

Radiological/Nuclear Countermeasures Test and Evaluation Complex, Nevada Test Site

Final
Environmental Assessment

August 2004



U. S. Department of Energy
National Nuclear Security Administration
Nevada Site Office
Las Vegas, Nevada

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List of Acronyms

BN	Bechtel Nevada
CAS	Corrective Action Site
Cm	Centimeters
CEMP	Community Environmental Monitoring Program
CFR	Code of Federal Regulations
DAF	Device Assembly Facility
dB	Decibels
dBA	A-weighted decibels
DHS	U.S. Department of Homeland Security
DOE	U.S. Department of Energy
EA	Environmental Assessment
EIS	Environmental Impact Statement
EPA	U.S. Environmental Protection Agency
FAA	U.S. Federal Aviation Administration
FFACO	Federal Facilities Agreement and Consent Order
FONSI	Finding of No Significant Impact
FWS	U.S. Fish and Wildlife Service
ft	Foot or Feet
g	Gram
gal	Gallons
HC	Hazard Category
HEU	Highly Enriched Uranium
HWSU	Hazardous Waste Storage Unit
in	Inches
kg	Kilograms
km	Kilometers
kph	Kilometers per Hour
kV	Kilovolt
l	Liters
m	Meters
mi	Miles
mph	Miles per Hour
NAC	Nevada Administrative Code
NEPA	National Environmental Policy Act
NESHAPS	National Emission Standards for Hazardous Air Pollutants
NNSA	National Nuclear Security Administration
NRHP	National Register of Historic Places
NTS	Nevada Test Site
NTS EIS	Nevada Test Site Environmental Impact Statement
NSO	Nevada Site Office
PDSA	Preliminary Documented Safety Analysis
PE-kg	Plutonium-equivalent Kilogram
PHA	Preliminary Hazards Analysis
PL	Public Law
PM10	Particulate Matter less than 10 microns in diameter
PPE	Personal Protective Equipment
RCRA	Resource Conservation and Recovery Act
Rad/NucCTEC	Radiological/Nuclear Countermeasures Test & Evaluation Complex
RMP	Resource Management Plan
ROD	Record of Decision

RWMS	Radioactive Waste Management Site
SA	Supplement Analysis
SAA	Satellite Accumulation Area
SAS	Sensitive Assignment Specialist
SNM	Special Nuclear Materials
SPOs	Security Police Officers
SSC	Safety Structures, Systems and Components
STD	Standard
TSCA	Toxic Substances Control Act
TSR	Technical Safety Requirement
USC	U.S. Code
WMD	Weapons of Mass Destruction

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1 **1.0 INTRODUCTION**

2
3 The National Environmental Policy Act of 1969 (NEPA) requires Federal agency officials to
4 consider the environmental consequences of proposed actions before decisions are made. In
5 complying with NEPA, the National Nuclear Security Administration (NNSA) follows the Council
6 on Environmental Quality regulations (40 Code of Federal Regulations [CFR] 1500-1508) and
7 the U.S. Department of Energy's (DOE's) NEPA implementing procedures (10 CFR 1021). The
8 purpose of an Environmental Assessment (EA) is to provide Federal decision makers with
9 sufficient evidence and analysis to determine whether to prepare an Environmental Impact
10 Statement (EIS) or issue a Finding of No Significant Impact (FONSI).

11
12 The DOE, National Nuclear Security Administration Nevada Site Office (NNSA/NSO), proposes
13 to establish a radiological/nuclear countermeasures testing and evaluation complex at the
14 Nevada Test Site (NTS) in Nye County, Nevada. This EA identifies and discusses potential
15 environmental impacts associated with the proposed action.

16
17 **1.1 BACKGROUND**

18
19 As the Federal agency that operates and manages the NTS, the U.S. Department of Energy in
20 1996 published a *Final Environmental Impact Statement for the Nevada Test Site and Off-Site*
21 *Locations in the State of Nevada* (NTS EIS). Although the NTS EIS addressed a very broad
22 range of potential activities at the NTS, it did not anticipate the increased interest and need for
23 tests and experiments for the development of remote sensing equipment and other activities
24 associated with weapons of mass destruction (WMD) detection and defense arising out of the
25 September 11, 2001, terrorist attacks on the United States. A major concern associated with
26 potential terrorist attacks in the United States is the placement and detonation of improvised
27 nuclear devices and/or radiological dispersion devices. The U.S. Department of Homeland
28 Security (DHS) is the Federal organization charged with defending the borders of the United
29 States. The Homeland Security Act of 2002 (Public Law 107-296), includes provisions
30 authorizing the DHS to utilize DOE sites in carrying out its missions. DHS requested the
31 NNSA/NSO, as part of its work for others program, to construct, operate, and maintain, for use
32 by DHS, the Radiological/Nuclear Countermeasures Test and Evaluation Complex
33 (Rad/NucCTEC) at the NTS. The Rad/NucCTEC would provide an isolated complex to support
34 capabilities for post bench-scale testing and evaluation of radiological and nuclear detection
35 devices that may be used in transportation-related facilities.

36
37 **1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION**

38
39 The NTS has been the site of a variety of activities relating to national security and combating
40 terrorism. These activities include but are not limited to the following: training, exercises,
41 testing and evaluation, development of technology, military operational readiness and response
42 to WMD environments and events.

43
44 A Supplement Analysis (SA) for the NTS EIS addressed the increase in activities associated
45 with combating terrorism and counterterrorism training as well as related activities (DOE, 2003).
46 The evaluation in the SA focused on certain areas of the NTS and anticipated sizes of facilities.
47 Although many of the individual components were described in the SA, the scope of the
48 proposed Rad/NucCTEC is substantially greater than anticipated and its location in a previously
49 undisturbed area was not foreseen. The use of special nuclear materials (SNM) was also not
50 addressed in the SA.

1 The DHS has identified a critical need to consolidate a broad spectrum of radiological and
2 nuclear countermeasures test and evaluation activities as well as training and other operational
3 needs throughout its organization. The NTS offers the isolation and security needed to
4 successfully operate such a complex. In recognizing the ongoing need for DHS activities,
5 NNSA/NSO is proposing that the Rad/NucCTEC be located at the NTS.

6 7 **1.3 PUBLIC INVOLVEMENT AND SCOPING**

8
9 Public involvement in the NEPA process is important for informing potential stakeholders about
10 proposed actions and ensuring any public concerns are given adequate consideration and
11 analysis. Public involvement activities are conducted pursuant to NEPA in accordance with the
12 Council on Environmental Quality Regulations for Implementing the Procedural Provisions of
13 NEPA (40 CFR 1500-1508) and DOE NEPA Implementing Procedures (10 CFR 1021). Public
14 participation for this EA includes scoping activities, public review, and expressed comment on
15 the preapproval draft EA.

16
17 DOE NEPA Implementing Procedures require, at a minimum, that notification of the intention to
18 prepare an EA be made to the host state and host tribe. In April 2004, NNSA/NSO notified state
19 and local government agencies and officials, other Federal agencies, 17 American Indian tribes
20 and organizations, and U.S. Senators and Representatives from Nevada of its intention to
21 prepare an environmental assessment for the proposed Rad/NucCTEC and provided a 33-day
22 scoping period. In response to these notifications, NNSA/NSO received scoping comments
23 from the Nevada Agency for Nuclear Projects, the Eureka County Yucca Mountain Information
24 Office, and the Citizens Education Project. Copies of the scoping comment letters are
25 reproduced in Appendix A.

26
27 Each of the three commenters requested that NNSA/NSO conduct public scoping meetings and
28 extend the scoping period. These requests for public scoping meetings and scoping period
29 extension were based at least in part on an assumption that NNSA/NSO was proposing to
30 conduct releases of radioactive materials into the environment at the Rad/NucCTEC. Based
31 upon the fact that no releases of radioactive materials are planned at the proposed facility and
32 due to the exigencies of the project schedule, NNSA/NSO determined that it would not conduct
33 the requested public scoping meetings nor extend the scoping period.

34
35 Two scoping commenters expressed concern for cumulative impact analysis. Of particular
36 concern was the potential for synergistic effects of operations at the Rad/NucCTEC and the
37 proposed releases of biological simulants and small volumes of chemicals at the NTS, ongoing
38 low-level radioactive waste operations at the NTS, the proposed high-level waste repository at
39 Yucca Mountain, and potential resumption of underground nuclear testing. In addition, one
40 scoping commenter identified possible impacts of terrorism and sabotage on the activities under
41 the proposed action.

42
43 A preapproval draft EA was released to the public for a 33-day review and comment period.
44 Comments received on the draft EA were reviewed and the final EA has been modified, as
45 needed, to address public and agency comments. Copies of the comments received and
46 NNSA/NSO's responses are in Appendix B of this EA.

1 **2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES**

2
3 This section describes the proposed action to construct the Rad/NucCTEC at the NTS. This
4 section also discusses alternatives to the proposed action and describes the no-action
5 alternative under which the Rad/NucCTEC would not be built.
6

7 **2.1 PROPOSED ACTION**

8
9 The NNSA/NSO proposes to construct the Rad/NucCTEC at the NTS (Figure 1). The Complex
10 would be located in Area 6, south of the Device Assembly Facility (DAF) (Figure 2). The
11 purpose of the Rad/NucCTEC would be to conduct a wide variety of testing and evaluation
12 activities related to combating terrorism. Specifically, the Rad/NucCTEC would encompass:
13

- 14 o Prototype detector testing and evaluation
- 15 o Systems testing and evaluation
- 16 o Performance standards validation
- 17 o Demonstration of prototype detectors, systems and performance standards
- 18 o Verified threat demonstration
- 19 o Concept of operations evaluation and verification
- 20 o Training

21
22 Primary components of the Rad/NucCTEC are discussed in the following paragraphs.
23

24 **2.1.1 Facility Description**

25
26 As currently conceived, the Rad/NucCTEC would be designed on a campus concept that would
27 be comprised of up to eight venues supported by common infrastructure as shown in Figure 3:
28 1) Port of Entry—Primary, 2) Port of Entry—Secondary, 3) Airport/Inspections Facility, 4) Active
29 Interrogation Facility, 5) Environmental Test Facility, 6) Sensor Test Track, 7) High-Speed
30 Road, and 8) Training Facility. The preferred location for the Rad/NucCTEC would be in Area 6
31 of the NTS, south of the DAF and north of Barren Wash. As plans for the Rad/NucCTEC
32 evolve, some of the facilities could be combined or reconfigured. Possible future expansion
33 could include additional venues. A brief description of each of the proposed venues appears
34 below. These descriptions are based on conceptual diagrams; layout and dimensions may be
35 subject to change.
36

37 The venues that would ultimately comprise the Rad/NucCTEC serve a variety of testing
38 functions. The projected roles of the venues in the overall testing mission are indicated in Table
39 1.
40

41 1) Port of Entry—Primary. The Primary Port of Entry would provide a fully operational mockup
42 of a realistically functional U.S. land border crossing facility. This facility would include from
43 three to five traffic lanes and all other features and elements common to a U.S. land border
44 crossing facility, such as roadway design, inspection booths, crash protection and traffic control,
45 canopy, and license plate reader system. This venue would be designed in general
46 conformance with specifications by the General Services Administration, U.S. Land Port of Entry
47 Design Guide (P130).
48

49 2) Port of Entry—Secondary. Vehicles designated for secondary processing would be routed
50 from the Port of Entry—Primary to the Port of Entry—Secondary. This inspection area would
51 consist of a building with an adjacent series of two drive-through lanes with a 50-foot (ft) [15

Table 1. Projected Roles of the Venues in the Overall Testing Mission

Venue	Replica Venue (Conduct of Operations and Testing)	Basic Testing Facility	Support Facility
Port of Entry--Primary	X		
Port of Entry—Secondary	X		X
Sensor Test Track		X	
Active Interrogation Facility	X	X	
High-Speed Road	X		
Environmental Testing Facility		X	
Airport/Inspections Facility	X		
Training Facility			X

meters (m)] wide by 65-ft (20 m) long canopy covering them from one end of the building. An area next to the canopied area would be paved and used for screening by either a mobile Vehicle and Cargo Inspection System or mobile x-ray. The building would include two bays with one or two hydraulic vehicle lifts for vehicle inspection and teardown. A loading dock for up to three trucks would be used for trucks too large to fit in the vehicle bays. The building would also include the following: a Port of Entry control room, a conference room, laboratory, restrooms, and the communications support room for the complex. This venue would be designed in general conformance with specifications by the General Services Administration, U.S. Land Port of Entry Design Guide (P130).

3) Airport Inspection Facility. The Airport Inspection Facility would consist of areas for pedestrian/passenger processing, mail and cargo handling, baggage handling, and a break area. This facility could function as a Port of Entry's passenger screening area for a land border crossing or the passenger and baggage screening facility at an international airport terminal. It would include detection equipment typical of international airports in the United States, i.e., baggage x-ray, metal detectors, etc. On the tarmac outside the building, other features could be sited, such as aircraft cargo containers and a mock-up of a wide-body aircraft fuselage with working cargo bay, and elevated ramp loaders. This facility would also include a large break room, restrooms, and a limited security area for storage of classified materials and discussions.

4) Active Interrogation Facility. The Active Interrogation Facility would operate as a user facility wherein developers of active interrogation systems for the detection of highly enriched uranium, special nuclear material, and/or fissile materials may operate their systems in a realistic test environment. The central feature of this facility is a test area composed of a hard surface pad over which semi tractor-trailers, and cargo containers on flat beds can pass. The pad and integral roadway would be designed to provide a wide range of source-to-target container distances (i.e. the distance between the accelerator to the cargo container wall) including a rail system for railroad cars. A remote control room for this facility would be located about 300 ft (91 m) away in the Environmental Test Facility (described below). There would also be a control room located within the Active Interrogation Facility. The facility would be equipped with an overhead crane. In addition to accelerator produced radiation fields, a vertical shaft would be located in the middle of the integral roadway, allowing the emplacement of a high-activity neutron-emitting radionuclide. The neutron beam would be able to sweep across moving containers on the integral roadway. The facility would be designed to safely handle neutron production of 10^{12} or more neutrons per second, broad spectra, and monochromatic high-energy

1 photon sources capable of generating photo-fission reactions, muon beams, and other charged
2 particle beams.

3
4 Shielding and exclusion areas would be established to protect personnel from receiving unsafe
5 radiation doses. In addition, the very high radiation area would be surrounded with a 6-foot high
6 chain link fence with an active interlock system for immediate accelerator shutdown if the gate is
7 opened during operation. All radiation areas would be posted and de-marked. Warning lights
8 would be active when accelerators are in operation.

9
10 5) Environmental Test Facility. The Environmental Test Facility would be a multi-function
11 building housing an operational test and evaluation center, user area, and facility control
12 centers. The facility would include a large environmental testing lab located in a 160-ft (49 m)
13 by 75-ft (23 m) climate-controlled hi-bay with a 20-ton overhead crane. The hi-bay would have
14 an area for assembly, reconfiguration, and maintenance of large detectors. The remainder of
15 the hi-bay would contain about six environmental chambers, each with an interior controlled
16 volume of at least 14 ft (4 m) wide by 14 ft (4 m) deep by 13 ft (4 m) high. The test
17 environmental chambers would consist of a temperature and humidity chamber, a smoke test
18 chamber, a vibration and shock table, a wind and dust chamber, a rain and spray chamber, and
19 an anechoic chamber. In addition to the hi-bay area, the facility would house offices, various
20 laboratories, control rooms, a conference room, a break room and restrooms.

21
22 6) Sensor Test Track. The Sensor Test Track would be within an area approximately 400 ft
23 (122 m) long and 60 ft (18 m) wide with a radio-controlled vehicle to carry a radioactive source.
24 The facility would be used for performing tests that require numerous radioactive source passes
25 at calibrated speeds. The radio-controlled vehicle, carrying a radioactive source would make
26 repetitive passes near installations of portal monitors.

27
28 7) High-Speed Road. The High-Speed Road would be a two-lane roadway built to current
29 Nevada Department of Transportation design standards, construction quality control standards,
30 and standard construction specifications. It would be at least 2 miles (mi.) [3 kilometers (km)]
31 long with a grade of about 3% and shoulders 4 ft (1 m) wide along most of its length. In a
32 2,000-foot (610 m) long section of the roadway, beginning about 1 mi. (2 km) from its upper end,
33 the shoulders would be approximately 8 ft (2 m) wide. Instrument mounting, power, and
34 communication facilities with restrooms would be installed along the roadway. The roadway
35 would be appropriately marked and would include a runaway arrestor ramp and turnarounds.
36 These features would increase the overall length of this venue to at least 12,450 ft (3,800 m).
37 The 2,000 ft (610 m) long section would be the test section of the roadway. The upper 1 mi. (2
38 km) of the roadway would be an acceleration zone for trucks to attain speeds of up to 80 miles
39 per hour (mph) [129 kilometers per hour (kph)] before entering the test area. When this facility
40 is in operation, a vehicle would be loaded with non-radioactive materials, sealed source(s),
41 medical isotope(s), (or a quantity of special nuclear material), then driven the length of the
42 roadway at various speeds through the test area where the sensors (portals) undergoing
43 evaluation would be installed. To minimize the risk should an accident occur, SNM would not
44 be removed from its shipping container when in use on the High-Speed Road.

45
46 8) Training Facility. The Training Facility would be located in a building 70 ft (21 m) wide by
47 100 ft (30 m) long and would include offices, conference/class rooms, control/observation
48 rooms, a break room with vending machines, and restrooms.

49
50 Although not part of the current proposed project, future additions to the Rad/NucCTEC could
51 include venues such as 1) a short length of full-scale railroad line, which would run parallel to

1 the High-Speed Road, 2) a seaport facility including shipping containers, a gantry crane, and a
2 mock cargo ship, and 3) a mock urban area. These potential future venues would be located
3 within the project area being assessed in this EA.
4

5 **2.1.2 Construction and Operations**

6 2.1.2.1 Construction

7
8
9 The Rad/NucCTEC would initially occupy approximately 50 acres, with possible future
10 expansion to approximately 100 acres. The proposed location is in undisturbed habitat.
11 Clearing, grubbing of vegetation and grading would be required. Some areas would require fill
12 material, which would be transported from a borrow pit within the NTS. Trenching and
13 excavation would be required for foundations and installation of various pipes, cables and other
14 appurtenances. Ancillary fuel-burning equipment common to construction of a facility that could
15 be used includes small diesel generators, air compressors, welding units and pumps.
16

17 It is anticipated that the Rad/NucCTEC would be constructed in phases. The exact sequencing
18 of the phases is subject to change but at this time the complex would be built in the following
19 phases:
20

21 Phase I

22 Port of Entry—Primary
23 Port of Entry—Secondary
24 Sensor Test Track
25

26 Phase II

27 High-Speed Road
28 Active Interrogation Facility
29 Environmental Test Facility
30

31 Phase III

32 Airport/Inspections Facility
33 Training Facility
34

35 Phase IV

36 Potential Future Expansion
37

38 2.1.2.2 General Operations

39 A description of each of the facilities that would comprise the Rad/NucCTEC appears in Section
40 2.1.1. The Rad/NucCTEC operations schedule would be consistent with the NTS work week,
41 i.e., four ten-hour days per week. Non-radiological/nuclear operations would consist of
42 housekeeping, preventive maintenance, classroom training, vehicle refueling, and general
43 administrative activities. Use and storage of chemicals at the Rad/NucCTEC would consist of
44 standard electronics laboratory chemicals (e.g. alcohol). Small amounts of liquid nitrogen would
45 be used for gamma spectroscopy and would be stored on site.
46

47 The expected lifetime of the Rad/NucCTEC is 20 years. After this time, if it is determined that
48 the facility is no longer needed for its intended purpose, it would be decommissioned or placed
49 into alternate service. Before making a decision to place the Rad/NucCTEC into alternate
50 service, NNSA/NSO would undertake an appropriate NEPA process. If the Rad/NucCTEC is

1 decommissioned, equipment and other property would
2 be removed and salvaged. The site would be surveyed
3 for radiological and chemical contamination and
4 decontaminated, if necessary. The diesel fuel tank
5 would be drained, cleaned out and removed. The septic
6 system would most likely be closed in place so that if
7 necessary it could be reactivated at a later date.

8 9 2.1.2.3 Nuclear Operations

10
11 The proposed handling of radioactive materials at some
12 of the Rad/NucCTEC venues requires that DOE
13 requirements be met for the design, construction, and
14 operation of a nonreactor nuclear facility. When fully
15 operational, Rad/NucCTEC is anticipated to be
16 classified as a Hazard Category (HC) 2 Nuclear Facility
17 pursuant to DOE Standard 1027-92, *Hazard*
18 *Categorization and Accident Analysis Techniques for*
19 *Compliance with DOE Order 5480.23, Nuclear Safety*
20 *Analysis Reports* and subject to the requirements of 10
21 CFR 830, *Nuclear Safety Management, Subpart B,*
22 *Safety Basis Requirements*. See section 7.0, *Hazard*
23 *Analysis*, for more information on this process.

24
25 NNSA/NSO proposes to use a variety of radioactive
26 materials in Rad/NucCTEC, including SNM, radioactive
27 sources, and short half-life isotopes. Short half-life
28 isotopes typically have half-lives ranging from a few
29 hours to a few years and are usually used for medical
30 applications. The amount of SNM that would be used
31 would not exceed 25 kilograms of plutonium-239, or a
32 radiologically equivalent amount of other SNM (i.e., 50
33 kg of highly enriched uranium). The quantity of non-
34 SNM radioisotopes that may be used at any of the
35 Rad/NucCTEC venues would not exceed the HC-3
36 threshold. For all venues at Rad/NucCTEC, the non-
37 SNM radioisotopes that are initially anticipated to be
38 used and their levels of activity are listed in Table 2.

39
40 Nuclear Material Safeguards Category I and II SNM
41 would be used in conjunction with sealed radioactive
42 sources at the Primary and Secondary Port of Entry
43 facilities, the High Speed Road, and the Active
44 Interrogation Facility. Handling of radioactive source
45 materials at the Port of Entry facilities would occur in
46 order to configure the source geometry for testing;
47 however, radioactive source materials would not be
48 processed, altered or modified in any way. Although
49 materials at the Active Interrogation Facility would be
50 subjected to neutron and high energy photon beams,
51

Non-Reactor Nuclear Facility Hazard

Category: Facilities operated under the purview of NNSA that contain radiological or special nuclear material are regulated in 10 CFR 830, *Nuclear Safety Management Subpart B, Safety Basis Requirements*,. These facilities must be categorized according to the inventory and/or potential consequence to the workers, public and environment. Facilities are categorized into 4 categories: Hazard Category 1, 2, 3 or less than Category 3, with Category 1 being the highest nuclear hazard. Although not yet complete, preliminary analyses indicate that the Rad/NucCTEC is likely to be categorized as a Category 2 Non-Reactor Nuclear Facility as determined by the process identified in DOE Std. 1027-92, *Hazard Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*.

Special Nuclear Material (SNM): As defined in Section 11 of the Atomic Energy Act of 1954, special nuclear material means: (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which the U.S. Nuclear Regulatory Commission determines to be special nuclear material; or (2) any material artificially enriched by any of the above.

Security Category: Nuclear materials managed by the NNSA carry an inherent security risk due to the nature and form of the materials. Because of this risk, NNSA categorizes these materials in four Nuclear Material Safeguards Categories, I through IV, with Category I material being considered to be the highest security risk. During operations, it is envisioned that the Rad/NucCTEC will routinely use Category III & IV material and sometimes use Category I & II material.

Radioactive Sources: The term sealed radioactive source as used in this document consists of a known or estimated quantity of radioactive material contained within a sealed capsule made of non-radioactive material, or contained in a manner to prevent leakage. Accountable sealed radioactive sources are subject to management as identified in 10 CFR 835. Small quantities of some types of radioactive material are not subject to these regulations and are therefore termed exempt. More information on radioactive sources can be found in 10 CFR 835.

1 the quantity of activation products would be so slight that those levels would be well below free
 2 release limits.

3
 4 Based on the Preliminary Hazard Analyses, source materials that could be used at these
 5 facilities could include up to 50 kg of highly enriched uranium and other SNM components in
 6 various shapes and sizes up to several kg each. The SNM would be solid metal and encased in
 7 non-radioactive metal cladding. Non-SNM radioactive sources would be in either solid or liquid
 8 form. Short half-life isotopes are typically used for medical purposes but at Rad/NucCTEC
 9 would not be used for those purposes, i.e., they would not be administered to people or animals.
 10 All radioactive materials used at the Rad/NucCTEC would be sealed or encased in metal
 11 cladding. None of the activities at the Rad/NucCTEC would involve the release of radioactive
 12 materials.

13
 14 **Table 2. Non-Special Nuclear Material Test and Evaluation Radiological Source Inventory**
 15

Isotope	Activity (mCi)
Industrial Isotopes	
Americium-241	20
Barium-133	0,25
Cobalt-57	1
Cobalt-60	0.1
Cesium-137	0.17
Iridium-192	0.2
Potassium-40	1
Radium-226	12
Thorium-232	2.3
Californium-252	0.0054
Cesium-137	2.00 E+3
Short Half-Life Isotopes	
Galium-67	0.65
Iodine-123	0.31
Iodine-125	0.35
Iodine-131	0.23
Technetium-99m	0.72
Thalium-204	0.78
Xenon-133	0.945
Beta Emitters	
Phosporus-32	0.05
Strontium-90	0.015
Portal Sources	
Cobalt-57	0.020-0.040
Barium-133	0.010
Cesium-137	0.010
Cobalt-60	0.0035
Thorium-228	0.070

16
 17 A source vault consisting of two portable steel armor storage magazines would be required to
 18 support Rad/NucCTEC operations. It is anticipated that the source vault would house a variety
 19 of non-SNM radioactive sealed sources. The majority of those would be exempt quantities (see
 20 sidebar on previous page) of check sources such as cobalt-60, cesium-137, europium-152,

1 barium-133, strontium-90, and Americium-241. In addition accountable quantities of these
2 sources as well as small quantities of uranium and plutonium would be held in the source vault.
3 The quantities of the radioactive material held in the source vault would be evaluated against
4 DOE Standard 1027 to assure the inventory is maintained at less than Hazard Category 3
5 thresholds. All of these sources would need to be readily available to the personnel for
6 checking the operation of, and calibrating instruments in the complex.

7
8 SNM would be stored at the DAF, transported to the Rad/NucCTEC when needed, and returned
9 to DAF storage at the completion of the activities. After the Rad/NucCTEC reaches full
10 operational status, SNM is expected to be used on a frequent basis, perhaps daily during
11 certain operational campaigns.

12
13 At the Active Interrogation Facility, testing and evaluation of active interrogation systems would
14 be facilitated for detection of highly enriched uranium/SNM/fissile materials in large packages
15 and cargo containers. As described above, an exclusion area would be established around the
16 pad and other engineering and administrative controls implemented to preclude access to the
17 radiation area during operations and to meet the requirements of 10 CFR 835.

18
19 Pursuant to Section 161(i)(3) of the Atomic Energy Act of 1954 [Public Law (P.L.) 83-703;
20 United States Code (U.S.C.) 2011 *et seq.*], NNSA is self-regulating with respect to its use of
21 radioactive materials. Consistent with that authority, radioactive source materials acquired from
22 commercial vendors for use at the Rad/NucCTEC would be managed under applicable DOE
23 directives, including 10 CFR 835 upon receipt by NNSA/NSO. Radioactive sources acquired
24 from vendors are regulated by the Nuclear Regulatory Commission or agreement state while in
25 the vendor's custody. During shipment of radioactive materials, regulations of the U.S.
26 Department of Transportation are applicable.

27 28 2.1.3 Safeguards and Security

29
30 The Security Protective Force at the NNSA/NSO currently has an authorized strength of 130
31 Security Police Officers (SPOs). The authorized number of SPOs will increase to 160 with the
32 move of the Los Alamos National Laboratory TA-18 project to the DAF (NNSA, 2002). Initial
33 evaluations indicate that the addition of the Rad/NucCTEC will require an additional 30 SPOs.
34 SPOs that protect SNM are Sensitive Assignment Specialist (SAS) SPO II Offensive trained
35 personnel. SAS personnel receive special weapons and tactics training that enhance their
36 ability to protect SNM.

37
38 Security requirements for Category 1 and 2 materials require the material be within a material
39 access area located within a protected area. To minimize the number of SPOs required for the
40 protection of a Threat Level 2 activity at the Rad/NucCTEC, additional security measures will be
41 necessary. Those measures include, but are not limited to, intrusion detection and assessment
42 equipment, access control, prohibited article searches, and radiation detection searches to
43 prevent the removal of SNM.

44
45 Pursuant to DOE Order 470.1, *Safeguards and Security Program*, NNSA/NSO will develop a
46 security plan for Rad/NucCTEC that meets all requirements for the current design basis threat.
47 A Vulnerability Analysis will validate the security plan, including modeling, force on force
48 exercises, and limited scope performance tests. The results of the Vulnerability Analysis will be
49 incorporated into the final security plan and the NNSA/NSO Site Safeguards and Security Plan.
50 DOE Order 470.1, establishes general program requirements and there are series of orders,
51 policies, and guides tiered from that order. Safeguards and Security program elements include:

1 Program Management, DOE Order 470 series; Personnel Security, DOE Order 472 series;
2 Protection Operations, DOE Order 5632 and DOE Order 473 series; Materials Control and
3 Accountability, DOE Order 5633 and DOE Order 474 series; and Information Security, DOE
4 Order 5639 and DOE Order 471 series.

5 6 **2.2 Alternative Actions**

7
8 The Council on Environmental Quality regulations, Section 1500.2 (e), states that federal
9 agencies shall to the fullest extent possible use the NEPA process to identify and assess the
10 reasonable alternatives to proposed actions that will avoid or minimize adverse affects of their
11 actions upon the quality of the human environment. Reasonable alternatives would be those
12 alternatives to the proposed action that meet the purpose and need of the agency. The purpose
13 and need of the NNSA in this instance is to support the DHS in its efforts to better defend US
14 borders by establishing the Rad/NucCTEC at the NTS.

15 16 **2.2.1 No Action Alternative**

17
18 Under the no action alternative, NNSA/NSO would not construct, operate and maintain the
19 Rad/NucCTEC at the NTS. Assessment of the no action alternative is required by DOE NEPA
20 Implementing Procedures and Guidelines (10 CFR 1021.321).

21 22 **2.2.2 Alternative Sites Eliminated from Further Consideration**

23
24 Alternative locations for the RAD/NucCTEC at the NTS were evaluated by NNSA/NSO as well
25 as the NTS Stakeholders Group and DHS/S&T. The site selection process was documented in
26 the *Radiological/Nuclear Testing and Evaluation Complex Site Selection Evaluation and*
27 *Recommendation Report* (DHS, 2004). Initially, basic criteria were established to narrow down
28 the selection of potential sites from the entire NTS. The first consideration was that the
29 proposed facility have no adverse impact on the NNSA Stockpile Stewardship and Test
30 Readiness missions. This requirement eliminated large portions of the NTS to the north and
31 northwest of Control Point in Area 6. Second, areas of the NTS were eliminated where ongoing
32 and future projects requiring non-encroachment for security and safety purposes were already
33 identified. This excluded large portions of the northwest quadrant of the NTS. Finally, an
34 overall assessment of existing NTS infrastructure was conducted, narrowing the selection to
35 eight sites for more detailed evaluation.

36
37 The eight alternative locations that were evaluated are shown in Figure 4. They include: 1) Port
38 Gaston in Area 26, 2) Area 25 Central Support Area, 3) Area 11 Tweezer Facility, 4) Areas 5
39 and 6 south of the DAF, 5) Area 6 east of Mercury Highway, 6) Area 5 south of DAF between
40 Cane Springs Road and Barren Wash, 7) Area 27 Baker Site, and 8), Areas 6 and 3 along
41 Orange Blossom Road. A rigorous site evaluation process considered a number of criteria that
42 were developed in conjunction with the NTS Stakeholders Group and the DHS Science and
43 Technology Directorate. First, a pass/fail grade was used to evaluate whether an NTS area
44 met the criterion of non-adverse impact to Stockpile Stewardship and Test Readiness. Areas
45 that did not meet this criterion were not considered further. Among the remaining criteria were
46 infrastructure condition and costs (power, water, sewer, etc.) operational security of activities,
47 distance from the DAF, safeguards and security, background radiation, impact to other NTS
48 missions, site geography, environmental considerations, and nuclear operations considerations,
49 such as potential accident scenarios and impact to the public. Each criterion was assigned a
50 relative weight of importance. NNSA and contractor subject matter experts were consulted to
51 determine relative scores. Following the initial scoring, a detailed analysis of the differential cost

1 of site preparation including excavation and fill and ten year operating costs, was conducted for
2 the three highest-rated sites. The three sites that were located in closest proximity to the DAF
3 were identified for further consideration (sites 4, 5, and 6).
4
5 The final site was chosen based on its close access to existing infrastructure and the close
6 proximity to DAF, which would reduce the cost and impact for movement of SNM to and from
7 the Rad/NucCTEC. In addition, the proposed site is not near NTS boundaries, has access to
8 the services at Mercury and emergency services at Control Point, and room for possible future
9 expansion.
10
11 The alternative sites are not evaluated any further in this EA.

1 **3.0 AFFECTED ENVIRONMENT**
2

3 Except where noted, the affected environment, as described in this Section, is summarized from
4 *the Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in*
5 *the State of Nevada* (DOE, 1996a). Updated information has been added where appropriate.
6

7 **3.1 Land Use**
8

9 3.1.1 Facilities
10

11 Area 6 occupies 212 km² (82 mi²) between Yucca Flat and Frenchman Flat, straddling
12 Frenchman Mountain. The DAF and the proposed site of the Rad/NucCTEC are located in the
13 south central portion of Area 6 within the land use area designated in the NTS Resource
14 Management Plan (RMP) as the National Security Use Zone (DOE, 1998). This zone has the
15 most stringent criteria of the three zones identified in the RMP; these criteria include but are not
16 limited to being complementary to or compatible with existing missions in the area, and a
17 compelling need (such as security, restricted access, remote location, physical characteristics)
18 that drives the project to be located in this zone. The DAF is the primary location of all nuclear
19 explosive assembly operations at the NTS.
20

21 The NTS is composed of lands reserved to the jurisdiction of the Atomic Energy Commission
22 and its successors. The primary purposes for which the NTS lands were withdrawn are
23 weapons testing and for “use in connection with the NTS”. Historical uses of the NTS have
24 included a number of compatible activities in addition to the primary continuing purpose of
25 weapons testing, including various “work for others” activities. The currently proposed activities
26 are also compatible, and not inconsistent with, the ongoing availability of the NTS for use as a
27 weapons testing site. For a more detailed discussion of the land withdrawals for the NTS, the
28 reader is referred to the NTS EIS, Volume 1, Section 4.1.1.1, Public Land Orders and
29 Withdrawals, and Volume 3, Part A, Section 1.4, Use of Withdrawn Lands for Purposes Other
30 than Weapons Testing.
31

32 The Control Point complex, a secured compound located centrally in Area 6, serves as the
33 command center as well as the air operations and timing and firing center for Yucca Flat,
34 Frenchman Flat, Pahute Mesa, and surrounding areas. Ancillary facilities near the secured
35 compound include a communications building, several radiological sciences and technical
36 services buildings, a fire and first aid station, and various maintenance and warehouse
37 structures.
38

39 The *Federal Facility Agreement and Consent Order* (FFACO) is an agreement between the
40 DOE, DOD and State of Nevada that sets priorities, schedules and deadlines for DOE
41 environmental restoration activities at the NTS and other locations within the state of Nevada.
42 There are no FFACO Corrective Action Sites (CAS) in the area in which the facilities would be
43 constructed. The only CAS in the vicinity of the project area is located about 0.75 mile south on
44 the border between Areas 5 and 6.
45

46 3.1.2 Infrastructure
47

48 Infrastructure and site support services at the NTS are described below. Included are roads
49 and parking areas, water distribution, waste management, and utilities.
50
51

1 Roads and Parking: Mercury Highway is the main access road inside the NTS. It originates at
2 U.S. Highway 95, approximately 65 mi (105 km) north of Las Vegas. Other existing roads,
3 some unpaved, could provide access or egress in an emergency.
4

5 There are approximately 400 mi (644 km) of paved roads and more than 300 mi (483 km) of
6 unpaved roads on the NTS. Paved areas are provided for commuter buses as designated
7 locations, and parking for government and private commuter vehicles is available at most of the
8 facilities on the NTS.
9

10 Water: The NTS water system consists of 9 operating wells for potable water, one for
11 nonpotable water and numerous storage tanks, construction water sumps and water
12 transmission systems. Wells, sumps, and storage tanks are used as necessary to support
13 construction or operational activities. A variety of domestic, construction and fire-protection
14 water uses are served by this system. The wells are not currently used to their full capacity and
15 can produce much more water if necessary.
16

17 Well 4a is part of the system that serves Area 6, which includes the Control Point, Yucca Flat,
18 and the Well 3 yard. This system is regulated under Public Water System Permit NY-0360-12-
19 NTNC, which is issued by the Nevada State Health Division under Nevada Administrative Code
20 445A. During normal operations, Well 4a provides water to the Well C booster that connects to
21 the Control Point. Well 4 provides potable water for the DAF and would also service the
22 Rad/NucCTEC. Well 4 is located approximately 1.25 mi (2 km) northeast of the proposed
23 Rad/NucCTEC site.
24

25 Power and Communications: Electric power is delivered to the NTS at the Mercury switching
26 center in Area 23 by a primary 138 kilovolt (kV) supply line. Power is then transmitted to a 138
27 kV transmission system loop which supplies 8 major substations and one 138 kV radial
28 transmission line.
29

30 Modes of communication at the NTS include telephone service, a microwave system, data
31 communications, video communications and teleconferencing, a radio network, a U.S. Post
32 Office, and an internal mail system.
33

34 Waste Management – At the NTS, Waste Management Program activities include disposal,
35 storage, treatment (i.e. thermal treatment at the Explosives Ordnance Disposal Unit) and
36 closure operations as well as the activities of the Waste Minimization/Pollution Prevention
37 Program. Six types of wastes are managed at the NTS, including low-level radioactive waste,
38 transuranic waste, mixed wastes (transuranic and low-level), hazardous waste, Toxic
39 Substances Control Act (TSCA) wastes (polychlorinated biphenyls), and non-hazardous solid
40 wastes.
41

42 Nonhazardous, nonradioactive sanitary, and industrial wastes are disposed of in several
43 industrial landfills, sewage treatment systems, and septic systems located throughout the NTS.
44 There are two Radioactive Waste Management Sites (RWMS) used for the disposal of low-level
45 waste, located in Areas 3 and 5. Mixed low-level radioactive waste generated on the NTS is
46 disposed of in the Area 5 RWMS. Transuranic mixed wastes, and mixed wastes are stored on
47 the Area 5 transuranic waste storage pad according to the Federal Facilities Agreement and
48 Consent Order with the state of Nevada, DOE and the Department of Defense. Hazardous
49 waste, regulated under the Resource Conservation and Recovery Act (RCRA) and TSCA-
50 regulated wastes are shipped off-site to a commercial permitted facility for disposal.
51

1 3.1.3 Transportation
2

3 The main access to Area 6 is Mercury Highway, which originates at U.S. Highway 95, 65 mi.
4 (105 km) northwest of Las Vegas, Nevada, and accesses the main gate in Mercury. Mercury
5 Highway, a paved two-lane road, is the primary route within the NTS. Most of this road is 26 ft
6 (8 m) wide; however, the shoulders vary from 4 to 6 ft (1 to 2 m) wide. Traffic consists of light-
7 and heavy-duty trucks and cars, security vehicles, and emergency vehicles. The Mercury
8 Bypass is also a paved, two-lane road, 26 ft (8 m) wide that was built to divert traffic around the
9 Mercury base camp to outlying areas of the NTS.

10
11 **3.2 Topography and Physiographic Setting**
12

13 The NTS is within the Basin and Range Physiographic Province. The Basin and Range
14 Province is characterized by more or less regularly spaced, generally north-south trending
15 mountain ranges separated by alluvial basins that were formed by faulting.

16
17 The area in the vicinity of the DAF and proposed Rad/NucCTEC site is situated on the western
18 margin of Frenchman Flat at an elevation of approximately 3,700 ft (1,130 m) above mean sea
19 level. The land surface in this area descends at a 4 - 5% slope to the east, towards Frenchman
20 Lake (DOE, 1995).

21
22 **3.3 Geology and Soils**
23

24 The geology of the NTS consists of a thick section [more than 34,768 ft (10,597 m)] of Paleozoic
25 and older sedimentary rocks, locally intrusive Cretaceous granitic rocks, a variable assemblage
26 of Miocene volcanic rocks, and locally thick deposits of postvolcanic sands and gravels that fill
27 the present-day valleys.

28
29 Although soils in the region have not been mapped extensively, they are thought to consist of
30 loose to dense granular alluvial deposits interspersed with hard, cemented layers of caliche at
31 depth (Converse Consultants, 1984).

32
33 **3.4 Seismicity**
34

35 The NTS lies within Seismic Zone 2B on the seismic risk map of the Uniform Building Code.
36 Historical records of tectonic earthquakes within a 200 mi (320 km) radius of the NTS indicate
37 that its structures have been subjected to ground accelerations of 0.12 g or less (DOE, 1995).
38 Several faults are located in the vicinity of the proposed site. These include the Cane Springs
39 Fault, Mine Mountain Fault, Yucca Fault, Rock Valley Fault and Mercury Valley Fault. There are
40 no known active faults located within the project boundaries (Frizzell and Shulters, 1990).

41
42 **3.5 Water Resources**
43

44 3.5.1 Surface Water
45

46 The NTS is within the Great Basin, a hydrographic basin in which no surface water leaves
47 except by evaporation. The Great Basin is part of the Basin and Range Physiographic
48 Province. Hydrographic basins in the region have internal drainage controlled by topography.
49 Streams in the region are ephemeral. Throughout the region, springs and manmade
50 impoundments are the only sources of perennial surface water. Runoff results from snowmelt
51 and from precipitation during storms that occur most commonly in winter and occasionally in fall

1 and spring, and during localized thunderstorms that occur primarily in the summer. Much of the
2 runoff quickly infiltrates into rock fractures or into the dry soils, some is carried down alluvial
3 fans in arroyos, and some drains into playas where it may stand for weeks as a lake. A number
4 of small arroyos are present throughout the proposed Rad/NucCTEC location. Barren Wash is
5 located south of the proposed project location.

6 Water discharges at the NTS are managed according to state of Nevada regulations. The NTS
7 maintains compliance with required permits. Water pollution control permits issued by the State
8 are obtained for industrial and domestic wastewater discharges. Discharge and monitoring
9 requirements imposed by the State serve to prevent degradation of the surface waters (and
10 groundwater) at the NTS.

11 3.5.2 Groundwater

12 The eastern half of the NTS, including the DAF and proposed Rad/NucCTEC site, is within the
13 Ash Meadows component of the Death Valley groundwater basin (DOE, 1995). The depth to
14 groundwater near the DAF is approximately 800 ft (244 m) below land surface (Bright et al,
15 2001). Groundwater flows generally south and southwest. Groundwater quality within aquifers
16 is generally acceptable for drinking water and industrial and agricultural uses.

17 Water-resource use in support of the missions of the NTS is undertaken pursuant to the NTS
18 federally reserved water rights associated with the land withdrawal comprising the NTS.

19 3.5.3 Floodplains and Wetlands

20 Floodplains and wetlands are environmentally sensitive resources, as listed in Title 10 CFR Part
21 1021 B(4)(iii). Pursuant to 10 CFR 1022, DOE requirements for compliance with floodplain and
22 wetland environmental review, NNSA/NSO evaluated the proposed project area to determine if
23 any wetlands or floodplains are present. No wetlands exist in the proposed Rad/NucCTEC
24 location. The proposed project area is subject to sheet-flow run-on of water from higher terrain
25 during heavy precipitation events but no backwater flooding occurs. The proposed project area
26 is not located in a floodplain.

27 3.6 Biological Resources

28 The proposed project site on the NTS is located in habitat most like the Mojave Desert on an
29 alluvial fan in northwestern Frenchman Flat. It lies near the transition ecoregion which straddles
30 the Great Basin ecoregion in the northern, higher altitude portions of the NTS and the Mojave
31 Desert ecoregion in the southern quarter of the NTS. As a result, there is a diversity of plant
32 and animal communities representative of both deserts, as well as some communities common
33 only in the transition zone between these deserts. The transition zone extends to the east and
34 west far beyond the boundaries of the NTS.

35 3.6.1 Flora

36 The most dominant perennial plant species in the project area include shadscale saltbush
37 (*Atriplex confertifolia*), white bursage (*Ambrosia dumosa*), creosote bush (*Larrea tridentata*),
38 Nevada jointfir (*Ephedra nevadensis*), and range ratany (*Krameria parvifolia*). The project site
39 lies within the *Atriplex confertifolia-Ambrosia dumosa* Shrubland vegetation association (Ostler,
40 et al, 2000).

1 No threatened or endangered plants, or plants proposed for listing as threatened or endangered
2 occur on the NTS. There are 17 plant species found on the NTS which are considered “species
3 of concern” by the U.S. Fish and Wildlife Service (FWS) or are on the state of Nevada plant
4 watch list. None of these plants are known to occur in the lower elevation alluvial fan of
5 northwestern Frenchman Flat. The nearest populations of plant species of concern are on the
6 slopes of French Peak to the northwest in Area 11.

7 8 3.6.2 Fauna

9
10 Over 300 vertebrate species have been observed on the NTS, including 60 species of
11 mammals, 239 species of birds, and 34 species of reptiles. Eighty percent of the bird species
12 are transients. Many of the birds on the NTS, including almost all of the waterfowl and
13 shorebirds, use the playas in Frenchman and Yucca Flats, artificial ponds at springs, and
14 sewage lagoons during their migration and/or during winter. All but three bird species observed
15 on the NTS are protected from harm under the Migratory Bird Treaty Act. Past field trapping
16 and observational studies conducted at the DAF resulted in the capture of 9 species of small
17 mammals, 7 species of lizards, and the observation of 35 species of birds (Woodward et al.,
18 1995a; 1995b).

19
20 The Mojave Desert population of the desert tortoise is listed under the Endangered Species Act
21 as threatened. The State of Nevada also classifies the desert tortoise as a threatened species
22 under its state laws protecting sensitive species. The proposed project area is within the range
23 of known desert tortoise habitat in an area of moderate tortoise abundance (17 – 35 tortoises
24 per square kilometer).

25 **3.7 Air Quality**

26
27 The climate at the NTS is characterized by limited precipitation, low humidity, and large diurnal
28 temperature ranges. The lower elevations receive approximately 15 centimeters (cm) [(6 inches
29 (in)] of precipitation annually, with occasional snow accumulations lasting only a few days. The
30 average annual wind speed is 7 mph (11 kph). The prevailing wind direction during the winter
31 months is north northwesterly, and during the summer months, south southwesterly. Severe
32 thunderstorms may produce high precipitation that continues for approximately one hour and
33 may create a potential for flash flooding.

34
35 The NTS is located in Nevada Intrastate Air Quality Control Region 147, which is designated as
36 an attainment area with respect to the National Ambient Air Quality Standards. Ambient air
37 quality at the NTS is not currently monitored for criteria pollutants or hazardous air pollutants,
38 with the exception of radionuclides. Elevated levels of ozone or particulate matter may
39 occasionally occur because of pollutants transported into the area or because of local sources
40 of fugitive particulates. There are no large sources of other pollutants nearby. The present air
41 quality on the NTS is good.

42 43 **3.8 Noise**

44
45 Major noise sources at the NTS include equipment and machines (e.g., cooling towers,
46 transformers, engines, pumps, boilers, steam vents, paging systems, construction and material-
47 handling equipment, and vehicles), blasting and explosives testing, and aircraft operations. No
48 NTS environmental noise survey data are available. A background sound level for rural desert
49 areas of 30 A-weighted decibels (dBA) is a reasonable estimate.

50

1 **3.9 Visual Resources**

2
3 Criteria used for the analysis of visual resources in the NTS EIS included scenic quality, visual
4 sensitivity, and distance and/or visibility zones from key public viewpoints. Area 6 is not visible
5 from any public viewpoint.

6
7 **3.10 Cultural Resources**

8
9 Cultural resources are prehistoric or historic sites, buildings, structures, districts, objects, or
10 places considered to be important to a culture or community. Cultural resources located on the
11 NTS include archaeological sites, architectural or engineering features, and Native American
12 religious or sacred places. Federal legislation requires agencies to consider the effect of
13 proposed projects on cultural resources that are considered eligible for listing on the National
14 Register of Historic Places (NRHP).

15
16 To date, more than 400 cultural resource investigations have been conducted on the NTS.
17 Approximately 4 percent of the NTS has been investigated, mostly by 100 percent coverage
18 pedestrian surveys, with some data recovery excavation and Native American ethnographic
19 consultation. A total of almost 2,200 cultural resources have been recorded; of those nearly half
20 are eligible for inclusion on the NRHP. Ninety-six percent of the resources are prehistoric, with
21 the remainder either historic, recent significant, unknown, or multi-component (DOE 1999; DOE
22 2000; DOE 2002c; FAA 2000).

23
24 A large area encompassing the proposed project location has been surveyed for cultural
25 resources. While this is an undisturbed site, there are no significant cultural resource sites
26 located within the proposed project site which would require any mitigation treatment before
27 construction.

28
29 **3.11 Occupational and Public Health and Safety**

30
31 The potential for activities at the NTS to impact the health and safety of the general public is
32 minimized due to factors such as the remote location of the NTS and the sparse population
33 surrounding it, and a comprehensive program of administrative and design controls. Potential
34 impacts to the health and safety of NTS workers are minimized by adherence to federal and
35 state regulations, to DOE orders, and to the plans and procedures of each organization
36 performing work on the NTS. Worker exposures to radioactive or chemical pollutants are
37 minimized through training, monitoring, use of personal protective equipment and the use of
38 administrative controls.

39
40 The types of work expected during construction of the Rad/NucCCTEC, such as forklift operation,
41 maintenance, and welding would be similar to those types encountered throughout the NTS.
42 Similar activities would also take place during operation of the Rad/NucCCTEC in order to
43 maintain the facility. Other activities that could pose additional safety risks involve handling of
44 radioactive sources and accidents involving heavy vehicles used in the training venues.

45 **3.12 Socioeconomics**

46
47 The region of influence for the NTS consists of Nye and Clark counties, Nevada. The NTS EIS
48 cites a 1994 survey of NTS worker residential distributions that found that 90 percent of the
49 work force lives in Clark County and 7 percent live in Nye County. The remaining 3 percent
50 reside in other counties or states. Within Clark County, most of the employees live in Las

1 Vegas. In 1994, the NTS accounted for 1 percent of total Clark County employment, as
2 contrasted with 6 percent of total Nye County employment. There are approximately 1,200
3 contractor, national laboratories, and federal personnel that work at the NTS, and annual
4 funding is about \$380 million (DOE, 1999).

5
6 A maximum of approximately 80 people are expected to occupy the Rad/NucCTEC during its
7 operation, including training activities. Future expansion could result in an increase of
8 personnel at the Rad/NucCTEC during training activities.

9

10 **3.13 Environmental Justice**

11

12 As required by Executive Order 12898, the NTS EIS analyzed the issue of adverse affects of
13 federal programs, policies, and activities on minority populations and low-income populations.
14 The percentages of minority and low-income populations within census block groups for Clark,
15 Nye, and Lincoln counties were plotted by using a geographic information system and the
16 impacts to off-site populations from activities on the NTS were identified. While low-income and
17 minority populations do exist, it was found that no populations existed that were subject to
18 disproportionately high adverse effects.

1 **4.0 ENVIRONMENTAL EFFECTS**
2

3 This section identifies the direct and indirect environmental consequences of the alternatives
4 considered. The level of analysis for each resource area is based upon the potential magnitude
5 of the environmental effect.
6

7 **4.1 PROPOSED ACTION**
8

9 This section describes the environmental consequences expected to occur if the Rad/NucCTEC
10 were to be constructed and operated at the NTS.
11

12 **4.1.1 Land Use**
13

14 4.1.1.1 Facilities
15

16 The proposed Rad/NucCTEC would be within a land use area designated in the NTS RMP as
17 the National Security Use Zone (DOE, 1998). The development of the Rad/NucCTEC would
18 result in an initial disturbance of approximately 50 acres of land with possible later expansion to
19 100 acres. Use of the proposed facility within this area is consistent with the NTS land use and
20 the Resource Management and Comprehensive Land-Use Planning measures outlined in the
21 NTS EIS Record of Decision (ROD)(DOE, 1996b). There would be no conflicts with land uses
22 in areas surrounding the NTS.

23 4.1.1.2 Infrastructure
24

25 Roads and Parking: Establishment of the Rad/NucCTEC at the proposed location would
26 necessitate the creation of an access road from Mercury Highway to the Complex approximately
27 0.5 mi. (0.8 km) long, a second road from the DAF to the Rad/NucCTEC approximately 0.5 mi.
28 (0.8 km) long, and additional shorter roads from within various parts of the Complex. All or most
29 of the access roads would be paved. Parking areas at each of the facilities would also be
30 paved.
31

32 Water: Water for domestic and process water requirements would be provided to the
33 Rad/NucCTEC through service connections to the main NTS public water system. A new 8 inch
34 (in.) water line to meet domestic and process water requirements would extend from the existing
35 10 in. line along Mercury Highway to the Rad/NucCTEC. The 10 in. line is fed from water
36 storage tanks 4 and 4a. Existing water tanks 4 and 4a are located east of the DAF and
37 approximately 1.25 mi. (2 km) from the Rad/NucCTEC. One water tank, approximately 100,000
38 gallons (gal) [(378,500 liters (l))] would be located near the complex. Water from the tank would
39 be solely for fire protection. Trenching for the new water pipe would take place in previously
40 disturbed areas running parallel to roads wherever possible.
41

42 Assuming an average use of 35 gal (132.5 l)/day per person, water usage and wastewater
43 produced by 80 people would be approximately 2,800 gal (10,598 l)/day. Extension of the
44 existing water and construction of new septic systems to incorporate the new facility would
45 require a design review and approval by the State, plus modification of the existing public water
46 system permit and new septic system permits. In order to protect the main water distribution
47 system, the facility would have appropriate backflow prevention devices installed and
48 periodically checked.
49

1 Power and Communications: Power and communication lines would extend to the
2 Rad/NucCTEC from existing lines located near Mercury Highway. After expansion it is
3 anticipated that the Rad/NucCTEC would consume approximately 1,000,000 kilowatt
4 hours/year. As identified in Chapter 3 the existing utility infrastructure would support all
5 activities with minor upgrades to the infrastructure as drops from utility lines.
6

7 Waste Management: Construction debris and general trash generated by worker activities
8 would result from construction and operation of the Rad/NucCTEC. Construction debris would
9 be disposed of in the U10c landfill. Food wastes and other general trash would be transported
10 to the Area 23 sanitary landfill for disposal. The amount of non-hazardous solid waste would
11 not be expected to exceed 450 m³ (15,390 ft³) per year, assuming an average occupancy of 30
12 personnel, resulting in minimal impacts from Rad/NucCTEC activities. Installation of two septic
13 tanks and leach fields is planned; the two septic systems would be sized to provide adequate
14 wastewater disposal capacity for all activities conducted at the Rad/NucCTEC, including
15 training. NNSA/NSO would coordinate with the Nevada Bureau of Health Protection Services to
16 ensure appropriate design of the septic systems and for permitting.
17

18 Small quantities of hazardous wastes such as paints and solvents could be generated during
19 construction activities. In accordance with normal operating procedures at the NTS, one or
20 more Satellite Accumulation Areas (SAA) would be set up at the construction site. After one
21 drum of hazardous waste had accumulated (in each SAA) it would be transported to the RCRA
22 permitted HWSU in Area 5. During the year when a sufficient quantity of hazardous waste has
23 accumulated at the HWSU to make off-site shipping economical, a licensed vendor transports
24 this waste to a RCRA permitted treatment/disposal facility for final disposition. Similar
25 measures would be used for any hazardous waste generated during operation of the
26 Rad/NucCTEC.

27 Little, if any, radioactive or mixed waste would be expected to result from Rad/NucCTEC
28 operations. It is anticipated that when the activity level of short half-life isotope sources is below
29 the levels needed for use at the complex they would be returned to the vendor for disposition.
30 Other non-SNM sources would be retained during the facility's lifetime or until they are no longer
31 needed. Disposition of other non-SNM sources would be accomplished by transferring them to
32 other suitable users, in accordance with applicable Federal rules for personal property
33 dispositioning or disposing of them as low-level waste in accordance with DOE Order 435.1,
34 *Radioactive Waste Management*. Low-level waste generated on the NTS may be disposed of
35 at the Area 5 or Area 3 Radioactive Waste Management Sites. If mixed low-level waste were
36 generated, it would be disposed either at the Area 5 RWMS or an off-site permitted disposal
37 facility.
38

39 4.1.1.3 Transportation

40
41 Transportation of equipment and materials to the NTS for construction of the Rad/NucCTEC
42 would be via commercial trucks over established roads. This is not expected to result in any
43 impacts on land use or the roads other than impacts normally incurred by trucking transport.
44 Upon completing construction of the Rad/NucCTEC, transportation would mainly consist of the
45 daily commute by approximately 15-20 personnel employed at the Rad/NucCTEC and
46 additional personnel attending training sessions. Existing roads to the facility would be sufficient
47 to handle transportation of construction materials and the vehicles that would be used to carry
48 personnel to the facility. Upon completion of the Port of Entry Primary, Port of Entry Secondary
49 and the Sensor Test Track, any SNM transported from the DAF to the Rad/NucCTEC would be
50 transported via Mercury Highway. Future expansion would include a separate access road that

1 would extend directly from the DAF to the Rad/NucCTEC so that traffic on Mercury Highway
2 would remain unaffected by transportation of SNM between the two facilities.

3 **4.1.2 Topography and Physiographic Setting**

4 The proposed facility would be situated on a large alluvial fan deposit. Arroyos are present
5 throughout the project site. Excavation and grading would be facilitated by flat or gently sloping
6 terrain. The project area would encompass approximately 50 acres with possible eventual
7 expansion to 100 acres and would not substantially alter the topography or physiographic
8 setting.
9

10 **4.1.3 Geology and Soils**

11 The geology of the site is generally favorable for construction of the proposed Rad/NucCTEC.
12 Soils are typically fined grained and caliche is generally not present in amounts that will
13 complicate excavation or grading. Maintenance of natural drainage will require some
14 engineering in the forms of ditches or culverts, or both.
15
16

17 **4.1.4 Seismicity**

18
19 Area 6 is within Seismic Zone 2b defined by the Uniform Building Code as an area with
20 moderate damage potential. Design of the Rad/NucCTEC would be according to the Uniform
21 Building Code to minimize risks of damage from seismic activity.
22

23 Seismicity would not be expected to affect the operation of the Rad/NucCTEC or result in any
24 associated adverse environmental impacts. In terms of potential seismic risk, the Cane Springs
25 Fault is the most significant known geological feature in the vicinity of the Rad/NucCTEC and
26 DAF, and its mapped surface expression is located approximately 3-5 miles south-southeast of
27 the DAF (DOE, 1995).
28

29 **4.1.5 Water Resources**

30 **4.1.5.1 Surface Water**

31
32
33 Water requirements for construction and operation of the Rad/NucCTEC would be serviced by
34 existing water supply wells and public water system. The main use of water during the
35 construction phase would be for dust suppression, and the quantity of water is within the
36 quantity analyzed in the NTS EIS (DOE, 1996a). Under normal operation, the Rad/NucCTEC
37 would have no adverse effects on the surface hydrology in the area. No perennial streams exist
38 in the vicinity of the proposed Rad/NucCTEC site.
39

40 **4.1.5.2 Groundwater**

41
42 The NTS EIS (DOE, 1996a) assesses the impact of water withdrawal at the NTS. Groundwater
43 use at the NTS is now less than one-fifth of the historic peak. Water requirements for
44 construction and operation of the proposed Rad/NucCTEC would be insignificant when
45 compared to previous usage at the NTS and would not be likely to require additional water
46 appropriation for the public waters of the state of Nevada.
47

1 Hazardous materials are not expected to be used at the Rad/NucCTEC, and so no liquid
2 effluents containing hazardous materials would be discharged during operation of the
3 Rad/NucCTEC. Even if a hazardous material release were to occur, the depth to groundwater
4 in the vicinity of Rad/NucCTEC is about 800 feet and the evapotranspiration rate far exceeds
5 precipitation. For this reason there is not a pathway for contamination to reach the
6 groundwater. Any spills of contaminants would be cleaned up expeditiously to prevent
7 contamination of runoff water. Radiological and nuclear materials would be handled according
8 to established procedures to prevent accidental releases. Some of the sources would be
9 sealed; some radioactive sources, due to their short lifetimes, would not be in a certified sealed
10 source container but in a sealed container not to be opened on site. Quantities of SNM would
11 either be a certified sealed source, ceramic oxide pellets in glass or plastic vials, metal clad
12 solid, or in metallic form. No SNM would be present in powder or other pyrophoric form.
13 Operation of the Rad/NucCTEC would therefore not be expected to result in any environmental
14 effects to the groundwater.

15 16 4.1.5.3 Flood Plains and Wetlands

17
18 Precipitation on the NTS results in surface water runoff only during unusually intense storms.
19 Rainfall typically infiltrates rapidly into the soil and runs off into channels where it evaporates. As
20 a result of flood hazard studies conducted at the DAF, a diversion channel and berm was
21 constructed to protect the facility from runoff during storm events (DOE, 1995). A similar storm
22 water conveyance structure would be constructed on the west side (i.e. upslope) of the
23 Rad/NucCTEC with appropriate culverts. A site-specific flood analysis for a 100-year event
24 would be developed before Title III design.

25 26 **4.1.6 Biological Resources**

27
28 The proposed project location is situated within the range of the threatened desert tortoise.
29 Biological surveys and monitoring for the desert tortoise would be performed as specified in the
30 existing Final Programmatic Biological Opinion for Nevada Test Site Activities (Opinion) issued
31 to NNSA/NSO by the U.S. Fish and Wildlife Service (File No. 1-5-96-F-33). The proposed
32 project may destroy up to 100 acres of tortoise habitat, but this amount is well within the
33 allowance of land disturbance permitted under the Opinion. All mitigation actions prescribed
34 under the Opinion would be followed to ensure that the project will not adversely impact the
35 population of desert tortoises in the region. Pursuant to the Biological Opinion for the NTS, it
36 would be necessary for the project to compensate for the loss of desert tortoise habitat, either
37 through payment for acres disturbed, or by revegetating an equal amount of disturbed tortoise
38 habitat elsewhere on the NTS. In addition, there would be some impacts to local populations of
39 plants and wildlife, primarily due to displacement. Effects to these local populations would be
40 minimized through careful planning and execution of activities. Surveys to determine the
41 presence of nests and eggs of birds protected under the Migratory Bird Treaty act would be
42 conducted and construction activities would be coordinated to prevent their harm during
43 construction.

44 45 **4.1.7 Air Quality**

46
47 Air emissions associated with the Rad/NucCTEC would primarily include fugitive dust from
48 construction. The quantity of fugitive dust emissions generated by vehicles and equipment
49 during construction would affect air quality in the project area, but these impacts would be minor
50 and short term in nature. Extensive surveys have been conducted on the NTS to delineate
51 areas of radioactive contamination, and the proposed project site was not found to be

1 radioactively contaminated. Therefore there would be no exposure pathways or potential health
2 impacts to workers, trainees and others from resuspension of radionuclides. Standard dust
3 suppression techniques, such as watering, would be used as needed to minimize emission of
4 fugitive dust. Other potential impacts to air quality from construction of the Rad/NucCTEC
5 include emissions from fuel-burning construction equipment such as scrapers and front-end
6 loaders, and from gasoline and diesel powered vehicles and trucks. It is estimated that a total
7 of 250,000 gallons of fuel would be consumed during construction of Rad/NucCTEC.
8

9 During operation of the Rad/NucCTEC air emissions would be minimal and would generally be
10 limited to pollutants from gasoline and diesel powered vehicles and trucks. Emissions from
11 radionuclides such as uranium and plutonium sources are regulated under the National
12 Emission Standards for Hazardous Air Pollutants (NESHAPS). Under 40 CFR 61.07 and 40
13 CFR 61.96, when radioactive sources are used or handled at a facility, an evaluation is required
14 by EPA to determine if an application for approval of construction or modification would be
15 required. Following United States Environmental Protection Agency (EPA) guidelines in
16 Appendix D to Part 61, "Methods for Estimating Radionuclide Emissions," an EPA CAP-88
17 model evaluation of the proposed facility was conducted and determined the dose to the
18 maximally exposed individual to be below 0.1 mrem/yr. Based on these results, an application
19 to the EPA for approval of construction would not be necessary. No emissions are anticipated
20 from the proposed facility under normal operations. The NTS presently operates an EPA-
21 approved site compliance air monitoring network for radionuclides that would include the
22 proposed facility in addition to other NTS facilities. In addition, the Desert Research Institute
23 operates the Community Environmental Monitoring Program (CEMP) on behalf of NNSA/NSO.
24 The CEMP consists of 26 air monitoring stations located in communities in Nevada and Utah.
25 Each of the CEMP stations is maintained by a local citizen.
26

27 **4.1.8 Noise**

28 Construction of the Rad/NucCTEC would create some elevated noise levels but these would
29 likely not be discerned by neighboring DAF personnel, due to the distance of the DAF from the
30 Rad/NucCTEC. Hearing protection would be required of all workers that could be potentially
31 adversely affected by increased noise levels. Noise from the Rad/NucCTEC during activities
32 such as travel by trucks on the 2-mile high-speed highway would not be expected to have any
33 effects.
34

35 **4.1.9 Visual Resources**

36
37 The proposed Rad/NucCTEC would not be visible from accessible public lands, including U.S.
38 Highway 95. The Rad/NucCTEC would be located in proximity to an already existing structure,
39 the DAF, and would not impact visual resources in this area.
40

41 **4.1.10 Cultural Resources**

42
43 The proposed site for the Rad/NucCTEC is within an undisturbed area. Based upon previous
44 intensive pedestrian surveys by qualified archaeologists, no significant cultural resource sites
45 exist in the area of potential effect for the proposed project. If previously undiscovered cultural
46 resources were encountered during construction, all activities that could adversely affect them
47 would be stopped; NNSA/NSO would initiate consultation with the Nevada State Historic
48 Preservation Officer and the Advisory Council on Historic Preservation, as appropriate, pursuant
49 to Section 106 of the National Historic Preservation Act. In addition, NNSA/NSO would consult

1 with the Consolidated Group of Tribes and Organizations to identify potential impacts to
2 American Indian cultural resources.

3 4 **4.1.11 Occupational and Public Health and Safety**

5
6 The potential for activities at the NTS to impact the health and safety of the general public is
7 minimized by a combination of the remote location of the NTS, the sparse population
8 surrounding it, and a comprehensive program of administrative and design controls. Visitors to
9 the NTS are subject to essentially the same safety and health requirements as workers. For
10 instance, if workers are required to wear personal protective equipment (PPE), such as a
11 hardhat, safety glasses, and/or steel-toed boots, before entering a facility, visitors would be
12 required to don the same PPE. Visitors would not be permitted unescorted access to any
13 Rad/NucCTEC venue. Access to areas of the NTS where working conditions require special
14 hazard controls is restricted through the use of physical security, signs, fences, and barricades.

15
16 The health and safety of NTS workers is protected by adherence to the requirements of federal
17 and state law, DOE orders, and the plans and procedures of each organization performing work
18 on the NTS. DOE Order 440.1A, *Worker Protection Management for DOE Federal and*
19 *Contractor Employees*, establishes the framework for an effective worker protection program to
20 reduce or prevent injuries, illnesses, and accidental losses by providing DOE Federal and
21 contractor workers with a safe and healthful workplace. DOE Order 440.1A requires
22 compliance with a wide range of safety and health related regulations and standards including,
23 29 CFR 1910, *Occupational Safety and Health Standards*, 29 CFR 1926, *Safety and Health*
24 *Regulations for Construction*, and 29 CFR 1960, *Basic Program Elements for Federal Employee*
25 *Occupational Safety and Health Programs and Related Matters*.

26
27 Inasmuch as Rad/NucCTEC would be used for Work for Others activities, it is anticipated that
28 non-NNSA/NSO personnel would be conducting work at the various venues. During the time
29 that these personnel would be conducting work at Rad/NucCTEC, they would be considered as
30 site workers and would be subject to all of the same requirements as NNSA/NSO Federal and
31 contractor workers. Those requirements would include training ranging from “General
32 Employee Radiation Training” to “Radiological Worker II Training”. NNSA/NSO would develop
33 facility-specific training, as appropriate, to help ensure the safety and health of all personnel
34 conducting work at Rad/NucCTEC.

35
36 Impacts to worker safety and health due to construction and industrial activities associated with
37 Rad/NucCTEC are not expected to vary from those analyzed in the NTS EIS. Similarly, the
38 impacts to worker health associated with radiological/nuclear operations would be the same as
39 those addressed in the NTS EIS.

40 41 **4.1.12 Socioeconomics**

42
43 At full operation, the Rad/NucCTEC is estimated to consist of about 15-20 personnel, including
44 a nuclear facility manager, nuclear cognizant systems engineer, nuclear operations safety,
45 instructors, technical staff, technical maintenance and a safety representative. It is not expected
46 that the small number of new employees would generate noticeable additional secondary jobs
47 related to purchases of goods and services in either Clark or Nye Counties.

1 **4.1.13 Environmental Justice**

2
3 Due to the relatively small size of this project, its remote location, and limited number of
4 employees, no subsection of the population, including minority or low-income population, would
5 receive disproportionate impact.
6

7 **4.2 NO ACTION ALTERNATIVE**

8
9 If the Rad/NucCTEC were not constructed, the environment in the vicinity of the project area
10 would remain as it is. Elimination of the small number of new jobs that would have been
11 created had the Rad/NucCTEC been constructed would not adversely affect socioeconomics or
12 environmental justice.

1 **5.0 CUMULATIVE EFFECTS**

2
3 According to the Council on environmental Quality regulations at 40 CFR 1508.7, cumulative
4 impacts are anticipated impacts to the environment resulting from “the incremental impacts of
5 the action when added to other past, present, and reasonably foreseeable future actions
6 regardless of what agency (federal or non-federal) or person undertakes such other actions.
7 Cumulative impacts can result from individually minor, but collectively significant, actions taking
8 place over a period of time.” The region of influence for assessing cumulative impacts can vary
9 widely from one resource to another. Because the Rad/NucCTEC would have few, if any,
10 environmental impacts outside of its immediate vicinity, the region of influence for this
11 cumulative impact analysis, unless otherwise stated is the NTS.
12

13 In addition to the ongoing activities of the NTS, such as waste management (solid, hazardous,
14 low-level radioactive, mixed waste, and transuranic wastes), HAZMAT Spill Center, and DAF
15 there are a number of other potential activities that NNSA/NSO analyzed as part of the
16 cumulative impacts assessment. Those potential activities include the Yucca Mountain
17 Repository, the relocation of Technical Area 18 critical experimental facilities from Los Alamos
18 National Laboratories to the DAF, releases of biological simulants and chemicals under
19 *Environmental Assessment for Activities Using Biological Simulants and Releases of Chemicals*
20 *at the Nevada Test Site* (DOE/EA-1494) (Chem/Bio EA), and expansion of the existing Area 6
21 Aerial Operations Facility.
22

23 The following sections summarize the potential incremental contribution to cumulative impacts
24 that would be expected from the proposed action and the no action alternative.
25

26 **5.1 PROPOSED ACTION**

27
28 **5.1.1 Land Use, Transportation, and Waste Management**

29
30 The Rad/NucCTEC fits within the expected land use of the National Security Use Zone as
31 identified in the NTS RMP (DOE, 1998). Use of the land for activities planned under the
32 Rad/NucCTEC project would not be expected to adversely impact ongoing activities at
33 surrounding NTS or off-site facilities. NNSA/NSO, as part of the site selection process for the
34 Rad/NucCTEC, determined that there would be no conflict with the primary mission of the NTS,
35 which is to maintain a state of readiness to conduct one or more underground nuclear tests at
36 the direction of the President.
37

38 The proposed construction and operation of Rad/NucCTEC would not have any impact on
39 activities or personnel at the Yucca Mountain Project. Although the presence of Rad/NucCTEC
40 in its proposed location would reduce potential areas on the NTS for conducting releases of
41 biological simulants and/or chemicals under the Chem/Bio EA, this impact is considered very
42 minor. There is sufficient displacement between the proposed project location and the Area 6
43 Aerial Operations Facility to preclude cumulative land use impacts.
44

45 An increase of approximately 15-20 one-way vehicle trips daily, generated by workers employed
46 at the Rad/NucCTEC, would contribute only slightly to the total annual mileage on U.S. Highway
47 95 and the NTS. The number of workers at the NTS as of 2001 (3,593) was less than the
48 average of 3,659 in 1996 and significantly less than the average 7,700 reported from 1993 data
49 (DOE, 2002). Thus, there would be no noticeable impact to traffic or transportation on public
50 highways or on the NTS.
51

1 Small amounts of hazardous wastes could be generated from construction and operation of the
2 Rad/NucCTEC. Solid and liquid non-hazardous wastes would be generated in greater
3 quantities but would only result in minimal impacts. The additional waste streams resulting from
4 operation of the Rad/NucCTEC would represent a very minor increase in waste volumes
5 currently generated at the NTS. There would be little cumulative impact from the generation of
6 these wastes.

7 **5.1.2 Topography and Physiographic Setting**

8 The Rad/NucCTEC would be constructed in an undisturbed area located in proximity to the
9 DAF. Cumulative effects on topography or the physiographic setting at this location would be
10 very minor.
11
12

13 **5.1.3 Geology and Soils**

14 Rad/NucCTEC construction would impact up to 100 acres of soil but would not affect
15 subsurface geological resources directly. Both the Yucca Mountain Project and the Area 6
16 Aerial Operations Facility would also impact soils. However, these impacts combined with
17 impacts to soils and geological media from existing facilities and activities in the region would
18 affect only a very small portion of the NTS and surrounding areas.
19
20

21 During the construction phase, grubbing and grading activities, as well as excavation, would be
22 minor. The amount of aggregate used during construction would be minor and would not result
23 in any impacts to regional aggregate mining. The cumulative impact on geology and soils at
24 both locations would be negligible.
25

26 **5.1.4 Water Resources**

27 Naturally occurring surface waters at the NTS are limited to ephemeral streams resulting from
28 snowmelt and precipitation runoff and drainage into playas to form temporary lakes. There
29 would be no impact to surface water from the construction or operation of the Rad/NucCTEC
30 therefore there would no cumulative impact to this resource.
31
32

33 Groundwater use at the NTS is now less than one-fifth of the historic peak (DOE, 1996a).
34 Withdrawal of groundwater for construction and operation of the proposed Rad/NucCTEC would
35 add incrementally to the amount currently used; however, this additional water use combined
36 with currently used and anticipated uses would be well within the quantity analyzed in the NTS
37 EIS (DOE, 1996a) and would not represent a cumulative increase in impacts over those
38 addressed in the NTS EIS. Because there would be no releases of radioactive material to the
39 environment, there would be no opportunity to contaminate groundwater resources. Therefore,
40 there would be no cumulative impacts to groundwater.
41

42 **5.1.5 Biological Resources**

43 Approximately 50 acres would initially be utilized for construction of facilities associated with the
44 initial phases of the Rad/NucCTEC, with possible eventual expansion to 100 acres. All of the
45 land that would be used for the Rad/NucCTEC is undisturbed. Wildlife habitat and existing plant
46 communities would be somewhat affected by construction or operation of the Rad/NucCTEC.
47 Some of that impact would be offset by reclamation of a like area of previously disturbed land
48 within desert tortoise habitat on the NTS. The Area 6 Aerial Operations Facility is located
49 outside of desert tortoise habitat. Therefore, there would be no cumulative effect on desert
50

1 tortoise from the Rad/NucCTEC and the Aerial Operations Facility. Activities under the
2 Chem/Bio EA would not result in loss of desert tortoise habitat and short term impacts would be
3 mitigated through relocation of any tortoises within the impact area. There would be no
4 cumulative impact to desert tortoises from the interaction of the Rad/NucCTEC and activities
5 under the Chem/Bio EA. The Yucca Mountain Project lies within desert tortoise habitat. The
6 Rad/NucCTEC project would conduct tortoise surveys before undertaking any ground disturbing
7 activities and would relocate any tortoises found to suitable habitat in another location. In
8 addition, NNSA/NSO would restore a like amount of previously disturbed tortoise habitat on the
9 NTS to compensate for loss of habitat. These mitigating actions for Rad/NucCTEC would
10 ensure that there would be no adverse impacts to the population of desert tortoises in the
11 region. Therefore, there would be no cumulative impact to desert tortoises when considering
12 Rad/NucCTEC with Yucca Mountain Project .
13

14 The NTS encompasses approximately 1,375 square miles (880,000 acres). As of 1996 the total
15 amount of land disturbed on the NTS was approximately 60,000 acres (DOE, 1996a). This
16 represents less than 7.0 per cent of the total NTS area. The proposed Rad/NucCTEC would
17 disturb a maximum of 100 acres of land not previously disturbed, for an incremental increase in
18 habitat loss of only 0.01 per cent. Noise generated by the operation of the Rad/NucCTEC when
19 combined with noises from existing industrial operations and other activities in the in the area
20 would result in a negligible cumulative impact on wildlife.
21

22 **5.1.6 Air Quality**

23
24 Construction activities would generate less than one ton of fugitive dust (PM¹⁰). This quantity of
25 fugitive dust would comprise less than 0.00006 percent of the total of 177,660 tons associated
26 with land disturbance activities throughout the region represented by the Stateline and Tonopah
27 resource areas and the Las Vegas Valley (DOE, 1996a). There would be little or no emissions
28 generated as a result of operations. The cumulative effect on air quality of constructing and
29 operating the Rad/NucCTEC would be minimal.
30

31 Based on the worst case analysis conducted for the facility, there would be no reasonable
32 likelihood that activities at Rad/NucCTEC, including an accident, could adversely affect
33 personnel at the Yucca Mountain Project.
34

35 **5.1.7 Noise**

36
37 Noise impacts associated with construction and operation of the Rad/NucCTEC would be
38 restricted to the immediate vicinity and would not affect persons or residents in adjacent areas
39 or add measurably to regional noise levels.
40

41 **5.1.8 Visual Resources**

42
43 Changes to the visual character of the region would be very minor due to the proximity of the
44 Rad/NucCTEC to the DAF and to nearby facilities at Control Point. The new facility would not
45 be visible from off-site, so that there would be no impact to the general public. The cumulative
46 visual impact of the Rad/NucCTEC at the NTS would be negligible.
47

1 **5.1.9 Cultural Resources**
2

3 The site of the proposed project is undisturbed. Previous surveys and studies in the vicinity of
4 the DAF and proposed Rad/NucCTEC location have determined that there are no resources of
5 significance present. There would be no cumulative impacts to cultural resources.
6

7 **5.1.10 Occupational and Public Safety and Health**
8

9 Based on occupational injury rates for construction and other industrial activities cited in the
10 NTS EIS (DOE, 1996a), Rad/NucCTEC activities would result in only one or two potential injury
11 cases per year, with a similar estimated number of lost workdays. The Rad/NucCTEC activities
12 would not affect the regional rate. Rad/NucCTEC activities would be conducted within the
13 proposed project boundaries and would not affect the public.
14

15 Some NTS workers may perform tasks at multiple facilities where exposure to radioactivity is
16 possible. All workers at NNSA/NSO and at the proposed Yucca Mountain Repository sites are
17 protected by a comprehensive radiation protection program, fully responsive to 10 CFR 835,
18 *Occupational Radiation Protection*. The NNSA/NSO and Yucca Mountain Project Radiation
19 Protection Program is documented in *NV/YMP Radiological Control Manual (RADCON Manual)*
20 (Gile 2000). The RADCON Manual specifies annual dose limits for workers, pregnant workers,
21 minors, and members of the public. NNSA/NSO coordinates all activities at the NTS through its
22 Site Operations Center to prevent conflicts associated with site use. NNSA/NSO has detailed
23 emergency response/management plans for each facility at the NTS and for the NTS in general.
24 If an accident were to occur at Rad/NucCTEC appropriate emergency response plans would be
25 implemented and steps take to protect the health and safety of potentially affected personnel.
26

27 Hazards posed to workers and the public during operations would be minimized by following
28 established procedures that include various administrative controls and ensuring that
29 Rad/NucCTEC personnel were properly trained in dealing with the potential hazards.
30 Cumulative impacts from operation of the facility would be minimal.
31

32 **5.1.11 Socioeconomics**
33

34 There would be no measurable effect on the number of jobs, average wages and household
35 earnings, and tax revenues in Nye County from the addition of the Rad/NucCTEC.
36

37 **5.1.12 Environmental Justice**
38

39 There would be no impacts to minority and low-income populations in the region of influence
40 from the development of the Rad/NucCTEC. Thus, there is no contribution to the cumulative
41 impact.
42

43 **5.2 NO ACTION ALTERNATIVE**
44

45 If the Rad/NucCTEC were not constructed, there would be no adverse affects that would result
46 in cumulative impacts to the environment, to occupational and public health and safety, or
47 socioeconomics or environmental justice.
48

1 **6.0 MITIGATION MEASURES**
2

3 Mitigation measures are required for resources that would have major adverse impacts as a
4 result of the proposed action or alternative action. In the FWS Biological Opinion for the
5 Nevada Test Site (1996), the FWS states that a viable mitigation measure for loss of tortoise
6 habitat is revegetation of disturbed areas. NNSA/NSO complies with the Biological Opinion
7 through such mitigation measures as revegetation and relocation. Desert tortoise relocation is
8 a common practice in Nevada. There are numerous examples of successful habitat reclamation
9 in the Mojave Desert, and various articles and reclamation manuals have been published
10 (Bainbridge et al 1998). NNSA/NSO has also funded research on habitat reclamation on and
11 near the NTS and has demonstrated that habitat reclamation is feasible (CRWMS 1999).
12

13 Impacts to resource areas analyzed throughout this EA, with the exception of the biological
14 resources, were determined to be minor for the Proposed Action. Construction of the
15 RadNucCTEC would result in a loss of habitat for the desert tortoise and other fauna that would
16 be compensated by appropriating funds to either restore habitat elsewhere on the NTS or to
17 deposit into the Desert Tortoise Habitat Conservation Fund administered by Clark County.
18 There would be no impacts to the resource areas analyzed throughout this EA for the No Action
19 Alternative.
20

1 **7.0 HAZARD ANALYSIS**
2

3 Materials that generate ionizing radiation occur in nature, and are all around us. As a result,
4 everyone receives some ionizing radiation exposure from the earth and the cosmos. Harmful
5 effects to exposure of ionizing radiation depend on the intensity of the radiation and the time of
6 exposure. Some radioactive materials proposed to be used at the Rad/NucCTEC will only emit
7 small quantities of ionizing radiation and pose little threat to the workers, public and
8 environment.
9

10 Other radioactive materials intended for use at the complex have the potential for generating a
11 radiation dose that could have harmful effects on living things under certain conditions.
12 Because of this potential at some facilities under the purview of the NNSA, a set of
13 requirements and standards have been developed that mandate the implementation of
14 programs that assure the safe operation of facilities that use large quantities of radioactive
15 materials. These programs are custom tailored to the facility, defining policies and procedures
16 for the safe operation of the facility, using a graded approach. For example, a facility only using
17 tiny sources to calibrate instruments would not have a program with the same rigor as that of a
18 nuclear reactor facility. In order to determine the scale of the program to be developed for a
19 facility, the proposed inventory of hazardous materials and the activities associated with those
20 materials are analyzed using the methods identified in DOE Standard 1027-92, Hazard
21 Categorization and Accident Analysis Techniques for Compliance with DOE Order 5480.23,
22 Nuclear Safety Analysis Reports. This preliminary analysis results in a preliminary hazard
23 categorization. (See sidebar on page 10 for further discussion about facility hazard
24 categorization.) Once identified, the hazard category (HC) of the proposed nuclear facility
25 determines the level and rigor of further analysis that is required for compliance with other DOE
26 requirements that are related to nuclear safety, including 10 CFR 830, Subpart B.
27

28 In addition to categorization, a preliminary hazards analysis (PHA) is performed on the facility
29 and the envisioned activities to identify potential accident scenarios. In the PHAs that were
30 developed for the Rad/NucCTEC, types of hazards and accidents that could occur were
31 categorized into those that involved radiation sources and those due to natural phenomena.
32 Three general types of accidents that could result from radiation sources included those
33 resulting during handling of sources, vehicle accidents resulting in damage to sources, and
34 impacts to sources from things including but not limited to falling objects, security firearm
35 discharges, fires, and worker exposure. Accidents from natural phenomena included those due
36 to lightning strikes and seismic activity.
37

38 DOE Order 420.1, *Facility Safety*, requires the application of design requirements for nuclear
39 facilities to be “guided by safety analyses that establish the identification and functions of safety
40 structures, systems, and components (SSC) for a facility and establish the significance to safety
41 of functions performed by those SSC.” Applying the principles contained in DOE Order 413.3,
42 *Program and Project Management for the Acquisition of Capital Assets*, a PHA was developed
43 during the conceptual phase of the proposed Rad/NucCTEC project. The purpose of the PHA is
44 to identify the potential hazards associated with the proposed facility (or complex), to estimate
45 the potential significance of consequences that arise from those hazards to the public, workers,
46 or the environment, and to identify the tentative importance of facility safety structures, systems,
47 and components or controls in the reduction of risks from those hazards. The PHA for each
48 venue is, therefore, based on the maximum source quantity anticipated to be used at that
49 venue. Results or conclusions drawn from the PHA are used to support decisions on design
50 concepts and national consensus codes or standards chosen for safety structures, systems,

1 and components that serve important safety functions. The results from the PHA are
2 conventionally used to support the critical decision to proceed with the preliminary design phase
3 of a project. To date, NNSA/NSO has completed PHAs for five of the proposed venues of the
4 Rad/NucCTEC. Those venues are the Port of Entry Primary and Secondary facilities, the Active
5 Interrogation Facility, the High-Speed Road, and the Sensor Test Track.
6

7 One of the principle purposes of several of the venues of the Rad/NucCTEC (i.e., Port of Entry
8 Primary, Port of Entry Secondary, High Speed Road, and Active Interrogation Facility) would be
9 to simulate hypothetical attempts by terrorists or other entities to smuggle radioactive material or
10 SNM into the United States and to test (or validate) monitoring equipment capabilities to detect
11 such materials. The amount of radioactive material used to simulate such activities is expected
12 to approach the amounts of SNM contained in conventional nuclear weapons of U.S. design.
13 Although no explosive material would be used at the facility, highly enriched uranium (HEU)
14 may be used at certain venues in quantities up to 50 kilograms (kg). Plutonium and other SNM
15 sources may also be used. The hazards analysis requires an upper bound on this material at
16 risk. A generic value equivalent to 25 kg of plutonium-239 is typically used for hazard and
17 accident analysis models for typical nuclear devices. Using the methodology of DOE Standards
18 1027-92 and a maximum inventory of 25 plutonium-239 equivalent kilograms (25 PE-kg), the
19 preliminary HC for those venues was determined to be an HC-2 nuclear facility. The HC-2
20 threshold as specified in DOE Standard 1027-92 is 900 PE grams. Thus the anticipated
21 inventory for these particular venues is more than 25 times higher than the threshold.
22 NNSA/NSO would make to attempt to limit the maximum inventory in these venues to a value
23 below the HC-2 threshold.
24

25 The maximum quantity of radioactive source material to be used at the Sensor Test Track
26 venue would be 8.0 grams (g) of plutonium-239, 8 g of Uranium-235, plus the non-SNM sources
27 listed in Table 2. Using the "sum of fractions" methodology of DOE Standard 1027-92, and
28 these source inventories, the Sensor Test Track was determined to be a less than HC-3 nuclear
29 facility (conventionally referred to as "radiological facility"). The HC-3 threshold as specified in
30 DOE Standard 1027-92 is 8.4 PE grams. Thus the total permitted inventory of radioactive
31 material must be maintained below the nuclear facility HC-3 threshold. The Sensor Test Track
32 will maintain a radiological inventory control program to ensure it remains within the analyzed
33 safety envelope.
34

35 Other venues that may be established at Rad/NucCTEC would be subject to the same analyses
36 as those described above.
37

38 A number of administrative and engineering controls would be implemented to ensure that the
39 probability of occurrence of potential accidents and hazards was low. These administrative and
40 engineering controls are derived from performing the PHA. Potential engineering controls would
41 include source size and packaging, radiation monitoring instruments, speed controls, and fire
42 protection features such as hydrants and building sprinkler systems. Potential administrative
43 controls would include a variety of programs such as training programs to ensure that personnel
44 were qualified, vehicle maintenance programs, an emergency response program, pre-positioned
45 fire extinguishers, source handling restrictions, and radiation protection programs.
46

47 The PHAs completed to date concluded that by instituting engineering and administrative
48 controls, applying standard industrial safety programs and a radiological control program,
49 operations could be conducted safely and missions accomplished. No significant residual
50 safety risks were identified.
51

1 The PHA also serves as the foundation for development of a Preliminary Documented Safety
2 Analysis (PDSA) and final DSA with technical safety requirements (TSR) that are required by 10
3 CFR 830, Subpart B for design, construction, and operation of nuclear facilities at DOE sites.
4 Currently, the project is at the point of the completion of the Conceptual Design phase. Using
5 the process identified in DOE O 413.3 (referenced above), Preliminary and Final Design are
6 conducted in parallel with the PDSA. This process enables an iterative interaction between the
7 two activities so that engineering controls to mitigate hazards identified in the PDSA can be
8 designed into the facility as the process evolves. Subsequently, as the DSA is developed,
9 operating procedures and TSRs can be developed for the conduct of safe operations. Prior to
10 the approval of nuclear operations, a series of approval events occurs. The DSA is reviewed by
11 an independent Safety Basis Review Team, the contractor conducts a Contractor Operational
12 Readiness Review, and the NNSA performs an Operational Readiness Review. These
13 operational reviews are performed when the facility is completed and the workers are fully
14 trained to the procedures written for the activities, and the TSRs are in place. After all issues
15 identified by the reviews are resolved, nuclear operations are permitted to commence with the
16 release of a Safety Evaluation Report signed by the NNSA approval authority.
17

1 **8.0 REGULATORY REQUIREMENTS**
2

3 This section briefly describes some of the major federal and state laws and regulations,
4 executive orders, and DOE Orders that may apply to the proposed action and alternative. The
5 NTS EIS, Appendix C, provides a comprehensive list of statutes, regulations, and executive
6 orders applicable to NNSA/NSO.
7

8 **8.1 FEDERAL LAWS AND REGULATIONS**
9

10 *Atomic Energy Act, 42 U.S.C. 2011, enacted by P.L. No. 83-703 as amended.* The Atomic
11 Energy Act ensures proper management, production, possession and use of radioactive
12 materials. Under the Act, DOE is authorized to develop generally applicable standards for
13 protecting the environment from radioactive materials.
14

15 *Clean Air Act (CAA), 42 U.S.C. 7401, enacted by P.L. No. 90-148 as amended.* The Clean Air
16 Act, as amended, is intended to protect and enhance the quality of the Nation’s air resources so
17 as to promote the public health and welfare and the productive capacity of its population. The
18 regulatory program for the CAA is administered within the state of Nevada by the Nevada
19 Division of Environmental Protection, Bureau of Air Pollution Control. Construction of the
20 Rad/NucCTEC would be conducted under the NTS Air Quality Operating Permit.
21

22 *Clean Water Act of 1977, 42 U.S.C. 1251, et seq. enacted by P.L. No. 95-917 [amendments to*
23 *the Federal Water Pollution Control Act of 1972].* The Clean Water Act was enacted to “restore
24 and maintain the chemical, physical, and biological integrity of the Nation’s water.” Aspects of
25 the proposed action subject to the CWA would be permitted through the State of Nevada.
26

27 *Endangered Species Act of 1973, 16 U.S.C. 1531, enacted by P. L. No. 93-205 as amended.*
28 The Endangered Species Act is intended to prevent the further decline of endangered and
29 threatened species and to restore these species and their habitats. The proposed project is
30 located with the range of the threatened desert tortoise.
31

32 *Energy Reorganization Act of 1974, 42 U.S.C. 5801, enacted by P. L. No. 93-438.* The Energy
33 Reorganization Act was established to improve government operations and to carry out the
34 performance of other functions including, but not limited to, the Atomic Energy Commission’s
35 military production and research activities.
36

37 *Homeland Security Act of 2002, 6 U.S.C. 101 et seq., enacted by P. L. No. 107-296,* served to
38 mobilize and organize our nation to secure the homeland from terrorist attacks. One primary
39 reason for the establishment of the Department of Homeland Security was to provide the
40 unifying core for the vast national network of organizations and institutions involved in efforts to
41 secure our nation.
42

43 *National Environmental Policy Act of 1969 , 42 U.S.C. 4321, enacted by P. L. No. 91-190 as*
44 *amended.* NEPA established the policy of promoting awareness of the consequences of major
45 federal activities on the quality of the human environment, and consideration of the
46 environmental impacts during the planning and decision-making stages of a project. This EA is
47 prepared pursuant to Section 102 of NEPA and in compliance with Council on Environmental
48 Quality *Regulations for Implementing the Procedural Provisions of the National Environmental*
49 *Policy Act* (40 CFR 1500-1508) and DOE *National Environmental Policy Act Implementing*
50 *Procedures* (10 CFR 1021).

1 *Noise Control Act of 1972, 42 U.S.C. 4901, enacted by P. L. 92-574 as amended.* The Noise
2 Control Act, as amended, directs all federal agencies to carry out, “to the fullest extent within
3 their authority,” programs within their jurisdictions in a manner that furthers a national policy of
4 promoting an environment free from noise that jeopardizes health and welfare.
5

6 *Occupational Safety and Health Act of 1970, 29 U.S.C. 657, et seq., enacted by P. L. 91-596.*
7 The Occupational Safety and Health Act (OSHA) establishes specific standards for employers
8 to assure as much as possible a safe and healthful workplace for employees. DOE emphasizes
9 compliance with these regulations through DOE orders that prescribe OSHA standards that
10 contractors shall meet as applicable to work at government-owned, contractor-operated
11 facilities.
12

13 *Resource Conservation and Recovery Act of 1976, 42 U.S.C. 6901, enacted by P. L. No. 94-*
14 *580 as amended,* was enacted to ensure the safe and environmentally responsible
15 management of hazardous and nonhazardous solid waste, and to promote resource recovery
16 techniques to minimize waste volumes. Hazardous waste is defined under RCRA as a waste
17 that poses a potential hazard to human health or the environment when improperly treated,
18 stored, or disposed.
19

20 *Safe Drinking Water Act (SDWA) of 1974, 42 U.S.C. 300f, et seq., enacted by P.L. No. 93-523*
21 *as amended.* The primary objective of the SDWA is to protect the quality of public water
22 supplies and all sources of drinking water. Through delegation by the Environmental Protection
23 Agency, the state of Nevada regulates public drinking water supplies by establishing and
24 enforcing drinking water standards and by developing and implementing aquifer and water
25 source protection regulations.
26

27 **8.2 STATE LAWS AND REGULATIONS**

28
29 State of Nevada laws and regulations that are applicable to the construction or operation of the
30 Rad/NucCTEC include:
31

32 Clean Water Regulations: Sewage lagoons and septic systems are regulated under the Nevada
33 Administrative Code (NAC), Chapter 444. Standards, regulations, permits, and requirements for
34 septic tanks and other sewage disposal systems are established for single-family dwellings,
35 communities, and commercial buildings.
36

37 Safe Drinking Water Regulations: The NAC, Chapter 445A, specifies that public water systems
38 must meet the requirements of the national Primary Drinking Water regulations. These
39 regulations set standards and requirements for drinking water and for the construction of wells
40 and other water supply systems. Rad/NucCTEC would be interconnected with an existing
41 permitted drinking water system. The permit would be modified, as necessary, to include the
42 proposed facilities.
43

44 Clean Air Regulations: The NAC, Chapter 445B, implements both state and federal clean air
45 statutes and identifies requirements for permits for each air pollution source as well as
46 monitoring requirements. Particulate emissions from surface disturbing activities which
47 encompass an area equal to or greater than five acres are regulated under the NAC and require
48 a Surface Disturbance Permit. Disturbances greater than 20 acres are required to implement a
49 dust control plan. The NTS Class II Air Quality Operating Permit includes surface disturbances,
50 so that separate Surface Disturbance permits are not required for activities within the NTS.
51 Because the permit is applicable to disturbances throughout the entire NTS, which is much

1 greater than 20 acres, dust suppression is required for all surface disturbances. At the NTS the
2 most common method of dust control is through the use of water sprays.

3
4 Solid Waste Regulations: Chapter 444 of the NAC sets forth the definitions, methods of
5 disposal, special requirements for hazardous waste, collection and transportation standards,
6 and classification of landfills.

7
8 Radiation Control Regulations: Chapter 459 of the NAC includes state regulations for radiation
9 control. NAC 459.120 exempts DOE and its contractors and subcontractors from regulation
10 under NAC 459.010-459.950 for certain activities. NNSA/NSO will consult with the Nevada
11 Bureau of Health Protection Services, as appropriate, to resolve any questions regarding
12 applicability of NAC 459.120 to Rad/NucCTEC.

13 14 **8.3 DOE REGULATIONS, STANDARDS AND ORDERS AND EXECUTIVE ORDERS**

15
16 10 CFR 830, Nuclear Safety Management, governs the conduct of DOE and contractor
17 personnel and others who provide items or services that affect, or may affect, the safety of DOE
18 nuclear facilities. A contractor must perform work according to the safety basis for a hazard
19 category 1 (potential for significant off-site consequences), 2 (potential for significant on-site
20 consequences) or 3 (potential for only local significant consequences). Hazard controls must be
21 established that ensure adequate protection of workers, the public, and the environment.

22
23 10 CFR 835, Occupational Radiation Protection, establishes radiation protection standards,
24 limits, and program requirements for protecting individuals from ionizing radiation resulting from
25 DOE activities. DOE activities must comply with a documented radiation protection program as
26 approved by the DOE.

27
28 DOE Order 420.1A. This Order, *Facility Safety*, requires that design requirements for nuclear
29 facilities be guided by safety analyses. These analyses must include the identification and
30 functions of safety structures, systems, and components for a facility and establish their
31 functions significance to safety.

32
33 DOE Order 435.1, Radioactive Waste Management. The objective of this Order is to ensure
34 that all DOE radioactive waste is managed in a manner that is protective of worker and public
health and safety, and the environment.

35
36 DOE Order 450.1, Environmental Protection. The objective of DOE Order 450.1 is to implement
37 sound stewardship practices that are protective of the air, water, land, and other natural and
38 cultural resources impacted by DOE operations and by which DOE cost effectively meets or
39 exceeds compliance with applicable environmental; public health; and resource protection laws,
regulations, and DOE requirements.

40
41 DOE Order 470.1, *Safeguards and Security Program*, establishes general program
42 requirements for all safeguards and security programs within DOE. There are series of orders,
43 policies, and guides tiered from that order. Safeguards and Security program elements include:
44 Program Management, DOE Order 470 series; Personnel Security, DOE Order 472 series;
45 Protection Operations, DOE Order 5632 and DOE Order 473 series; Materials Control and
46 Accountability, DOE Order 5633 and DOE Order 474 series; and Information Security, DOE
47 Order 5639 and DOE Order 471 series.

1 DOE Standard 1027-92. This Standard, *Hazard Categorization and Accident Analysis*
 2 *Techniques for Compliance with DOE Order 5480.23, Nuclear Safety Analysis Reports*, (DOE,
 3 1997) provides guidance in determining the preliminary hazard category for a nuclear facility.

4
 5 Executive Order 11514 (NEPA). Under this Order, federal agencies must continually monitor
 6 and control their activities to protect and enhance the quality of the environment. Procedures
 7 must also be developed to ensure that the public is informed and understands the federal plans
 8 and programs with environmental impact and to obtain the views of interested parties.

9
 10 Executive Order 12898. This Order directs federal agencies to achieve environmental justice
 11 through identifying and addressing, as appropriate, disproportionately high and adverse human
 12 health or environmental effects of its programs, policies, and activities on minority populations
 13 and low-income populations in the United States, its territories and possessions.

14
 15 **8.4 PERMITS**

16
 17 Permits that are applicable to the construction or operation of the Rad/NucCTEC are listed in
 18 Table 1. Other compliance-related activities that would need to be addressed before
 19 construction include the preparation and submittal of engineering plans and drawings for
 20 installation of potable water lines, water storage tanks, and septic systems.

21 **TABLE 3**

Permits Applicable to the Rad/NucCTEC

Permit Number	Permit Name	Expiration Date	Issuing Agency/ Regulation	Applicability to RNCTEC
AP9711-0549.01	Air Quality Operating Permit	06/25/09	State of Nevada Clean Air Act	<ul style="list-style-type: none"> • Surface Disturbance • Requires Dust Plan
NY-0360-12 NTNC	Public Water System Permit	09/30/04	State of Nevada Safe Drinking Water Act	<ul style="list-style-type: none"> • Potable water supply • Permit Modification Required • Engineering Plan Review Required
New Permit Required	Septic System	N/A	State of Nevada Clean Water Act	<ul style="list-style-type: none"> • Septic Tank/Leach Field • New Permit Required • Engineering Plan Review Required
1-5-96-F-33	Desert Tortoise Incidental Take Authorization	12/31/06	US Fish & Wildlife Service	<ul style="list-style-type: none"> • Authorizes Incidental Take • Requires Pre-Activity Surveys

9.0 GLOSSARY

Ambient air. That portion of the atmosphere, outside of buildings, to which the general public is exposed.

Aquifer. Stratum or zone below the surface of the earth capable of producing water as from a well.

Decibel (dB). A standard unit for measuring sound-pressure levels based on a reference sound pressure of 0.0002 dynes per square centimeter. This is the smallest sound a human can hear.

Decibel, A-weighted (dBA): Adjusted unit of sound measurement that corresponds to the relative sensitivity of the human ear at specified frequency levels. This represents the loudness as perceived by humans.

Endangered Species. A species of possible management concern due to their restricted distribution or the potential for habitat disturbance.

Effluent. A gas or fluid discharged into the environment.

Environmental Impact Statement. A document required by the *National Environmental Policy Act* of 1969, as amended, for proposed major Federal actions involving potentially significant environmental impacts.

Fault. A fracture or fracture zone along which there has been displacement of the sides relative to one another parallel to the fracture.

Fugitive Dust. Particulate matter composed of soil. Fugitive dust may include emissions from haul roads, wind erosion of exposed soil surfaces, and other activities in which soil is either removed or redistributed.

Groundwater. Subsurface water within the zone of saturation.

Half-life. A half-life represents the time necessary for half of the radioactive element in a material to decay. In general, an isotope with a longer half-life presents a weaker field of ionizing radiation than the same mass of an isotope with a shorter half-life.

Hazardous Waste. Wastes that are designated as hazardous by the Environmental Protection Agency or State of Nevada regulations. Hazardous waste, defined under the Resource Conservation and Recovery Act, is waste from production or operation activities that pose a potential hazard to human health or the environment when improperly treated, stored, or disposed.

Infrastructure. Utilities and other physical support systems needed to operate a laboratory or test facility.

Mitigation. Actions and decisions that (1) avoid impacts altogether by not taking a certain action or parts of an action, (2) minimize impacts by limiting the degree or magnitude of an action, (3) rectify the impact by repairing, rehabilitating, or restoring the affected environment, (4) reduce or eliminate the impact over time by preservation and maintenance operation during the life of the action, or (5) compensate for an impact by replacing or providing substitute resources or environments.

Nonattainment Area. An area that has been designated by the U.S. Environmental Protection Agency or the appropriate site air quality agency as exceeding one or more national or state Ambient Air Quality Standards.

Particulate. Fine liquid or solid particles such as dust, smoke, mist, fumes, or smog found in air or emissions.

Playa. A dry, vegetation-free, flat area at the lowest point of an undrained basin.

Record of Decision (ROD). A public document that explains which cleanup alternative would be selected for the area of concern.

Runoff. The discharge of water through surface streams.

Seismicity. The likelihood of an area being subject to earthquakes. The phenomenon of earth movements.

Significant. The common meaning of significant is; "having or likely to have considerable influence or effect." As it pertains to the National Environmental Policy Act, "significant" requires that both context and intensity be considered in evaluating impacts (40 CFR Part 1508).

Special Nuclear Materials (SNM). SNM is defined in the Atomic Energy Act of 1954 as plutonium, uranium enriched in the isotope 233 or 235, and any other material which the Nuclear Regulatory Commission determines to be SNM; or, any material artificially enriched by any of the foregoing.

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