DOE/EA– 1499

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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1.0 INTRODUCTION

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

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

1.1 BACKGROUND

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

1.2 PURPOSE AND NEED FOR THE PROPOSED ACTION

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

A Suppleme

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

1.3 PUBLIC INVOLVEMENT AND SCOPING

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

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

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

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

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

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

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

2.1 PROPOSED ACTION

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

- Prototype detector testing and evaluation
- Systems testing and evaluation
- Performance standards validation
- Demonstration of prototype detectors, systems and performance standards
- Verified threat demonstration
- Concept of operations evaluation and verification
- Training

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

2.1.1 Facility Description

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

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

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

2) Port of Entry—Secondary. Vehicles designated for secondary processing would be routed from the Port of Entry—Primary to the Port of Entry—Secondary. This inspection area would 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

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

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

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

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

7) High-Speed Road. The High-Speed Road would be a two-lane roadway built to current Nevada Department of Transportation design standards, construction quality control standards, and standard construction specifications. It would be at least 2 miles (mi.) [3 kilometers (km)] long with a grade of about 3% and shoulders 4 ft (1 m) wide along most of its length. In a 2,000-foot (610 m) long section of the roadway, beginning about 1 mi. (2 km) from its upper end, the shoulders would be approximately 8 ft (2 m) wide. Instrument mounting, power, and communication facilities with restrooms would be installed along the roadway. The roadway would be appropriately marked and would include a runaway arrestor ramp and turnarounds. These features would increase the overall length of this venue to at least 12,450 ft (3,800 m). The 2,000 ft (610 m) long section would be the test section of the roadway. The upper 1 mi. (2 km) of the roadway would be an acceleration zone for trucks to attain speeds of up to 80 miles per hour (mph) [129 kilo8 2409 vkr ho(rs (km)])Tj10.98 0.9 10.08 188.75626 2be.8 e it.14i1 Tm(te to at least)T

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

2.1.2 Construction and Operations

2.1.2.1 Construction

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

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

Phase I
Port of Entry—Primary
Port of Entry—Secondary
Sensor Test Track

Phase II
High-Speed Road
Active Interrogation Facility
Environmental Test Facility

Phase III
Airport/Inspections Facility
Training Facility

Phase IV
Potential Future Expansion

2.1.2.2 General Operations

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

The expected lifetime of the Rad/NucCTEC is 20 years. After this time, if it is determined that the facility is no longer needed for its intended purpose, it would be decommissioned or placed into alternate service. Before making a decision to place the Rad/NucCTEC into alternate service, NNSA/NSO would undertake an appropriate NEPA process. If the Rad/NucCTEC is decommissioned, equipment and other property would be removed and salvaged. The site would be surveyed for radiological and chemical contamination and decontaminated, if necessary. The diesel fuel tank would be drained, cleaned out and removed. The septic system would most likely be closed in place so that if necessary it could be reactivated at a later date.

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 b4 the quantity of activation products would be so slight that those levels would be well below free release limits.

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

Table 2. Non-Special Nuclear Material Test and Evaluation Radiological Source Inventory

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

A source vault consisting of two portable steel armor storage magazines would be required to support Rad/NucCTEC operations. It is anticipated that the source vault would house a variety of non-SNM radioactive sealed sources. The majority of those would be exempt quantities (see sidebar on previous page) of check sources such as cobalt-60, cesium-137, europium-152, barium-133, strontium-90, and Americium-241. In addition accountable quantities of these sources as well as small quantities of uranium and plutonium would be held in the source vault. The quantities of the radioactive material held in the source vault would be evaluated against DOE Standard 1027 to assure the inventory is maintained at less than Hazard Category 3 thresholds. All of these sources would need to be readily available to the personnel for checking the operation of, and calibrating instruments in the complex.

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

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

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

2.1.3 Safeguards and Security

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

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

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

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

2.2 Alternative Actions

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

2.2.1 No Action Alternative

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

2.2.2 Alternative Sites Eliminated from Further Consideration

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

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

The final site was chosen based on its close access to existing infrastructure and the close proximity to DAF, which would reduce the cost and impact for movement of SNM to and from the Rad/NucCTEC. In addition, the proposed site is not near NTS boundaries, has access to the services at Mercury and emergency services at Control Point, and room for possible future expansion.

The alternative sites are not evaluated any further in this EA.

3.0 AFFECTED ENVIRONMENT

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

3.1 Land Use

3.1.1 Facilities

Area 6 occupies 212 km^2 (82 mi^2) between Yucca Flat and Frenchman Flat, straddling Frenchman Mountain. The DAF and the proposed site of the Rad/NucCTEC are located in the south central portion of Area 6 within the land use area designated in the NTS Resource Management Plan (RMP) as the National Security Use Zone (DOE, 1998). This zone has the most stringent criteria of the three zones identified in the RMP; these criteria include but are not limited to being complementary to or compatible with existing missions in the area, and a compelling need (such as security, restricted access, remote location, physical characteristics) that drives the project to be located in this zone. The DAF is the primary location of all nuclear explosive assembly operations at the NTS.

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

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

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

3.1.2 Infrastructure

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

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

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

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

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

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

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

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

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

3.1.3 Transportation

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

3.2 Topography and Physiographic Setting

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

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

3.3 Geology and Soils

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

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

3.4 Seismicity

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

3.5 Water Resources

3.5.1 Surface Water

The NTS is within the Great Basin, a hydrographic basin in which no surface water leaves except by evaporation. The Great Basin is part of the Basin and Range Physiographic Province. Hydrographic basins in the region have internal drainage controlled by topography. Streams in the region are ephemeral. Throughout the region, springs and manmade impoundments are the only sources of perennial surface water. Runoff results from snowmelt and from precipitation during storms that occur most commonly in winter and occasionally in fall and spring, and during localized thunderstorms that occur primarily in the summer. Much of the runoff quickly infiltrates into rock fractures or into the dry soils, some is carried down alluvial fans in arroyos, and some drains into playas where it may stand for weeks as a lake. A number of small arroyos are present throughout the proposed Rad/NucCTEC location. Barren Wash is located south of the proposed project location.

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

3.5.2 Groundwater

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

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

3.5.3 Floodplains and Wetlands

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

3.6 Biological Resources

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

3.6.1 Flora

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

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

3.6.2 Fauna

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

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

3.7 Air Quality

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

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

3.8 Noise

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

3.9 Visual Resources

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

3.10 Cultural Resources

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

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

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

3.11 Occupational and Public Health and Safety

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

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

3.12 Socioeconomics

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

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

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

3.13 Environmental Justice

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

4.0 ENVIRONMENTAL EFFECTS

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

4.1 PROPOSED ACTION

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

4.1.1 Land Use

4.1.1.1 Facilities

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

4.1.1.2 Infrastructure

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

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

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

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

Waste Management: Construction debris and general trash generated by worker activities would result from construction and operation of the Rad/NucCTEC. Construction debris would be disposed of in the U10c landfill. Food wastes and other general trash would be transported to the Area 23 sanitary landfill for disposal. The amount of non-hazardous solid waste would not be expected to exceed 450 m^3 (15,390 ft^3) per year, assuming an average occupancy of 30 personnel, resulting in minimal impacts from Rad/NucCTEC activities. Installation of two septic tanks and leach fields is planned; the two septic systems would be sized to provide adequate wastewater disposal capacity for all activities conducted at the Rad/NucCTEC, including training. NNSA/NSO would coordinate with the Nevada Bureau of Health Protection Services to ensure appropriate design of the septic systems and for permitting.

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

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

4.1.1.3 Transportation

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

4.1.2 Topography and Physiographic Setting

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

4.1.3 Geology and Soils

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

4.1.4 Seismicity

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

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

4.1.5 Water Resources

4.1.5.1 Surface Water

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

4.1.5.2 Groundwater

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

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

4.1.5.3 Flood Plains and Wetlands

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

4.1.6 Biological Resources

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

4.1.7 Air Quality

Air emissions associated with the Rad/NucCTEC would primarily include fugitive dust from construction. The quantity of fugitive dust emissions generated by vehicles and equipment during construction would affect air quality in the project area, but these impacts would be minor and short term in nature. Extensive surveys have been conducted on the NTS to delineate areas of radioactive contamination, and the proposed project site was not found to be radioactively contaminated. Therefore there would be no exposure pathways or potential health impacts to workers, trainees and others from resuspension of radionuclides. Standard dust suppression techniques, such as watering, would be used as needed to minimize emission of fugitive dust. Other potential impacts to air quality from construction of the Rad/NucCTEC include emissions from fuel-burning construction equipment such as scrapers and front-end loaders, and from gasoline and diesel powered vehicles and trucks. It is estimated that a total of 250,000 gallons of fuel would be consumed during construction of Rad/NucCTEC.

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

4.1.8 Noise

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

4.1.9 Visual Resources

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

4.1.10 Cultural Resources

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

4.1.11 Occupational and Public Health and Safety

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

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

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

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

4.1.12 Socioeconomics

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

4.1.13 Environmental Justice

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

4.2 NO ACTION ALTERNATIVE

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

5.0 CUMULATIVE EFFECTS

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

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

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

5.1 PROPOSED ACTION

5.1.1 Land Use, Transportation, and Waste Management

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

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

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

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

5.1.2 Topography and Physiographic Setting

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

5.1.3 Geology and Soils

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

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

5.1.4 Water Resources

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

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

5.1.5 Biological Resources

Approximately 50 acres would initially be utilized for construction of facilities associated with the initial phases of the Rad/NucCTEC, with possible eventual expansion to 100 acres. All of the land that would be used for the Rad/NucCTEC is undisturbed. Wildlife habitat and existing plant communities would be somewhat affected by construction or operation of the Rad/NucCTEC. Some of that impact would be offset by reclamation of a like area of previously disturbed land within desert tortoise habitat on the NTS. The Area 6 Aerial Operations Facility is located outside of desert tortoise habitat. Therefore, there would be no cumulative effect on desert tortoise from the Rad/NucCTEC and the Aerial Operations Facility. Activities under the Chem/Bio EA would not result in loss of desert tortoise habitat and short term impacts would be mitigated through relocation of any tortoises within the impact area. There would be no cumulative impact to desert tortoises from the interaction of the Rad/NucCTEC and activities under the Chem/Bio EA. The Yucca Mountain Project lies within desert tortoise habitat. The Rad/NucCTEC project would conduct tortoise surveys before undertaking any ground disturbing activities and would relocate any tortoises found to suitabn8 1141 646.56006 Tm1 Tc -0859836 633.90002 Te h

5.1.9 Cultural Resources

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

5.1.10 Occupational and Public Safety and Health

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

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

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

5.1.11 Socioeconomics

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

5.1.12 Environmental Justice

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

5.2 NO ACTION ALTERNATIVE

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

6.0 MITIGATION MEASURES

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

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

7.0 HAZARD ANALYSIS

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

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

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

DOE Order 420.1, *Facility Safety*, requires the application of design requirements for nuclear facilities to be “guided by safety analyses that establish the identification and functions of safety structures, systems, and components (SSC) for a facility and establish the significance to safety of functions performed by those SSC.” Applying the principles contained in DOE Order 413.3, *Program and Project Management for the Acquisition of Capital Assets*, a PHA was developed during the conceptual phase of the proposed Rad/NucCTEC project. The purpose of the PHA is to identify the potential hazards associated with the proposed facility (or complex), to estimate the potential significance of consequences that arise from those hazards to the public, workers, or the environment, and to identify the tentative importance of facility safety structures, systems, and components or controls in the reduction of risks from those hazards. The PHA for each venue is, therefore, based on the maximum source quantity anticipated to be used at that venue. Results or conclusions drawn from the PHA are used to support decisions on design concepts and national consensus codes or standards chosen for safety structures, systems, and components that serve important safety functions. The results from the PHA are conventionally used to support the critical decision to proceed with the preliminary design phase of a project. To date, NNSA/NSO has completed PHAs for five of the proposed venues of the Rad/NucCTEC. Those venues are the Port of Entry Primary and Secondary facilities, the Active Interrogation Facility, the High-Speed Road, and the Sensor Test Track.

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

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

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

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

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

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

8.0 REGULATORY REQUIREMENTS

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

8.1 FEDERAL LAWS AND REGULATIONS

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

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

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

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

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

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

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

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

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

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

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

8.2 STATE LAWS AND REGULATIONS

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

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

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

Clean Air Regulations: The NAC, Chapter 445B, implements both state and federal clean air statues and identifies requirements for permits for each air pollution source as well as monitoring requirements. Particulate emissions from surface disturbing activities which encompass an area equal to or greater than five acres are regulated under the NAC and require a Surface Disturbance Permit. Disturbances greater than 20 acres are required to implement a dust control plan. The NTS Class II Air Quality Operating Permit includes surface disturbances, so that separate Surface Disturbance permits are not required for activities within the NTS. Because the permit is applicable to disturbances throughout the entire NTS, which is much greater than 20 acres, dust suppression is required for all surface disturbances. At the NTS the most common method of dust control is through the use of water sprays.

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

Radiation Control Regulations: Chapter 459 of the NAC includes state regulations for radiation control. NAC 459.120 exempts DOE and its contractors and subcontractors from regulation under NAC 459.010-450.950 for certain activities. NNSA/NSO will consult with the Nevada Bureau of Health Protection Services, as appropriate, to resolve any questions regarding applicability of NAC 459.120 to Rad/NucCTEC.

8.3 DOE REGULATIONS, STANDARDS AND ORDERS AND EXECUTIVE ORDERS

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

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

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

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

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

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

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

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

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

8.4 PERMITS

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

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	• Surface Disturbance • Requires Dust Plan
NY-0360-12 NTNC	Public Water System Permit	09/30/04	State of Nevada Safe Drinking Water Act	• Potable water supply • Permit Modification Required • Engineering Plan Review Required
New Permit Required	Septic System	N/A	State of Nevada Clean Water Act	• Septic Tank/Leach Field • New Permit Required • Engineering Plan Review Required
1-5-96-F-33	Desert Tortoise Incidental Take Authori-zation	12/31/06	US Fish & Wildlife Service	• 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.

10.0 REFERENCES

Regulations, Orders, and Laws

10 CFR Part 830	U.S. Department of Energy, "Nuclear Safety Management," *Code of Federal Regulations*, Office of Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 2001
10 CFR Part 835	U.S. Department of Energy, "Occupational Radiation Protection," *Code of Federal Regulations*, Office of Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1998.
10 CFR Part 1021	U.S. Department of Energy, "National Environmental Policy Act; Implementing Procedures," *Code of Federal Regulations*, Office of Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1992.
29 CFR Part 1910	U.S. Department of Labor "Labor: Occupational Safety and Health Standards," *Code of Federal Regulations*, Office of the Federal Register, National Archives and Records Administration, U.S. Government Printing Office, Washington, D.C., 1993.
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