outside the envelope of consequences established in the 1996 NTS EIS, determine whether the incremental change in environmental consequences is significant, as defined in NEPA regulations.

4.2 Areas not requiring detailed analysis

The potential impacts of new and modified projects are judged to be minimal and within the scope of the impacts analysis of the 1996 NTS EIS in the following technical discipline areas: occupational safety and health, noise, traffic, and transportation, geology and soils, land use, visual resources, ecological resources, groundwater, socioeconomic, environmental justice, cultural resources, and American Indian resources. These technical discipline areas met the screening criteria described in Section 4.1 and more detailed analysis is not needed. For each of these technical discipline areas, the 1996 NTS EIS remains an adequate description of potential NTS sitewide impacts and no supplementation of the 1996 NTS EIS is needed.

4.2.1 Occupational safety and health

The screening review for occupational safety and health risks compared the operational status of current NTS missions to those missions (actual and projected) evaluated in the 1996 NTS EIS. Current NTS chemical inventories were reviewed to determine any significant increases or decreases in chemical source terms. Site injury, lost time, and fatality logs were evaluated to determine lost time and injury rates for the five-year period since issuance of the 1996 NTS EIS.

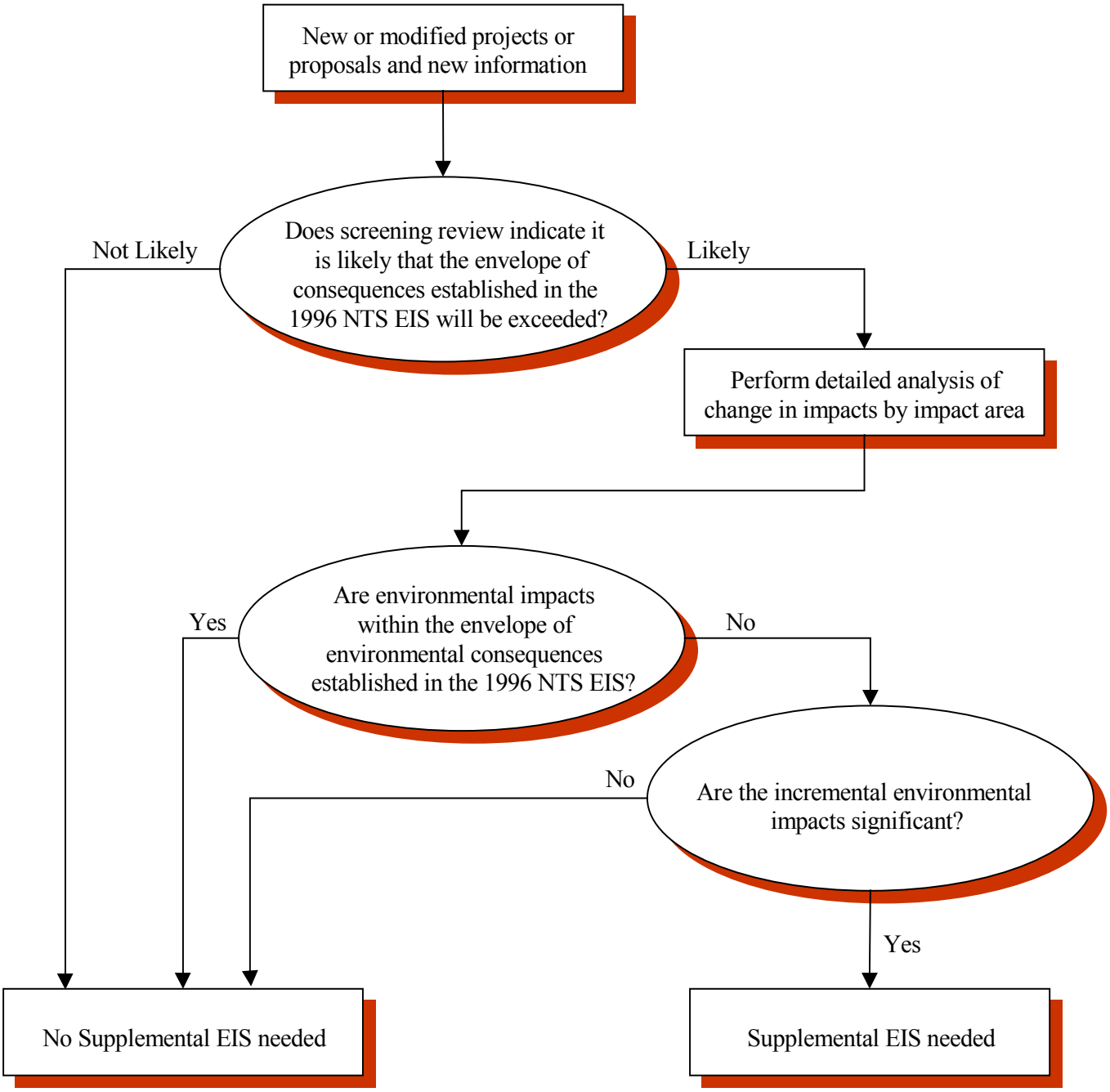

Figure 4-1. General analysis approach.

The 1996 NTS EIS concluded that worker health risks related to NTS activities were primarily the result of occupational safety hazards in the workplace. The greatest potential for these in types of events were associated with waste handling, construction, environmental restoration, and decontamination and demolition activities. A review of current and anticipated NTS programs, identified in Section 3.1, as well as projects completed since the 1996 NTS EIS, was performed to determine if increases in higher risk activities had occurred. The number of new missions identified, when compared to canceled and completed projects, did not represent a significant increase in projects beyond those reported in the 1996 NTS EIS. While chemical inventories at individual facilities may increase in response to ongoing activities (e.g., Hazardous Materials Spill Center, National for Combating Terrorism), administrative controls are in place to ensure quantities do not approach the levels addressed in the 1996 NTS EIS.

In support of these reviews, the Computerized Accident/Incident Reporting System (CAIRS) was queried for injury and illness information. CAIRS injury/illness experience reports from 1996 to November 2001 (DOE 2001a) were reviewed. Actual annual person-hours worked from 1996 through 2000 averaged 5.98 million, ranging from 5.88 million in 1998 to 6.33 million in 1996. Incomplete data from the first two quarters of 2001 indicate annual hours worked would be within this range. These person-hours indicate a stable workload for the cumulative site mission. Annual totals for NNSA/NV and its contractors for total recorded cases (TRC), lost work cases (LWC), lost work days (LWD), and fatalities, along with associated rates, are listed in Table 4-1.

As with the total person-hours worked, TRC, LWC, and LWD rates for this period have remained relatively stable, indicative of a stable occupational health and safety environment.

Historical beryllium data from past sampling and monitoring had not been gathered and considered as a body of information relative to potential beryllium hazard at the NTS until recently. This information is now being validated and supplemented by data and information being acquired under the NNSA/NV Environmental Restoration Program for inactive sites, and an aggressive beryllium sampling and monitoring program for facilities that housed historical beryllium operations and are still active. Facilities that are still active and deal with beryllium and beryllium bearing materials in current operations have ongoing sampling and monitoring programs consistent with the level of hazard posed and applicable standards. In addition, NNSA/NV has initiated a voluntary worker testing program using the lymphocyte proliferation test to assess potential exposure to the beryllium sensitive members of the workforce.

Table 4-1. Annual totals for total recorded cases, lost work cases, lost work days, and fatalities at the Nevada Test Site.[a,b]

Year	TRC	TRC Rate	LWC	LWC Rate	LWD	LWD Rate	Fatalities
1996	97	3.1	52	1.6	1,952	61.7	0
1997	64	2.2	37	1.3	983	34.5	0
1998	83	2.8	57	1.9	1,247	42.4	0
1999	51	1.7	30	1.0	1,303	42.5	0
2000	62	2.1	44	1.5	1,466	49.7	0
2001	49	3.1	38	2.4	677	42.9	0

a. 2001 values represent first and second quarter data only. TRC = total recorded cases; LWC = lost work cases; LWD = lost work days

b. CAIRS data for the following organizations: Bechtel Nevada (and predecessors), and subcontractors, IT Corporation, Nevada Operations Office, and Wackenhut services.

Summary

The National Nuclear Security Administration Nevada Operations Office (NNSA/NV) concludes that there is no evidence that current anticipated changes in NTS missions would result in impacts to future occupational safety and health risks that would exceed those reported in the 1996 NTS EIS. A comprehensive occupational safety and health program remains effective through ongoing and new missions. Therefore, detailed analysis of occupational safety and health risks is not warranted. The issue of occupational safety and health would not precipitate a supplemental EIS.

The industrial use of beryllium was found to result in an acute respiratory disease and led the Atomic Energy Commission to establish an airborne concentration standard of 2 micrograms per cubic meter for the workplace based on the then accepted standard for metals. Adoption of this standard has essentially eliminated the presence of acute beryllium disease. However, epidemiological studies carried out in the late 1980s and 1990s revealed the presence of another form of lung disease, chronic beryllium disease (CBD), among workers at DOE sites. It wasn't until 1997 that a series of research efforts to investigate the prevalence of CBD among former beryllium workers, alternatives to screening tools for identifying pre-clinical disease, and policy implications of alternative occupational safety and health programs to reduce disease incidence were undertaken. In 1999 the DOE established the Chronic Beryllium Disease Prevention Program (CBDPP). NNSA/NV is in the process of implementing the CBDPP at the NTS and other NNSA/NV managed facilities to: (1) reduce the number of workers potentially exposed to beryllium in the course of their work; (2) minimize the levels of, and potential for, exposure to beryllium; and (3) establish a medical surveillance program to ensure early detection of the disease.

4.2.2 Noise

4.2.2.1 Nevada Test Site

Atlas Facility

Construction of the Atlas Facility would elevate noise levels on-site, however, it would likely not be discernable above current ambient noise levels off-site (e.g., in publically accessible areas). Operation of the Atlas Facility would probably result in periodic sudden and short-term noises that could be heard at some distance. Hearing protection would be required for all workers that could be potentially adversely affected by the increased noise levels. Operational noise from the Atlas Facility may create short-term startle reactions in some species of wildlife, but would not be expected to have any other effects (DOE 2001b).

Kistler Launch Facility (KLF)

Noise impacts would occur during construction, launch of the vehicle, and vehicle reentry. Construction activities and traffic noise would temporarily increase the ambient noise levels. Workers would wear protective hearing equipment in accordance with Occupational Safety and Health Administration (OSHA) regulations. The general public would not be in the immediate vicinity of the construction site. The closest public access is more than 32 kilometers from the vehicle processing facility and launch site and more than 24 kilometers from the landing and recovery area. Maximum predicted construction noise levels at 24 kilometers would be less than 40 decibels, which would be undetectable with normal daytime ambient noise levels. Therefore, adverse impacts to the general public and construction workers as a result of construction noise are not expected.

Noise impacts during launch of operational flights consist of the reusable launch vehicle's engine noise. Predicted noise levels are well within occupational operating parameters for facility work (i.e., only during the first 18 seconds after the launch would workers in the vehicle processing facility need hearing protection with predictions of 106 decibels). Noise levels at the closest public access (about 32 kilometers) are estimated to be below 77 decibels. Off-site locations would experience no significant launch noise impacts. Figure 4-2 presents the maximum noise levels at different distances from the launch site at the NTS.

Sonic booms would be generated during the vehicle ascent and the reentry stages descent to the landing and recovery area. Sonic boom levels generated outside the NTS boundaries would resemble distant thunder or fireworks and have no significant impact on surrounding communities. Figure 4-3 presents the predicted sonic boom footprint produced by the Kistler vehicle launched from the NTS (FAA 2000).

Quantifying the Effects of Sound

The process of quantifying the effects of sound begins with establishing a unit of measure that accurately compares sound levels. The physical unit most commonly used is the decibel. The decibel represents a relative measure or ratio to a reference pressure. The reference pressure is approximately the weakest sound that a person with very good hearing can hear in an extremely quiet room. The reference pressure is 20 micropascals, which is equal to zero decibels.

4.2.2.2 Tonopah Test Range

B-83 rocket rail and bomb drop tests

The short-term noise at the Tonopah Test Range (TTR) from High-velocity Aircraft Rocket motors is estimated to be 135 decibels at the source. This level of sound is similar to being near a commercial jet engine. The sound would be of short duration, thereby minimizing the noise impact to the area. Personnel in the vicinity would be required to wear hearing protection during testing. Impacts to the off-site public would be minimal.

4.2.3 Traffic and transportation

The overall method for the screening review is to examine selected input parameters from the 1996 NTS EIS analyses and see if they would be significantly different under the transportation scenario identified for this SA. No modeling of impacts has been performed. The input parameters selected for comparison are the most sensitive ones that also have the potential to change as a result of changing missions or changing environmental baseline conditions.

4.2.3.1 On-site traffic

The general methodology for the on-site traffic analysis is to examine site employment as an indicator of on-site traffic. The site employment reported in the 1996 NTS EIS (1993 data) was 7,700 from Clark and Nye Counties (Nevada), representing 97 percent of the workforce. Based on government data (TtNUS 2001a), the NTS had an average of 3,659 employees in 1996. From 1996 to 2001, employment varied (see Table 4-4 in Section 4.2.9.2), with the largest average annual growth from 2000 to 2001 (3.5 percent) and the greatest loss in 1997 (10.2 percent). In 2001, the average annual employment based on data available through October 2001 was 3,593. In the ensuing years, employment has been consistently below that reported in the 1996 NTS EIS. Therefore, using employment as a surrogate for overall on-site traffic, NNSA/NV concludes that on-site traffic has not increased since the previous EIS. New projects identified in Chapter 3 do not project sufficient increases in employment to change this conclusion in the immediate future.

4.2.3.2 Off-site traffic

In the 1996 NTS EIS, the analysis of off-site traffic is presented as average daily trips assigned to nearby roadway segments. Changes in the Level of Service (LOS) designations were calculated based on increased traffic from the various alternatives. Given the extensive growth

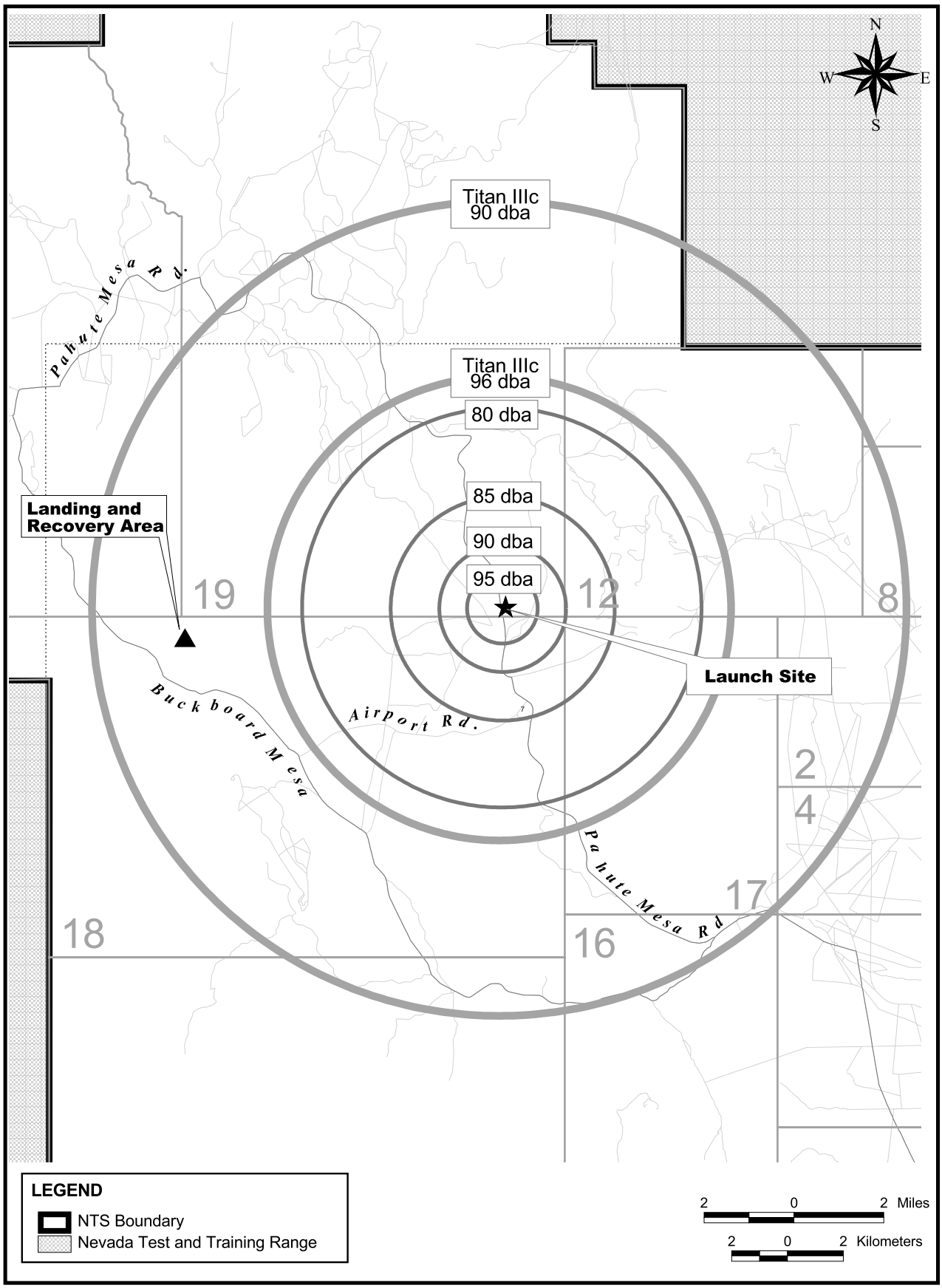

Figure 4-2. Maximum noise levels at different distances from the Kistler Launch Facility.

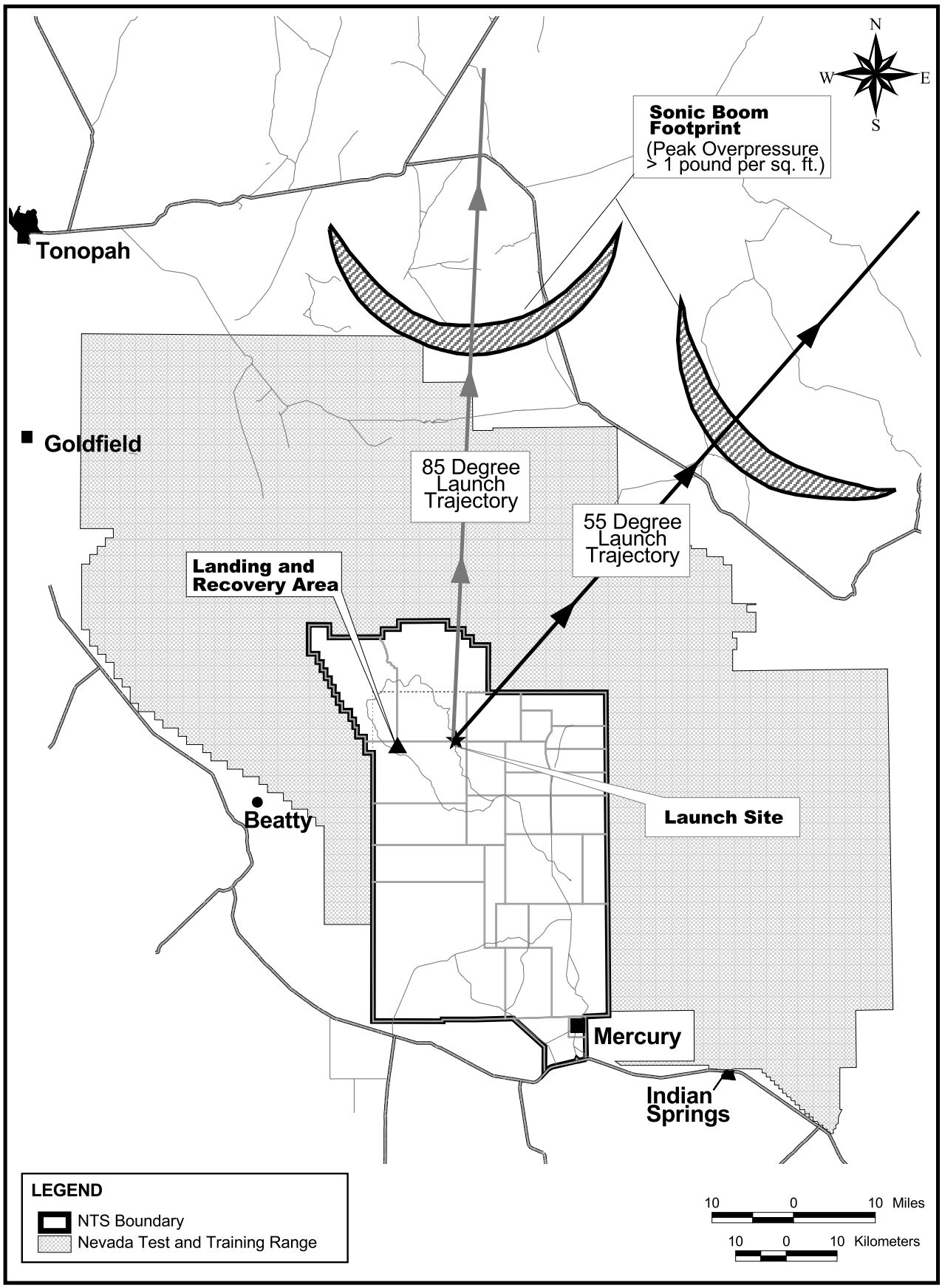

Figure 4-3. Predicted sonic boom footprint produced by the Kistler vehicle.

in the Las Vegas area, the marked deterioration in the LOS for roads in the region (irrespective of NTS activities), and the small magnitude of the NTS contribution to regional traffic problems, a re-examination of LOS designations is not indicated from the screening review. Decreases in on-site employment, as well as decreases in defense programs and waste management transportation (discussed below) indicate that contributions of NTS activities to off-site traffic have decreased since the 1996 NTS EIS. American Indian perspectives on transportation through their communities is presented in Section 4.2.12.3, "Waste Management."

4.2.3.3 Transport of defense programs materials

Some of the defense programs activities identified in the 1996 NTS EIS have not been selected for implementation at the NTS. These include the National Ignition Facility and those described in the Storage and Disposition of Weapons-Usable Fissile Materials Programmatic EIS (DOE 1996b). However, 12 new missions/activities have the potential for increased defense programs traffic and transportation. The new missions are identified in Section 3.1.

NNSA/NV examined program documentation for the 12 new missions to determine the magnitude of transportation impacts associated with these new programs. NNSA/NV has concluded that transportation impacts under these new programs would be infrequent or incidental, such as commuting employees. With the exception of a few shipments via Safe Secure Trailers, the projected defense programs transportation is already included in the analysis of waste management activities (below) or on-site traffic (above). There are no new shipment campaigns that would indicate a need for reanalysis of traffic and transportation impacts for defense programs, and many shipments have been eliminated.

4.2.3.4 Waste management activities

The 1996 NTS EIS projected volumes and numbers of shipments to the NTS from many waste generators over a 10-year period for each of the alternatives. The Preferred Alternative (Expanded Use) included more waste management shipments than any other alternative. The volume and shipment numbers for the Expanded Use Alternative are reported in Tables 5.3-5 and 5.3-6 of that EIS for low-level waste (LLW) and mixed low-level waste (MLLW), respectively. The numbers were prepared to be consistent with those in the U.S. Department of Energy's (DOE's) Waste Management Programmatic EIS (DOE 1997).

On February 25, 2000, DOE published the fourth Record of Decision under the WMPEIS (*65 FR 10061*) for management of LLW within the DOE complex. That decision determined that particular DOE sites would continue, to the extent practicable, to dispose of LLW at the site that generated it (most specifically Idaho National Engineering and Environmental Laboratory, Los Alamos National Laboratory, Oak Ridge Reservation, and Savannah River Site) and to establish two regional disposal sites at the Hanford Site and the NTS. This decision directs much of the waste that had been projected to be disposed at the NTS under the 1996 the NTS EIS Expanded Use Alternative to instead be disposed elsewhere.

The DOE Office of Environmental Management Integrated Planning, Accountability, and Budgeting System (IPABS) (Guevara 2001) provides updated estimates from DOE sites on projected volumes of LLW/MLLW needing future disposal. Although the updated information (covering Fiscal Years [FYs] 2002 to 2011) includes some new generators, it indicates that many generators are no longer planning shipments to the NTS and that some show marked decreases in waste volumes. Comparison of the 1996 NTS EIS data to the new data is provided in Table 4-2.

Table 4-2. Low-level and mixed low-level waste shipments at the Nevada Test Site.

	1996 NTS EIS		Updated Information	
	Volume (m^3)[a]	No. Shipments	Volume (m^3)[a]	No. Shipments
Low-level waste	1,041,422	39,084	517,753	42,636
Mixed low-level waste	300,500	15,415	20,000[b]	0

m^3 = cubic meters

a. To convert cubic meters to cubic feet, multiply by 35.316.

b. The Nevada Operations Office has submitted an application to the state of Nevada for a RCRA Part B permit to provide for the receipt and disposal of mixed low-level were from out of state DOE approved generators and on-site sources up to a volume of 20,000 m^3.

DOE considered a small number of other potential generators of LLW that were not addressed in the DOE IPABS (see Chapter 3). Some of these potential projects are in the early planning stages and are thus not completely defined. Consequently, not all have quantifiable waste volumes. Nevertheless, the total volume of these shipments is likely to be small, compared with the values in DOE's IPABS. For example, one of the larger projects involves decontamination wastes from Battelle Columbus facilities. The projected Battelle Columbus waste is approximately 1,600 cubic meters, less than 1 percent of the volume reported in the IPABS.

In 1999, DOE performed a comparison study of different modes of transporting waste volumes considered in the 1996 NTS EIS Expanded Use Alternative (DOE 1999a). The modes of transport included four options of intermodal (rail and truck) transport, two options of all-truck transport, and current truck routes. The analysis used the then-current versions of various computer codes such as RISKIND, RADTRAN 4, and RSAC-5. Results from this study showed that traffic would be unaffected, and there would be no adverse health effects from any of the modes or their options.

As a point of reference, in FY 2000, there were 520 motor carrier shipments of LLW and mixed LLW waste to the NTS and 1 outbound shipment of polychlorinated biphenyl (PCB)-contaminated LLW. The total inbound shipment volume was 23,930 cubic yards (DOE 2001c). None of the 521 shipments was involved in any vehicular accidents or incidents.

4.2.3.5 Summary

Based on the above discussions, NNSA/NV concludes that there is no evidence that either changing environmental conditions or changing NTS missions would cause traffic and transportation impacts in the planned future that would exceed the limits established in the 1996 NTS EIS. The decrease in numbers of shipments would be reflected in similar decreases in health effects and traffic incidents. Therefore, detailed analysis of traffic and transportation is not necessary. The issue of traffic and transportation would not precipitate a supplemental EIS.

4.2.4 Geology and soils

The scope of past, current, and expected impacts to geology and soils at the NTS established in the 1996 NTS EIS was extensive. Almost all changes in mission or actions taken since development of the 1996 NTS EIS would clearly be within the envelope of impacts evaluated in the EIS, or would have little or no effect on geology and soils.

One action, the proposed KLF, would result in potential impacts that were not described in the 1996 NTS EIS. The launch of the rockets would result in the emission of hydrogen chloride (HCl). This compound combines with water vapor in the exhaust or in the atmosphere to form hydrochloric acid. The rockets would emit 2.14 kilograms of HC1 within the first second of each launch. Using a conservative dispersion area for the exhaust plume of the rocket, about 0.009 grams of HC1 would be deposited on each square meter of soil surface over an area of one-

half kilometer on a side, or 250,000 square meters. This is equal to 0.468 gram per square meter per year, based on an assumption of 52 launches each year.

The proposed KLF is in an area of very low rainfall and high evaporation, with sandy-textured alkaline (pH above 7.0) soils and a low organic content. The deposition of acid in the launch site area could cause a slight lowering of the soil solution pH. This would have little to no impact on soils in the area. (FAA 2000).

Soil disturbance would occur over the entire area of the proposed project. All three of the operating areas (including the vehicle processing facility, landing/recovery area, and payload processing facility) would be cleared and graded. In the landing/recovery area, the soil is generally undisturbed, although there are some existing two-track roads in the area. Woody vegetation and large rocks would be removed and the ground surface graded to specific contours, exposing the soils to increased erosion by wind and water. Diverting upstream runoff around the landing/recovery area by using diversion channels or berms could mitigate soil erosion caused by water. Although the landing/recovery area would be maintained to prevent the growth of woody vegetation that could damage the landing bags of the K-1 vehicle, natural revegetation by herbaceous species would be allowed to ameliorate wind and water erosion at the site.

For off-site locations within the state of Nevada, there would be no adverse impacts to geology and soils. For the TTR, the changes in mission or actions taken since development of the 1996 NTS EIS would clearly be under the umbrella of impacts evaluated in the EIS. For the Project Shoal Area and the Central Nevada Test Area, surface site characterization, remediation, and closure have been completed. Therefore, a minor beneficial impact to geology and soils has been realized since issuance of the 1996 EIS. For the Solar Enterprise Zone (SEZ), there have been no impacts to date and potential impacts from currently planned actions would clearly be under the umbrella of impacts evaluated in the 1996 NTS EIS.

4.2.5 Land use

The Federal Government manages more than 85 percent of the land in Nevada (93,000 square miles). Most of this land is under the control of the Bureau of Land Management (BLM) (an agency of the U.S. Department of the Interior), the U.S. Department of Defense (DoD), or the DOE. The remainder of the federally managed land is primarily under the jurisdiction of the U.S. Forest Service (an agency of the U.S. Department of Agriculture), with smaller areas under the control of the National Park Service and the Bureau of Reclamation (both of the U.S. Department of the Interior). Approximately 2,000 square miles are Native American lands. Table 4-3 summarizes current Nevada land holdings and the controlling authorities. Figure 4-4 shows ownership and use of lands around the NTS.

Table 4-3. Nevada land areas (square miles) and controlling authorities.[a]

Authority	Approximate Area	Percentage[b]
State, local, county, or private	16,216	15
Bureau of Land Management	74,904	68
Department of Defense	5,019	5
Department of Energy	1,375	1
Other federal authorities	10,038	9
Native American tribes	1,931	2

a. Sources: CRWMS M&O 1999; USAF 1999; DOI 2000.
b. Percentages calculated from values prior to rounding.

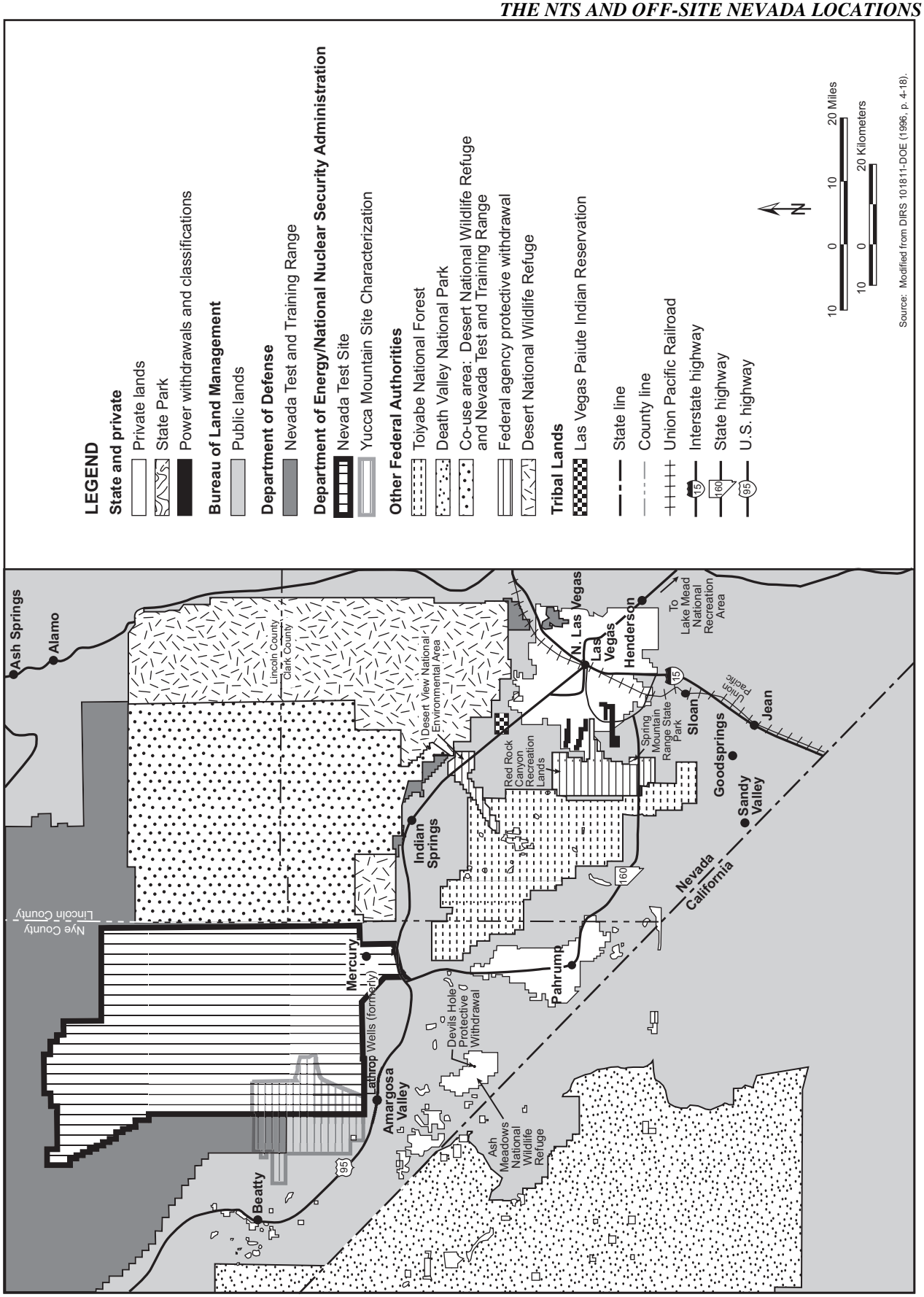

Figure 4-4. NTS and surrounding land use.

Since publication of the 1996 NTS EIS, the NTS has increased by approximately 25 net square miles after enactment of the Military Lands Withdrawal Act of 1999, Public Law 106-65. This law added land to the northwest portion (Pahute Mesa) of the NTS which was previously used by the NTS under permit from the U.S. Air Force. Additionally, it removed land that had been previously assigned to the DOE. In general, the functional size of the NTS did not change that much. What did change was that the NTS is no longer operating under permit from the U.S. Air Force for approximately 112,000 acres.

An area within the boundary of the NTS has been designated a National Natural Landmark (USAF 1999). The area, known as Timber Mountain Caldera, was listed as a landmark because of its unique volcanic features. The general area of the Caldera had also been listed as an Area of Critical Environmental Concern. Parts of the Caldera lie on portions of BLM land and also on Nevada Test and Training Range (NTTR) land. The Landmark, with the exception of land within the NTS, is managed by the National Park Service through Death Valley National Park, located in California and Nevada. The portion of the Landmark within the NTS is managed by NNSA/NV.

The NNSA/NV and Yucca Mountain Site Characterization Office have a management agreement that allows the use of about 90 square miles of NTS land for site characterization activities. The Land Facility Use Management Policy under the Memorandum of Agreement provides for protection of this land. An EIS was published by DOE in February 2002 (DOE 2002). The withdrawal of NTS lands for the YMP is not expected to significantly impact current or planned operations at the NTS.

The NTS is surrounded by other federal lands. It is bordered by the NTTR to the north, east, and west and by BLM land to the south and southwest. The NTS is located in Nye County, Nevada. Land uses in Nye County include mining, grazing, agriculture, and recreation. Urban and residential land uses occur beyond the immediate vicinity of the NTS in fertile valley regions, such as the Owens and San Joaquin to the west, the Virgin River to the east, Pahrump to the south, the Moapa River to the southeast, and Hiko and Alamo to the northeast. The nearest population centers are Amargosa Valley, Indian Springs, Beatty, and Pahrump Valley. These are all rural communities. Amargosa Valley is closest (two miles) to the NTS. Las Vegas, the closest major metropolitan area, is located about 65 miles southeast of the NTS.

Because there is currently no public access to NTS lands, there are no anticipated additional impacts resulting from denial of access of the general public to the NTS for current or planned projects. Impacts to American Indian culture resulting from limited access are explained in Section 4.1.12.2, “Environmental Justice.”

Construction and operations of the off-site facilities will cause minimal land use impacts. The off-site locations are currently in areas where operations/missions are similar to those of the surrounding areas. The land disturbance will be short-term and within the parameters outlined in the 1996 NTS EIS.

Summary

There have been no proposed changes or additions to the projects outlined in the 1996 EIS with the exception of the potential land use increase by the YMP that would create significant land use issues. The NNSA/NV and Yucca Mountain Site Characterization Office have a management agreement that allows the use of about 90 square miles of NTS land for site characterization activities. The Land Facility Use Management Policy under the Memorandum of Agreement provides for protection of this land.

4.2.6 Visual resources

Visual resources include natural and man-made physical features that give a particular landscape its character and value. The feature categories that form the overall impression a viewer receives of an area include land form, vegetation, water, color, adjacent scenery, rarity,

and man-made (cultural) modifications (DOE 1996a). Criteria used in this visual resources analysis include scenic quality, visual sensitivity, and distance and/or visibility zones from key public viewpoints.

The scenic quality of the NTS ranges from Class B to Class C (Class B - areas in which there is a combination of some outstanding characteristics and some that are fairly common and Class C - areas in which the characteristics are fairly common to the region). The areas of the NTS visible from U.S. Highway 95 are visually common to the region and have been designated as Class C. An American Indian assessment of visual resources at the NTS and their importance to American Indian culture is provided in Section 4.2.12.1, "Visual Resources."

The NTS consists of 26 areas that historically have been used for industrial purposes. Because there is no public access to the NTS, impacts to visual resources due to site activities are considered negligible. The current operations/ missions and actions are unlikely to cause impacts to visual resources, with the possible exceptions of the proposed Yucca Mountain Repository (DOE 2002) and the proposed wind generation facilities at the NTS. An EIS for the wind turbine facility is currently under development to determine and evaluate impacts.

Past on-site operations occurred well within the boundary of the NTS. Operations conducted or planned since the 1996 NTS EIS have been or would be in or near old operational areas. Newly disturbed land areas would be small in comparison to the size of the historical operational areas. The disturbed areas would have short-term impacts from new construction or modification of existing facilities. The NTS mission of reclamation would also minimize impacts to on-site visual resources. The construction and operation of off-site locations would be in areas where operations/missions are consistent with surrounding usage and they are unlikely to cause additional long-term impacts to visual resources.

4.2.7 Biological resources

Implementation of all projects included under the Preferred Alternative (in essence, the Expanded Use Alternative) of the 1996 NTS EIS would involve expansion of existing NTS facilities (e.g., [Device Assembly Facility] DAF), construction of new heavy-industrial facilities in Area 6, development of a SEZ with solar generating facilities, and extensive land clearing and soil removal in support of remediation activities. A total of 15,600 acres could be disturbed under the Preferred Alternative (DOE 1996a). The Preferred Alternative also would be associated with a generally higher level of human activity and automobile traffic across the NTS, as large numbers of construction workers would be engaged in facility construction and environmental restoration work. The EIS analyzed a number of potential impacts to biological resources, among them:

- Noise-related disturbance of wildlife
- Disturbance of wildlife associated with land clearing and site preparation for new facilities and facility expansion
- Disturbance of wildlife associated with environmental restoration activities (land clearing, excavating, filling, grading, replanting)
- Increased exposure of wildlife to contaminants in excavated soils and open evaporative tanks of liquid waste treatment systems (Area 6, in particular)
- Destruction of wildlife habitat (previously undeveloped areas converted to industrial use)
- Mortality of small mammals and ground-nesting birds (land clearing and site preparation for new facilities)
- Mortality of wildlife (killed by automobiles)

- Displacement of individual animals (fleeing construction sites)
- Disruption of normal activities and daily/seasonal movements (avoiding construction sites).

Although potential impacts to a variety of wildlife types (reptiles, birds, and mammals) were explored in the 1996 NTS EIS, potential impacts to the federally listed (threatened) desert tortoise were emphasized, because this was the only federally-listed species known to occur on the NTS with any regularity. The desert tortoise, although uncommon, occurs across the southern one-third of the NTS in Areas 5, 6, 11, 14, 22, 23, 25, 26, and 27 (DOE 1996a). Other federally listed species (e.g., the bald eagle and peregrine falcon [since de-listed]) received less attention in the EIS because these species were described as "rare migrants" in the region and had been sighted only once on the NTS (DOE 1996a).

As discussed earlier in this section, the desert tortoise occurs within the southern one-third of the NTS. In December 1995, DOE/NV (now NNSA/NV) completed consultation with the U.S. Fish and Wildlife Service (FWS) concerning the effects of proposed activities on the desert tortoise on the NTS. A final Biological Opinion (Opinion) (FWS 1996) was received from the FWS in August 1996. The Opinion concluded that the proposed activities on the NTS were not likely to jeopardize the continued existence of the Mojave population of the species and that no critical habitat would be destroyed or adversely modified. All terms and conditions listed in the Opinion must be followed when activities are conducted within the range of the desert tortoise on the NTS.

The Desert Tortoise Compliance task of the Environmental Monitoring and Compliance (EMAC) program was developed to implement the terms and conditions of the Opinion, to document compliance actions taken by NNSA/NV, and to assist NNSA/NV in FWS consultations. The terms and conditions that were implemented for NNSA/NV by Bechtel Nevada staff biologists in FY 2001 included: (1) conducting clearance surveys at project sites within 24 hours from the start of project construction, (2) ensuring that environmental monitors are on-site during heavy equipment operation, and (3) preparing an annual compliance report submitted to the FWS (BN 2001).

The most serious impacts to biological resources were associated with the proposed development of a SEZ, which would require approximately 2,400 acres of previously undisturbed land for generating facilities and an additional 420 to 960 acres for utility corridors, if located off-site (DOE 1996a). Because the final site for the SEZ facilities had not been selected in 1996, impacts were evaluated for both on-site (Areas 22 and 25) and off-site locations (Eldorado Valley, Dry Lake Valley, and Coyote Springs Valley). Other impacts to biological resources were associated with five environmental restoration projects, including the Soil Media Corrective Action Unit project (removal of contaminated soils from 3,257 acres) and the Industrial Site Corrective Action Unit project (removal of contaminated soils from 2,510 acres (DOE 1996a). These projects, although they may involve relatively large land areas, create short-term impacts to wildlife (usually individuals displaced and occasionally killed by construction equipment), but may ultimately benefit wildlife populations. After remediation, formerly contaminated areas are reclaimed (excavated areas filled with clean soil, graded, and replanted with native vegetation) and risks to wildlife from exposures to contaminants are reduced. The EIS noted that military training exercises under the work-for-others program would also disturb wildlife and wildlife habitat, but these exercises were not well enough defined to credibly predict impacts.

Changes in the biological resources baseline since 1996

The ecological communities of the NTS have changed very little since issuance of the 1996 NTS EIS. There has been land disturbance associated with new facility and infrastructure development, waste management, and environmental restoration, but these activities have affected relatively small amounts of land

compared to the total site acreage (BN 1997, 1998, 1999, 2000, 2001). Many of the areas disturbed were within or adjacent to existing facility areas, areas with little or no native vegetation or wildlife. Other areas were disturbed in the course of site characterization or remediation and, prior to remediation, offered only marginal wildlife habitat.

The 1996 NTS EIS discussed the status of three federally listed species (desert tortoise, peregrine falcon, and bald eagle) and four candidates for federal listing (Beatley milkvetch, Clokey's eggvetch, blue diamond cholla, and mountain plover). The EIS also noted that a number of state-protected plants and animals ("over 20 state-protected birds…"), state-designated game animals, and state-designated fur-bearers occurred on the NTS, but provided no detailed lists or descriptions of these species.

Since 1996, NNSA/NV has expended considerable effort identifying, mapping, and monitoring the health and viability of sensitive species. The list has grown to include wild horses, raptors, bats, game animals, and fur-bearing animals, all indicators of the health of NTS ecosystems. NNSA/NV now conducts biological surveys at proposed NTS project sites for 13 plant, 2 reptile, 12 bird, and 18 mammal species that are protected under state or federal regulations and known to occur on or adjacent to the NTS (BN 2001). These include species listed by the FWS; species formerly listed by the FWS; species proposed for listing by the FWS; species that the FWS regards as "of concern;" species protected under the Bald and Golden Eagle Act, the Migratory Bird Treaty Act, or the Wild and Free-roaming Horses and Burros Act; game species whose harvest is regulated by the state of Nevada; and fur-bearing species whose harvest is regulated by the state of Nevada. Although the list of species that are monitored and protected on the NTS has grown longer, the number of NTS species protected under the Endangered Species Act (ESA) has actually gotten shorter since 1996, as several species were removed from the candidate list in 1997 (*62 FR 49397*) and the peregrine falcon was de-listed in 1999 (*64 FR 46541*).

No new threatened, endangered, or candidate species have been discovered on the NTS since issuance of the 1996 NTS EIS, but more is known about the ecology (distribution, abundance, recruitment, preferred habitat) of previously identified populations as a result of the EMAC Program. More is also known about a number of species that are not threatened or endangered, but are protected by NNSA/NV as part of its commitment to the principles of ecosystem management and natural resource stewardship (DOE 1998).

The list of permanent water sources (seeps, springs, and impoundments), important contributors to biological diversity on the NTS, has also expanded since the 1996 NTS EIS was issued. The 1996 NTS EIS identified 10 springs and 23 manmade ponds and impoundments. The EMAC Program currently monitors the health of 12 wetlands (seeps and springs) and 91 man-made water sources (sumps, treatment ponds, well ponds) (BN 2001). Wetlands are visited on a regular basis to ensure that they are not encroached on or degraded by NTS operations. Man-made water sources are monitored to assess their use by wildlife and, in the event that they are being used, to determine if mitigation measures are necessary to prevent them from causing harm to wildlife (e.g., covering tanks with nets to prevent birds from drowning).

In summary, the ecological resources of the NTS have changed very little since issuance of the 1996 NTS EIS. They are, however, better documented and better protected as a result of mitigation measures committed to in Chapter 7 of the 1996 EIS that were ultimately incorporated into the Resource Management Plan (RMP) (DOE 1998) and the EMAC Program.

Update and screening-level review (1996 - present)

The 1996 NTS EIS indicated that the primary source of impacts to biological resources would be development of solar-powered generating facilities in the proposed SEZ. These facilities, as envisioned in 1996, would require

approximately 2,400 acres of previously undisturbed land and up to 960 acres of land for utility rights-of-way. Although the SEZ was established in Areas 22, 23, and 25 in the southern portion of the NTS, no generating facilities have been built and none are currently planned. Although solar generating facilities may ultimately be built in the SEZ at the NTS, they will almost certainly be on a much smaller scale than was envisioned in 1996, with proportionately smaller impacts to biological resources.

The NTS Development Corporation (NTSDC), a non-profit entity funded by DOE, is working with Boulder City to establish a Green Energy Futures Park demonstration program within the 2,500 acre Eldorado Valley Energy Zone in Boulder City. Boulder City acquired 107,500 acres in the Eldorado Valley via a federal land transfer and a $1.23-million purchase by the City in 1995. Boulder City subsequently designated approximately 2,500 acres for energy development purposes and a 480-megawatt gas-fired power plant built by El Dorado Energy was the first to go online, in May 2000. The Green Energy Futures Park, which will occupy a limited portion (around 300 acres) of the 2,500-acre site, will be used to demonstrate a range of renewable technologies, including solar- and wind-powered systems, hydrogen fuel cells, hybrid energy generation and use systems, and various "off-grid" systems.

Based on a review of actions carried out by NNSA/NV since the 1996 NTS EIS was issued, the conclusions of the EIS remain valid with respect to biological resources. The analysis in the EIS assumed more facility development than actually took place in the intervening years and more land disturbance. As a result, potential impacts were overstated.

Proposed/future actions and missions

One major action, the proposed KLF, was not evaluated in the 1996 EIS and could result in impacts that were not factored into the analysis. Under the proposed action, the Federal Aviation Administration (FAA) would issue a license to Kistler Aerospace to operate a commercial launch vehicle service that would carry commercial payloads (such as communications satellites) into space (see Chapter 3 for additional information). As many as 52 launches per year could be carried out when the facility is fully operational. Kistler operations and activities would be carried out in Areas 18 and 19 of the NTS, with the proposed payload processing facility and launch site on the southern slopes of Pahute Mesa south of Rattlesnake Ridge and the proposed landing and recovery area seven miles west of the launch site, just north of Buckboard Mesa.

Dominant vegetation in the area of the proposed payload processing facility and launch site is singleleaf pinyon pine, Utah juniper, and big sagebrush (FAA 2000). This area was formerly occupied by the Pahute Control Point but, since demolition of that facility, native plant species have recolonized the area. The dominant vegetation of the landing and recovery area includes budsage, green rabbitbrush, and Nevada ephedra. Ground based operations at the vehicle processing facility and launch site would not affect vegetation. Buildings or pavement would cover both operational areas. The landing/recovery area would be impacted but would be permitted to re-vegetate naturally with herbaceous vegetation. Woody vegetation that could damage the landing bags on the K-1 vehicle would be selectively removed on a periodic basis.

Although the proposed payload processing facility and launch site and the proposed landing and recovery area support different vegetation communities, they are used by many of the same animals. Feral horses and mule deer range over the area and use a small man-made pond near the proposed launch site for drinking water. Mountain lions may use caves in the area. Other wildlife believed to be in the area includes desert cottontails, black-tailed jackrabbits, coyotes, bobcats, chukars, common ravens, red-tailed hawks, and golden eagles (FAA 2000). No federally listed species, including the desert tortoise, are believed to occur in this part of the NTS.

Construction of the KLF would result in the clearing of approximately 671 acres of land, much of it previously undisturbed (FAA 2000). After construction, most areas that are not occupied by launch facilities, support buildings, and parking lots would be allowed to revegetate naturally. A relatively small amount of additional vegetation would be lost in the area of the launch facility as a result of hot exhaust gases and releases of chemicals (e.g., HC1) from launch vehicles. Vegetation may be damaged or destroyed by high temperature exhaust gases produced by launching the K-1. A NASA study reported that a deposition of more than one gram per square meter of chloride is necessary to cause serious damage to many plant species. The K-1 launch vehicle would deposit about 0.009 grams per square meter over an area of 250,000 square meters or 0.468 grams per square meter per year based on an assumed maximum 52 annual launches. Therefore, adverse impacts to vegetation from HCI deposition are expected to be negligible.

Wildlife would be disturbed by construction activities (clearing and grading land), construction noise, human activity in and around the facilities, launch noise, and sonic booms. The FAA Draft Environmental Assessment (EA) maintains that the potential loss of as much as 671 acres of land would reduce population levels of some animal species in the immediate vicinity of the KLF, but would not significantly reduce biodiversity in the area or region (FAA 2000). The Draft EA notes that, "considered in the context of the 100,000 sub- and supersonic sorties expected each year at the Nevada Test and Training Range…", noise impacts to wildlife from Kistler operations would be relatively minor.

NTS Ecological Monitoring and Compliance Program

The NTS EMAC Program, carried out by Bechtel Nevada (BN) and funded by the NNSA/NV, monitors sensitive ecological resources (wetlands, plants, animals) of the NTS in order to ensure compliance with applicable environmental laws and regulations (e.g., Clean Water Act, ESA, NEPA). The program is also intended to delineate and define NTS ecosystems and provide ecological information that can be used to predict and evaluate the potential impacts of proposed projects and programs on those ecosystems.

The EMAC Program ensures that the biological resources of the NTS are inventoried, monitored, and protected, consistent with the goals of the 1998 NTS RMP (DOE 1998), which grew out of the "framework" for the RMP outlined in Volume 2 of the 1996 NTS EIS. The major elements of the EMAC Program, as defined in the RMP, include (1) compliance with the Biological Opinion for Desert Tortoise Protection, (2) biological surveys, (3) candidate species and species of concern surveys, (4) raptor surveys, (5) special interest and game species surveys, (6) wildlife water source surveys, and (7) the HAZMAT Spill Center Monitoring Program (DOE 1998).

The RMP and associated monitoring programs were intended to (1) protect and conserve significant biological resources and (2) minimize cumulative impacts to biological resources (DOE 1998). In order to protect and conserve significant biological resources of the NTS, it was necessary to embark on an ambitious program that included identifying and mapping sensitive resources, as well as monitoring these sensitive resources. These included plants and animals listed or proposed for listing under the ESA, a number of raptors protected under the Migratory Bird Treaty Act, wild horses protected under the Wild Horses and Free-roaming Burros Act, and wetlands (seeps, springs, and man-made ponds), which are critical to the survival of many desert-dwelling animals.

The EMAC Program calls for biological surveys "at proposed NTS project sites where land disturbance will occur" (BN 2001). Once surveys are completed, survey reports are provided to the appropriate NNSA/NV organizations along with mitigation recommendations. In FY 2001, BN and allied scientists conducted 23 biological surveys on or near the NTS, most involving relatively small (1 to 25 acres) tracts of land. A total of 718

acres were surveyed, most (580 acres) associated with a proposed geo-seismic study of Frenchman Flat (BN 2001). Although the 23 projects evaluated have the potential for disturbing 589 acres, only 21 acres involved construction-related activities. The bulk of the acreage (568 acres) would be disturbed by off-road driving (geo-seismic survey transects) in the Frenchman Flat area (BN 2001).

Because of the EMAC Program, impacts to biological resources from NTS operations have been and will continue to be minimized, as sensitive areas (i.e., those known to harbor sensitive species or springs or wetlands) are avoided to the extent practicable when sites are being considered for new activities, facilities, and missions. When impacts are unavoidable, the EMAC Program serves to reduce them by suggesting mitigation measures. These mitigation measures have ranged from capturing and relocating individual animals that might be harmed, to marking areas (e.g., nests and burrows) that should be avoided by vehicles and personnel, to suggesting times of day or year in which construction activity should be conducted to minimize disturbance to a particular roosting, denning, or nesting area. Appreciation of the results of the EMAC Program at the NTS by American Indians is explained in Section 4.2.12.2, "Ecological Resources."

Conclusions

The conclusions of the 1996 NTS EIS remain valid with respect to biological resources. The analysis was conservative, meaning that impacts have been and will continue to be less severe than those described in the EIS. This stems from the fact that fewer new industrial facilities have been built than were planned, and the SEZ (proposed in 1996 and now a reality) has, to date, attracted no commercial solar-generating facilities. Further, the EMAC Program, elements of which grew out of the 1996 NTS EIS (see Chapter 7, Mitigation Measures), has effectively reduced impacts to biological resources by identifying and monitoring sensitive resources, surveying sites being considered for development (pre-activity surveys) to ensure that sensitive resources will not be affected, and by follow-up monitoring of developed sites to gauge the degree to which biological resources have been affected.

4.2.8 Groundwater

Groundwater Use/General Hydrology

There are two major types of effects possible on groundwater: reductions in water resource availability and impacts on water quality. NNSA/NV routinely withdraws groundwater at the NTS and other NNSA/NV-administered lands in Nevada. These groundwater withdrawals could result in localized availability, including a lowering of water levels, changes in groundwater flow directions, and a reduction in the quantity of water available to other users. If large-scale groundwater withdrawals occur, the impacts could increase to include reductions in off-site spring discharge rates, water quality impairment, and reduced underflow to downgradient areas.

The second effect is the potential impact of a given activity on the quality of groundwater. The grading of soils and other construction actions could alter the quantity and quality of runoff. However, because of the arid conditions and great depth to groundwater, water (and/or contaminants) that enter the surface and shallow subsurface on the NTS would generally not percolate downward toward the water table (DOE 2000a). The American Indian assessment of impacts to groundwater is presented in Section 4.2.12.2, "Groundwater."

The impacts to groundwater from continuing operations are studied and reported annually (DOE 2000a). A decline in site water usage due to the moratorium on nuclear testing has continued. Peak annual water use at the NTS was 4.2×10^6 cubic meters in 1989 (DOE 1996a); by 1999, water use had declined to 8.3×10^5 cubic meters (DOE 2000a). Year 2000 water use was approximately the same as 1999 (USGS 2001). No planned expansion of present operations would affect water use. Potential additional future water users include: KLF, Atlas Facility, Fire Experiment Facility, and the Advanced Accelerator applications project.

Kistler operations would be supplied by Well 8 in the Buckboard Mesa hydrologic basin. Well 8 water use reached a peak in 1964 (4.2×10^5 cubic meters per year), decreasing to 6.8×10^4 cubic meters per year by 1995 (FAA 2000), where it remains (USGS 2001). The basin has an estimated total perennial yield of 4.4×10^6 cubic meters per year (FAA 2000). Construction of Kistler would require approximately 3.8×10^3 cubic meters; operations would require approximately 6.8×10^3 cubic meters (FAA 2000). Kistler water use would not affect groundwater availability.

The main use of water during construction of the Atlas Facility would be for dust suppression and would come from Yucca Flats (DOE 2001b). Routine domestic operating water use of 400 m^3/year would be obtained from the same wells used by the Area 6 cafeteria.

The Fire Experiment Facility would use non-potable water from the "Roller Coaster well" at TTR; Figure 4-5 shows the well location. Less than 100 cubic meters would be placed in the proposed fire experiment pool. This water would be reused, with makeup to compensate for evaporation. This volume of water is 2.4 percent of the well's annual output.

The Advanced Accelerator would use the most water. The major use of this water would be as cooling water. Water during construction and system initialization (4.9×10^6 cubic meters) would be on the order of the peak historic withdrawal rate. Thereafter, system makeup requirements would be 4.9 to 9.8×10^5 cubic meters per year (DOE 2001b); this would approximately double present NTS water use, but would still result in total NTS water use of less than half the peak site usage. This water use is sustainable (DOE 2001b).

Groundwater Contamination

No adverse impacts to groundwater quality have resulted from operations since 1996; contamination in on-site supply wells is much less than maximum contaminant levels (MCLs) and no off-site migration of contamination has been found (DOE 2000a). Figure 4-6 shows the location of on-site supply wells and potable water sampling stations. The Routine Radiological Environmental Monitoring Plan monitors 59 off-site and 54 on-site monitoring wells (TtNUS 2001b). The Underground Test Area (UGTA) project has drilled 24 new wells since 1996. Twenty of these wells were drilled between Pahute Mesa and Oasis Valley, to the southwest of Pahute Mesa, and 4 were drilled in Frenchman Flat on the NTS. Monitoring results of NNSA/NV's Routine Radiological Environmental Monitoring Program of the new wells drilled by the UGTA Project confirm that no contamination has been detected off of the NTS.

Tritium, because of its mobility in water, is monitored routinely; concentrations continue to decline (DOE 2000a). The inventory of radionuclides in groundwater was updated when tritium, cobalt, cesium, europium, and plutonium contamination was found near the TYBO site. The plutonium was found to be from the nearby BENHAM test (Kersting et al., 1999), located 0.9 mile north of TYBO. Only tritium concentrations were greater than MCLs (TtNUS 2001b). The TYBO test is located 1.1 miles from the NTTR, and 13.7 miles from the nearest publicly accessible land.

The Underground Test Area Project is evaluating the extent of groundwater contamination due to past underground nuclear testing. This is being accomplished through the collection of data and developing groundwater flow and transport models to estimate the maximum extent of contaminant migration. The work of the UGTA project is being conducted under the oversight of the Nevada Division of Environmental Protection as part of the Federal Facility Agreement and Consent Order.

Monitoring at active waste management sites indicated no impacts to groundwater. No chemical or radioactive constituents attributable to either weapons testing or waste disposal have been detected at the MLLW or LLW disposal sites, RWMS-3 and 5 (DOE 2000b). Under current conditions, the recharge to groundwater

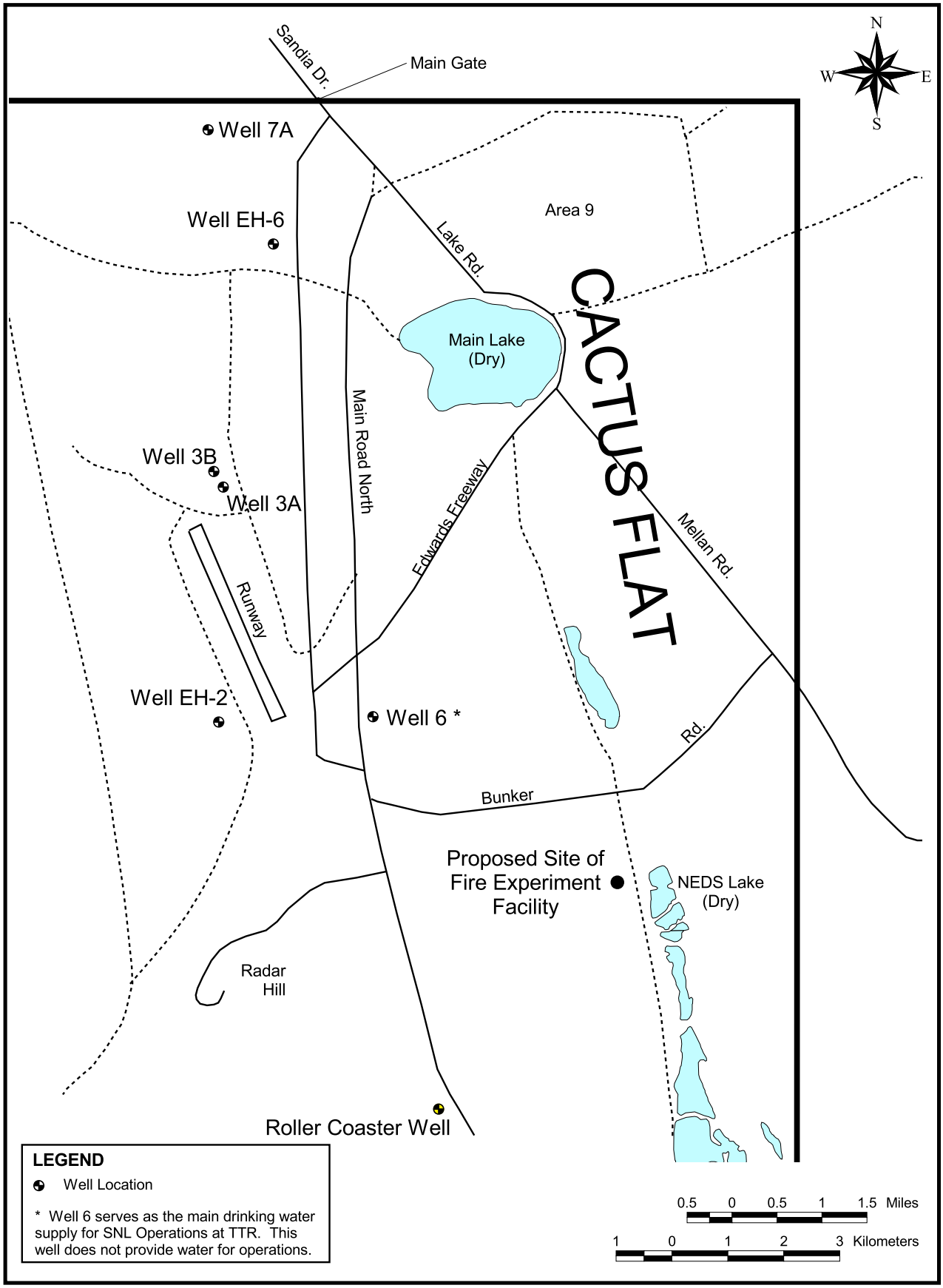

Figure 4-5. Domestic wells supporting Tonopah Test Range.

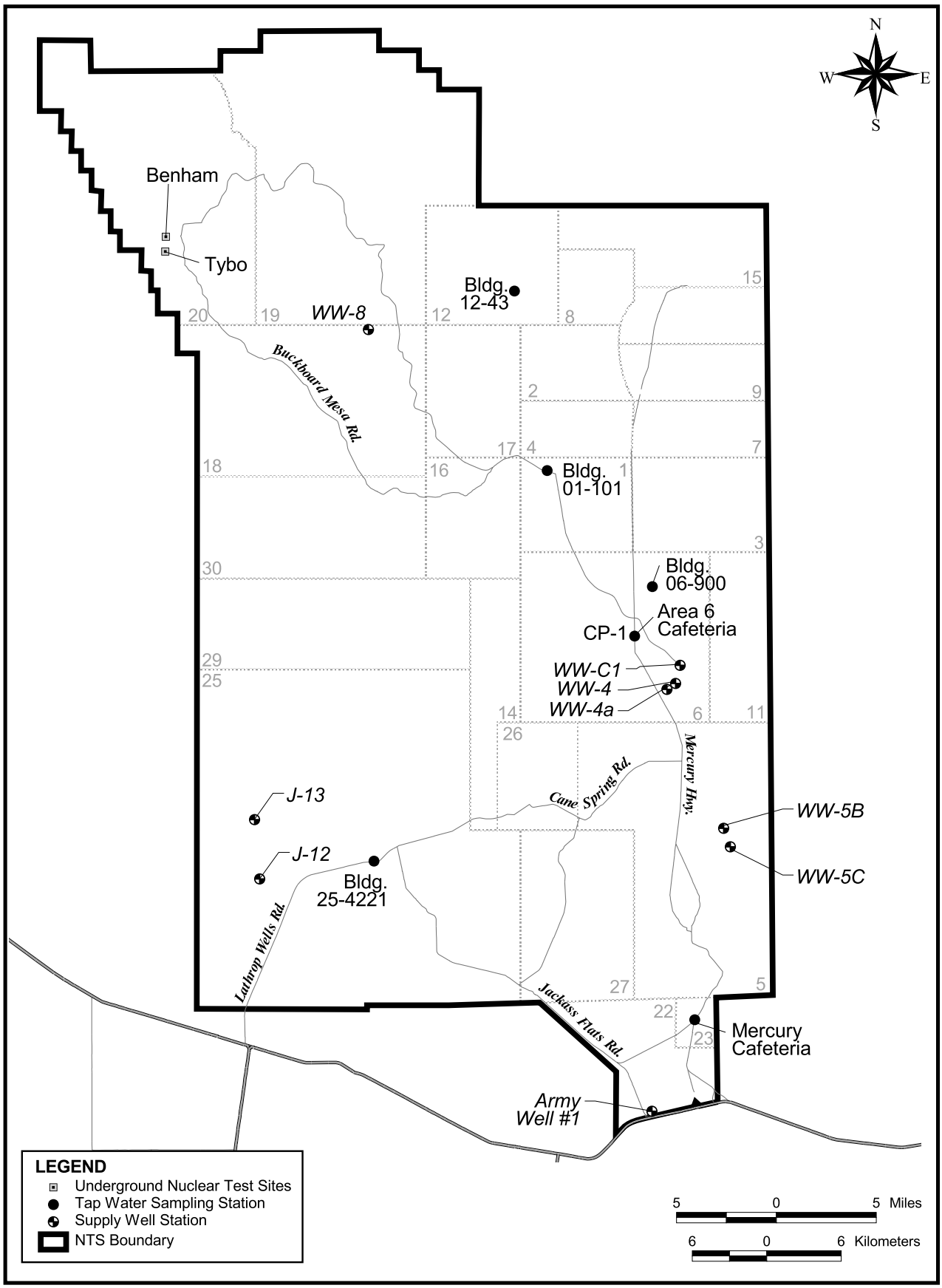

Figure 4-6. Supply well and potable water sampling stations on the NTS - 1999.

at these sites is zero; vadose zone monitoring has confirmed this (DOE 2000b). Results of groundwater monitoring at the active sewage lagoons indicate that all measured parameters were below the limits set in the discharge permit (DOE 2000b).

The NTS has about 1,300 wells and boreholes that are no longer used and are not candidates for future use. These holes could serve as a pathway for surface contaminants to reach subsurface strata, or for contaminated fluids in a well to migrate vertically to non-contaminated zones. Increased funding is being sought to expedite the process of properly abandoning and plugging these unused boreholes and wells.

The conclusions of the 1996 NTS EIS remain valid for impacts to groundwater.

4.2.9 Socioeconomics

For socioeconomic analysis purposes, the region of influence is defined as the area in which the principal direct and secondary socioeconomic effects of site actions are likely to occur and are expected to be of the most consequence for local jurisdictions. The region of influence for this SA is comprised of Nye and Clark Counties, Nevada, the same region of influence that was analyzed in the 1996 NTS EIS. The region of influence includes most of the residential distribution of NNSA/NV employees, its contractor personnel, and supporting government agencies. It also encompasses the probable location of future off-site contractor operations and indirect economic activities.

4.2.9.1 Population

Southern Nevada has been and continues to be among the fastest-growing areas in the United States. The population of Clark County grew from 741,459 in 1990 to 1,375,765 in 2000, an increase of 85.5 percent (USCB 2001), averaging about 63,000 new residents annually. Led by Clark County, Nevada is the fastest growing State in the country. From 1990 to 2001, Nevada had a total growth rate of 66.3 percent, compared to the 13.1 percent overall growth rate of the United States.

Population growth in the state of Nevada and in Clark County is expected to exceed average national trends for the foreseeable future. The explosive population growth in Clark County is expected to slow, but remain well above national averages.

Population changes in the region of influence due to potential future activities at the NTS would be small, compared to the overall population (i.e., less than one percent) and would therefore have no discernible impact on the population of the region of influence or its rate of growth.

4.2.9.2 Employment

In 1996, the NTS reported an average of 3,659 employees. Table 4-4 shows the NTS employment trends from 1996 through 2001. During those years, employment had its largest average annual growth in 2001 at 3.5 percent and its lowest drop in employment in 1997 of -10.2 percent. In 2001, the average annual employment data, available through October 2001, was 3,593.

The 1996 NTS EIS predicted a total NTS employment under Alternative 3 of 13,294 full-time-equivalent positions (Table A-4), of which 4,000 were assumed to be employed at the "large, heavy-industrial facility." The new or modified NTS mission that would result in the largest increase in NTS employment would be the KLF. This would result in 90 new permanent operations employees. The total estimated increase in NTS employment from all potential new or modified NTS missions, facilities, and projects would result in a total NTS employment level that is well within that presented in the 1996 NTS EIS.

Based on a count of workers in a 2001 data report, 79 percent of the NTS on-site employees live in Clark County and approximated 19 percent live in Nye County.

In 2000, the estimated employment in Clark County was about 840,000. This constituted 98 percent of the regional employment and about 68 percent of the State employment. During the

Table 4-4. The NTS employment trends (1996 - 2001).

Year	Employment
1996	3,659
1997	3,285
1998	3,334
1999	3,395
2000	3,471
2001	3,593

Source: TtNUS 2001a.

same year, Nye County had an employment base of about 13,000.

Summary

Changes in NTS employment due to potential future missions would result in the addition of a small number of employees, compared to the total employment in the region of influence, and would have only a small impact on the total employment in the region of influence.

4.2.10 Environmental justice

The 1996 NTS EIS presented detailed information on demographic characteristics of the three-County (Clark, Lincoln, Nye) region of influence based on an analysis of census block groups, which are subsets of census tracts that generally contain 250 to 550 housing units. The demographic information included the total population of the region of influence, numbers in minority communities, and numbers of low-income populations, all based on 1990 U.S. Census Bureau data.

The total population of the three-County area was 763,015 in 1990 (DOE 1996a). The 1990 census data showed that Clark County was subdivided into 318 census block groups, of which 91 were made up of low-income populations and 57 constituted minority communities (DOE 1996a). Lincoln County contained eight census block groups, none of which represented minority or low-income populations. Nye County was subdivided into 25 census block groups, none with minority communities and one with a low-income population.

Using geographic information system (GIS) software (ArcView®), the transportation routes discussed in Appendix I (Transportation Study) of the 1996 NTS EIS were layered on census block groups to determine how many miles of these routes traveled through areas having minority and/or low-income populations. Less than two percent of the routes in Clark County and less than one percent of the routes in Nye County moved through areas of minority or low-income populations (DOE 1996a).

The 1996 NTS EIS indicated that implementation of the Preferred Alternative would result in impacts to American Indian groups with traditional ties to the NTS and surrounding areas. Impacts included continued restricted access to culturally significant areas, the potential for unauthorized artifact collection, and the potential for "culturally inappropriate environmental restoration techniques" (DOE 1996a). The EIS concluded that these impacts would be perceived only by American Indian groups, but would constitute a disproportionately high impact on these groups. No other disproportionately high and adverse impacts to minority or low-income populations were identified in the EIS.

4.2.10.1 Update of population characteristics

At present, updated (2000) U.S. Census Bureau data are available for total populations and minority populations within a given census block group, census tract, or county in Nevada.

However, low-income population data are not expected to be available until summer 2002. The total population of the three-County area was 1,412,415 in 2000, almost doubling since 1990 (USCB 2000a). Virtually all of this population increase was due to population growth in Las Vegas and Clark County. Although the population of Clark County grew 85.5 percent between 1990 and 2000 (USCB 2000b), the percentage of minority census block groups increased very little, from 17.9 percent (57 of 318 blocks) to 19.1 percent (159 of 832 blocks). The 2000 census data showed four census block groups in Lincoln County, none of which were made up of minority populations. Nye County was comprised of 22 census block groups, none of which were minority populations.

Based on 2000 census data, there has been dramatic population growth in the three-County region of influence in recent years, but no marked changes in the locations or proportions of census block groups containing minority communities. All minority populations identified in 1990 and 2000 were in and around the City of Las Vegas. As noted before, data on low-income populations will not be released by the U.S. Census Bureau until summer 2002.

4.2.10.2 Conclusions

Although there has been dramatic population growth in the region of influence (associated with the economic boom in Las Vegas), the locations and proportions of census block groups having minority communities have changed little since issuance of the 1996 NTS EIS. There is no evidence that changing environmental conditions or changing NTS missions would alter the conclusions of the 1996 NTS EIS with respect to potential health risks or health effects to off-site populations (see Sections 5.1.1). In every instance, health risks and potential health effects from NTS operations and (off-site) transportation of nuclear and hazardous materials were determined to be small and well within regulatory limits. The analysis was conservative, meaning that impacts to workers and off-site populations have been and would continue to be less severe than those described in the EIS. The American Indian perception of impacts is explained in Section 4.2.12.2, "Environmental Justice."

As a consequence, the conclusions of the 1996 NTS EIS with regard to possible disproportionate impacts to minority and low-income populations remain valid.

4.2.11 Cultural resources

To date, there have been 443 cultural resource investigations conducted on the NTS. The following characterization of cultural resource sites includes the preliminary findings from inventories conducted of the Shoshone Mountain Project Area for the (now cancelled) Wind Farm EIS. These inventories identified 68 resources at this project area, 44 of which are preliminarily recommended as eligible for listing on the National Register of Historic Places. NNSA/NV has not made final determinations on these recommendations and the National Historic Preservation Act, Section 106 consultation has not been completed for these inventories. Approximately 5.5 percent of the NTS has been investigated, mostly by 100-percent-coverage pedestrian surveys, with some data recovery excavation and Native American ethnographic consultation. A total of 2,960 cultural resources has been recorded. National Register eligibility for the resources is as follows: 1,512 resources are not eligible, 1,075 resources are eligible or potentially eligible, and 373 resources are undetermined. This last category includes the 68 resources recorded at Shoshone Mountain, which do not have final determinations of eligibility. Ninety-six percent of the resources are prehistoric, with the remainder either historic, recent significant, unknown, or multi-component (DOE 1999b; DOE 2000b; DOE 2002; FAA 2000).

The distribution and density of sites has not changed since the 1996 NTS EIS. The largest number of recorded cultural resources is in the northwest part of the NTS, on and around the Pahute and Rainier Mesas, followed by the southwest portion of the NTS, on and around Jackass Flats; Yucca Mountain (DOE 1999b) and Shoshone Mountain. However, this

distribution should be regarded with caution. The relatively high number of cultural resources in these areas is related in part to the numerous activities being conducted on those portions of the NTS, as most cultural resource investigations are conducted in response to planned NTS projects. Additional cultural resources on the NTS may include American Indian resources, as described in Section 4.2.12.2, "American Indian Cultural Resources."

4.2.11.1 Changes in legislation

The legislation detailed in the 1996 NTS EIS (Appendix E, Section E.2.10) that addresses federal agencies' obligations for cultural resources still apply to the NNSA/NV at the NTS. However, there have been some changes and additions to these obligations. The *National Historic Preservation Act of 1966* (NHPA) (16 USC 470, as amended) was revised in 1992 to include more extensive involvement of Native American tribes and the public in cultural resource identification and decisions regarding evaluation, assessment of effect, and treatment. Another change was the determination that, while data recovery is an acceptable mitigation for adverse effects to archaeological resources, data recovery no longer removes the effect. Although the law was revised in 1992, revision of the NHPA's implementing regulations (36 CFR Part 800) was not completed and adopted until January 11, 2001. However, changes in the regulations did not require gross changes in the operation of the NTS cultural resources program; the NNSA/NV follows and will continue to follow the new regulations set forth in January 2001.

Three new Executive Orders (EOs) have been established since the 1996 NTS EIS. EO 13007, *Protection and Accommodation of Access to Indian Sacred Sites* (*61 FR 26771*), was signed on May 24, 1996. This order directs land managing agencies to (1) accommodate access to and ceremonial use of Indian sacred sites by Indian religious practitioners, and (2) avoid adversely affecting the physical integrity of such sacred sites. EO 13084, *Consultation and Coordination with Indian Tribal Governments* (*63 FR 27655*), was signed on May 14, 1998. This was later revoked and replaced with EO 13175, *Consultation and Coordination with Indian Tribal Governments* (*65 FR 67249*), which was signed on November 6, 2000. This Order requires agencies to establish regular and meaningful consultation with tribal officials in the development of policies that have tribal implications. The DOE revised its *Tribal Government Policy* in early 2000 to include EOs 13007 and 13084; however, it was signed into policy before EO 13175 was established. The DOE/NV (now NNSA/NV) has an exemplary record of consultation with tribes concerning existing, new, and proposed activities on the NTS, as well as tribal concerns for natural and cultural resources located on the NTS. The Nevada Operations Office has consulted with concerned American Indians since 1988. These consultations have led to establishment of the Consolidated Group of Tribes and Organizations (CGTO), which includes members from 16 tribes and 2 pan-tribal organizations representing 3 ethnic groups that were found to have prehistoric and historic ties to the NTS: Western Shoshone, Southern Paiute, and Owens Valley Paiute. Consultations with this group and any other affiliated tribes are ongoing and follow the policies set forth by the DOE and current EOs.

4.2.11.2 Summary

The 1996 NTS EIS projected that impacts would occur to cultural resources as a result of implementation of Alternative 3, and that the exact nature and significance of those impacts would not be fully understood until cultural resource inventories and consultations with American Indian tribes were conducted. The 1996 NTS EIS also proposed mitigation measures for any project that would adversely affect a significant cultural resource. Many proposed NTS future missions and facilities would be located in existing facilities or built in areas that have been previously disturbed, and are therefore not likely to impact cultural resources. However, some of the new facilities would be constructed in undisturbed areas. Direct impacts to cultural resources may result from construction of new facilities or infrastructure, improvements to existing facilities or infrastructure, and implementation

of training activities. Indirect impacts such as vandalism, artifact collection, or inadvertent damage could result from improved access to project areas. These impacts are consistent with those described for Alternative 3 in the NTS EIS.

NNSA/NV follows and would continue to follow DOE policy and the various legislations that require the responsible agencies to take into consideration the effects a project may have on cultural resources. If adverse effects to significant resources occur as a result of a project, NNSA/NV would continue to follow the mitigation measures described in the NTS EIS and reiterated in the *Cultural Resource Management Plan for the Nevada Test Site* (DOE 1999c). By following these procedures, the impacts projected for future missions and activities would not exceed the envelope of consequences established in the 1996 NTS EIS. Therefore, no supplement to the 1996 NTS EIS is needed for cultural resources.

4.2.12 American Indian resources

This section was prepared by the American Indian Writers Subgroup (AIWS) of the CGTO, with review by NNSA/NV, for inclusion in this SA. Information provided by the AIWS is italicized in this section to distinguish it from NNSA/NV text.

The NNSA/NV has been conducting government-to-government consultation with American Indian tribes since 1988. During the process, the CGTO was established as a consultation vehicle for the NTS. The CGTO comprises 16 tribes and 2 official pan-tribal organizations that represent 3 ethnic groups from Arizona, California, Nevada, and Utah that are culturally and historically affiliated with the NTS and surrounding areas: Western Shoshone, Southern Paiute, and Owens Valley Paiute. As such, the CGTO has a long-standing relationship with the NNSA/NV. The primary focus of the CGTO has been the identification and protection of traditional cultural resources, and it has identified numerous sites on the NTS that are important to the Indian people. These include storied rocks, rock shelters, wooden lodges, rock rings, springs, trails, and some archaeological sites.

During preparation of the 1996 NTS EIS, a small committee of Indian people representing the above ethnic groups was appointed by the CGTO to provide American Indian input into the 1996 NTS EIS. This committee was called the AIWS. Its input into the 1996 NTS EIS was documented in Appendix G, which is a summary of opinions expressed by the CGTO regarding long-term impacts of NNSA/NV's activities at the NTS on resources important to American Indians. Specific comments made by the AIWS were also inserted in various chapters of the 1996 NTS EIS.

In accordance with DOE American Indian and Native Tribal Governments Policy, the CGTO was notified in October 2001 of NNSA/NV's intent to prepare an SA for the 1996 NTS EIS and invited to participate by providing its concerns on new and expanded programs. Tetra Tech NUS, Inc., briefed CGTO members on the SA process at the annual meeting between the CGTO and NNSA/NV in Las Vegas, Nevada, in November 2001. A three-day meeting of four CGTO representatives (the AIWS) was held in Las Vegas, Nevada, in early December 2001 to provide input into the SA. The meeting was facilitated by Tetra Tech NUS, Inc., and the University of Arizona's Bureau of Applied Research in Anthropology.

Such a writing procedure demonstrates the on-going interest of the CGTO in the activities and potential environmental impacts of NNSA/NV activities at the NTS and emphasizes the continuity of issues established in the 1996 NTS EIS and again here. *The AIWS reaffirmed that the American Indian concerns and viewpoints presented in Appendix G are still valid today: the following discussion builds on established ideas presented in Appendix G and many are only referenced here*. The discussion focuses on those resource areas of most concern to the CGTO. Not enough information was available on some expanded and new programs for the AIWS to draw definite conclusions about their effects on American Indian resources. However, it was noted that most of new and expanded

programs included in this SA occur in previously disturbed areas or within existing facilities. This discussion begins with a statement by a member of the Indian community regarding the meaning of the land in Indian culture.

4.2.12.1 "The work is not finished yet"

The land, air, and water speak. This is what all indigenous people know, understand, and acknowledge as the foundation and center of their existence. Our emphasis is on communicating with the living force that lives in all life forms and using the learned response by incorporating it with respect into a visual form such as a petroglyph or hearing an oral story. In this way, our unique documentation of this force and its presence in nature is handed down through the generations. Is our work finished for the landscape, air, and water on the NTS? No, not likely. The recognized continuity of the life there on the NTS moves forward continuously without interruption. It generates its own will. This continuous flow or spark is still there on the NTS and is in essence waiting to be singled out once again by the ones who comprehend it.

The AIWS and the CGTO are becoming recognized for their knowledge and expertise gained throughout NEPA process. Their efforts can serve as a model for involving American Indians in future NEPA efforts. Already other Indian tribes and federal agencies are reviewing this process and considering similar American Indian participation in the management of Indian holy lands. We believe that the efforts of the CGTO with the NNSA/NV will encourage other federal agencies to include Indian tribes and organizations into their NEPA processes and will encourage American Indian tribes and organizations to become actively involved in their cultural interests.

4.2.12.2 Discussion of resource issues

Visual resources

Views are important cultural resources that contribute to the location and performance of American Indian ceremonialism. Views combine with other cultural resources to produce special places where power is sought for medicine and other types of ceremonies. Views can be of any landscape, but more central viewscapes are experienced from high places, which are often the tops of mountains and the edges of mesas. Indian viewscapes tend to be panoramic and are special when they contain highly diverse topography. The viewscape panorama is further enhanced by the presence of volcanic cones and lava flows. Viewscapes are tied with songscapes and storyscapes, especially when the vantage point has a panorama composed of multiple locations from either song or story. Key to the Indian experience of viewscapes is isolation. Successful performance of ceremonies (whether by individuals or groups) is often commemorated by the building of rock cairns and by rock peckings and paintings.

The CGTO tribes recognize the cultural significance of viewscapes and have identified a number of these on the NTS. The Timber Mountain Caldera contains a number of significant points with different panoramas, including Scrugham Peak-Buckboard Mesa and the Shoshone Mountain massif.

Ecological resources

NTS lands were withdrawn from the public domain in the 1940s. Since that time, some places have been disturbed by nuclear testing and other activities. However, there are other places that have returned to a more natural condition because of the restricted-access status of the NTS. Before being withdrawn from public domain, some places on the NTS had been used for mining and grazing. Public highways crisscrossed the area, making it accessible for hunting or other consumptive activities. Creation of the NTS provided a protective umbrella under whose shadow mining activities were halted, grasses recovered from grazing, and animals came to live in peace. Indian places containing many ancestral cultural materials have been protected from artifact collectors and vandals who would have taken the arrowheads, grinding stones, baskets, and

pottery, broken up Indian homes, and vandalized storied rock sites. Missing from this recovered natural setting are the Indian people who were created to protect and sustain these animals, plants, and topography.

So while the CGTO tribes do not support activities that harm the land, they value the environmental protection and natural resource recovery that has occurred since the NTS was established. The CGTO tribes recommend that places with special ecological features be recognized by NNSA/NV and, if they qualify, be maintained as traditional cultural properties so that such ecosystems will persist into the future for all mankind.

Groundwater

The forces of power in the world move along channels and combine into specific nodes or places of power. A common set of these channels follows the path of water. These paths begin at the tops of mountains, especially at the highest peaks. On these highlands and peaks, snow and rain falls after being called down by the mountain itself. From this beginning, the water moves downhill in rivulets, washes, and streams. The water often goes underground, where it forms similar networks of channels moving in various directions, only somewhat corresponding to what others call hydrological basins. Each discrete underground water network basin has its own origin story, having been made by Ocean Woman where she placed her feet. At certain points, the water emerges at the surface in springs and seeps. It was here that Ocean Woman placed her medicine staff in the ground and, thus, the water emerged. At other places, the surface water in low playa lakes meets the underground water channels. These points are like doorways between the surface world and the subterranean world. Water is often attracted to volcanic activity, thus producing power places like hot mineral springs. Water is a living organism that is fully sentient and willful. Because water is a powerful being, it is associated with other powerful beings, like water babies. When humans respect water, it sustains them and life forms on the surface; but, when water is not treated well, it withdraws its life-giving support and returns to the underworld.

According to the CGTO tribes, springs on the Pahute and Rainier Mesas and near Buckboard Mesa have dried up because the water has returned to the underworld because it has not been treated correctly by the NNSA/NV activities. There are also places on the NTS where rain falls, but does not nurture the plants and animals.

American Indian cultural resources

American Indian cultural resources are spiritual and therefore include more than physical natural resources and archaeological remains. According to the CGTO tribes, only Indian people can divine the cultural importance of these resources. The NTS and nearby lands were central in the lives of the Western Shoshones, Owens Valley Paiutes, and Southern Paiute people and were mutually shared for religious ceremony, resource use, and social events. Despite the destruction of some cultural, natural, and other resources important to American Indians from nuclear testing and other activities at the NTS, Indian people continue to value and recognize the central role these lands play in the traditional life-ways of American Indians today. The continued and expanded activities at the NTS, as reviewed in this SA, may affect American Indian cultural resources. Detailed descriptions of American Indian cultural and other resources on the NTS are given in Section G.3.2 of Appendix G of the 1996 NTS EIS.

Environmental justice

Environmental justice concerns of the CGTO were addressed in Appendix G of the 1996 NTS EIS and are still the same today. According to the CGTO tribes, American Indian concerns include: (1) holy land violations, (2) perceived risks from radiation, and (3) cultural survival, especially in response to access restrictions.

The NTS lands are part of the holy lands of the Owens Valley Paiutes, Southern Paiutes, and Western Shoshone peoples. The CGTO tribes

maintain that these lands have been polluted and the resources damaged by long-term activities involving radioactive materials. According to the CGTO tribes, past, present, and future pollution of these holy lands constitutes both environmental justice and equity violations. No other people have had their holy lands impacted by NTS-related environmental pollution and damage.

The CGTO tribes believe that the lives and health of Indian people who have occupied this area have been threatened by continued exposure to radioactivity. This threat is not limited to Indian people who live in the immediate vicinity of the NTS, but also those Indian people who share resources that have been collected in the NTS region. Indian people fear the continuous threat of radioactive contamination and its cumulative effects on future Indian generations. These Indian people have experienced, and will continue to experience, perceived health effects and risks from NTS radioactivity.

According to the CGTO tribes, one of the most detrimental consequences of NTS operations for the survival of American Indian culture, religion, and society has been the denial of access to their traditional lands and resources. Indian people have experienced, and will continue to experience, breakdowns in the process of cultural transmission due to lack of access to NTS lands and resources. Indian people fear that land disturbance and irreparable contamination of the soil and underground water may render many important locations unsuitable for ceremonial use. An important exception is the Gold Meadows area, where NNSA/NV has acknowledged the importance of this area to American Indians and will make every effort to protect it.

4.2.12.3 Discussion of specific project issues

Environmental restoration

The CGTO tribes support most environmental restoration activities that have occurred on the NTS and TTR. The CGTO tribes are still concerned about the removal of contaminated soils that were previously disturbed on TTR, in that cultural resources could be within these soils and potentially damaged through removal. A subcommittee of the CGTO visited these sites and provided guidelines for performing these tasks in a culturally sensitive manner. In addition, the subcommittee recommended that tribal religious leaders conduct balancing ceremonies and healing prayers at these sites as a critical step in restoration. So far, none of these recommendations have been implemented by the NNSA/NV.

Waste management

The CGTO tribes continue to have reservations regarding the storage of LLW and other hazardous waste at the NTS and the transportation of LLW to the NTS for storage. The CGTO maintains that American Indian cultural resources will continue to be adversely affected because the waste has not been disposed in a culturally appropriate manner. Access to culturally significant places on the NTS will be reduced because waste storage facilities increase Indian peoples' perception of health and spiritual risks.

Indian people perceive the transportation of LLW as potentially destructive to the environment and people. During the Intermodal and Highway Transportation of Low-Level Radioactive Waste to the Nevada Test Site study, the CGTO tribes and other American Indian tribes located on or near the transportation routes expressed concern that the transportation of radioactive waste, an accident involving the release of radioactive materials, and the mere existence of trucks hauling radioactive waste on the roads would damage the economic prospects of their communities, including agricultural, wildlife, and tourism. These concerns continue to be expressed by the CGTO tribes.

Non-defense research and development

The potential for non-defense and development missions coming to NTS lands was reviewed and supported in principle by the CGTO tribes during the preparation of the 1996 NTS EIS. At that time, there were few details about possible

projects, so the CGTO tribes requested to be involved in the environmental impact analyses of proposed projects, utilizing the process of consultation described in Attachment C of Appendix G of the NTS EIS. Since that time, a number of projects have been formally proposed and there is evidence that some of these projects have not honored the CGTO tribes' request, especially regarding the process of consultation. The CGTO tribes request that the NNSA/NV commit to consistent use of the established consultation protocols, as outlined in Appendix G and as manifested in normal NNSA/NV consultation practice, to ensure continuity among its environmental analysis projects on the NTS.

4.2.12.4 Cumulative impacts

According to the CGTO tribes, increased land disturbances associated with all forms of activities and development on the NTS could result in a decrease in access to these areas for American Indians. Limiting access could reduce the traditional use of the NTS and other areas and affect their sacred nature. Increased development at the NTS could increase the potential for greater disturbance and vandalism of American Indian cultural resources. The CGTO tribes believe that cumulative impacts in the following areas may occur:

- *Holy land violations. Further destruction of traditional cultural sites, making the water disappear, general treatment of the land without proper respect.*

- *Cultural survival. Decreased ability and access to perform ceremonies.*

- *Environmental restoration. Revegetation of restored lands with native species.*

- *Empowerment process. Over the past 11 years of regular consultation between the NNSA/NV and the CGTO tribes, there has been a growing co-management role for the tribes. Their recommendations have been heard and, for the most part, responded to by the NNSA/NV. Indian access to places on the NTS has increased, after an early period of access loss. Unfortunately, each new program that is added to the NTS decreases the amount of space that is available for the practice of Indian religions, ceremonies, and cultural persistence. However, having no programs also can have an impact. For example, even though the mesas are now accessible to Indians for ceremonies, the roads are not maintained because there are no projects on the mesas. This makes access to the ceremonially important areas difficult.*

- *Radiation risks. These risks began with nuclear testing. Today, the CGTO tribes perceive that the radioactive risks continue in known and unknown ways underground. There are still ongoing risks to Indian people from storage and disposal of waste and these will continue. Finally, transportation of radioactive materials is continuing and increasing. It is not clear to the CGTO tribes that, after two American Indian studies of radioactive waste transportation, there has been a meaningful consideration of their concerns.*

CHAPTER 5
DETAILED CONSEQUENCE ANALYSIS

This chapter presents more detailed analyses for technical disciplines that did not pass the screening criteria described in Section 4.1, thus requiring further analysis. It also presents a summary of the cumulative impacts for both the region of influence and Nevada Test Site (NTS) activities.

5.1 Public and worker health and safety

5.1.1 Radiological impacts (normal operations)

Radiological impacts from normal operations are expected to be consistent with the conclusions of the 1996 NTS Environmental Impact Statement (EIS) (DOE 1996a). Radiological impacts to workers and members of the public may occur in the course of normal site activities involving radioactive materials. Perceptions by American Indians for radiological impacts are included in Section 4.2.12.2, "Environmental Justice." This section reviews the potential changes since the 1996 NTS EIS that could result in increased radiological impacts from normal operations, except operations involving transportation of radioactive material (see Section 4.2).

In the 1996 NTS EIS (Appendix H, Table 4-1), impacts to members of the public from routine airborne emissions of radionuclides were not analyzed. The great distances from the areas in which operations are conducted to the nearest members of the public ensures that routine operations have negligible off-site health impacts. This would still be the case for new or expanded operations with potential emissions of radionuclides at the NTS.

In compliance with Subpart H of 40 Code of Federal Regulations (CFR) 61.94, the NTS is required to submit an annual air emissions report. The 2000 annual report (Grossman 2001) indicates that impacts to the maximally exposed off-site individual from all sources of emissions are less than 2 percent of the 10 millirem annual limit. By far the greatest contribution to this dose (over 99 percent) is from particulate resuspension of contaminated soil resulting from remedial actions, vehicular traffic, or wind erosion. A minor source (less than 1 percent) is due to diffuse gaseous tritium emissions. Emissions from permitted stacks contributed less than 0.01 percent of the dose from total site emissions. As the amount of remedial activity decreases over time, there will be reductions in the off-site impacts of radiological air emissions. A dose assessment for glovebox work in the Device Assembly Facility, part of the Joint Actinide Shock Physics Experimental Research (JASPER) project, was done to comply with the requirements of 10 CFR 61 (Grossman 2001). The annual off-site dose to an individual was estimated to be approximately 0.000001 percent of the 10-millirem per year dose limit. Therefore, this new source would have a negligible impact on the total off-site dose from routine emissions. For the impacts of routine airborne emissions to increase significantly, the amount of resuspended material would have to increase proportionally. This is unlikely, due to two factors. Remediation of surface contamination is resulting in a progressive removal of sources of contamination, making them unavailable for future resuspension. It is possible, but unlikely, that activities leading to resuspension will be accelerated to the point of significantly increasing the resuspension. However, any increased emission rates would be temporary and would be followed by a significant reduction in emissions following remediation. Finally, because no new sources of surface contamination are being added to the existing inventory, concentrations of radioactive materials in these diffuse sources are continuously decreasing.

The 1996 NTS EIS defined a single scenario (Scenario GW1) to estimate radiological impacts to members of the public from transport and ingestion of contaminated groundwater resulting from past underground testing of nuclear weapons. The EIS indicated that any impacts to

the public would not be expected to occur within the 10-year timeframe of the 1996 NTS EIS and would be independent of the alternatives being analyzed. The EIS concluded that resumption of underground testing would not significantly affect the amount of subsurface contamination that is present. Because no underground testing has been conducted since the 1996 NTS EIS was issued, these results and conclusions have not changed. In addition, no new sources of groundwater contamination have been introduced or are planned in the future.

The 1996 NTS EIS defined a single scenario (Scenario HR1) to evaluate routine radiation exposure to workers from radioactive materials operations. These activities included waste handling, waste packaging, waste treatment, construction, decontamination and decommissioning, maintenance, and excavation. These activities could result in doses to workers from external (direct) exposures to low levels of radiation or from inhalation of small amounts of radioactive materials. Scenario HR1 was applied to all alternatives in program areas/activities in which radioactive materials would be handled.

The exposure to any individual during routine operations would be administratively maintained within current U.S. Department of Energy (DOE) limits (5 rem per year), a limit that has not changed since the 1996 NTS EIS was issued. Therefore, this analysis focuses on whether new or existing operations could result in a significant increase in the annual collective dose to the worker population. Historical reports of total collective occupational doses incurred by NTS workers are not available. The 1996 NTS EIS estimated the annual collective dose to workers from direct exposure, using the number of radiation workers and the average worker dose rate (rem per year). Therefore, one way to assess whether current and projected occupational doses are within the limits established in the 1996 analysis is to review historical trends in the number of radiation workers, average worker dose rates, and projected dose rates for new operations.

Because the collective dose is also a function of the number of workers, trends in employment can be used as a rough indicator of potential impacts. However, an increase in employment numbers would not necessarily mean an increase in occupational doses. An increase in the proportion of workers performing non-radiological work, or work in low-dose areas, would cause the average worker dose to go down.

Employment at the NTS has remained fairly steady since 1996. Based on data (TtNUS 2001) through October 2001, total employment at the NTS stood at 3,593. During this five-year period, employment levels at the NTS did not fluctuate by more than 10 percent.

There are several indicators that point to a decrease in the number and/or collective dose to radiation workers. As indicated in Section 5.3.1, the volumes of low-level waste (LLW) generated by or shipped to the NTS would be within the volumes projected in the 1996 NTS EIS. While the volumes of transuranic waste are higher than those reported in the 1996 NTS EIS, it is the LLW that contributes the bulk of external exposures to waste management workers. Therefore, the collective dose to such workers would be within the limits established in the 1996 NTS EIS. A number of environmental restoration missions have been completed, and the closed facilities are no longer contributing to doses incurred by cleanup workers involved in the operations. Worker exposures at sites targeted for future restoration are not expected to exceed the doses for these activities reported in the 1996 NTS EIS.

A number of defense programs with the potential for occupational exposures during normal operations have been added or their missions expanded since the 1996 NTS EIS, including the Atlas and Big Explosives Experimental Facility (BEEF) programs. These additions are offset by the elimination of (or decision not to locate at the NTS) other radiological programs considered in the 1996 NTS EIS, such as the national ignition facility

and the storage and disposition of weapons-usable fissile materials. Therefore, occupational doses from changes in defense-related programs would still be within the limits established in the 1996 NTS EIS.

New activities in other program areas do not involve significant amounts of work with radioactive materials or radiation-generating machines, and existing activities in these program areas have not been expanded, relative to the 1996 EIS. Therefore, any collective doses to workers in the non-defense research and development program and the work-for-others program would be within the limits established in the 1996 NTS EIS.

The increase in programs at the NTS that do not involve occupational radiation exposures is expected to continue, resulting in a smaller number of radiation workers that require monitoring. In addition, new and existing programs involving radioactive materials are subject to design and operational reviews to ensure that doses are maintained as low as reasonably achievable (ALARA). Implementation of the ALARA programs are likely to result in further decreases in dose rates incurred by individuals, while collective doses to all radiation workers is expected to decrease as a function of both the ALARA programs and the reduction in the total number of radiation workers employed at the NTS. Based solely on employment trends at the NTS and the proportion of radiation workers in the workforce, it is very unlikely that impacts to NTS radiation workers from routine operations will exceed the limits established in 1996 NTS EIS.

Summary

Based on the foregoing discussion, the public and worker radiological impacts from normal operation of future NTS activities are within the radiological impact limits presented in the 1996 NTS EIS.

5.1.2 Accident analysis

The occupational and public health and safety evaluations addressed and presented in the 1996 NTS EIS (DOE 1996a), were based on various ongoing National Nuclear Security Administration Nevada Operations Office (NNSA/NV) missions, as described for each alternative, with the addition of new activities within each program. Future new planned or proposed activities at the NTS (and other off-site locations in Nevada) are described in detail in Chapter 3 of this SA. Available accident scenario, impact, and risk information for the proposed activities were compared to the evaluations presented in the 1996 NTS EIS. Proposed activities with a potential for accidental release of nuclear and chemical materials and thus, a potential for impacts are discussed. The potential impacts of accidents are discussed and compared with those presented in the 1996 NTS EIS.

As evident from Chapter 3, some activities analyzed in the 1996 NTS EIS are either completed or discontinued. Therefore, there would be fewer NTS employees than considered in the 1996 NTS EIS and, therefore, in worker injuries and safety considerations. However, there are a number of proposed activities on-site and in off-site locations that have the potential for increasing the workforce and thus increasing health and safety impacts to workers. It is anticipated that net changes in the workforce, worker impacts, and safety concerns would be small. Construction risks from proposed activities may temporarily increase impacts slightly.

JASPER

JASPER has been categorized as a radiological facility based on hazard analysis (LLNL 2000). This analysis considered the complete spectrum of hazards and accidents that could result from facility operations or external initiators that would result in potential accident consequences

to workers, the public, and the environment. A number of radionuclides (including plutonium-238, plutonium-239, various isotopes of uranium and, to a lesser degree, other actinides) may be used as target materials in shock physics experiments. These actinides are impacted by projectiles within a primary target chamber nested inside of a secondary confinement chamber. The potential release fractions are significantly smaller than the release fraction of 10^{-3} that is used in DOE (1992) to evaluate the category 3 threshold quantity of plutonium.

Three accident scenarios with the potential for releasing plutonium materials to the environment were evaluated in detail in Lawrence Livermore National Laboratories (LLNL) (2000). The calculated maximum dose from any of these accidents at 30 meters is 6.4×10^{-2} rem, resulting in a risk of 3.2×10^{-9} (assuming a probability of 1×10^{-6} per year), which is much smaller than the maximum reasonably foreseeable radiological accident risk of 0.0054 over the 10-year period that was considered in the 1996 NTS EIS. The potential consequences to workers include death or serious injury (due to variety of extremely unlikely initiating events having an annual probability of 1×10^{-6} of occurring). The worst consequence to the environment would be minor local contamination. The risks to the public from JASPER operations are negligible.

BEEF

The BEEF was analyzed and details are presented in Appendix F of the 1996 NTS EIS. New missions have been identified at BEEF.

Operations with nuclear-explosives-like assemblies (NELAs) are planned to be performed at the BEEF facility. LLNL's draft Safety Analysis Report (SAR) analyzed generic facility inventory and presented results (LLNL 2001). A 40 kilogram high-explosive (HE) explosion is considered for the accident release, without any filtration. The detonation would affect the hazardous material inventory of the test assembly in three ways: (1) the material surrounded by the HE charge is assumed to be completely aerosolized and dispersed as fine particles, (2) the material adjacent to the HE would become large-particle shrapnel, with only a small portion being fine particles, and (3) massive components located more than a few inches away from the HE would remain intact and be ejected like projectiles.

The values used in the accident analysis present the estimated maximum quantities of each hazardous material present in a test assembly. Typical instantaneous explosion source terms include uranium oxide, beryllium, beryllium oxide, mercury, thallium, thorium oxide, and lithium hydroxide. Typical 15-minute fire-dispersed source terms includes uranium oxide, beryllium oxide, and lithium hydroxide.

The SAR analysis assumed moderate meteorological conditions and estimated concentrations for each chemical component of the test assembly at near (100 meters), middle-distance (2,000 meters) and for (21,000 meters) locations (LLNL 2001). The results indicate that off-site concentrations for all hazardous materials would be less than Emergency Response Planning Guidelines (ERPG) 2 values (no serious health effects), and BEEF on-site concentrations would be less than ERPG 3 values (no life-threatening health effects), except for the beryllium/beryllium oxide releases. These releases would be above ERPG 3 values at the BEEF (within 100 meters), but not at other locations on the NTS. It is concluded that only workers at the facility could be impacted, not persons at other NTS locations or the general public. The facility is classified as a moderate hazard and may require some mitigation measures.

Atlas Facility

Future missions at the NTS include the relocation of a hydrodynamic test machine, the Atlas pulsed-power machine from Los Alamos National Laboratory (LANL) to the NTS. At the NTS, the Atlas Facility would be housed in a newly constructed, pre-engineered 26,000 square-foot building. After Atlas is reassembled at the NTS, it would be recommissioned to ensure proper operation and then used to conduct approximately 40 pulsed-power

experiments per year, with a potential increase to approximately 100 experiments per year. It would employ 15 people, mainly engineers and scientists.

The probability of a major accident occurring at the proposed Atlas Facility during its construction and operation is low. The maximum foreseeable accidents considered and evaluated for a construction worker involve either electrocution from a high-energy power source or injury from the mechanical collapse of the overload crane. Both have an equal likelihood of occurrence. The impact to a construction worker in these scenarios could be death; however, the frequency is less than 0.01 per year. The most likely operational accident scenario that could result in an impact to noninvolved workers has a possibility of occurring of a 0.001 per year. This scenario involves exposure to emissions and effluents from a capacitor bank fire, from either smoke or sprinkler system water containing mineral oil spilled from a failed capacitor module. The impact to a noninvolved worker would be temporary irritation and discomfort. The impact to a member of the public would be less than that experienced by the noninvolved worker. Based on the accident scenarios and impact analyses, there are no probable NELA accidents that would result in an adverse impact to the public (DOE 2001). Water containing mineral oil would not present any serious environmental concern.

Advanced Accelerator

Advanced accelerator applications would be performed at the accelerator-driven test facility at the NTS (either Area 22 or Area 25). As noted in Section 3.1 of this SA, the NTS would be one of several sites under consideration for this project. This facility would comprise an advanced high-energy accelerator that would provide protons to experimental facilities, and a subcritical multiplier that includes a Spallation-target. Potential accidents due to the application of advanced accelerators were analyzed in the *Programmatic Environmental Impact Statement for Tritium Supply and Recycling* (DOE 1995). Based on the accident analysis of advanced accelerators, at the NTS the maximum risk per year due to a spallation-target accelerator accident is 6.7×10^{-6} for a worker at 1 kilometer, 3.7×10^{-7} to a maximally-exposed offsite individual, and a collective risk 9.0×10^{-6} for the population within 50 miles of the NTS (DOE 1995).

Fire Experiment Facility

Experiments at Tonopah Test Range (TTR) are within the accident analysis of the proposed action for the Fire Experiment Facility. The test series at this facility would include exposing realistic test units to a fire environment to determine both the effect of the objects on the fire and response of the objects to the fire. The information gathered would include data on the fire environment, boundary conditions experienced by the test units, and the actual response of the units. The burn experiment specimen would contain 1,600 kilograms of depleted uranium, 2.8 kilograms of niobium, 48 kilograms of beryllium, 78 kilograms of lithium, 94 kilograms of insensitive HE, and 884 milligrams of titanium (DOE 1999a).

Based on the Environmental Assessment (EA) for this facility (DOE 1999a), a burn test accident involving potential burns and exposure to toxic fumes to personnel, together with an environmental release of test material, was determined to have an annual likelihood of occurrence of less than 1×10^{-6}. To occur, such an accident would require multiple failures of equipment components, systems, or safety features. If such an accident were to occur, the potential result could be life-threatening to workers, although impacts to the public would be negligible.

Depleted Uranium Management

Depleted uranium in the form of uranium hexafluoride (UF_6) is a product of the gaseous diffusion process for the enrichment of uranium (U-235). DOE has management responsibility for approximately 700,000 metric tons of depleted uranium hexafluoride (DUF_6) contained in about 57,700 steel cylinders at the Portsmouth, Paducah, and K-25 sites. The

details of DOE management options which include the NTS as a disposal site, are covered in the *Programmatic Environmental Impact Statement for Alternative Strategies for the Long-term Management and Use of Depleted Uranium Hexafluoride* (DOE 1999b).

Based on this Programmatic Environmental Impact Statement, it was estimated that 0.1 accidental fatality and approximately 140 accident related worker injuries would occur during a 41-year period for the management of depleted uranium. Accidents are possible that could release radiation and chemicals from the cylinders. A wide range accidents was evaluated, from accidents that could be considered likely to occur (probability 0.01 per year [a 1 in 100 probability of occurring in any year]) to those that would be extremely rare (less than 1×10^{-6} [a 1 in 1 million probability of occurring in any year]). The greatest risk over the 41-year period would result from an accident having a probability of 1×10^{-5} per year (once in 100,000 years). It would result in less than 1 (0.1) irreversible adverse health effects from chemicals among workers and the general public combined. The estimated risk of an additional latent cancer fatality among workers and the general public combined over the 41-year period due to an accident with a probability of 1×10^{-5} per year, would be much less than 1.

Kistler Launch Facility (KLF)

Under the proposed activities during non-defense research and development missions and facilities, Kistler Aerospace Corporation would obtain a license from the Federal Aviation Administration (FAA) to conduct commercial launch and reentry operations at the NTS. The EA for the KLF (FAA 2000) addressed the potential accident scenarios.

Examples of accidents that could occur during ground operations are identified and described in FAA 2000. Safety and heath risks to workers would occur primarily from accidents during construction, decontamination and decommissioning, or maintenance activities. Explosions/fires and spills of propellants could also endanger workers. Generally, the impact would be limited to workers within the vicinity of the accident. For many hazardous operations, including launches, workers would be located at safe distances from the launch pad to avoid being involved is a catastrophic event. Only accidents during a Kistler vehicle (K-1) flight could potentially affect the public. Because of the remote and restricted location of the launch activities, workers would not be impacted. The accident scenarios constitute the most likely failures. However, such effects are expected to be minimal.

Waste Management

The maximum reasonably foreseeable waste management program (DOE 1996a) radiological accident at the NTS would be an airplane crash into the Area 5 transuranic waste storage unit, which has an annual probability of occurrence of 6×10^{-7}. This accident would result in a latent cancer fatality risk of 8.4×10^{-7} to a noninvolved worker, 1.1×10^{-9} to the maximally exposed offsite individual, and less than 7.5×10^{-6} to the offsite population within 50 miles.

Summary

Based on the foregoing discussion, the accident impacts of future NTS missions and facilities are within the limits presented in the 1996 NTS EIS.

The total population within 50 miles of the NTS (considered in the 1996 NTS EIS) is about 21,750. With the 2000 census data, it was estimated that this population would increase to 34,000 by the year 2000 and 76,000 by the year 2035. Based on this estimated population projection, the population accidental impacts evaluated in the 1996 NTS EIS could increase by an approximate factor of 2, assuming that planned future activities at the NTS occur. NNSA/NV does not consider this increase significant.

5.2 Air quality

5.2.1 Nevada Test Site

Infrastructure improvement at the U1a Complex

Changes to defense programs affecting air quality include various improvements at the U1a Complex. The U1a Complex currently contributes particulates with a diameter of 10 microns or less (PM_{10}) as emissions from traffic on unpaved areas and roads. Paving the U1a and U1h Areas and Complex Road would reduce these emissions.

Stockpile Stewardship and Management Operations

The *Stockpile Stewardship and Management Programmatic EIS* (DOE 1996b) included an alternative to transfer the stockpile management operations from Pantex to the NTS. The quantities of criteria and hazardous air pollutants that would result from this transfer are presented in Tables 5.3-14 and 5.3-15 of the 1996 NTS EIS. The Record of Decision (ROD) selected Pantex for the location of this alternative. Therefore, those criteria and hazardous air pollutants presented are no longer applicable to the NTS. Tables 5-1 and 5-2 summarize those criteria and hazardous air pollutants that no longer apply to the NTS. These emissions numbers are based on the 1993 Pantex emissions inventory.

National Ignition Facility

The *Stockpile Stewardship and Management Programmatic EIS* ROD selected LLNL for the location of the proposed National Ignition Facility (DOE 1996b). Criteria pollutant emissions for this facility were included in the estimated NTS stationary emissions under the Expanded Use Alternative. Table 5-3 presents the reduced criteria pollutant emissions at the NTS without the National Ignition Facility contribution.

This reduction represents less than 1 percent of the total NTS emissions for the listed pollutants and, therefore, not locating the National Ignition Facility at the NTS has little impact on the NTS air quality.

Criteria pollutant emissions data presented in Table 5-3 for the "Expanded Use Alternative - Total NTS" are presented in the 1996 NTS EIS and are assumed to represent potential emissions based on 8,760 hours of full time operation. Whereas, the criteria pollutant emissions presented in Table 5-3 as "NTS 2001 Actual Emissions" represent actual criteria pollutant emissions during calendar year 2001. Those criteria pollutant emissions listed in Table 5-3 as "2002 Projected Potential Emissions" represent projected potential criteria pollutant emissions from all sources operating for all hours, as specified in the 2002 NTS air emissions permit application. As can be seen in Table 5-3, actual NTS criteria pollutant emissions in 2001 and those projected emissions listed in the 2002 air emissions permit application are far below those estimated in the 1996 NTS EIS for the Expanded Use Alternative indicating that the criteria pollutant emissions listed for the Expanded Use Alternative represent conservative estimates of potential emissions.

Table 5-1. Stockpile management facilities criteria pollutant summary.

Pollutant	Pounds per year	Tons per year
Carbon monoxide	49,589.01	24.79
Nitrogen oxides	119,173.42	59.59
Particulate matter	18,604.74	9.30
Sulfur dioxide	0.22	0.00
Total	187,367.39	93.68

Source: DOE 1996a.

Table 5-2. Stockpile management facilities hazardous air pollutants emissions summary under Alternative 3.[a]

Pollutant	Chemical Abstracts (CAS#)	Pounds per Year	Tons per Year
1,1,1-Chloroethane	75003	50.14	0.03
1,1,2-Trichloroethane	79005	8.34	0.00
2-Nitropropane	79469	3.76	0.00
Benzene	71432	201.49	0.10
Carbon disulfide	75150	59.64	0.03
Carbon tetrachloride	56235	34.36	0.02
Chlorobenzene	108907	3.94	0.00
Chromium	7440473	4.71	0.00
Cresol	1319773	0.11	0.00
Cresylio acid	1319773	0.11	0.00
Dichloro methane	75092	12.35	0.01
Dibenzofuran	132649	0.16	0.00
Ester glycol ethers	NA	1.89	0.00
Ethene, trichlor	79016	3.48	0.00
Ethyl benzene	100414	3.34	0.00
Ethylene dichloride	107062	2.93	0.00
Formaldehyde	50000	127.62	0.06
HCL	7647010	2,438.56	1.22
HF	7664393	2,592.76	1.30
Ketones	NA	0.061	0.00
Lead	7439921	408.37	0.20
Mercury	NA	0.00	0.00
Methanol	67561	2,411.40	1.21
Methyl ethyl ketone	78933	15,581.44	7.79
Methyl isobutyl ketone	108101	1.36	0.00
Methylene chloride	75092	401.39	0.20
Naphthalene	91203	0.90	0.00
Nickel	7440020	0.36	0.00
Nitrobenzene	98953	0.11	0.00
Phenol	108952	4.92	0.00
Tetrachloroethylene	127184	14.19	0.01
Toluene	10883	1,027.29	0.51
Trichlorethylene	79016	43.00	0.02
Triethylamine	121448	0.00	0.00
Xylene	1330207	489.75	0.25
Total		25,934.231	12.96

Source: DOE 1996a.
NA – Not Applicable.
a. Amounts less than 0.01 lb/yr are listed as 0.00.

Table 5-3. Revised criteria pollutant emissions at the NTS.

	Criteria pollutant emissions (tons per year)					
	Carbon Monoxide	Nitrogen Oxides	Sulfur Dioxide	Total Suspended Particulates	PM_{10}	Volatile Organic Compounds
Expanded Use Alternative - Total NTS[a]	91.72	300.52	32.42	177.50	a	a
National Ignition Facility[b]	(0.41)	(2.22)	(0.004)	a	(0.09)	a
Fire Experiment Facility[c]	136.28	2.48	6.59	a	123.66	a
Big Explosives Experimental Facility	0.4	0	0	a	8.0	0
Explosive Ordnance Disposal Unit	0.2	0.1	0	a	1.7	0
Revised Total NTS	228.19	300.88	39.01	177.50	133.27	0
NTS 2001 Actual Emissions[d]	4.84	22.23	1.68	a	2.06	2.01
2002 Projected Potential Emissions[e]	12.3	61.6	9.1	58.2	47	28.2
Total Nye County	187.68	933.28	960.68	1,685.70	(f)	(f)

a. Source: DOE 1996a.
b. Source: DOE 1996b.
c. Source: DOE 1999a.
d. Source: Honea 2002.
e. Source: Calman 2002.
f. data not available.

Atlas Facility

The plan to relocate the Atlas pulsed-powered machine to the NTS would increase air pollutant emissions at the NTS (DOE 2001).

Fugitive dust would be generated during construction of the Atlas Facility. Standard dust suppression techniques, such as watering, would be used as needed. Other potential impacts to air quality from construction of the Atlas Facility include emissions from fossil-fuel-burning construction equipment (such as scrapers and front-end loaders) and trucks.

Construction activities for the Atlas Facility would take less than one year and less than one ton of fugitive dust (PM_{10}) would be generated. This quantity of fugitive dust would comprise less than one percent of the total 177,660 tons associated with land disturbance activities throughout the region represented by the Stateline and Tonopah resource areas and the Las Vegas Valley (DOE 1996a).

Emissions generated during facility operations would result primarily from conducting experiments and from the use of solvents as cleaning agents. Minute quantities of the metal targets used during experiments would vaporize and be deposited onto the inside surface of the target chamber. Only minute quantities of metals would stay volatilized. The quantity of emissions generated from each experiment would be small, and would therefore require no facility air filtration or scrubbers. Potential Atlas metal targets include lead, beryllium, and depleted uranium. The majority of solvents used during cleaning operations would evaporate. Hazardous chemicals (such as isopropyl alcohol, trichloroethylene, and 1,1,2-trichloroethane) would be used occasionally and in small amounts. Ethanol, which would be used in larger quantities, (approximately 42 gallons per year) is not considered a hazardous air pollutant (HAP) under the Clean Air Act. The majority of the ethanol used for cleaning would evaporate. The argon/SF_6 system that would be used to supply railgap switches with pressurized

dielectric gas is non-hazardous, albeit an asphyxiant; however, some of the decomposition products, in particular sulfur tetrafluoride (SF_4) and hydrofluoric acid (HF), are toxic or corrosive. Four exhaust fans, each circulating 30,000 cubic feet per minute of air would be used to vent the shot products, including SF_4, and HF to the ambient air. No SF_4 or HF decomposition products have been detected during machine operations at LANL.

Some of the metal targets (including lead) and the solvents are classified as HAPs and are regulated by the state of Nevada. Assuming the maximum 100 experiments per year, annual emissions from the metal targets would be approximately 100 grams (0.22 pounds). Annual emissions of each of the solvents would be approximately 3000 grams (6.6 pounds). Combined annual emissions, assuming the use of one metal target twice a week and use of three different solvents, would be approximately 20 pounds per year.

Beryllium is one of seven HAPs for which there are national emission standards, and it is regulated by the U.S. Environmental Protection Agency under the National Emissions Standards for Hazardous Air Pollutants (NESHAP). The emissions from use of beryllium as a target material would be similar to emissions from the metals discussed in the previous paragraph, and would fall well below the NESHAP emissions limit of 10 grams per 24-hour period (40 CFR 61.32).

Depleted uranium (DU) is regulated under Subpart H of NESHAP. Emissions from use of DU as a target material would be similar to the emissions from the metals discussed previously, and would fall well below the NESHAP dose limit of 10 millirem per year (40 CFR 61.92).

The quantity of fugitive dust emissions generated by vehicles and equipment during construction would affect air quality in the project area, but these impacts would be minor and short-term in nature (DOE 2001).

Addition of emissions from the Atlas Facility to those presented for Alternative 3, Expanded Use, in the 1996 NTS EIS are not expected to increase air quality impacts above those presented for the Preferred Alternative.

Fire Experiment Facility

NNSA proposes to construct and operate a fire and thermal testing facility at the NTS. This facility, called the Fire Experiment Facility, would allow NNSA to continue and extend its existing fire and thermal testing capabilities in support of national defense missions.

Emissions from open burning include carbon monoxide (CO), PM_{10}, nitrogen dioxide (NO_2), sulfur dioxide (SO_2), HAPs, toxic air pollutants (TAP), and volatile organic compounds (VOCs). All criteria pollutant emissions were modeled to determine their impacts and relationship to the National Ambient Air Quality Standards (NAAQS). The emissions of criteria pollutants would not cause concentrations to exceed the NAAQS, nor would the pollutants exceed the prevention of significant deterioration (PSD) levels. Thus, operation of the open burn facility would be in compliance with the NAAQS.

The ozone standard is 0.12 parts per million. Ozone impacts were determined by using the rural lookup table within the screening document, based on the total estimated annual VOC emissions (78.2 tons) and the ratio of VOC and nitrogen oxides (NO_x) emission rates (78.2/0.99). The predicted increase in the ambient ozone concentration resulting from the facility emissions is 0.0004 parts per million, or less than 1 percent of the standard. The NTS is located within Nye County, which is in attainment for all criteria pollutants; therefore, a conformity determination is not required for federal actions.

The HAP/TAP emissions were initially evaluated by using the occupational exposure limit (OEL) and dividing by 15 to determine whether modeling would be required. Based on this evaluation, 19 HAP/TAP emissions were modeled and compared to the ambient threshold of the OEL, divided by 100. These pollutants include acetonitrile, benzene, benzyl chloride, p-dichlorobenzene, hexachloro-1,3,-butadiene,

indene, naphthalene, styrene, toluene, 1,1,2-trichloroethane, vinyl chloride, p,m-xylene, arsenic, cadmium, chromium, lead, nickel, selenium, and tin. The modeling results demonstrate compliance with the 1/100 of the OEL threshold for all HAP/TAP emissions.

Two additional analyses were completed as part of the air quality assessment: a visual plume impairment determination and an air quality impact analysis for a Class I area. The focus of both analyses was the Death Valley National Park. The Death Valley National Park is protected from adverse impacts on visibility and air quality. The air quality analyses demonstrated that the open burn facility would not adversely affect visibility and air quality at the Death Valley National Park (DOE 1999a).

The addition of emissions from the Fire Experiment Facility to those presented for Alternative 3 (Expanded Use) in the 1996 NTS EIS are not expected to increase air quality impacts above those presented for that Alternative.

Kistler Launch Facility

Air emissions would result from construction activities, engine ground tests, test launches, and sustained launch/flight operations. Because the KLF is located in an air quality control region that is in attainment with federal and State ambient air quality standards, an analysis of conformity to the Clean Air Act Section 176 (c) is not required.

Construction activities that could affect air quality include the operation of heavy construction equipment to clear land for the landing and recovery site, and construction at the payload processing facility and launch site. Emissions during construction of the launch and recovery facilities would be fugitive dust (PM_{10}) from land clearing and soil transfer, and engine exhausts, and NO_x, sulfur oxides, CO, PM_{10}, and VOCs from vehicle and equipment engines.

The maximum daily average concentrations of PM_{10} are not expected to exceed 144 micrograms per cubic meter, which is less than the national and Nevada daily average PM_{10} standards of 150 micrograms per cubic meter. In addition, the annual average is not expected to exceed 18.9 micrograms per cubic meter, which is well below the national and Nevada standards of 50 micrograms per cubic meter. Because these maximums occur within a small area, the public and site personnel are not expected to be adversely affected. The impact on the general public would be minimal. Table 5-4 presents the maximum downwind concentrations of criteria pollutants resulting from construction of the KLF.

Table 5-4. Maximum downwind concentrations of other criteria pollutants during construction of the KLF, compared to Nevada and national standards.

	CO Concentration ($\mu g/m^3$)		SO_x Concentration ($\mu g/m^3$)		NO_x Concentration ($\mu g/m^3$)	HC Concentration ($\mu g/m^3$)
Average Time	Max 8-hour	Max 1-hour	Max 24-hour	Max 3-hour	Annual	Max 24-hour
Ambient Concentrations at the NTS	2,290.0	2,748.0	39.3	65.4	NA	NA
Maximum Downwind Concentration	245.6	2,45.6	20.3	48.6	38.6	11
Total Concentration	2,535.6	2,993.6	59.6	114.0	38.6	11
NAAQS Standard	NA	40,000	365	NA	100	NA
Nevada Standard	10,000	40,000	365	1,300	100	NA

Source: FAA 2000.
CO – Carbon monoxide
HC – Hydrocarbons
NO_x – Nitrogen oxides
SO_x – Sulfur oxides

The exhaust of oxygen and RP-1 fuel from the K-1 rocket engine would affect air quality near the ground and the upper atmosphere. Ground effects from the rocket engine would occur from start cartridges and rocket exhaust. The only criteria pollutant emitted from rocket exhaust is CO. The launch of the rockets would result in the emission of hydrogen chloride, which combines with water vapor in the exhaust or in the atmosphere to form hydrochloric acid.

Kistler's K-1 rocket engine CO emissions can be calculated as a percentage of Titan IIIE/Centaur, because its emissions are well known. The Titan IIIE/Centaur emissions result in downwind peak instantaneous concentrations of less than 5 parts per million of CO in the spring and 5.3 parts per million of CO in fall at a distance of 1 kilometer. At distances of 10 kilometers (6 miles) away, the CO concentrations drop below 1.5 parts per million. Because Kistler K-1 CO emissions are estimated to be less than 50 percent of the Titan IIIE/Centaur emissions, for all meteorological conditions they are expected to be significantly less than the 6 parts per million Nevada standard for sites above 1,524 meters (5,000 feet), and much less than the national standard of 9 parts per million. Thus, no adverse effects on air resources are anticipated from rocket launches (FAA 2000).

Summary

The addition of emissions from the KLF to those presented for Alternative 3 (Expanded Use) in the 1996 NTS EIS are not expected to increase air quality impacts above those presented for that Alternative.

5.2.2 Tonopah Test Range

Continued current operations

Pollutant emissions at the TTR result from rocket artillery firing, aircraft, missile, and explosives operations. These activities would be intermittent and would produce only local emissions, which would be dispersed over a relatively large target area (DOE 1996a). These types of experiments are expected to remain the same, but the frequency at which they are conducted is anticipated to increase. The result of the increased frequency of experiments would result in minor impacts to air quality at the site boundary and off-site areas.

Summary

Based on the foregoing above discussion, the air quality impacts of future NTS missions and facilities are within the limits presented in the 1996 NTS EIS.

5.3 Waste management

The waste management assessment focused on changes to waste management facilities and capabilities at the NTS since issuance of the 1996 NTS EIS. The waste types assessed were LLW, mixed, transuranic, polychlorinated biphenyls, (PCBs), hazardous, and nonhazardous wastes and wastewater.

The 1996 NTS EIS Alternative 3, Expanded Use, was selected for implementation after the fourth Record of Decision for the Waste Management Programmatic EIS (*65 FR 10061, February 25, 2000)* made NTS facilities available to all DOE sites meeting NTS waste acceptance criteria for LLW disposal. In addition, the NTS was named, along with Hanford, as a disposal site for DOE mixed waste, when consistent with permit conditions and other applicable requirements. This analysis takes into account this expanded use of NTS disposal units.

The waste management facilities at the NTS have changed since issuance of the 1996 NTS EIS. However, these changes were planned at that time and were included in the analysis for the 1996 NTS EIS. The status of proposed changes addressed in the 1996 NTS EIS are also presented in Table 3-3 of this SA.

The assessment did not identify additional changes in waste management facilities for the next 10 years that were not addressed in the 1996 NTS EIS. The American Indian assessment of waste management impacts is presented in Section 4.2.12.3, "Waste Management."

5.3.1 Low-level waste

The NTS is currently (and was at the time of the 1996 NTS EIS) accepting LLW from off-site approved generators. An approved generator has undergone the extensive approval process detailed in *Nevada Test Site Waste Acceptance Criteria* (DOE 2002a). The process is designed to verify that the generator site has a program in place to ensure that waste shipped to the NTS meets acceptance criteria.

Table 3-4 lists the waste generators who currently expect to dispose of LLW at the NTS and presents the waste disposal projections.

Also expected to use NTS waste management facilities are 10 strontium-90 radioisotope thermoelectric generators (RTGs) removed from service by the U.S. Air Force (USAF). The 10 RTGs would have a volume of approximately 30 cubic meters and would be stored at the NTS. Additional thermoelectric generators are expected to be removed from service after 2011.

Summary

The estimated volume of LLW to be disposed at the NTS is less than the amount analyzed in the 1996 NTS EIS under the Expanded Use Alternative. The projected volume is also less than the available disposal capacity. Therefore, the 1996 NTS EIS impact analysis is sufficient.

Table 5-5 compares the waste forecasts and capacities from the 1996 NTS EIS and this NTS EIS Supplement Analysis (SA).

Not included in the quantitative analysis are radioactively-contaminated wastes from USAF aircraft accidents (see Section 3.1.2.2). Potentially, this waste could be transferred to the NNSA for disposal. Also not included is a nickel waste stream that could come to the NTS. The timeframe for transfer to the NNSA, waste characteristics, and volumes for these waste streams are not yet available for analysis.

5.3.2 Mixed waste

Currently, the NTS is not permitted to receive mixed waste from off-site (excluding NNSA/NV) locations. A Resource Conservation and Recovery Act (RCRA) permit application requesting that the NTS be allowed to dispose of mixed waste generated on-site and off-site in a mixed waste disposal unit in Area 5 is under review by the state of Nevada. This analysis assumed disposal of mixed waste from on-site and off-site within the 20,000 cubic meter disposal limit anticipated to be established in the RCRA permit if issued.

The current projection is less than 10 percent of the 10-year projection for the Expanded Use Alternative in the 1996 NTS EIS. Therefore, the 1996 NTS EIS impact analysis is considered sufficient. Table 5-5 presents the results of the comparative analysis.

5.3.3 Transuranic waste

Transuranic waste is stored at the NTS pending shipment to DOE's Waste Isolation Pilot Plant (WIPP) in New Mexico.

The transuranic waste projection presented in this SA includes the waste stored in 1996. Some of this waste has been re-packed, which has lead to a slightly higher volume (736 cubic meters based on container volume (Colarusso 2001).

In addition, the waste projection in this SA takes into account transuranic waste anticipated from the JASPER Facility (see Section 3.1). The JASPER Facility waste would be stored prior to shipping to WIPP for disposal.

More storage space is available (Colarusso 2001); however, DOE anticipates shipments to WIPP beginning in late 2003, with an initial shipping campaign of 215 cubic meters. The JASPER Facility may generate waste as early as 2002, with 18 cubic meters projected for 2002. Therefore, the current volume projections and

Table 5-5. Waste management facility capacities and waste volume (m^3) projection (2002 through 2011).[a]

	1996 NTS EIS		Supplement Analysis		
Waste type	Capacity	Projection	Capacity	Projection	Percent usage
Low-level	1,000,000	1,041,422	1,000,000[b]	520,000	14
Mixed	300,000	300,500	70,800[c]	20,000	31
Transuranic (storage)	Not reported	612	Not available	990	(d)
Hazardous (storage)	210	Not reported	61.6	650	(e)
Explosive hazardous (treatment)	1873 kg/yr	Not reported	45.4 kg/hr	1,500	34 hours
Hydrocarbon	42,000	15,000[f]	92,000	11,000	12
Inert debris	990,000	95,000	660,000	93,000	14
Sanitary solid	450,000	18,000	210,000	35,000	16

a. Quantities given in cubic meters, unless otherwise noted. To convert cubic meters to cubic feet, multiply by 35.316.
b. The two NTS radioactive waste disposal facilities are capable of disposing 3,800,000 cubic meters of low-level waste, if the NNSA/NV were to use all the available disposal area. However, NTS generators are projecting LLW disposal needs of only 520,000 m^3 from FY 2002 through 2011. Therefore, the NNSA/NV anticipates disposing a total volume of 1,000,000 cubic meters (waste already disposed plus the 520,000 m^3 projected until FY 2011).
c. Upon receipt of the RCRA permit, this capacity may be limited to 20,000 cubic meters. The NTS capacity could accommodate 71 percent of DOE complex mixed waste estimated to be 99,000 cubic meters (Guevara 2001).
d. Storage capacity is available; however, it is dependent on the size of containers and storage configurations. DOE plans to begin shipments to WIPP in 2003, shipping 215 cubic meters to WIPP in 2002 through 2004. Projected generation of transuranic waste from the JASPER Facility are 18 cubic meters in 2002 and 27 cubic meters annually through 2011.
e. The RCRA permit limits storage to 61.6 cubic meters at any one time. Hazardous waste is shipped to an off-site permitted facility for treatment/disposal, as needed.
f. Historic disposal volume.

shipment schedule indicate that the storage volume analyzed in the 1996 NTS EIS is sufficient. Table 5-5 presents the waste projections.

5.3.4 Toxic Substances Control Act waste

The Toxic Substances Control Act (TSCA) waste managed at the NTS is PCBs. The PCBs in storage in 1996 have since been shipped off-site for treatment and disposal. Regulated PCB waste is not generated during operations, but could be generated during remediation and decommissioning activities.

Currently, PCB-contaminated mixed and LLW are stored on the Transuranic (TRU) Waste Storage Pad in a designated area outside of the TRU Pad Cover Building. PCB-contaminated hazardous waste can be stored in the Hazardous Waste Storage Unit. Treatment and disposal options for the PCB wastes are available; therefore, the wastes are shipped off-site when sufficient quantities have accumulated.

5.3.5 Hazardous waste

Since 1996, the NTS has continued to store hazardous waste on-site prior to shipping it to a permitted commercial facility for treatment/ disposal. The NTS received its final RCRA permit for storage in 1995 and it was renewed in 2000. The permit limited storage to 61,600 liters or 61.6 cubic meters at one time. This storage volume was evaluated under the Continued Operations Alternative. The Expanded Use Alternative included an expansion of storage capacity that was not implemented.

This reduced storage capacity is adequate for projected waste volumes. The greatest annual generation of hazardous waste at NTS in the last 5 years was about 65 cubic meters. Considering

this historic high volume, the NTS can maintain storage limitations by continuing its practice of shipping stored waste off-site for treatment/disposal when sufficient quantities have been accumulated (about four times per year) and by shipping waste from the generation area, rather than first transferring waste to on-site storage. Given this capacity limitation, the 1996 NTS EIS analysis is considered sufficient. Table 5-5 presents forecast and capacity volumes.

The NTS is also permitted to treat certain explosive hazardous wastes. The projected volume of waste to be treated is well under the limit set by the RCRA permit and less than the volume evaluated in the 1996 NTS EIS; therefore, the EIS analysis is considered sufficient. See Table 5-5 for forecast and treatment capacity.

5.3.6 Nonhazardous waste

As in 1996, the NTS has three landfills permitted for the disposal of nonhazardous waste. The Hydrocarbon Disposal Site in Area 6 and the Area 9 U10c Disposal Site are permitted as Class III landfills. Hydrocarbon-contaminated soils and sludge are disposed in the hydrocarbon landfill, and inert debris (such as construction and demolition debris) is disposed in the Area 9 landfill. The third landfill is a Class II landfill in Area 23 that receives sanitary solid waste.

Currently, only the NTS and off-site Nevada locations under NNSA/NV control dispose of waste in these landfills. Under the Expanded Use Alternative, DOE considered allowing adjacent rural counties to use NTS disposal facilities. This possibility was pursued and is no longer under consideration.

However, NNSA/NV intends to use the Area 9 and Area 23 landfills for the disposal of construction and demolition debris and sanitary and industrial solid waste from the proposed Yucca Mountain repository, if a nonhazardous waste landfill is not sited at the repository. Therefore, Yucca Mountain waste volumes (2010 and 2011) have been accounted for in the 2002 through 2011 waste projections. The projected volumes are based on current generation rates. Review of the future missions did not indicate that the work force was expected to increase beyond the number evaluated in the 1996 NTS EIS; therefore, the current rate of sanitary solid waste is acceptable for projecting waste generation.

The waste projections and estimated remaining capacity volumes are presented in Table 5-5. Only the sanitary solid waste projection is beyond the projected waste volume of the 1996 NTS EIS. Construction of a new Class I or II landfill with a capacity of approximately 420,000 cubic meters was included under the Expanded Use Alternative. The impact to current remaining capacity at the Area 23 landfill is estimated at 16 percent; therefore, the need for a new landfill before 2011 is not indicated. However, uncertainties such as conversion of mass to volume are inherent in this impact calculation. The impact to remaining capacity is estimated to be 12 percent for the Hydrocarbon Disposal Site and 14 percent for the Area 9 landfill. Based on waste projections and remaining capacities, the 1996 NTS EIS impact analysis is considered sufficient.

5.3.7 Wastewater

As in 1996, wastewater at the NTS is disposed either by a septic system or by a lagoon system. However, sewage lagoon systems other than Area 23 Mercury and Area 25 Effluent Treatment System will be replaced by septic systems by the end of Fiscal Year 2002. Sludge removed from the systems is disposed in the Area 23 sanitary landfill or the Hydrocarbon Disposal Site, depending on hydrocarbon content. At areas not serviced by a permanent wastewater system, portable sanitary units are provided.

Review of the historic flow records and design capacities do not indicate impacts to wastewater capacity beyond permit and design limitations.

Summary

The 1996 NTS EIS impact analysis is considered sufficient for all waste types evaluated in this SA.

5.4 Cumulative impacts

In accordance with the Council on Environmental Quality regulations, a cumulative impact analysis in an EIS includes "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant, actions taking place over a period of time." (40 CFR Part 1508.7).

The cumulative impact analysis for this SA includes: (1) an examination of the cumulative impact analysis in the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE 1996a); (2) a review of past, present and reasonably foreseeable actions for other federal and non-federal agencies; (3) a summary of impacts identified in this SA; and (4) a summary of the cumulative impacts and changes since the 1996 NTS EIS was issued.

Past and present actions associated with activities of the NNSA/NV in the state of Nevada are described in the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada* (DOE 1996a), and updated with new and modified projects in Chapter 3 of this SA.

Reasonably foreseeable future actions of the NTS are described in Chapter 3 of this SA. Reasonably foreseeable future actions for the region impacted by the NTS were also reviewed and included in the analysis. Primary sources for the analysis for the region of influence include:

- *Final Environmental Impact Statement for a Geologic Repository for the Disposal of Spent Nuclear Fuel and High-Level Radioactive Waste at Yucca Mountain, Nye County, Nevada* (DOE 2002b)
- *Proposed Las Vegas Resource Management Plan and Final Environmental Impact Statement* (BLM 1998a) and *Record of Decision* (BLM 1998b)
- *Draft Nevada Test and Training Range Resource Management Plan and Environmental Impact Statement* (BLM 2001)
- *Nye County Perspective: Potential Impacts Associated With the Long-term Presence of a Nuclear Repository at Yucca Mountain, Nye County, Nevada, Water Resources Evaluation* (Buqo 1999)
- *Renewal of the Nellis Air Force Range Land Withdrawal, Department of the Air Force, Legislative Environmental Impact Statement* (USAF 1999a)
- *F-22 Aircraft Force Development Evaluation and Weapons School Beddown, Nellis AFB Final Environmental Impact Statement* (USAF 1999b) and *Record of Decision* (USAF 1999c)

Table 5-6 provides a summary of cumulative impacts by discipline for both the region of influence and NTS activities. The region of influence varies by discipline. For instance, the region of influence for transportation impacts is nationwide, whereas the region of influence for socioeconomics (and most disciplines) is more local, impacting Nye and Clark Counties.

The results of the analysis indicate that the cumulative impacts for past, present, and future actions at the NTS are not expected to exceed the impacts analyzed and presented in the 1996 NTS EIS. The exception is for noise levels. An increase in noise levels is expected both in the region of influence (F-22 Beddown Project at the Nevada Test and Training Range) and at the KLF. Sonic boom impact levels generated outside the NTS boundaries would resemble distant thunder or fireworks and have no significant impact on surrounding communities.

Table 5-6. Summary of cumulative impacts.

Discipline Area	Cumulative Impacts[a]
Health and Safety	*Region of Influence*. Activities from the potential Yucca Mountain National Geologic Repository could result in up to 4 fatalities from industrial hazards to the facility workers during the project life. Radiological health impacts from Yucca Mountain activities could result in up to 8 latent cancer fatalities to workers; short-term radiation exposure could result in up to 3 latent cancer fatalities in the population. More than 99 percent of this impact would be due to the release of naturally occurring radon from the exposed rock in the repository. Short-term radiation exposure to the maximally exposed individual could cause an increased cancer risk of about 5.7×10^{-5}. Long-term releases from the Repository and the NTS could cause an increased risk of fatal cancer in the future of 6×10^{-6}over the lifetime of an exposed individual. (DOE 2002b) *NTS activities*. For worker injury or illness, there is no evidence that changing NTS missions would result in impacts to future occupational safety and health risks exceeding the limits of those reported in the 1996 NTS EIS. Additionally, based on employment trends at the NTS and the proportion of radiation workers in the workforce, it is unlikely that impacts to NTS radiation workers from routine operations would exceed limits established in the 1996 EIS. Accident impacts of future activities at the NTS are within the accident analysis in the 1996 EIS. However, because of the increase in offsite population, the population impacts evaluated in the 1996 NTS EIS increase by an approximate factor of 2. The impact to the maximally exposed (off-site) individual from all sources is less than 2 percent of the 10 mrem annual dose limit (Grossman 2001). Emissions from past nuclear weapons testing could have resulted in a dose of 150 millirem over the lifetime of those individuals exposed during atmospheric weapons testing (DOE 2002b). Recent information suggests that a potential occupational safety and health risk may exist at historical beryllium sites, both active and inactive, at the NTS. As a result, NNSA/NV has initiated an aggressive program of hazard awareness and worker protection along with a focused effort to identify historic beryllium sites and historical monitoring data to identify and characterize potential hazards.
Air Quality/Noise	*Region of Influence.* Air emissions from all sources would be less than applicable standards. For noise, the greatest impact in the region of influence is from aircraft based at the Nevada Test and Training Range (formerly the Nellis Air Force Range). This impact is expected to increase with the F-22 Beddown Project (USAF 1999a,b). *NTS activities.* Emissions from existing and planned NTS activities would be less than applicable standards. The potential KLF would generate an increase in noise levels from the launch and re-entry of the launch vehicle.
Traffic and Transportation	*Region of Influence.* Because radioactive waste is shipped from all over the U.S., the region of influence for transportation impacts extends nationwide. The impacts include all historic and proposed national radioactive waste shipments for a period of 100 years. For all radioactive shipments throughout the U.S., including to and from the potential Yucca Mountain Repository and the NTS, the potential worker dose has been estimated at 410,000 person-rem (160 latent cancer fatalities[b]), the general population dose at 350,000 person/rem (180 latent cancer fatalities[b]), and potential traffic fatalities at 110 over the 100-year timeframe. (DOE 2002b) *NTS activities*. The transportation screening analysis indicated a decrease in the number of shipments of waste, compared to the 1996 NTS EIS. There is no indication that future traffic and transportation impacts would exceed those reported in the 1996 NTS EIS.
Geology and Soils	*Region of Influence*. Regional use of geologic resources (such as minerals needed for construction activities) has increased due to the population growth in Clark County. Additionally, the increased population in Clark County would likely result in increased soil compaction, loss, and disturbance (BLM 1998a,b). *NTS activities*. Almost all activities would be within the umbrella of impacts evaluated in the 1996 NTS EIS. The emissions from rocket launches at proposed KLF could result in a slight lowering of the soil solution pH in nearby soils. This would have little or no impact on soils in the area.

Table 5-6. Summary of cumulative impacts. (Continued).

Discipline Area	Cumulative Impacts[a]
Land Use	*Region of Influence*. Major land use changes in the region of influence include land development in the Las Vegas vicinity, land use for the potential Yucca Mountain Repository, and the establishment of the Timbisha Shoshone Reservation. Approximately 1,300 acres/year of public land are privately developed in the Las Vegas Valley (BLM 1998a). Land needed for the potential Yucca Mountain Repository (600 square kilometers, or 150,000 acres) is already under federal control, although public access to about 200 square kilometers (50,000 acres) of land currently under Bureau of Land Management (BLM) control would be terminated (DOE 2002b). Approximately 10,000 acres of land in southwestern Nevada and eastern California have been designated as the Timbisha Shoshone Reservation (DOE 2002b). *NTS activities*. There have been no proposed changes or additions to the projects outlined in the 1996 NTS EIS that would create significant land use issues.
Visual Resources/ Aesthetics	*Region of Influence*. Exhaust stacks at the crest of Yucca Mountain could impact visual resources because the stacks would be visible from some distance (DOE 2002b). Additionally, the transfer of public lands to private use in the Las Vegas Valley results in a disturbance of the natural environmental setting as the land is developed (BLM 1998a). *NTS activities*. Minimal impacts to the visual resources would be expected with proposed and current NTS activities.
Ecological Resources	*Region of Influence*. Most disturbances of ecological resources are occurring in the Las Vegas area due to the increasing demand from population growth, resulting in loss of wildlife habitat. For the potential Yucca Mountain Repository, disturbance of some desert tortoise habitat would occur, and wildlife would be displaced as a result of Repository and transportation activities (DOE 2002b). *NTS activities*. The conclusions of the 1996 NTS EIS remain valid with respect to biological resources. Impacts have been and will continue to be less severe than those described in the EIS.
Groundwater	*Region of Influence*. The Las Vegas Valley groundwater system has been in an overdraft condition since 1945 and, within the 29 hydrographic basins wholly or partially within the Las Vegas BLM District, all have committed resources which exceed perennial yield (BLM 1998a). Water quality in the region is often poor, due to high evaporation rates and the chemical composition of rocks and soils (BLM 1998a). The estimated cumulative NTS and Yucca Mountain Repository groundwater impacts to the maximally exposed individual would be about 0.007 mrem per year at 20 km. The estimated potential cumulative impact from the repository and the NTS would be essentially the same, because of the small contribution from the proposed repository (DOE 2002b). *NTS activities*. While there has been substantial contamination and damage to the underlying aquifer from past underground nuclear tests, no adverse groundwater quality impacts have resulted from operations since 1996, and no off-site migration of contamination has been found (DOE 2000). Resumption of underground nuclear weapons testing could result in additional impacts to the groundwater; this impact is covered in the 1996 NTS EIS.
Socioeconomics	*Region of Influence*. Southern Nevada is one of the fastest growing areas of the United States. The population of Clark County increased by 85.5 percent from 1990 to 2000 (USCB 2001). *NTS activities*. Changes in the population and employment in the region of influence from future potential activities at the NTS would have no discernible impact on population growth and a small impact on total employment.

Table 5-6. Summary of cumulative impacts. (Continued).

Discipline Area	Cumulative Impacts[a]
Environmental Justice	*Region of Influence*. American Indians living in the region of the proposed Repository and the NTS have expressed concerns about the protection of traditions and the spiritual integrity of the land. Establishment of the Yucca Mountain Repository would continue restricted access to the Repository site. Additionally, the increased noise associated with the Nevada Test and Training Range F-22 Beddown Project would disproportionately affect minority and low-income populations in the area near the Nellis Air Force Base (USAF 1999c). *NTS activities*. The analysis in the 1996 NTS EIS was conservative, meaning that impacts to minority and low-income populations remain valid.
Cultural Resources	*Region of Influence*. Direct impacts to cultural resources may result from land development, construction or expansion of facilities, or public access. Indirect impacts such as vandalism, artifact collection, or inadvertent damage may result from increased public access. *NTS activities*. Cultural resource impacts at the NTS are essentially the same as for the region of influence. The NTS will continue to follow the mitigation procedures outlined in the 1996 NTS EIS (DOE 1996a). By following these procedures, the impacts projected for future missions and activities will not exceed the envelope of consequences established in the NTS EIS.
American Indian Resources	*Region of Influence*. According to the Consolidated Group of Tribes and Organizations (CGTO), increased land disturbances associated with all forms of development in the Indian region of influence could result in decreased access to these areas for American Indians. Limiting access could reduce the traditional use of the lands and affect their sacred nature. Increased development could also increase the potential for greater disturbance and vandalism of American Indian cultural resources. Additionally, the CGTO believes that cumulative impacts may occur in the form of holy land violations, loss of cultural survival, loss of empowerment, and radiation risks. The CGTO supports restoration of contaminated lands and recovery of species through revegetation with native species. *NTS activities*. Impacts to American Indian resources at the NTS are essentially the same as for the region of influence. The CGTO recognizes the positive benefits of regular and continuing consultation between NNSA/NV and the CGTO.
Waste Management	*Region of Influence*. The potential Yucca Mountain Repository, if built, would require the expansion of existing landfills at the NTS to accommodate nonradioactive, nonhazardous solid waste from the repository. *NTS activities*. The 1996 NTS EIS impact analysis is considered sufficient for all waste types evaluated.

a. For the proposed Yucca Mountain Repository the impacts are for the maximum inventory of spent nuclear fuel and high-level waste analyzed, identified as Module 2 in the Repository Environmental Impact Statement (DOE 2002b).

b. The conversion factors for worker and general population collective dose to latent cancer fatalities are 0.0004 and 0.0005 latent cancer fatality per person-rem, respectively (NCRP 1993).

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CHAPTER 6
CONCLUSIONS

The Council on Environmental Quality regulations require that supplemental Environmental Impact Statements (EISs) be issued when "the agency makes substantial changes to the proposed action" or there are "significant new circumstances or information relevant to the environmental concerns and bearing on the proposed action or its impacts". This Nevada Test Site (NTS) EIS Supplement Analysis (SA) was written to determine whether either case applies to continued operations at the NTS and off-site locations in the state of Nevada, such that a supplemental EIS should be prepared.

This SA evaluates whether changes from actions foreseen in 1996, plus new and modified proposals and projects, present a seriously different picture of the likely consequences of continued operation of the NTS than was presented in the 1996 NTS EIS and Record of Decision. This evaluation focused on determining whether the impacts of NNSA/NV operations, as identified today, would be within the limits of impacts identified in the 1996 NTS EIS and, if not, whether the additional impacts would be significant.

Chapters 4 and 5 of this SA evaluated a set of new and modified proposals and projects and other changes and concluded that no supplementation is needed for any technical discipline areas. Based on the analysis in this SA, NNSA/NV has determined that there are no substantial changes to the NTS EIS or Record of Decision or significant new circumstances or information relevant to environmental concerns, and that no supplemental EIS is needed.

Recent information suggests that a potential occupational safety and health risk may exist at historical beryllium sites, both active and inactive, at the NTS. While this information is relevant to environmental concerns, it is not significant enough to cause the preparation of a supplemental EIS.

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CHAPTER 7
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Chapter 2 References

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Chapter 6 References

None

APPENDIX A

PUBLIC COMMENTS AND RESPONSES

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APPENDIX A. PUBLIC COMMENTS AND RESPONSES

In April 2002, the U.S. Department of Energy's National Nuclear Security Administration Nevada Operations Office (NNSA/NV) published the *Draft Supplement Analysis for the Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (DOE/EIS-0243-SA-01)* and invited public comment on the document.

News releases were issued by NNSA/NV to notify the public of both the start of the Supplement Analysis process and the availability of the Draft Supplement Analysis. Fact sheets were mailed to more than 300 interested individuals, special interest groups, and federal state and local officials. Approximately 150 copies of the Draft Supplement Analysis were distributed. DOE received written comments from three organizations, International Technologies Corporation, the State of Nevada, and the Department of the Air Force. NNSA/NV considered all comments in preparing this Final SA.

This appendix provides the comments received and NNSA/NV's responses. Written comments and their responses are summarized below. In this appendix, each written comment letter is reproduced, with individual comments, questions, and suggestions labeled; responses to them are provided on the pages that follow each comment letter. Table A-1 lists the comment letters and provides the letter numbers and commenter names.

Table A-1. Written Comments on the Draft NTS EIS Supplement Analysis.

Comment Source Number*	Commenter	Page Number
L-1	Mr. John M. Fowler, IT Corporation	A-2
L-2	Ms. Heather K. Elliott, State of Nevada, Department of Administration	A-9
L-3	Col. Arvil E. White, 99th Civil Engineer Squadron (ACC), Department of the Air Force	A-23

*Unique codes were given to each of the letters received. Individual comments are coded L-1-1, etc.

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May 24, 2002

Project No.:831838.02050045

Mr. Robert C. Furlow
NEPA Document Manager
U.S. Department of Energy
National Nuclear Security Administration
Nevada Operations Office
Post Office Box 98518
Las Vegas, NV 89193-8518

Contract No. DE-AC08-97NV13052
TRANSMITTAL OF ITLV COMMENTS ON
DRAFT SUPPLEMENT ANALYSIS
FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE NEVADA TEST SITE AND OFF-SITE LOCATIONS IN THE STATE OF NEVADA

Dear Mr. Furlow:

Enclosed for your review are ITLV's comments on the subject document.

If you have any questions or need any further information, please contact Mike Foley at 295-2258 or me at 295-1858.

Sincerely,
IT Corporation

John M. Fowler

John M. Fowler,
Environmental Compliance Manager

Enclosures
As Stated

IT Corporation
A Member of The IT Group

Robert C. Furlow 2 May 24, 2002

cc w/ encl.:
EC Chron Files
Central Files
Mike Foley

COMMENTS
"DRAFT SUPPLEMENT ANALYSIS FOR THE FINAL ENVIRONMENTAL IMPACT STATEMENT FOR THE NEVADA TEST SITE AND OFF-SITE LOCATIONS IN THE STATE OF NEVADA"

1. Executive Summary, Page S-1, Paragraph 2, Lines 1-6

This paragraph states in part that NNSA/NV has made a determination that "...there are not substantial changes...or significant new circumstances or information relevant to environmental concerns..." This statement, and a number of other statements and discussions within the Supplement may need to be reconsidered in view of the significant number of historical sites and facilities recently identified as having housed or been impacted by the use, processing, and/or storage of beryllium or beryllium bearing compounds at the NTS. It is well established that a small but finite percentage of individuals exposed to beryllium dust develop sensitivity to beryllium, and most people who become sensitized to beryllium eventually develop chronic beryllium disease (CBD). It is also a fact that currently, no test is available to determine which individuals are sensitive to beryllium before an exposure occurs, and there is no established "safe" level of exposure for sensitive individuals. There is at least one recently documented case of CBD due to occupational exposure to beryllium at the NTS. As a result NNSA/NV has initiated an aggressive program of hazard awareness and worker protection along with a focused effort to identify historic beryllium sites and historical monitoring data to identify and characterize potential hazards. L-1-1

2. Executive Summary, Page S-1 is missing from some documents. L-1-2

3. Executive Summary, Page S-4, Environmental conditions

A summary discussion of the potential beryllium hazard as discussed under Comment #1 should be included consistent with other discussions of conditions, e.g., *Radiation exposure to NTS workers.* L-1-3

4. Chapter 3, Page 3-1, New And/Or Modified Projects And Information

At Chapter 2, Purpose and Need, Paragraph 4, Lines 1-6, the Supplement states: "DOE regulations...require that a supplemental EIS be prepared 'if there are substantial changes to the proposal or significant new circumstance or information relevant to environmental concerns' are found to exist." The information relative to the presence, levels, and potential hazards of beryllium may qualify as "new..information relevant to environmental concerns", and probably should be addressed in Chapter 3, possibly at 3.1.3 "Environmental restoration programs," or perhaps more appropriately at 3.2 "Environmental conditions." L-1-4

5. Chapter 4, Screening Review, Page 4-1 & 4-3, 4.2.1 "Occupational safety and health"

This section reports to compare "...occupational safety and health risks...to those missions...evaluated in the 1996 NTS EIS." The occupational safety and health risks of beryllium contaminated facilities and sites was not addressed in the 1996 NTS EIS. We now have significant information to suggest that a potential occupational safety and health risk does exist at historical beryllium sites both active and inactive, and this now recognized risk should probably be addressed in this section. In addition, it may be appropriate to note in the "Summary" on page 4-3 that we now have an enhanced understanding of the hazards posed by the presence of beryllium at several sites and facilities, and that related occupational safety and health risks exist at the NTS that were not reported or evaluated in the 1996 NTS EIS. L-1-5

6. Chapter 4, Page 4-4, Section 4.2.2.1, Nevada Test Site, Paragraph 1, Lines1-4

This paragraph appears to be internally inconsistent regarding the discussion of noise levels. The first sentence indicates that "Construction of the Atlas Facility would elevate noise levels..." yet goes on to say that the increase "...would likely not be discernible above current ambient noise levels in the area." It is not clear if the statement is trying to say that temporary and intermittent construction noise on-site would exist; however it would likely not be discernible off-site, e.g., in publically accessible areas. L-1-6

7. Table 5-5, Page 5-14, Waste Management facility capacities and waste volume (m^3) projection

It appears that the entry under "Hazardous (storage) is an error, or the impact of a projected volume (650 m^3) that is approximately an order of magnitude above stated capacity (61.6 m^3) should be discussed. This is the only entry where the projection exceeds the capacity. If the discussion of the second paragraph under 5.3.5, Hazardous waste, is intended to explain this situation, it should be simply stated that no more than 61.6 m^3 of hazardous waste (consistent with the capacity) would be in storage at the Hazardous Waste Storage Unit at any given time. The discussion as it currently is written is not clear suggesting that as many as ten shipments per year would be required, not the "about four" as mentioned. L-1-7

It is also unclear in the second paragraph under 5.3.5, Hazardous waste, what is meant by the sentence, "The greatest volume of hazardous waste generated in the last 5 years was about 65 cubic meters." Is this volume for one location on the NTS, the maximum amount of hazardous waste generated within the entire NTS at any one time, or the maximum amount of hazardous waste generated on the NTS for a period of one year? Please clarify. L-1-8

8. Table 5-6, Page 5-17, Summary of cumulative impacts, Paragraph 2.

Consistent with the discussions of beryllium as a potential hazard and contaminant of concern, this table should make specific mention of legacy beryllium contamination as a specific hazard under Discipline Area Health and Safety, NTS activities. L-1-9

9. Chapter 6, Conclusions, Page 6-1, Paragraph 4, Lines 6-10

Please refer to Comments #1 & 4. The presence of beryllium and a large number of sites and facilities at the NTS could be considered "new information relative to environmental concerns." This is not to imply that the basic conclusion of the Supplement is in question, only that new information has been obtained relative to existing environmental, health and safety hazards from historical activities. L-1-10

Response to comment L-1-1: This paragraph has been revised to incorporate the following text:

"In the 1960s and 1970s beryllium was used extensively at the NTS in a number of experimental nuclear reactors, nuclear weapons tests, and other applications. A recent review of NTS historical documents indicates that some beryllium contamination remains in surface and sub-surface soils and at some facilities. However, based on the evaluation of a few facilities at the NTS where beryllium was present, surface and airborne contamination levels are below the established regulatory levels. An effort is underway to identify historic beryllium sites and to retrieve historical beryllium monitoring data."

Response to comment L-1-2: Comment noted.

Response to comment L-1-3: This paragraph has been revised to incorporate the text listed above for comment L-1-1.

Response to comment L-1-4: Section 3.2.1 has been revised to incorporate the following text:

"In the 1960s and 1970s beryllium was used at the NTS in a number of experimental nuclear reactors, nuclear weapons tests, and other applications. A recent review of NTS historical documents indicates that some beryllium contamination remains in surface and sub-surface soils and at some facilities. The beryllium contamination was frequently associated with radioactivity debris and, at some locations, the surface contaminated soil was removed and disposed in approved NTS waste management facilities.

A number of facilities at the NTS where beryllium was present have been evaluated for residual contamination. Surface and airborne contamination levels in the facilities examined to date are below the established regulatory limits for beryllium. An effort is underway to identify historic beryllium sites and to retrieve historical beryllium monitoring data. This effort includes the following activities:

1) The development of sampling plans for evaluating potential residual beryllium contamination of identified buildings and sites, in coordination with ongoing programmatic operations and environmental remediation activities.

2) The identification of all buildings and sites under at the NTS where beryllium containing materials have been machined, processed, assembled, stored, explosively dispersed, etc.

3) The establishment and approval of posting and access controls for historic beryllium facilities and areas where beryllium was present."

Response to comment L-1-5: Section 4.2.1 has be revised to incorporate the following text:

"Historical beryllium data from past sampling and monitoring had not been gathered and considered as a body of information relative to potential beryllium hazard at the NTS until recently. This information is now being validated and supplemented by data and information being acquired the NNSA/NV Environmental Restoration Program for inactive sites, and an aggressive beryllium sampling and monitoring program for facilities that housed historical beryllium operations and are still active. Facilities that are still active and deal with beryllium and beryllium bearing materials in current operations have ongoing sampling and monitoring programs consistent with the level of hazard posed and applicable standards. In addition, NNSA/NV has initiated a voluntary worker testing program using the lymphocyte proliferation test to assess potential exposure to the beryllium sensitive members of the workforce."

The Summary section of Section 4.2.1 has been revised to incorporate the following text:

"The industrial use of beryllium was found to result in an acute respiratory disease and led the Atomic Energy Commission to establish an airborne concentration standard of 2 micrograms per cubic meter for the workplace based on the

then accepted standard for metals. Adoption of this standard has essentially eliminated the presence of acute beryllium disease. However, epidemiological studies carried out in the late 1980s and 1990s revealed the presence of another form of lung disease, chronic beryllium disease (CBD), among workers at DOE sites. It was not until 1997 that a series of research efforts to investigate the prevalence of CBD among former beryllium workers, alternatives to screening tools for identifying pre-clinical disease, and policy implications of alternative occupational safety and health programs to reduce disease incidence were undertaken. In 2000 the DOE established the Chronic Beryllium Disease Prevention Program (CBDPP). NNSA/NV is in the process of implementing the CBDPP at the NTS and other NNSA/NV managed facilities to: (1) reduce the number of workers potentially exposed to beryllium in the course of their work; (2) minimize the levels of, and potential for, exposure to beryllium; and (3) establish a medical surveillance program to ensure early detection of the disease."

Response to comment L-1-6: The sentence: "Construction of the Atlas Facility would elevate noise levels, but these would likely not be discernible above current ambient noise levels in the area." has been changed to "Construction of the Atlas Facility would elevate noise levels on-site, however, it would likely not be discernible above current ambient noise levels off-site (e.g., in publicly accessible areas)."

Response to comment L-1-7: Footnote "d" to Table 5-5 explains how the capacity limit will not be exceeded. The footnote states "Hazardous waste is shipped to an off-site permitted facility for treatment/disposal, as needed."

To clarify that the projections in Table 5-5 are 10-year projections the title of the table has been revised to "Waste management facility capacities and waste volume (m^3) projection (2002 through 2011)."

Response to comment L-1-8: The sentence has been revised to read "The greatest annual generation of hazardous waste at NTS in the last 5 years was about 65 cubic meters."

Response to comment L-1-9: The NTS Activities Section of the Health and Safety Discipline of Table 5-6 has been revised to incorporate the following text:

"Recent information suggests that a potential occupational safety and health risk may exist at historical beryllium sites, both active and inactive, at the NTS. As a result, NNSA/NV has initiated an aggressive program of hazard awareness and worker protection along with a focused effort to identify historic beryllium sites and historical monitoring data to identify and characterize potential hazards."

Response to comment L-1-10: Paragraph 4 of this Section has been revised to incorporate the following text:

"Recent information suggests that a potential occupational safety and health risk may exist at historical beryllium sites, both active and inactive, at the NTS. While this information is relevant to environmental concerns, it is not significant enough to cause the preparation of a supplemental EIS."

KENNY C. GUINN
Governor

STATE OF NEVADA

JOHN P. COMEAUX
Director

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June 14, 2002

Kathleen A. Carlson, Manager
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Re: State Clearinghouse Comments – Draft Supplement Analysis (SA) for the Nevada Test Site Environmental Impact Statement – SAI E20002-157

Dear Ms. Carlson:

We have completed our review of the Draft Supplement Analysis (SA) for the Nevada Test Site, Site Wide Environmental Impact Statement (EIS). A general overview of the document is presented first, followed by specific section-by-section comments. We conclude with several specific recommendations.

General Comments:

Land Use: The U. S. Department of Energy's (DOE) Record of Decision (ROD) for the Nevada Test Site, Site Wide Environmental Impact Statement (EIS), states that the Department's "use of the Nevada Test Site (NTS) continues to be consistent with the existing land withdrawals." However, the ROD further stated " in view of the comments submitted by the State [of Nevada] and Department of Interior . . . DOE commits to continue to consult with the Department of Interior, Bureau of Land Management as to whether the four major land withdrawals that comprise the Nevada Test Site need to be updated." The ROD also states that "DOE has selected the No Action Alternative for management of low-level and mixed low-level wastes, pending programmatic decisions regarding where the Department should manage these wastes, [and thus] there will be no immediate changes in DOE's ongoing use of the lands for disposal of radioactive wastes." L-2-1

2

With the issuance of DOE's Programmatic EIS ROD for low-level waste (LLW), significant changes in DOE's national policy concerning disposition of certain LLW have now occurred. Many LLW streams, which are deemed unsuitable for onsite disposal at facilities across the Nuclear Weapons Complex, can now be sent to the NTS and/or the Hanford nuclear reservation for "final" disposal. The SA is silent, however, on the land use implications of this action. This is particularly relevant concerning the purpose of the intended land withdrawals for the NTS. The purpose of the land withdrawals was to established an "on continent" proving ground for nuclear testing; the orders say nothing about using the NTS as a national/regional LLW disposal site to support cleanup of the nuclear weapons complex. L-2-1

The land withdrawal orders also say nothing about using the NTS for non-defense commercial uses. In that regard, what is the specific federal land use authorization for the two major non-defense (private) commercial applications proposed at the NTS (i.e., the Wind Farm proposal and the Kistler Launch Facility)? State officials are aware of certain references to delegated permitting authorities granted to the NTS Development Corporation by DOE, however the SA is silent on whether or not these activities would be consistent with the land withdrawal orders.

The SA also suggests that land uses will not be affected by new site activities at the NTS. Yet the document fails to evaluate changes in environmental impacts, changes in physical characteristics, and changes in regulatory requirements that would result from new site activities envisioned at the NTS. L-2-2

Soils Remediation: In Chapter 4 of the SA (Section 4.2.4) a discussion is provided that suggests that plutonium-contaminated soil remediation on the Nevada Test and Training Range (NTTR) would not cause any adverse impacts. (NTTR is the new name for the Nellis Air Force Range.) The SA further indicates changes in mission or soil remediation plans taken since development of the 1996 NTS EIS would clearly be under the umbrella of impacts evaluated in that EIS. It is also noted in Chapter 3 (Section 3.1.3) that the overall environmental restoration program strategy for soils (reference Table 3-4) is the same as described in the 1996 NTS EIS. L-2-3

The State's review of the 1996 NTS EIS, however, indicates that DOE did not define a clear environmental restoration strategy for remediation of plutonium and uranium contaminated soils on the NTTR. The 1996 NTS EIS only states that "the final disposition of the remaining isotope inventory in these soils will be determined as part of the Soils Corrective Active Unit of the Environmental Restoration Program," (see page 4-106 third paragraph – DOE Final NTS EIS 08/96). L-2-4

In the years since the 1996 NTS Site Wide EIS was completed, the State of Nevada (*Division of Environmental Protection - NDEP*) has participated with DOE and the United States Air Force in a dialog concerning "cleanup levels" for contaminated soils on the NTTR. While this dialog continues today, the parties have yet to reach complete agreement on a final soil remediation level that should be pursued to address soil contamination on the NTTR. L-2-5

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As a matter of record, the NTS Site Wide EIS did not evaluate alternatives for soil remediation levels and their consequences. And since an interim or final decision that establishes a soil remediation level would be considered a major federal action, DOE should initiate a National Environmental Policy Act (NEPA) process to address alternative remediation "cleanup" levels, costs, and Long Term Stewardship (LTS) management options. State officials strongly believe that DOE should institute such a process to further agency planning through development of a separate Environmental Assessment (EA) for the NTS Soils Corrective Action Unit Environmental Restoration Program, [see agency planning and decision-making 40 CFR Part 1501.3(b)]. Examples of issues that should be addressed in such a document could include:

L-2-6

- An examination of alternative soil removal levels and the effects on occupational safety and health issues;
- A review of long-term stewardship responsibilities such as institutional controls among the responsible federal entities (i.e., DOE, the United States Air Force, and the Bureau of Land Management [1]).
- An assessment of the effects of soil extraction and related short-term erosion by water and wind processes including proliferation of contaminants in the biosphere; and
- An assessment of hazards associated with shipping LLW from the NTTR to NTS for disposal.

Waste Management: Changes in waste management activities at the NTS occurred with the issuance of DOE's Waste Management Programmatic Environmental Impact Statement (PEIS) Record of Decision (ROD); the ROD selected Nevada (NTS) and Washington (Hanford site) as regional/national disposal sites for DOE low-level waste (LLW) and mixed LLW.

This national decision also required an amendment to the NTS Site Wide EIS ROD. The amendment now permits DOE to significantly expand the list of offsite waste generators that would be allowed to dispose of LLW and potentially mixed LLW at either the NTS Area 5 or Area 3 waste disposal sites. L-2-7

In addition to these programmatic changes, DOE has also revised the agency's self-regulatory authorities for waste management activities through replacement of Waste Management Order 5820.2A, with DOE Order 435.1. This action revised DOE's approach to self-regulation by re-defining and/or adding new waste management requirements including revised performance assessments, a new composite analysis requirement and disposal authorization statements,

[1] NTTR is comprised of public lands withdrawn by the United States Congress and, authorized for military used for a period of 20 years; the current "landlord" is the United States Air Force, the ultimate landlord is Bureau of Land Management

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defined closure plans, as well as new waste acceptance requirements and site monitoring activities.

While these recent programmatic decisions and new/revised self-regulatory authorities are not projected to result in increased waste disposal volumes that were assessed in the NTS Site Wide EIS, they do represent major program changes to DOE's LLW management program. Moreover, these major program changes have raised new policy, regulatory, and long-term environmental management issues that have yet to be collectively assessed or fully disclosed in a single comprehensive DOE document. Issues that should be addressed in such a document include: L-2-7

- Public disclosure and review of a "common" waste acceptance criteria for the NTS and Hanford LLW disposal sites;
- An assessment of new waste streams that could be excluded from disposal at the Hanford reservation per the bounding analysis contained in the recently released Hanford Solid Waste EIS; L-2-8
- Evaluation of DOE's self-regulation of LLW disposal activities conducted at NTS and at the Hanford nuclear reservation. (Both the states of Nevada and Washington contend that such an evaluation must be included in an assessment of alternatives to self regulation); L-2-9
- Assessment of Long-Term Stewardship (LTS) options for DOE's LLW disposal sites to include an evaluation of permanent financing options (e.g., state trust funds) to support LTS management activities. (This is a state equity issue that is directly related to constraints associated with DOE's self regulation of LLW disposal sites at NTS and Hanford.) L-2-10
- Review of DOE's waste acceptance process to insure LLW proposed by DOE for disposal at the NTS is in fact defense waste, as opposed to LLW generated from commercial activities. L-2-11
- Review of DOE's waste acceptance process to ensure LLW proposed by DOE for disposal at the NTS is defense waste that is not defined as, and/or was previously defined as, defense "Special Case Waste" or "high activity LLW" exhibiting radiation characteristics considered equal to, or greater than, commercial Greater Than Class C wastes. Such wastes are not appropriate for shallow land burial. L-2-12

Although most of these waste management issues are probably outside the scope of the SA, they do represent new potential impacts to DOE's waste management program at the NTS. Accordingly, State officials urge the DOE to institute a National Environmental Policy Act (NEPA) process to further agency planning through development of a separate Environmental Assessment (EA) for the NTS waste management program, [see agency planning and decision-making 40 CFR Part 1501.3(b)]. L-2-13

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At a minimum, such an assessment should address development of a "common" waste acceptance criterion for NTS and Hanford; it should evaluate a bounding analysis of waste streams in the Nuclear Weapons Complex that could be sent to the NTS; it should disclose findings including any technical constraints and limitations identified in recently completed site specific and composite performances assessments. It should also offer an evaluation of alternatives to self-regulation including (LTS) management of LLW sites including LTS financing options (i.e., creation of state/private LTS trust funds). Finally, such a document should address questions concerning waste restrictions at the NTS to include LLW considered not suitable for shallow land burial and commercial LLW. L-2-13

Specific Comments -- *by Document Pages Number*

S-3 -- It would be useful to include English conversions with the metric values in the document (i.e., cubic feet as well as cubic meters). Historically, DOE/NNSA has reported waste volumes in cubic feet as opposed to cubic meters. L-2-14

S-4 – No mention is made on page S-4 or in other places in the document about the NTS Underground Test Area (UGTA) program, including the results of the program to date. Since groundwater contamination beneath the NTS is a critical long-term concern, and given it is the leading environmental issue for NTS Environmental Management program, at least in terms of long-term costs, it would seem the program should be discussed in detail under the title of the UGTA program (section 4.2.8). L-2-15

1-3 – The map on this page includes the modified boundaries resulting from the Military Lands Withdrawal Act of 1999 (Public Law 106-65). This map (or other maps in the document) should depict/address the land use issues associated with the addition of the Pahute Mesa to the NTS withdrawal(s), (i.e., as implemented by PL 106-65). What is the significance of the land use change generally; why did Congress institute the revised withdrawal; and what are the long-term stewardship responsibilities to DOE, if any? L-2-16

1-6 – The public involvement process is mentioned, but what was the outcome of the process? L-2-17

3-10 – The time period mentioned in Section 3.1.2.2 (*New waste management missions and facilities*) is different than the time period for the SA as a whole, (i.e., current and proposed programs and activities from now through 2006 – *see page 2-1*). The focus of the SA should not be alerted for just one major program area such as waste management and not other program activities such as the UGTA and/or the soil remediation program. L-2-18

3-11 – In the right column in Table 3-3 (*page 3-11*), what ten-year period is referenced for waste volumes and number of shipments? What is the rationale for ten years? Given the statement on page *S-3* that " additional waste streams are considered that may be generated at, or sent to, the NTS for management from 2002 through 2011. In addition, the statement on page *5-13*, which notes: "after 2011, it is anticipated that the proposed repository at Yucca Mountain would dispose of its LLW at the NTS." DOE officials at DOE/NNSA need to be aware that the State of Nevada would consider LLW generated at the proposed HLW repository at Yucca Mountain to be L-2-19

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commercial LLW, and thus not eligible for disposal at the NTS. In any event, the SA presents a confused and un-quantified review of LLW streams and waste acceptance time periods. L-2-19

3-18 – Given the extensive nature of the Defense Threat Reduction Agency Hard Target Defeat Tunnel Program and the potential for environmental impacts, there is very little discussion of this new activity in the SA. More importantly, the SA fails to make the case that existing NEPA coverage for this activity is "bounded" in the analysis contained in the NTS Site Wide EIS. In fact, the SA fails altogether to declare if there is a NEPA document, either programmatically or site-specific, that addresses environmental affects of this program. L-2-20

4-8 – There is an inconsistent conclusion between Table 4-2 and the text in section 4.2.3.5. Either there are increased numbers of shipments with a consequent increased impact or there is a problem in the table. In any case, more discussion and analysis of transportation impacts needs to be undertaken in the SA. For example, with the unwritten DOE policy of keeping trucks laden with LLW out of the Las Vegas Valley (i.e. per agreement between DOE/NNSA and State and local governments), does the transportation analysis contained in the NTS Site Wide EIS still apply? The SA fails to mention that truck transport of LLW to the NTS is now confined to several in-state rural highway routes. L-2-21

4-17 – The discussion in section 4.2.8 should be subdivided into (1) groundwater use/ general hydrology, and (2) groundwater contamination beneath the NTS. As mentioned before, the NTS UGTA program is the most significant EM activity being conducted at the NTS. In part, this is because of uncertainties associated with how fast and where contaminants are moving in the groundwater. There is a need to determine if groundwater contaminants are contained within the borders of the NTS land withdrawals. If contaminant in the groundwater moves off the NTS, the State of Nevada would pursue Natural Resource Damage Assessments to mitigate the loss of groundwater along with adverse effects on local land uses. Hence, a more detailed discussion of the UGTA program and its results is needed to substantiate the statement in the SA that says, "the conclusions of the 1996 NTS EIS remain valid for impacts to groundwater" (*see page 4-21*). What are the impacts to groundwater, in terms of ongoing contaminant transport? In fact, State officials contend that DOE is not yet able to confirm that contaminants in the groundwater beneath the NTS will not move beyond the land withdrawals. L-2-22

5-13 – The capacity for the waste management facility noted in table 5-5 has tripled for LLW, yet the volume has decreased. What is the reason for the increased capacity and why does the SA fail to discuss this expansion? Also, the time period is again in question using the 2002 to 2011 waste projections. What is the time period being analyzed in the SA? L-2-23

5-17 – The summary statement on this page under Traffic and Transportation is inconsistent with other information in the SA, given changes in DOE's LLW transportation program undertaken after completion of the NTS Site Wide EIS (i.e, number of shipments on rural routes). L-2-24

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References: There are a number of references that are either e-mails or telephone logs of conversations. Are theses available for review? Are these legitimate references for a document of this nature? L-2-25

Recommendations:

Land Use: The SA indicates that land use issues will not be affected by new site activities proposed at the NTS. However, the document fails to assess changes in land use that would result in new environmental effects, changes in the physical characteristics of the site, and challenges to long-standing legal and regulatory requirements. The SA needs to be amended to include a more realistic and detailed discussion of land use issues, including DOE's commitment to consult with the Department of Interior about the relevance of the existing NTS public land orders. L-2-26

Soil Remediation: The State's review of the SA indicates there are potential impacts associated with making a soil remediation decision to address "cleanup" of plutonium-contaminated soils on the Nevada Test and Training Range, the Tonopah Test Range and the NTS. Accordingly, and for the reasons outlined in the general comments above, the State of Nevada is encouraging DOE/NNSA to use the National Environmental Policy Act (NEPA) process to further agency planning by developing NEPA documentation to support a soils "cleanup" decision for the referenced "withdrawn" public lands. L-2-27

Waste Management: The State's review of the SA also indicates there are potential impacts associated with both existing and expected changes in LLW and Mixed LLW disposal activities at the NTS. As with the soils program, and for the reasons outlined in the general comments above, State officials are encouraging DOE/NNSA to use the NEPA process to further agency planning by developing NEPA documentation to support NTS's evolving waste management program. L-2-28

If you or your staff has any questions about these comments, the State Clearinghouse could arrange an intergovernmental meeting between DOE and State officials to address your concerns.

Sincerely

Heather K. Elliott

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State Clearinghouse Coordinator/SPOC

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Carl Gertz NNSA/NV
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Response to comment L-2-1: It is our opinion that the previous response to such comments on the NTS EIS is still pertinent and that the reuse activities being considered at the NTS (e.g., the Kistler Launch Facility) are consistent and compatible with the purpose for which the lands were withdrawn. Furthermore, as noted in the NTS EIS response to comments, NNSA/NV committed to undertake consultation with the U.S. Department of Interior regarding the status of the land withdrawals and to determine whether any updating of the withdrawals would be necessary or appropriate. That dialogue is still continuing and NNSA/NV plans to keep the U.S. Department of Interior advised of new uses of the NTS within the ongoing consultation process.

The Wind Farm Project has been cancelled.

Response to comment L-2-2: One project proposed for the NTS (Kistler Launch Facility) probably has the greatest potential to result in new environmental effects. The Federal Aviation Administration (FAA), with the assistance of NNSA/NV as a cooperating agency, prepared an Environmental Assessment to evaluate Kistler Aerospace Corporation's proposal to construct and operate a commercial launch and reentry/recovery facilities at the NTS. After reviewing and analyzing available data and information on existing conditions, project impacts, and measures to mitigate those impacts, the FAA determined that the project would not significantly affect the quality of the human environment within the meaning of National Environmental Policy Act.

The discussion of the Kistler project in the second column on page 4-15 has been revised to incorporate a summary of the environmental impacts of the project at the NTS. For a detailed discussion of the environmental impacts of the project at the NTS, please review the Environmental Assessment for this project, which was released on April 30, 2002.

Response to comment L-2-3: Section 4.2.4 (*Geology and Soils*) refers to the possible environmental impacts associated with the Kistler Launch Facility and the Environmental Restoration (ER) Off Site Project sites. There is no mention made of the other ER projects (Industrial Sites, Underground Test Area Project or Soils). There is no discussion that "suggests that plutonium-contaminated soil remediation on the Nevada Test and Training Range would not cause any adverse impacts" in this section.

Response to comment L-2-4: The NNSA/NV believes that the mission of Environmental Restoration (ER) program, and the Soils Remediation Project in particular, has not significantly changed since the preparation of the NTS EIS. ER project characterization and remediation activities presented in the Life-Cycle Baseline are within the scope of work specified in the NTS EIS.

Generalized site characterization activities and remedial actions were presented in the NTS EIS because detailed project and site-specific activities were not well defined. Most of the ER sites have not been characterized. While it is generally understood what project and site-specific remedial actions will be performed, final determinations are made as part of the Federal Facilities Agreement and Consent Order process and with the oversight of the Nevada Division of Environmental Protection.

Response to comment L-2-5: In Fiscal Year 2000, NNSA/NV re-examined Environmental Restoration priorities and suspended work on the Soils Remediation Project until Fiscal Year 2007. NNSA/NV agrees that no formal soil remediation meetings have been held with the Nevada Division of Environmental Protection (NDEP) since calendar year 2000. The Air Force is satisfied that a 1000 pCi/g total transuranic residual activity level will meet their foreseeable land use needs (April 6, 2002 letter to NNSA/NV) and we are in agreement. We will continue to work with NDEP to resolve this issue.

Response to comment L-2-6: As required by the Federal Facilities Agreement and Consent Order (FFACO), following site characterization, a Corrective Action Decision Document is prepared that includes a Corrective Action Alternative (CAA) analysis. National

Environmental Policy Act compliance would be considered in the CAA analysis, including compliance with regulations. Depending on the complexity of the site, the CAA would address all or some of the following considerations:

- Feasibility, including implementation and long-term effectiveness and reliability.
- Protection of human health.
- Short and long-term environmental impacts.
- Compliance with regulations, including the FFACO.
- Waste Management.
- Stakeholder acceptance (regulator and general public).
- Cost

In addition, a risk analysis (chemical and radiological) is performed that evaluates the short-term (worker, transportation, and public) and long-term (realistic future land uses) risks. If required, an as-low-as-reasonably-achievable analysis is also prepared.

NNSA/NV believes that there is adequate planning and involvement with Nevada Division of Environmental Protection and the Air Force regarding the remediation of soil sites on the Nellis Test and Training Range.

Response to comment L-2-7: In accordance with the Agreement In Principle, Appendix X, the state of Nevada reviews changes to the Nevada Test Site Waste Acceptance Criteria including the "common" waste acceptance criteria.

Response to comment L-2-8: This is outside the scope of the Supplement Analysis. However, the current Performance Assessment documentation for the NTS Radioactive Waste Management Sites have considered waste streams projected for disposal at the NTS and serve as the bounding analysis for waste disposal at the NTS. Under the Performance Assessment Maintenance Program, NNSA/NV will update the analysis on an annual basis.

Response to comment L-2-9: DOE's self-regulation of its low level waste disposal activities is conducted pursuant to its Congressionally provided statutory authority under the Atomic Energy Act of 1954.

Response to comment L-2-10: This is a congressional issue and outside the scope of the Supplement Analysis.

Response to comment L-2-11: The NTS accepts waste from its generators in compliance to the NTS Waste Acceptance Criteria, which complies with DOE Order 435.1. The Order does not allow NNSA/NV to accept commercially generated waste.

Response to comment L-2-12: The NTS accepts waste from its generators in compliance to the NTS Waste Acceptance Criteria, which complies with DOE Order 435.1.

Response to comment L-2-13: The scope of the NNSA/NV waste management program is consistent with the analysis presented in the NTS EIS and the Environmental Management Programmatic EIS. Further National Environmental Policy Act review is not warranted.

Response to comment L-2-14: The current practice in DOE National Environmental Policy Act documents is to use the units in common use for the various activities or resource areas and the units presented in the cited references. NNSA/NV currently reports waste volumes in cubic meters rather than cubic feet. To convert cubic meters to cubic feet, multiply by 35.316. Footnote "a" in Table 5-5 provides this multiplier value. Tables 3-4 and 4-2 have been revised to add this same footnote

Response to comment L-2-15: The "Radiological Impacts From Exposure to Groundwater" section on page S-4 has been revised to incorporate the following:

"The 1996 NTS EIS indicated that any radiological impacts to members of the public from transport and ingestion of contaminated groundwater resulting from past underground testing of nuclear weapons would not be expected to occur. No underground testing has been conducted since the 1996 NTS EIS was completed and no new sources of groundwater contamination have been introduced. In addition, the Underground Test Area (UGTA) Project is evaluating the extent of radionuclide migration in the groundwater in accordance with the Federal Facility Agreement and Consent Order. The UGTA project has drilled 24 new wells since 1996 and has not detected any contamination beyond the NTS land withdrawals. As a result, the conclusions of the 1996 NTS EIS have not changed."

Response to comment L-2-16: There are no contemplated land use changes associated with the addition of the Pahute Mesa to the NTS withdrawals, which was accomplished through P.L. 106-65. The Pahute Mesa area that was added to the NTS had been historically used by NNSA/NV for nuclear weapons testing activities, pursuant to a Memorandum of Understanding with the U.S. Air Force. In recent years, this area has also been included in NNSA/NV's planning for environmental remediation activities. Thus, the Congressional action addressing this land merely effected an administrative change consistent with NNSA/NV's long term historic usage of the land and its commitment to ongoing stewardship responsibilities for that area.

Response to comment L-2-17: As a result of the public involvement effort, the Consolidated Group of Tribes and Organizations (CGTO) convened the American Indian Writers Subgroup (AIWS) to provide input to the Supplement Analysis (SA). The AIWS analyzed potential impacts important to the CGTO including: visual resources, ecological resources, groundwater, cultural resources, environmental justice, project specific issues and cumulative impacts. The results of the AIWS impact analysis are presented in Section 4.2.12, American Indian Resources. Text provided by AIWS is italicized to distinguish it from NNSA/NV text.

A presentation concerning the SA was made to the NTS Community Advisory Board (CAB) in December 2001. Questions by CAB members were primarily on the SA process and were answered at the meeting by NNSA/NV representatives. The CAB did not provide comments on the Draft SA.

News releases were issued by NNSA/NV to notify the public of both the start of the SA process and the availability of the Draft SA. Fact sheets were mailed to over 300 interested individuals, special interest groups, and federal state and local officials. Approximately 150 copies of the Draft SA were distributed. Other than the state of Nevada and International Technology Corporation comments, no public comments were received on the Draft SA.

Response to comment L-2-18: The Draft Supplement Analysis covers the impacts of NTS missions, facilities, and projects that are either ongoing or projected to begin during the period through the year 2006. However, the environmental consequence analysis is for the entire period of activities for the given missions, facilities, and projects, to the extent foreseeable. For Waste Management missions and facilities, the environmental consequence analysis is based on the period of time over which the projects of waste generation, storage, and disposal rates, as calculated by NTS personnel, are the most foreseeable. The period through the next ten years represents waste generation, storage, and disposal projections that are based on such measures as interviews with generator sites and organizations and facility operational plans. For years after the next ten years, the uncertainties associated with the operations at NTS and other sites would make these projections less precise.

Response to comment L-2-19: See response to specific comment on page 3-10.

No Decision has been made regarding the acceptance of Yucca Mountain Project Low Level Waster at the NTS Low Level Waste disposal facilities. The Draft Supplement

Analysis has been revised to reflect the status of this decision.

Response to comment L-2-20: The Defense Threat Reduction Agency's (DTRA) Hard Target Defeat Program (HTDP) is authorized in the NTS EIS Record of Decision (ROD) as a Work for Others Program (see pages 17 and 18). The HTDP is classified as a counter proliferation program. According to the ROD, "Counter proliferation refers to the Department of Defense efforts to combat the international proliferation of weapons of mass destruction. Facilities for developing, producing, and storing weapons of mass destruction are likely to be located underground. Counter proliferation research and development is directed towards the detection, monitoring, and neutralization of buried targets." The ROD further states, "Other defense related research and development activities include tests and training exercises employing weaponry, such as small arms, artillery, guns, aircraft, armored vehicles, demolitions, rockets, bazookas, and air-dropped armaments……."

The HTDP is strictly Research and Development, consisting of 6-8 dynamic tests per year that may involve aircraft flying under tightly controlled conditions and targeting a small area (24 × 24 feet) in a previously disturbed area.

DTRA submits a test plan, along with a National Environmental Policy Act (NEPA) checklist, for each test to the NNSA/NV Project Manager, the Environment, Safety, and Health Division, and other applicable NNSA/NV organizations for review. The NEPA checklist describes the environmental impacts of each test and any required mitigation measures. The NNSA/NV NEPA Compliance Officer reviews the test plan and the checklist to determine if an Environmental Assessment needs to be prepared or if the test can be categorically excluded from further NEPA review. To date all of the tests have been categorically excluded from further NEPA review.

Response to comment L-2-21: Regarding the comment on inconsistent conclusions between text and Table 4-2, the table shows a total of 54,499 shipments analyzed in the NTS EIS and 42,636 currently being considered. This is a 21 percent decrease in the number of shipments, which is consistent with the Section 4.2.3.5 statement that "[t]he decrease in numbers of shipments would be reflected in similar decreases in health effects and traffic incidents."

The comment also requested more discussion and analysis of transportation impacts and gives an example on agreements on shipment routing. In accordance with the methodology for the Draft Supplement Analysis (SA), as described in Section 4.1 of the SA, the transportation analysis in Chapter 4 is a screening analysis. The analysis did not involve any modeling and was not sufficiently detailed to consider the effect of routing on the conclusions. More detailed analyses could be useful to the NTS program for managing transportation impacts; however, these analyses may be more appropriate for other venues than the SA. The SA directs the reader to the 1999 study, *Intermodal and Highway Transportation of Low-level Radioactive Waste to the Nevada Test Site*, DOE/NV-544, which examines route-related issues.

Response to comment L-2-22: Section 4.2.8 has been subdivided into a groundwater use/general hydrology section and a section on groundwater contamination.

We agree that, to date, we have not able to confirm that contaminants in the groundwater will not move beyond the NTS land withdrawals. However, our studies and sampling conducted to date do not show migration of contaminants beyond the NTS.

The first paragraph of the groundwater contamination section has been revised to incorporate the following:

"The Underground Test Area (UGTA) Project has drilled 24 new wells since 1996. Twenty of these wells were drilled between Pahute Mesa on the NTS and Oasis Valley to the southwest of Pahute Mesa, and 4 were drilled in Frenchman Flat on the NTS. Monitoring results of NNSA/NV's Routine Radiological Environmental Monitoring Program of the new

wells drilled by the UGTA Project confirm that no contamination has been detected off of the NTS."

The third paragraph of the groundwater contamination section has been revised to incorporate the following:

"The Underground Test Area (UGTA) Project is evaluating the extent of groundwater contamination from past underground nuclear testing. This is being accomplished through the collection of data and developing groundwater flow and transport models to estimate the maximum extent of contaminant migration. The work of the UGTA project is being conducted under the oversight of the Nevada Division of Environmental Protection as part of the Federal Facility Agreement and Consent Order."

Response to comment L-2-23: The NTS radioactive waste disposal facilities have not been expanded in area since the NTS EIS. The 3,800,000 cubic meters represents the total area that could be used for disposal, not the active portions of the disposal facilities. NNSA/NV does not anticipate utilizing the full disposal capacity. The NTS EIS capacity did not include that area that NNSA/NV did not expect to utilize. To match the approach taken in the NTS EIS for presenting disposal capacity, Table 5-5 has been revised to show a disposal capacity of 1,000,000 million cubic meters. In addition a footnote has been added to clarify the disposal capacity versus total disposal area.

Response to comment L-2-24: The comment does not specify what information is inconsistent or what other statements in the Draft Supplement Analysis (SA) need to be examined. However, an evaluation of the veracity of the statements on page 5-17 regarding transportation indicates that all statements are correct and consistent with Section 4.2.3, "Traffic and transportation." The data on nationwide impacts of DOE radioactive shipments is derived from the 2002 reference to the Yucca Mountain EIS, which has received thorough and critical review. The statement on NTS activities is identical to the conclusion in Section 4.2.3.5 of the SA. The need to make any changes to this section is not clear without further specification of the comment.

Response to comment L-2-25: Emails and telephone conversation logs are legitimate references for National Environmental Policy Act documentation. Referenced emails and telephone logs are included in the Administrative Record and are available for public review.

Response to comment L-2-26: It is our opinion that the previous response to such comments on the NTS EIS are still pertinent and that the reuse activities being considered at the NTS (e.g., the Kistler Launch Facility) are consistent and compatible with the purpose for which the lands were withdrawn. Furthermore, as noted in the NTS EIS response to comments, NNSA/NV committed to undertake consultation with the U.S. Department of Interior regarding the status of the land withdrawals and to determine whether any updating of the withdrawals would be necessary or appropriate. That dialogue is still continuing and NNSA/NV plans to keep the U.S. Department of Interior advised of new uses of the NTS within the ongoing consultation process.

One project proposed for the NTS (Kistler Launch Facility) probably has the greatest potential to result in new environmental effects. The Federal Aviation Administration (FAA), with the assistance of NNSA/NV as a cooperating agency, prepared an Environmental Assessment to evaluate Kistler Aerospace Corporation's proposal to construct and operate a commercial launch and reentry/recovery facilities at the NTS. After reviewing and analyzing available data and information on existing conditions, project impacts, and measures to mitigate those impacts, the FAA determined that the project would not significantly affect the quality of the human environment within the meaning of National Environmental Policy Act (NEPA).

The discussion of the Kistler project in the second column on page 4-15 has been revised to incorporate a summary of the environmental impacts of the project at the NTS. For a detailed

discussion of the environmental impacts of the project at the NTS, please review the Environmental Assessment for this project, which was released on April 30, 2002.

Response to comment L-2-27: NNSA/NV agrees there are potential impacts associated with site remediation on the Nevada Test and Training Range, the Tonopah Test Range and the NTS. These impacts are currently presented, reviewed and approved by Nevada Division of Environmental Protection with stakeholder involvement, as part of the existing Federal Facilities Agreement and Consent Order (FFACO) process. The preparation of a separate Environmental Assessment for each corrective action unit that is part of the FFACO would be cost prohibitive, unnecessarily delay site remediation and not provide any added value to the current decision making process.

Response to comment L-2-28: The scope of the NNSA/NV waste management program is consistent with the analysis presented in the NTS EIS and the Environmental Management Programmatic EIS. Further NEPA review is not warranted.

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Las Vegas NV 89193-8518

Dear Mr Furlow

We have reviewed the Draft Supplemental Analysis for the Nevada Test Site Environmental Impact Statement. The most significant issues from the Nellis perspective are the location of open burn experiment and the fire experiment facility. Please include Nellis leadership in the coordination process for your planned actions at these two sites. Both of these sites may impact operations on the Nevada Test and Training Range. L-3-1

Additionally, the Air Force reviewed the Final Draft Environmental Assessment for the Construction and Operation of the Fire Experiment Facility (DOE 1999) during the public review process. Energy Secretary Bill Richardson withdrew the proposal; therefore, we did not pursue our comments further. If DOE plans to revitalize the project, please recirculate the document so the public and the Air Force can provide comments. L-3-2

Cooperative airspace scheduling of Kistler operations is critical to assure the USAF mission can continue and to avoid accidents. Also, we recommend the Department of Energy (DOE) develop an information program to notify the residents in the Military Operating Areas of each launch so that the sonic booms would not be assumed to come from Air Force testing and training operations. L-3-3

If you have additional questions about this review and/or the comments, please call Ms Deborah Stockdale, Chief, Natural and Cultural Division, at (702) 652-6106.

Sincerely

ARVIL E. WHITE III, Colonel, USAF
Commander

cc:
98 RANW/CC

Global Power For America

Response to comment L-3-1: NNSA/NV will include the Nellis Air Force Base in our coordination efforts for these two projects.

Response to comment L-3-2: If the project is revitalized, NNSA/NV will keep the Nellis Air Force Base informed.

Response to comment L-3-3: There will be close coordination between the NNSA/NV and the Nellis Air Force Base concerning Kistler operations at the NTS.