

**CHAPTER 3**  
**DESCRIPTION OF ALTERNATIVES**

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### 3.0 DESCRIPTION OF ALTERNATIVES

This chapter contains descriptions of the alternatives that are being evaluated by the U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) for continued operation of the Nevada National Security Site (NNSS) (formerly known as the Nevada Test Site), the Remote Sensing Laboratory (RSL) at Nellis Air Force Base, the North Las Vegas Facility (NLVF), the Tonopah Test Range (TTR), and environmental restoration sites located on the Nevada Test and Training Range (formerly the Nellis Air Force Range). Three alternatives are addressed in this *Site-Wide Environmental Impact Statement for the Continued Operation of the Department of Energy/National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (NNSS SWEIS)*: (1) the No Action Alternative, described in Section 3.1; (2) the Expanded Operations Alternative, described in Section 3.2; and (3) the Reduced Operations Alternative, described in Section 3.3. Other sections of this chapter include Section 3.4, Comparison of Potential Consequences of the Alternatives; Section 3.5, Alternatives Eliminated from Detailed Study; and Section 3.6, Identification of the Preferred Alternative. Appendix A of this *NNSS SWEIS* provides a more detailed description of the alternatives. Some of the descriptions include American Indian perspectives prepared by the American Indian Writers Subgroup (AIWS); the AIWS input is in text boxes identified with a Consolidated Group of Tribes and Organizations (CGTO) feather icon.

Descriptions of the alternatives are organized under three mission areas, each with two or more associated programs. These missions and their associated programs are: (1) the National Security/Defense Mission, which includes the Stockpile Stewardship and Management, Nuclear Emergency Response, Nonproliferation, Counterterrorism, and Work for Others Programs; (2) the Environmental Management Mission, which includes the Waste Management and Environmental Restoration Programs; and (3) the Nondefense Mission, which includes the General Site Support and Infrastructure, Conservation and Renewable Energy, and Other Research and Development Programs.

The three alternatives include similar types of projects and activities, but differ primarily in operational intensity and facilities requirements. The No Action Alternative generally reflects the use of existing facilities to maintain operations at levels consistent with those experienced since 1996, as well as those anticipated by project-specific National Environmental Policy Act (NEPA) analyses and agency decisions made since 1996 (see Chapter 2, Section 2.5). The Expanded Operations Alternative differs from the No Action Alternative in that, for many activities, the levels of operation would be higher and a number of new facilities would be constructed to support these higher levels of operation. In addition, under the Expanded Operations Alternative, NNSA would modify NNSS land use zones to better reflect the kinds of activities that would be undertaken. Under the Reduced Operations Alternative, NNSA would conduct some activities at levels similar to those under the No Action Alternative, but for other activities, the levels of operations would be lower or would cease. NNSA would also make NNSS land use zone changes under the Reduced Operations Alternative that would limit most activities in the northwestern portion of the NNSS. Mission-related capabilities, projects, and programmatic activities are identified for each of the proposed alternatives in the following sections and **Table 3-1** summarizes the similarities and differences among the three alternatives evaluated in this site-wide environmental impact statement (SWEIS). Detailed descriptions of the activities included under each alternative are provided in Appendix A.

DOE/NNSA has at various times considered the possibility of supporting commercial solar projects at the NNS. In this *NSS SWEIS*, DOE/NNSA evaluates potential commercial solar power generation facilities under each of the three alternatives; however, there is no specific proposal for such a project at this time. For this reason, DOE/NNSA cannot be certain regarding the size of any solar power generation facility that might be constructed or whether DOE/NNSA support for such a facility might extend beyond providing access to land and certain infrastructure, such as providing partial funding. However, to ensure consideration of potential environmental impacts in a decision by DOE/NNSA to actively support development of one or more commercial solar power generation facilities at the NNS, each alternative in this *NSS SWEIS* addresses commercial-scale projects (the size of the potential facility varies with each alternative). DOE/NNSA selected the potential size of the generation facility under each alternative in terms of megawatts of generating capacity to provide a reasonable range of generating capacities, not to portray any actual project under consideration. If a commercial solar power project were proposed at the NNS in the future, additional project-specific NEPA analysis would be required.

#### **Detailed Description of Alternatives—American Indian Perspective**



The Consolidated Group of Tribes and Organizations (CGTO) is concerned about culturally perceived harmful land disturbing U.S. Department of Energy (DOE) actions described in this chapter and Appendix A of this site-wide environmental impact statement (SWEIS). We are concerned because these actions adversely impact the Nevada National Security Site (NNS) land and offsite locations, which in turn affect the American Indian cultural landscape.

Since 1987, DOE has provided opportunities for representatives of the CGTO to visit portions of the NNS and identify important places, spiritual trails, and landscapes of traditional and contemporary cultural significance.<sup>1</sup> These actions by DOE are considered positive steps towards fulfilling its trust responsibility through facilitating co-stewardship and land management strategies between DOE and the CGTO; however, this is an ongoing process.

To avert or minimize further impacts, the CGTO recommends DOE and the CGTO develop co-management strategies to help protect the land by implementing the following actions before continuing with these current or proposed activities:

- Identify those areas that have been disrespected and culturally damaged, so that balance can once again be restored.
- Avoid further harmful ground-disturbing activities
- Make mitigation of restorable areas a top priority
- Avert or minimize damage to geological formations important to the cultural and ecological landscape, songscapes and storyscapes
- Implement collaborative environmental restoration techniques that require minimal ground disturbing activities (see CGTO response to Section 3.1.2.2)
- Continue to pursue systematic consultations with American Indians so potentially impacted resources can be readily identified, alternative solutions discussed, and adverse impacts averted
- Provide American Indian people increased access to culturally significant areas so that we can use our knowledge, prayers, and traditions to effectively restore balance to the natural and spiritual harmony of the NNS area and offsite locations

In addition, the CGTO recommends DOE and the CGTO continue to hold annual meetings to discuss current and proposed actions in greater depth, deliberate potential impacts, and consider and develop mutually acceptable mitigation measures. This is particularly necessary for those actions requiring additional National Environmental Policy Act (NEPA) analysis, including but not limited to solar and geothermal energy development.

In the view of Indian people, the ideal alternative would be to avoid any action that further disturbs the land and resources associated with the NNS and the offsite locations.

We believe we have been created and placed on these lands. Because of our birth-right and strong ties to our ancestral land, the CGTO believes we have undeniable rights to interact with its precious resources, and a continuous obligation to protect it. The CGTO takes this responsibility very seriously and has developed our input for the alternatives presented throughout Chapter 3 so we may fulfill this obligation.

*See Appendix C for more details.*

<sup>1</sup> *Because this is a public document, the exact locations of these areas will not be revealed unless determined necessary during government-to-government consultation.*

**Table 3–1 Comparison of Mission-Based Program Activities Under the Proposed Alternatives**

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
<b>National Security/Defense Mission</b>		
<b>Stockpile Stewardship and Management Program</b> (see Sections 3.1.1.1, 3.2.1.1, and 3.3.1.1 of this chapter for additional information)		
Maintain readiness to conduct underground nuclear tests.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Conduct up to 10 dynamic experiments per year within NNSS Areas 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 16, 19, or 20.	Conduct up to 20 dynamic experiments per year within NNSS Areas 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 16, 19, or 20.	Conduct up to 6 dynamic experiments per year at the NNSS; no dynamic or dynamic plutonium experiments or hydrodynamic tests would be conducted in Areas 19 or 20.
Conduct up to 20 conventional explosives experiments per year at BEEF and up to 10 per year within NNSS Areas 1, 2, 3, 4, 12, or 16 using up to 70,000 pounds TNT [2,4,6-trinitrotoluene]-equivalent of explosive charges; would also support Work for Others Program.	<ul style="list-style-type: none"> <li>• Conduct up to 100 conventional explosives experiments per year within NNSS Areas 1, 2, 3, 4, 12, or 16 using up to 120,000 pounds TNT-equivalent of explosive charges (70,000 pounds at BEEF); would also support Work for Others Program.</li> <li>• Add second firing table and high-energy x-ray capability at BEEF.</li> <li>• Establish up to three areas at the NNSS for conducting explosive experiments with depleted uranium.</li> </ul>	Conduct up to 10 conventional explosives experiments per year at BEEF using up to 70,000 pounds TNT-equivalent of explosive charges per year to directly support the Stockpile Stewardship and Management Program; no other explosives experiments would be conducted.
Conduct up to 12 shock physics experiments per year at the NNSS using actinide targets at JASPER in Area 27 and up to 10 experiments per year using the Large-Bore Powder Gun in Area 1.	Conduct up to 36 shock physics experiments per year at the NNSS using actinide targets at JASPER in Area 27 and up to 24 experiments per year using the Large-Bore Powder Gun in Area 1.	Conduct up to 6 shock physics experiments per year at the NNSS using actinide targets at JASPER in Area 27 and up to 8 experiments per year using the Large-Bore Powder Gun in Area 1.
Conduct up to 500 criticality operations (experiments, training, and other operations) per year at the Criticality Experiment Facility at DAF in Area 6.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Maintain the Atlas Facility in standby with the capability to conduct up to 12 pulsed-power experiments per year.	Activate the Atlas Facility and conduct up to 24 pulsed-power experiments per year.	Decommission and disposition the Atlas Facility.
Conduct up to 600 plasma physics and fusion experiments each year at NLVF and 50 per year in NNSS Area 11.	Conduct up to 1,000 plasma physics and fusion experiments each year at NLVF and 650 per year in NNSS Area 11, increasing the size and complexity of such experiments.	Conduct up to 350 plasma physics and fusion experiments each year at NLVF and 25 per year in NNSS Area 11.
Conduct five drillback operations at NNSS over about a 10-year period.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
Conduct Stockpile Management Program activities in NNSS Areas 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 16, 19, or 20, including:	Same as under the No Action Alternative, plus the following activities:	Stockpile Stewardship and Management Program activities would be the same as under the No Action Alternative, except activities would not be conducted in Areas 18, 29, and 30).
– Disposition damaged U.S. nuclear weapons.	<ul style="list-style-type: none"> <li>– Stage nuclear devices pending dismantlement, modification/maintenance, and/or transportation to another location.</li> <li>– Dismantle up to 100 nuclear weapons per year.</li> <li>– Replace limited-life components of up to 360 nuclear devices and conduct associated maintenance activities.</li> <li>– Test weapons components for quality assurance under the Limited Life Component Exchange Program.</li> </ul>	
– Stage special nuclear material, including nuclear weapon pits.	– Stage special nuclear material, including nuclear weapon pits, and transfer between 4 and 5 metric tons of special nuclear material from other parts of the DOE Complex for use in experiments at the NNSS.	
Conduct training for the Office of Secure Transportation up to six times per year at various locations on NNSS roads.	Same as the No Action Alternative, plus:  Develop facilities in Area 17 and upgrade or construct new facilities in Area 6, 12, or 23 to support training for the Office of Secure Transportation.	Conduct training for the Office of Secure Transportation up to four times per year at various locations on NNSS roads.
Conduct the following stockpile stewardship operations at the TTR:  <ul style="list-style-type: none"> <li>– Conduct tests and experiments, including flight test operations for gravity weapons (i.e., bombs).</li> <li>– Conduct ground/air-launched rocket and missile operations.</li> <li>– Conduct impact testing.</li> <li>– Conduct passive testing of joint test assemblies and conventional weapons.</li> <li>– Conduct fuel-air explosives testing.</li> </ul>	Same as under the No Action Alternative.	Same as under the No Action Alternative, except:  <ul style="list-style-type: none"> <li>– Discontinue ground/air launched-rocket and missile operations.</li> <li>– Discontinue fuel-air explosives testing at the TTR.</li> </ul>
<b>Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs</b> (see Sections 3.1.1.2, 3.2.1.2, and 3.3.1.3 of this chapter for more information)		
Provide support for the Nuclear Emergency Support Team, the Federal Radiological Monitoring and Assessment Center, the Accident Response Group, and Radiological Assistance Program. Most of this support is out of RSL.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Conduct Aerial Measuring System activities from RSL base.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Conduct WMD emergency responder training at various NNSA/NSO venues.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Support DOE Emergency Communications Network.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
Disposition improvised nuclear devices, deploy the NNSA and FBI Disposition and Disposition Forensic Programs to the NNSS for training and exercises or for an actual event, as needed.	Same as under the No Action Alternative, plus:  Disposition radiological dispersion devices, as needed.	Same as under the No Action Alternative.
Integrate existing activities and primarily NNSS facilities to support U.S. efforts to control the spread of WMDs, particularly nuclear WMDs, including arms control, nonproliferation activities, nuclear forensics, and counterterrorism capabilities.	Same as under the No Action Alternative, plus:  At the NNSS: <ul style="list-style-type: none"> <li>• Construct laboratory space and other facilities for design and certification of treaty verification technology, training of inspectors, and development of arms control confidence-building measures as part of the Arms Control Treaty Verification Test Bed.<sup>a</sup></li> <li>• Develop and construct new facilities to support a Nonproliferation Test Bed to simulate chemical and radiological processes that an adversary would clandestinely conduct.<sup>a</sup></li> <li>• Construct an Urban Warfare Complex to support counterterrorism training.<sup>a</sup></li> </ul>	Same as under the No Action Alternative.
<b>Work for Others Program</b> (see Sections 3.1.1.3, 3.2.1.3 and 3.3.1.3 of this chapter for more information)		
Continue to conduct Work for Others Program activities in all appropriate zones on the NNSS, and at RSL and NLVF.	Same as under the No Action Alternative, except the NNSS land use zone designation for Area 15 would be changed from “Reserved Zone” to “Research, Test, and Experiment Zone.”	Same as under the No Action Alternative, except Work for Others Program activities, with the exception of military training and exercises, would not be conducted in Areas 18, 19, 20, 29, and 30 at the NNSS.
Host treaty verification activities.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Conduct nonproliferation projects and counterproliferation research and development at the NNSS, including:	Same as under the No Action Alternative.	Same as under the No Action Alternative, except:
– Conduct conventional weapons effects and other explosives experiments.		Discontinue conventional weapons effects and other Work for Others Program explosives experiments.
– Support development of capabilities to detect and defeat military assets in deeply buried hardened targets.		Discontinue development of capabilities to defeat military assets in deeply buried hardened targets.
– Conduct up to 20 controlled chemical and biological simulant release experiments per year (each experiment would include multiple releases by a variety of means, including explosive).		Discontinue projects requiring explosive releases of chemical or biological simulants.
– Support training, research and development of equipment, specialized munitions, and tactics related to counterterrorism.		Same as under the No Action Alternative.
Support the U.S. Department of Defense and other Federal agencies in developing counterterrorism capabilities.	Develop and construct new facilities to support counterterrorism training and research and development activities.	Same as under the No Action Alternative.

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
Conduct criticality experiments to support NASA's deep space power source development within the parameters for criticality experiments established under the Stockpile Stewardship and Management Program.	Same as under the No Action Alternative, plus:  Support NASA's deep space power source development, including conducting experiments using existing boreholes at the NNSC to sequester emissions such as radionuclides. <sup>a</sup>	Same as under the No Action Alternative.
Host the use of various aerial platforms, such as airplanes and helicopters, at various locations at the NNSC for research and development, training, and exercises.	<ul style="list-style-type: none"> <li>• Increase use of various aerial platforms, such as airplanes and helicopters, for research and development, training, and exercises, including constructing additional hangars, shops, and buildings at existing airports at the NNSC.</li> <li>• Conduct up to 3 underground and 12 open-air radioactive tracer experiments per year.</li> <li>• Host treaty verification activities, including development of a facility for simulating nuclear fuel cycle-related radionuclide release detection and characterization.<sup>a</sup></li> <li>• Develop a facility for specialized explosive experiments and simulated manufacture to support high-explosives experiments.<sup>a</sup></li> <li>• Support increased research and development of active interrogation equipment, methods, and training.</li> <li>• Develop new facilities to support research and development in radio frequency generation and infrasonic observations.<sup>a</sup></li> <li>• Develop new facilities, including simulated clandestine laboratories, to support chemical and biological simulant experiments.<sup>a</sup></li> </ul>	Same as under the No Action Alternative.
Conduct Work for Others Program activities at the TTR, including robotics testing, smart transportation-related testing, smoke obscuration operations, infrared tests, and rocket development.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Environmental Management Mission</b>		
<b>Waste Management Program</b> (see Sections 3.1.2.1, 3.2.2.1, and 3.3.2.1 of this chapter for more information)		
Dispose up to 15,000,000 cubic feet of LLW and 900,000 cubic feet of MLLW <sup>b</sup> in the Area 5 RWMC.	Dispose up to 48,000,000 cubic feet of LLW and 4,000,000 cubic feet of MLLW at the Area 5 RWMC and Area 3 RWMS.	Same as under the No Action Alternative.
Maintain the Area 3 RWMS on standby.	Open the Area 3 RWMS for disposal of authorized and/or permitted waste.	Same as under the No Action Alternative.

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
Repackage onsite-generated MLLW.	Same as under the No Action Alternative, plus: Treat MLLW received from on- and offsite generators via macroencapsulation and microencapsulation, sorting/segregating, and bench-scale mercury amalgamation, as appropriate, and store at the Area 5 RWMC pending treatment or disposal.	Same as under the No Action Alternative.
Continue to use rail-to-truck transloading facilities outside of Nevada.	Increase rail-to-truck transloading, including use of facilities within Nevada.	Same as under the No Action Alternative.
Store onsite-generated TRU waste pending offsite disposal.	Same as under the No Action Alternative, except a larger volume of TRU waste would be generated by increased activities at NNSS facilities, such as JASPER.	Same as under the No Action Alternative, except smaller volumes of TRU waste would be generated by reduced operational levels at NNSS facilities, such as JASPER.
Store onsite-generated hazardous waste as needed at the Area 5 Hazardous Waste Storage Unit pending offsite treatment or disposal.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Operate the Area 11 Explosives Ordnance Disposal Unit.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Operate the Area 6 Hydrocarbon Landfill.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Operate the Area 23 Solid Waste Disposal Site and the U10c Solid Waste Disposal Site.	Same as under the No Action Alternative, plus: Larger volumes of solid sanitary waste would be generated by increased activity levels at the NNSS. Construct new sanitary solid waste disposal facilities as needed in Area 23 and develop a new solid waste disposal site in Area 25 to support environmental restoration activities.	Same as under the No Action Alternative, except lower volumes of solid sanitary waste would be generated by reduced activity levels at the NNSS.
<b>Environmental Restoration Program</b> (see Sections 3.1.2.2, 3.2.2.2, and 3.3.2.2 of this chapter for more information)		
Underground Test Area Project – Comply with the FFAO; monitor groundwater from existing wells; drill new characterization and monitoring wells; develop groundwater flow and transport models; and continue to evaluate closure strategies.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Soils Project – Identify and characterize areas with contaminated soils and perform corrective actions in compliance with the FFAO.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Industrial Sites Project – Identify, characterize, and remediate industrial sites under the FFAO and continue decontaminating and decommissioning facilities.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Defense Threat Reduction Agency sites – In accordance with the FFAO, perform remediation activities at sites that are the responsibility of the Defense Threat Reduction Agency.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Execute the Borehole Management Program.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
<b>Nondefense Mission</b>		
<b>General Site Support and Infrastructure Program</b> (see Sections 3.1.3.1, 3.2.3.1, and 3.3.3.1 of this chapter for more information)		
<p>Conduct small projects to maintain the present capabilities of NNSA/NSO facilities in all areas of the NNSS and at NLVF, RSL, and the TTR.</p> <p>Maintain existing infrastructure, manage various permits and agreements, and provide security for the former Yucca Mountain site.</p>	<p>Same as under the No Action Alternative, plus:</p> <ul style="list-style-type: none"> <li>• Construct a new 85,000-square-foot multistory security building in Area 23.</li> <li>• Replace the NNSS 138-kilovolt electrical transmission system.</li> <li>• Expand cellular telecommunication system on the NNSS.</li> <li>• Reconfigure Mercury.</li> </ul>	<p>Same as under the No Action Alternative, except:</p> <p>No infrastructure projects would be conducted within Areas 18, 19, 20, 29, and 30 at the NNSS beyond maintaining mission-critical existing electrical and communication facilities and Well 8.</p>
<b>Conservation and Renewable Energy Program</b> (see Sections 3.1.3.2, 3.2.3.2, and 3.3.3.2 of this chapter for more information)		
<p>Continue to identify and implement energy conservation measures and renewable energy projects in compliance with applicable Executive orders and DOE orders.</p>	<p>Same as under the No Action Alternative, plus:</p>	<p>Same as under the No Action Alternative, except:</p>
<p>– Reduce energy intensity by 3 percent annually through the end of fiscal year 2015, for a total 30 percent reduction.</p>		
<p>– Reduce greenhouse gas emissions by 28 percent by fiscal year 2020.</p>		
<p>– Install advanced electric metering systems.</p>		
<p>– Obtain at least 7.5 percent of the NNSS annual electricity and thermal consumption from renewable energy sources.</p>		
<p>– Support development of a 240-megawatt commercial solar power generation facility in Area 25.<sup>a</sup></p>	<ul style="list-style-type: none"> <li>• Modify NNSS land use zones to establish a 39,600-acre Renewable Energy Zone in Area 25 and support development of commercial solar power facilities in Area 25 with a maximum combined generating capacity of 1,000 megawatts.<sup>a</sup></li> <li>• Construct a 5-megawatt photovoltaic solar power facility near the Area 6 Construction Facilities.</li> <li>• Support a Geothermal Energy demonstration project and Geothermal Research Center at the NNSS.<sup>a</sup></li> </ul>	<p>Support development of a 100-megawatt commercial solar power generation facility in Area 25.<sup>a</sup></p>
<p>– Reduce water use by 16 percent by 2015.</p>		
<p>– Maximize use of alternative fuels (e.g., E85 and biodiesel).</p>		
<p>– Ensure all new construction and renovation projects implement high-performance building goals.</p>		

NO ACTION ALTERNATIVE	EXPANDED OPERATIONS ALTERNATIVE	REDUCED OPERATIONS ALTERNATIVE
<b>Other Research and Development Programs</b> (see Sections 3.1.3.3, 3.2.3.3, and 3.3.3.3 of this chapter for more information)		
Support the DOE National Environmental Research Park Program and other non-DOE/NNSA research and development activities in all areas of the NNSS.	Same as under the No Action Alternative.	National Environmental Research Park Program and other non-DOE/NNSA research and development activities would be conducted in all areas of the NNSS except Areas 18, 19, 20, 29, and 30.

BEEF = Big Explosives Experimental Facility; DAF = Device Assembly Facility; FBI = Federal Bureau of Investigation; FFACO = Federal Facilities Agreement and Consent Order; JASPER = Joint Actinide Shock Physics Experimental Research Facility; LLW = low-level radioactive waste; MLLW = mixed low-level radioactive waste; NASA = National Aeronautics and Space Administration; NLVF = North Las Vegas Facility; NNSA = National Nuclear Security Administration; NNSA/NSO = National Nuclear Security Administration Nevada Site Office; NNSS = Nevada National Security Site; RSL = Remote Sensing Laboratory; RWMC = Radioactive Waste Management Complex; RWMS = Radioactive Waste Management Site; SWEIS = site-wide environmental impact statement; TNT = 2,4,6-trinitrotoluene; TRU = transuranic; TTR = Tonopah Test Range; WMD = weapon of mass destruction.

<sup>a</sup> These potential projects have not reached a point of development to allow full analysis in this *NNSS SWEIS* and would be subject to additional NEPA analysis before NNSA would make any decision regarding implementation. At this point, NNSA has not received or solicited proposals for any commercial solar power generation projects.

<sup>b</sup> The actual permitted capacity of the Mixed Waste Disposal Unit (Cell 18) is 899,996 cubic feet.

### **3.1 No Action Alternative**

As defined in this *NNSS SWEIS*, the No Action Alternative reflects the use of existing facilities and ongoing projects to maintain operations consistent with those experienced in recent years at the NNSS and offsite locations in Nevada. For each mission and its supporting programs, levels of operations for associated capabilities and projects were determined by evaluating historic operational values since 1996, such as the number of experiments performed at the Joint Actinide Shock Physics Experimental Research Facility (JASPER) or the U1a Complex; reasonable expectations for newer projects, such as the number of projected shots for the Large-Bore Powder Gun; or the nature and number of proposed activities, such as training undertaken for the Office of Secure Transportation. For example, in 2004 and 2006, NNSA conducted 8 experiments with plutonium at JASPER; for the No Action Alternative, NNSA is analyzing up to 12 such experiments at JASPER. The operational level for disposal operations of low-level radioactive waste (LLW) in the No Action Alternative is based on the volumes of LLW actually disposed during fiscal years (FY) 1997 through 2010. The No Action Alternative level of operations represents the baseline against which the other alternatives are compared. In the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (1996 NTS EIS)* (DOE 1996c), NNSA identified land use zones in which certain categories of activities, such as nuclear, dynamic, and hydrodynamic experiments and other compatible defense and nondefense research and development and testing, would be conducted. The land use zones are used to manage activities at the NNSS to prevent interference among the various missions, programs, projects, and activities, but are not considered absolute descriptors of the range of activities that may occur in a particular zone. **Figure 3–1** depicts these land use zones and the major facilities at the NNSS that would continue under the No Action Alternative.

#### **3.1.1 National Security/Defense Mission**

Under the No Action Alternative, NNSA would continue to pursue the Stockpile Stewardship and Management, Nuclear Emergency Response, Nonproliferation, Counterterrorism, and Work for Others Programs.

##### **3.1.1.1 Stockpile Stewardship and Management Program**

As part of its National Security/Defense Mission, NNSA is tasked with strengthening national security through the military application of nuclear energy and reducing the global threat from terrorism and weapons of mass destruction. The term “stockpile stewardship” refers to core competencies in activities associated with research, design, development, and testing of nuclear weapons components, as well as assessment and certification of their safety and reliability. NNSA’s science-based Stockpile Stewardship and Management Program maintains and enhances the safety, reliability, and performance of the U.S. nuclear weapons stockpile, including the ability to design, produce, and test weapons, to meet national security requirements. Stockpile stewardship and management activities at NNSA facilities in Nevada are conducted via a variety of methods, including experiments involving special nuclear materials (SNM) and high explosives (either in combination or separately), shock physics, nuclear criticality, pulsed power, and plasma physics and nuclear fusion. Under the No Action Alternative, diagnostics and other instrumentation would be developed and used in related tests and experiments. In addition, NNSA would conduct drillback operations; support Office of Secure Transportation training; and, as necessary, disposition damaged U.S. nuclear weapons. Major facilities at the NNSS where stockpile stewardship and management activities would be performed include the Device Assembly Facility (DAF), the U1a Complex, the Big Explosives Experimental Facility (BEEF), and JASPER. NNSA also conducts stockpile stewardship and management activities at the TTR.

#### **Special Nuclear Material (SNM)**

SNM is (1) plutonium, uranium-233, uranium enriched in isotopes of uranium-233 or -235, or any other material that the U.S. Nuclear Regulatory Commission determines to be SNM, or (2) any material artificially enriched by any of these radioactive materials.

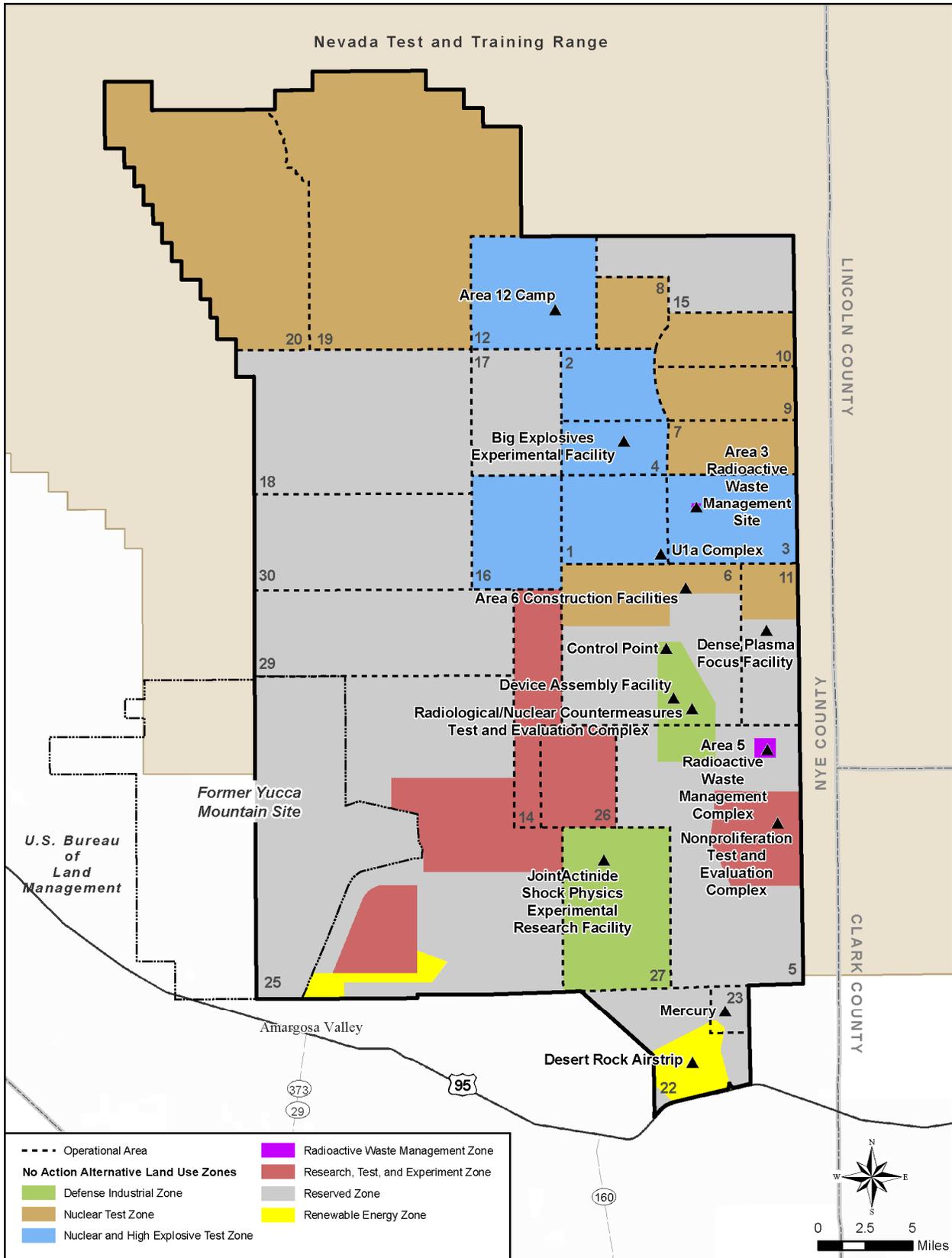


Figure 3-1 Nevada National Security Site Land Use Zones and Major Facilities Under the No Action Alternative

Stockpile stewardship and management activities would continue at NNSA facilities in Nevada under the conditions of the ongoing nuclear testing moratorium. These activities would emphasize science-based stockpile stewardship tests, experiments, and projects to maintain the safety and reliability of the nuclear weapons stockpile without underground nuclear testing. Historically, the primary mission of the NNSS was to conduct nuclear weapons tests. With the moratorium on nuclear testing that began in October 1992, this mission changed to maintaining a readiness to conduct nuclear tests. For this reason, the No Action Alternative includes those activities necessary to maintain the capability to conduct nuclear tests if so directed by the President. Readiness-to-test capabilities include maintaining the necessary infrastructure and, more importantly, exercising the research and engineering disciplines of the U.S. nuclear weapons program through an active science-based Stockpile Stewardship and Management Program at the NNSS to ensure the continued competence of its technical staff. As part of its readiness-to-test activities, NNSA would conduct training and exercises using various kinds of nuclear weapon simulators. A generic description of underground nuclear testing is provided in Appendix H.

In addition to maintaining the capability to conduct nuclear weapon tests and in support of stockpile stewardship and management at the NNSS, NNSA would perform a variety of national security activities under the No Action Alternative, consistent with the program goals and direction provide in Annex D of NNSA's *2011 Biennial Plan and Budget Assessment on the Modernization and Refurbishment of the Nuclear Security Complex* (NNSA 2010) and as summarized in the following descriptions. Detailed descriptions of these activities are included in Appendix A of this *NNSS SWEIS*.

**Dynamic experiments** – Dynamic experiments, including subcritical and hydrodynamic experiments, would be conducted in alcoves at the U1a Complex, in unused nuclear test vertical emplacement holes, or at other sites within the Nuclear Test and Nuclear and High Explosives Test Zones of the NNSS, which include all or parts of Areas 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 16, 19, and 20. Under the No Action Alternative, NNSA would conduct up to 10 dynamic tests per year. Over the next 10 years, a total of 5 dynamic experiments would be conducted in emplacement holes and cause new land disturbances.

**Conventional explosives experiments** – Experiments using explosives, including high explosives, would be conducted at BEEF and other locations at the NNSS. Experiments would use up to 70,000 pounds

## **Dynamic Experiments**

### **Dynamic Plutonium Experiments**

Dynamic plutonium experiments are designed to improve knowledge of plutonium material properties, including equation of state (an equation that expresses the relationship between temperature, pressure, and volume of a substance) and strength, over broad ranges of relevant pressures, temperatures, and time scales. They range from essentially static experiments to increasingly dynamic experiments. None of these experiments reaches nuclear criticality or involves a self-sustaining nuclear reaction.

### **Hydrodynamic Experiments**

Hydrodynamic experiments are high-explosives-driven experiments to assess the performance and safety of nuclear weapons. During a nuclear weapon function test, the behavior of solid materials is similar to liquids, hence the term "hydrodynamic." These experiments do not use special nuclear material (plutonium or enriched uranium), but are conducted using test assemblies that are representative of nuclear weapons.

Hydrodynamic experimentation is a central component in maintaining nuclear weapons design and assessment capability. It is coupled with high-performance computer modeling and simulation to certify, without underground nuclear testing, the safety, reliability, and performance of the nuclear physics package of weapons.

### **Subcritical Experiment**

Subcritical experiments are performed with special nuclear material (for example, plutonium) in a manner that prevents it from achieving a nuclear explosion. Subcritical experiments are designed to improve current knowledge of the dynamic properties of new or aged nuclear weapons parts and materials and to assess the effects of new manufacturing techniques on weapon performance. Subcritical experiments can vary any or all factors that influence criticality (mass, density, shape, volume, concentration, moderation, reflection, neutron absorption, enrichment, and interactions). Because there is no nuclear explosion, subcritical experiments are consistent with the U.S. nuclear testing moratorium.

TNT [2,4,6-trinitrotoluene]-equivalent of explosive charges. Experiments within the BEEF operational area could include potentially hazardous materials such as beryllium, depleted uranium, deuterium, and tritium. Up to 20 conventional explosives experiments would be conducted each year at BEEF and up to 10 per year would be conducted at other locations at the NNSS under the No Action Alternative. The experiments would consist of both open-air and contained (no release to the atmosphere) research and diagnostic experiments using a variety of explosive compounds. These totals do not include the dynamic experiments addressed in the preceding paragraph. Conventional explosives operations supporting other programs at the NNSS are described under those programs. All explosive operations would be conducted in compliance with DOE Manual 440.1-1A, *DOE Explosives Safety Manual*.

**Shock physics experiments** – Shock physics experiments are a subset of dynamic experiments, but are not included in the dynamic experiments described above. There are two shock physics facilities at the NNSS: JASPER in Area 27, and the Large-Bore Powder Gun at the U1a Complex in Area 1. Up to 12 SNM experiments per year would be conducted at JASPER under the No Action Alternative. The Large-Bore Powder Gun would be operated in an alcove designed for conducting subcritical experiments and would be used to conduct up to 10 subcritical experiments per year using SNM. Additional operations would be conducted without SNM at each of these facilities.

**Criticality experiments, training, and other activities** – Under the No Action Alternative, NNSA would conduct up to 500 criticality operations within DAF each year for experiments, training, and other purposes in support of Stockpile Stewardship and Management and other programs.

**Pulsed-power experiments** – Under the No Action Alternative, the Atlas Facility would be maintained in a standby status with the capability to conduct up to 12 pulsed-power experiments per year.

**Plasma physics and fusion experiments** – Using the Dense Plasma Focus Machines located in Area 11 of the NNSS and at NLVF, NNSA would conduct plasma physics and fusion experiments to support the Stockpile Stewardship and Management and Work for Others Programs. In the future, fusion experiments at the NNSS and NLVF could support energy production research. Up to 650 plasma physics and fusion experiments would be conducted yearly under the No Action Alternative: 50 in Area 11 of the NNSS and 600 at NLVF.

**Drillback operations** – NNSA assumes that five drillback operations to obtain samples from former underground nuclear test cavities would take place under the No Action Alternative over the next 10 years. Each drillback operation would be conducted near a former underground nuclear test location and would disturb approximately 5 acres of land.

**Stockpile management activities** – Stockpile management activities are the hands-on, day-to-day functions and operations involved in maintaining an enduring nuclear weapons stockpile. The following stockpile management activities would be conducted by NNSA at the NNSS under the No Action Alternative:

- Disposition of damaged U.S. nuclear weapons, as needed
- Staging, assembly, and disassembly of nuclear devices “Staging” means to maintain programmatic material, such as nuclear devices, SNM, or other materials, in a safe and

#### **Categories of Special Nuclear Material (SNM) (Security Categories I, II, III, and IV)**

The U.S. Department of Energy (DOE) uses a graded approach to provide SNM safeguards and security. Quantities of SNM stored at each DOE site are categorized into Security Categories I, II, III, and IV, with the greatest quantities included under Security Category I, and lesser quantities included in descending order under Security Categories II through IV.

#### **Nuclear Weapon Pit**

The pit is the central core of a nuclear weapon containing plutonium-239 and/or highly enriched uranium that undergoes fission when compressed by high explosives. The pit and the high explosive are known as the “primary” of a nuclear weapon.

secure manner until needed for a test, experiment, or other activity. Staging does not include maintaining material with no reasonable expectation of use in the foreseeable future.

- SNM staging, including nuclear weapon pits

**Training for the Office of Secure Transportation** – The NNSA Office of Secure Transportation would use existing NNSA infrastructure to conduct training and exercises up to six times per year to maintain and improve the skills of its agents to safely and securely transport nuclear weapons, weapons components, and SNM. Training includes practicing convoy activities on existing NNSA roads and adjacent off-road areas.

**TTR operations** – The primary mission of NNSA at the TTR is to ensure that U.S. nuclear weapons systems meet the highest standards of safety and reliability. In addition, Work for Others Program activities are conducted at the TTR. NNSA activities at the TTR are conducted under the conditions set forth in a land use permit from the U.S. Air Force (USAF) and are the responsibility of the Sandia Site Office, located in Albuquerque, New Mexico. Under the No Action Alternative, in support of stockpile stewardship and management, NNSA would use the TTR for the following activities:

- Tests and experiments, including flight tests for gravity weapons (bombs), would be conducted to ensure the compatibility of the hardware necessary for the interface between weapons and delivery systems and to assess weapon system functions in realistic delivery conditions. NNSA does not expect to use Category I/II SNM in flight tests.
- Impact testing would be conducted to test various parameters of a weapon while in flight or when dropped, including penetration of the ground surface. Weapons tested would include joint test assemblies and conventional and inert projectiles. Joint test assemblies are nuclear weapons with a portion of the nuclear package omitted, making them incapable of achieving the criticality required to produce a nuclear detonation. Impact tests would include the following:
  - Air-drop operations
  - Ground/air-launched rocket operations
  - Ground/air-launched missile operations
  - Compressed-air gun operations
  - Davis Gun operations
  - Fuel-air explosives operations
  - Open-air and underground detonation of explosives
  - Post-test procedures and recovery operations
- Passive tests would be conducted to check the systems in joint test assemblies and conventional weapons. Tests would also be conducted on behalf of nonproliferation research to develop equipment and techniques for determining whether other countries are using or developing nuclear capabilities. Passive tests would include the following:
  - Telemetry, microwave, and photometrics operations
  - Radar operations
  - Laser tracker operations
  - Radiographic operations
  - Electromagnetic radiation testing

Although not listed under the Work for Others description in Section 3.1.1.3, all of these Stockpile Stewardship and Management activities listed for the TTR are similar to activities that may be conducted as Work for Others at the TTR.

### 3.1.1.2 Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs

NNSA facilities in Nevada provide a broad support base for Nuclear Emergency Response Program activities, including a variety of areas and facilities that may be used for training and exercise activities. Under the No Action Alternative, NNSA would support the Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs by conducting the activities summarized in the following discussion. Detailed descriptions of these activities are included in Appendix A of this *NNSS SWEIS*.

- Personnel and logistical support for the Nuclear Emergency Support Team would be provided at RSL. Nuclear Emergency Support Team activities would also occur at the NNSS and other locations.
- Support consequence management, including personnel and early-phase activities management, of the Federal Radiological Monitoring and Assessment Center (FRMAC).
- Fixed-wing and rotary-wing aircraft would be provided for emergency response and aerial mapping activities as part of the Aerial Measuring System. These assets are based at RSL and activities are conducted at various locations around the country.
- Personnel and logistical support would be provided to the Accident Response Group.
- Logistical support would be provided to the Radiological Assistance Program.
- Weapons of mass destruction emergency responder training would be provided.
- Equipment and technical support would be provided for the DOE-dedicated Emergency Communications Network.

#### Radiological Emergency Response Assets

**Nuclear Emergency Support Team (NEST)** – NEST provides specialized technical expertise in resolving nuclear or radiological terrorist incidents. The National Nuclear Security Administration (NNSA) assists the Federal Bureau of Investigation or U.S. Department of State with conducting, directing, and coordinating search and recovery operations for nuclear materials, weapons, or devices, and assists in identifying and deactivating an improvised nuclear device or a radiological dispersal device.

**Aerial Measuring System (AMS)** – AMS provides rapid response to radiological emergencies with helicopters and fixed-wing aircraft equipped to detect and measure radioactive material. In addition, AMS surveys U.S. Department of Energy (DOE) sites, participates in interagency exercises, and performs work for other Federal agencies. AMS can also provide detailed aerial photographs and multi-spectral imagery and analyses.

**Radiological Assistance Program (RAP)** – RAP is a first-response resource in assessing a radiological emergency, conducting the initial radiological assessment of the area of the emergency and providing assistance to minimize immediate radiation risks. RAP also provides emergency response training to first responders, and is involved in the Weapons of Mass Destruction First Responder Training Program. RAP is implemented on a regional basis, with eight Regional Coordinating Offices in the United States. The National Nuclear Security Administration Nevada Site Office (NNSA/NSO) is part of Region 7, headquartered in Oakland, California.

**Federal Radiological Monitoring and Assessment Center (FRMAC)** – FRMAC coordinates the efforts of 17 agencies to integrate the Federal response to a radiological emergency within the United States. DOE's responsibility is to set up and initially manage a FRMAC and NNSA provides the Consequence Management Response Team, which draws from NNSA Emergency Response Assets, including the RAP and AMS. The Phase 1 Consequence Management Response Team is deployed from among NNSA/NSO assets.

**Accident Response Group (ARG)** – ARG develops and maintains readiness to efficiently manage the resolution of accidents or significant incidents involving nuclear weapons that are in DOE's custody and support the U.S. Department of Defense for similar incidents with weapons in its custody. ARG's role in an emergency situation involving a nuclear weapon includes initial onsite assessment; performing evaluations for the safety and health of emergency response personnel, the public, and the environment; weapon recovery; and support for onsite radiological monitoring, analysis, and assessment.

- Disposition improvised nuclear devices as needed, including conducting forensics activities on such a device and its components under the Disposition Forensics Program. Training drills and exercises would be conducted at existing NNSS facilities to maintain a readiness capability for the Disposition and Disposition Forensics Programs.

The NNSA and Federal Bureau of Investigation Disposition and Forensics Programs would deploy to the NNSS for periodic exercises and training or for an actual incident. All activities would take place in existing facilities at the NNSS.

- Nonproliferation- and counterterrorism-related activities would continue in the areas of arms control (see below), nonproliferation, and counterterrorism. Nonproliferation- and counterterrorism-related activities would provide scientific research and development, technology realization, process and procedure development, equipment testing and certification, and training. The kinds of activities that would be involved in supporting nonproliferation and counterterrorism include use of underground detonations of conventional explosives for seismic studies, releases of biological and chemical simulants, geological studies, and experiments to simulate radio frequencies resulting from various nuclear fuel cycle technologies. These activities are addressed in more detail in Section 3.1.1.3. Some activities supporting U.S. nonproliferation and counterterrorism efforts would occur at RSL and NLVF, but would primarily be conducted at the NNSS.

Under the No Action Alternative, nonproliferation- and counterterrorism-related activities would integrate existing capabilities (i.e., research and development, training, nonproliferation tests and experiments, counterterrorism training, etc.) under an overall program. There would be no new facilities constructed, although existing buildings and other facilities would be modified to accommodate these activities.

**Arms control** – A key component of nonproliferation activities would be the use of existing facilities as part of an Arms Control Treaty Verification Test Bed dedicated to supporting U.S. arms control initiatives and commitments. This component would support design and certification of treaty verification technology, training of inspectors, and development of arms control confidence-building measures.

**Nonproliferation** – Facilities would be provided for Federal agencies to develop remote sensing equipment, methodologies, and training to support national and international nonproliferation programs. Under the No Action Alternative, NNSA would use existing facilities in Nevada to support research and development in the following areas:

- Safeguarding fissile materials in nations with nuclear weapons or nuclear industries
- Tightening export controls on technology with potential application to weapons of mass destruction
- Improving border protection by installing detectors for radioactive materials
- Inspecting commercial shipments for smuggled nuclear materials

### **Nuclear Forensics**

Nuclear forensics is the analysis of nuclear materials recovered from either the capture of unused materials or the radioactive debris following a nuclear explosion. Nuclear forensics can contribute significantly to the identification of the sources of the materials and the industrial processes used to obtain them. In the case of an explosion, nuclear forensics can also reconstruct key features of the nuclear device (AAAS 2008).

### **Test Bed**

A test bed is an area that includes physical structures or designated terrain where tests and experiments are conducted. Test beds may be permanent facilities or temporary sites.

**Counterterrorism** – NNSA would support research, development, and training associated with detecting and countering various types of improvised explosive devices, including those that are vehicle-borne. These activities would occur at BEEF, the Nonproliferation Test and Evaluation Complex, and other locations at the NNSS. Detonations of high explosives associated with counterterrorism-related activities would be conducted at various existing facilities and other locations on the NNSS. All explosive operations would be conducted in compliance with DOE Manual 440.1-1A, *DOE Explosives Safety Manual*.

### 3.1.1.3 Work for Others Program

The Work for Others Program, hosted by NNSA, facilitates the use by other agencies and organizations of NNSA facilities and capabilities, such as BEEF, the Nonproliferation Test and Evaluation Complex, T-1 Training Area, and other areas of the NNSS as well as resources at RSL, NLVF, and the TTR. Under the No Action Alternative, NNSA would continue to host the projects of agencies such as the U.S. Department of Defense (DoD) and the U.S. Department of Homeland Security (DHS), as well as other Federal, state, and local government agencies and nongovernmental organizations, by conducting the activities summarized in the following discussion. Detailed descriptions of these activities are included in Appendix A of this *NNSS SWEIS*.

**Treaty verification** – NNSA would continue to host projects related to verification of compliance under a number of nuclear weapon-related treaties. The projects would range from hosting inspections by other nations to conducting research and development in the area of detecting violations of treaties by others.

**Nonproliferation projects and counterproliferation research and development** – NNSA would continue to provide support for the following types of activities by other agencies:

- Conventional weapons effects testing, including live drop and static detonations
- Development and demonstration of capabilities and technologies using conventional high explosives and other methods to effectively threaten and defeat military missions protected in tunnels and other deeply buried and hardened facilities
- Explosives experiments and other explosives operations using up to 2,000 pounds of explosives at various locations on the NNSS. All explosive operations would be conducted in compliance with DOE Manual 440.1-1A, *DOE Explosives Safety Manual*.
- Controlled experiments involving releases (including explosive releases) of biological and chemical simulants. Up to 20 controlled chemical and biological simulant release experiments (each experiment would consist of multiple releases) would be conducted yearly. More-detailed information regarding releases of chemicals and biological simulants is included in Appendix A, Section A.1.1.3.

**Counterterrorism** – NNSA would continue to support DoD and other Federal agencies in developing methods for engaging or neutralizing an adversary in a variety of topographical environments. In addition to ground-based operations, military operations would be conducted in the restricted air space above the NNSS and the TTR.

DHS and DoD would continue to use facilities at the NNSS to develop technology for homeland security applications. The NNSS would continue to provide land and infrastructure to support testing and evaluation of radiological and nuclear detection devices for use in transportation-related applications. DHS would continue to use the Radiological/Nuclear Countermeasures Test and Evaluation Complex

(RNCTEC), a facility constructed at the NNSS on behalf of DHS, as well as other NNSS land and infrastructure, to conduct its activities.

NNSA's Counterterrorism Operations Support Program would continue to support the Federal Emergency Management Agency's efforts to develop and implement national programs to enhance the capability of state and local agencies to respond to incidents involving weapons of mass destruction through coordinated training, equipment acquisition, technical assistance, and support for state and local exercise planning.

**Military Training and Exercises** – NNSA would continue to support DoD by providing land, airspace, and infrastructure for use by various branches of the military to conduct training and exercises. These activities range from small-scale, i.e., focused at a specific building or site, to large-scale exercises involving multiple air and/or ground assets with live-fire operations. These activities would include live fire of military munitions, including small arms, hand grenades, rocket-propelled grenades, etc. Military training and exercises may be conducted throughout the NNSS, but would be primarily conducted in the western portions, including Areas 18, 19, 20, 25 (northern portion), 29, and 30 to preclude interference with and from other NNSS activities. Military training and exercises are subject to all applicable regulatory requirements and to NNSA/NSO work authorization processes (NSO O 412.X1E, Real Estate/Operations Permit), which are designed to minimize hazards to workers, the environment, and NNSS physical assets.

**Support for the U.S. National Aeronautics and Space Administration (NASA)** – NNSA would conduct criticality experiments at DAF in support of NASA's efforts to develop power sources for use in future missions to Mars and similar deep space exploration.

**Miscellaneous Work for Others Program activities** – Customers would use aerial platforms for various purposes, including research and development, training and exercises, and deployment of sensors for detection of various items. These types of operations would use a variety of manned and unmanned aerial vehicles, including fixed-wing aircraft (airplanes) and helicopters.

**Work for Others Program activities at the TTR** – These activities would be similar to those addressed under the Stockpile Stewardship and Management Program, with the following additions:

- Robotics testing and development (handling, application, and recovery of hazardous [chemical] material)
- Smart transportation-related testing – preprogrammed/remote-controlled air and ground vehicles
- Smoke obscuration operations
- Infrared tests
- Rocket development, testing, and deployment

### National Security/Defense Mission—American Indian Perspective



The Consolidated Group of Tribes and Organizations' (CGTO) concerns and perspective regarding the National Security/Defense Mission are presented in the following text, which summarizes our views and applies to all aspects of this mission, including those pertaining to the Stockpile Stewardship and Management Program; the Nuclear Emergency Response, Nonproliferation, and Counterterrorism Program; and the Work for Others Program.

According to tribal elders, *"There is always going to be testing. Areas such as U1a that support underground testing are where the effects are evaluated. There are programs and facilities where stockpile stewardship and management activities are currently performed. The CGTO knows that the U.S. Department of Energy (DOE) maintains and conducts experiments and testing at various locations throughout the NNSS. We continue to be concerned about these activities and their impacts to the cultural landscape. Our involvement is essential to restoring and maintaining the balance to the land and its resources."*

The CGTO understands the National Security Defense Mission includes complying with the nuclear weapons test moratorium of 1992, which precludes new underground nuclear testing. We also understand DOE is required to maintain a state of readiness to resume nuclear tests if so directed by the President. The CGTO continues to be intensely opposed to all nuclear testing. In consideration of our ancestral ties and proximity to the land, the DOE, as a representative of the Federal government, must fulfill its trust responsibility by fully informing the CGTO and culturally affiliated tribal governments prior to any proposed testing activities. This step is vital to protecting the spiritual and physical health of our people by preparing for the desecration of our Holy Land and its resources.

The CGTO understands the fundamental intent of the Nonproliferation and Counterterrorism projects is to promote world peace and reduce the need to use the Nevada National Security Site (NNSS) and its offsite locations for nuclear weapons production, storage, assembly, and testing. However, the CGTO believes these activities may increase the number of weapons stored, disassembled, and disposed. These dangerous conditions may result in the land becoming angry and further contaminated, thereby impeding our ability to access important resources on our ancestral land.

The CGTO knows from past experience, but not formal study, that military training exercises and weaponry tests can adversely impact cultural resources. Military people move across the land on foot and in vehicles without either the time or the purpose to pay attention to delicate plants being disturbed, animals that are being dislocated, or the archaeological material and other important resources underfoot.

Often geographically distinctive power places or culturally sensitive areas are targeted without regard or knowledge of the significance to Indian people. Military exercises involving aircraft disrupt the harmony within the cultural landscape. Cultural resources may be damaged when conventional weapons are fired nearby. The environmental setting is disrupted from the noise and vibrations associated with these military operations and overflights. Noise and vibrations upset the spirituality and solitude of the area, negatively impacting songscapes and storyscapes. When the thoughts and focus are interrupted, the balance and well-being of the community as a whole become affected. Cultural resources are damaged when conventional weapons are fired nearby. Without a formal study, the exact impacts of military training exercises will not be fully understood. Thus, the CGTO again recommends adequate funds and time be provided for the CGTO to develop a guidance document. At a minimum, applicable CGTO representatives must obtain appropriate military clearances and access to pray for (talk to) and prepare the land and its resources prior to these military exercises.

*See Appendix C for more details.*

### 3.1.2 Environmental Management Mission

DOE/NNSA's Environmental Management Mission includes the Waste Management and Environmental Restoration Programs. Related activities under the No Action Alternative are described in the following sections. A more detailed description of these activities is provided in Appendix A, Section A.1.2.

### Environmental Management Mission—American Indian Perspective



The Consolidated Group of Tribes and Organizations' (CGTO) concerns and perspective regarding the Environmental Management Mission are presented under the Waste Management Program (Section 3.1.2.1) and the Environmental Restoration Program (Section 3.1.2.2), as appropriate.

*See Appendix C for more details.*

### 3.1.2.1 Waste Management Program

The Waste Management Program would continue to store, treat, and/or dispose various wastes at the NNSS. These wastes include LLW, mixed low-level radioactive waste (MLLW), transuranic (TRU) waste, mixed TRU waste, hazardous waste, asbestos and polychlorinated biphenyl (PCB) wastes, hydrocarbon-contaminated soil and debris, and solid wastes such as construction debris or sanitary solid waste. Liquid nonhazardous wastes (such as sewage and other wastewater) are not included under the Waste Management Program, but are addressed in Section 3.1.3.1 Infrastructure. All NNSA waste management activities operate in compliance with applicable regulatory requirements and DOE Orders. Waste management activities at NNSA sites in Nevada under the No Action Alternative would include the following:

**LLW and MLLW management** – LLW and MLLW from approved generators that meet the NNSS waste acceptance criteria would be accepted for disposal. The volume of LLW projected for disposal at the NNSS and analyzed under the No Action Alternative is based on the actual volume of LLW disposed at the NNSS during FY 1997 through FY 2010, and is estimated to total about 15,000,000 cubic feet. The volume of MLLW projected for disposal at the NNSS is based on the disposal capacity of the new Mixed Waste Disposal Unit, Cell 18,<sup>1</sup> and is estimated to total about 900,000 cubic feet.

NNSA would continue to manage onsite-generated MLLW by a combination of several options: (1) repackaging at the TRU Pad in the Area 5 Radioactive Waste Management Complex (RWMC), when appropriate; (2) storage at the TRU Pad or at a new MLLW storage facility, pending certification for disposal; and/or (3) shipment to a permitted facility, such as Energy Solutions in Clive, Utah, or Materials and Energy Corporation in Oak Ridge, Tennessee, for appropriate treatment. Onsite-generated MLLW treated at another location would be returned to the NNSS for disposal or would be disposed at a permitted commercial facility. Under the No Action Alternative, offsite-generated MLLW would not be treated at the NNSS.

#### Waste Definitions

**Radioactive Waste** – Solid, liquid, or gaseous material that contains radionuclides regulated under the Atomic Energy Act of 1954, as amended, and of negligible economic value considering costs of recovery.

**Transuranic (TRU) Waste** – Radioactive waste containing alpha particle-emitting radionuclides having an atomic number greater than 92 (the atomic number of uranium) and half-lives greater than 20 years, in concentrations greater than 100 nanocuries per gram.

**Low-Level Radioactive Waste (LLW)** – Radioactive waste not classified as high-level radioactive waste, TRU waste, spent fuel, or byproduct material as defined by Section 11e(2) of the Atomic Energy Act of 1954, as amended. Test specimens of fissionable material irradiated for research and development only, and not for the production of power or plutonium, may be classified as LLW, provided the concentration of TRU elements is less than 100 nanocuries per gram.

**Hazardous Waste** – A category of waste regulated under the Resource Conservation and Recovery Act (RCRA). To be considered hazardous, waste must be a solid waste under RCRA and must exhibit at least one of four characteristics described in 40 *Code of Federal Regulations* (CFR) 261.20-24 (ignitability, corrosivity, reactivity, and toxicity) or be specifically listed by the U.S. Environmental Protection Agency in 40 CFR 261.31-33.

**Mixed Waste** – Waste containing both radioactive and hazardous components, as defined by the Atomic Energy Act and RCRA, respectively. Mixed waste intended for disposal must meet the Land Disposal Restrictions as listed in 40 CFR Part 268. Mixed waste is a generic term for specific types of mixed waste, such as mixed low-level radioactive waste (MLLW) and mixed TRU waste.

**Waste Generator** – An individual, facility, corporation, government agency, or other institution that produces waste material for certification, treatment, storage, or disposal.

**Waste Acceptance Criteria** – A document that establishes the National Nuclear Security Administration Nevada Site Office waste acceptance criteria. The document provides the requirements, terms, and conditions under which the Nevada National Security Site (NNSS) accepts LLW and MLLW for disposal. It includes requirements for the generator's waste certification program, characterization, traceability, waste form, packaging, and transfer. The criteria apply to radioactive waste received at the NNSS Area 3 Radioactive Waste Management Site and Area 5 Radioactive Waste Management Complex for storage or disposal.

<sup>1</sup> The actual permitted volume of MLLW that may be disposed in Cell 18 is 899,996 cubic feet.

Under the No Action Alternative, the Area 5 RWMC would continue to operate within the approximately 740-acre area set aside for waste management purposes. LLW disposal units would be developed, filled, and closed as needed, in compliance with applicable regulatory requirements and DOE Orders. NNSS- and offsite-generated LLW would be disposed within these units. The Nevada Division of Environmental Protection (NDEP) issued a Resource Conservation and Recovery Act (RCRA) Part B permit effective December 1, 2010, for a new MLLW disposal unit, Cell 18, at the Area 5 RWMC. Construction of the new MLLW disposal unit is complete and it began accepting MLLW for disposal in January 2011. Temporary storage operations for MLLW would continue at RCRA-permitted facilities. Support facilities within the Area 5 RWMC would continue to operate.

The Area 3 Radioactive Waste Management Site (RWMS) would be maintained in a standby status under the No Action Alternative.

Small quantities (a few cubic feet over the next 10 years) of LLW may be generated at RSL and NLVF. Normal operations at the TTR are not expected to generate radioactive waste, but environmental restoration activities at the TTR would generate LLW and possibly unknown quantities of TRU waste. These environmental restoration wastes would be disposed at appropriate disposal sites, such as the Area 5 RWMC and/or the Waste Isolation Pilot Plant, as appropriate.

**TRU and mixed TRU waste management** – TRU waste generated by NNSA operations or by the Environmental Restoration Program (an estimated 9,600 cubic feet over the next 10 years) would be safely stored at the TRU Pad, pending characterization and shipment either to the Waste Isolation Pilot Plant for disposal or to another facility, such as Idaho National Laboratory, for processing before being sent to the Waste Isolation Pilot Plant.

TRU and mixed TRU wastes would not be generated at RSL, NLVF, or by NNSA Sandia Site Office activities at the TTR. However, an unknown quantity of TRU waste may be generated by environmental restoration projects at the TTR.

**Hazardous waste management** – DOE/NNSA activities would generate about 170,000 cubic feet of hazardous waste at the NNSS over the next 10 years under the No Action Alternative. The Hazardous Waste Storage Unit in Area 5 of the NNSS would continue to operate under a RCRA Part B permit issued by NDEP. Onsite-generated hazardous waste would be stored for up to 1 year prior to shipment to offsite treatment and/or disposal facilities.

RSL is a small-quantity generator of hazardous waste. Hazardous waste would continue to be accumulated at RSL for no more than 90 days and transferred off site to a permitted facility for treatment and/or disposal. Waste management field activities at RSL are provided by the USAF as landlord services under a Memorandum of Agreement. USAF personnel pick up and dispose miscellaneous laboratory and process equipment wastes under the terms of Nellis Air Force Base Plan 12 (Hazardous Waste Management Plan, October 2007).

NLVF is a conditionally exempt, small-quantity generator of hazardous waste. Hazardous waste would continue to be accumulated at NLVF and transferred off site to a commercially permitted facility for treatment and/or disposal.

Excess materials that may otherwise be considered hazardous waste would continue to be shipped off site for recycling. Excess materials are those that are no longer needed or are unusable but can be recycled.

The TTR is a small-quantity generator of hazardous waste. Hazardous wastes would continue to be accumulated at the TTR for no more than 180 days before being transferred off site to a permitted treatment, storage, and disposal facility.

Used oil from all NNSA/NSO facilities and the TTR would continue to be collected and sent off site for recycling.

**Asbestos and PCB waste management** – Friable, nonradioactive asbestos waste would continue to be disposed at the Area 23 Solid Waste Disposal Site and possibly at the U10c Solid Waste Disposal Site, pending permit modification and review. Radioactive asbestos waste would continue to be disposed at the Area 5 RWMC. Nonfriable asbestos waste would continue to be disposed at the U10c Solid Waste Disposal Site. Nonradioactive PCB wastes would be accumulated at the Hazardous Waste Storage Unit in Area 5, pending transfer to a permitted treatment and/or disposal facility. Radioactive PCB-contaminated waste meeting 40 *Code of Federal Regulations* (CFR) Part 761 requirements would continue to be disposed in the MLLW Disposal Unit at the Area 5 RWMC.

NNSA would continue to dispose asbestos and PCB wastes generated at the TTR at a permitted treatment, storage, and disposal facility.

**Explosives waste treatment** – NNSA would continue to treat old and/or unusable explosives by open-air detonation at the permitted Explosive Ordnance Disposal Unit in Area 11.

**Hydrocarbon-contaminated soil and debris management** – The Area 6 Hydrocarbon Solid Waste Disposal Site would continue to operate under a permit issued by NDEP and would accept onsite-generated soil and debris contaminated with hydrocarbons. The U10c Solid Waste Disposal Site would also continue to operate under a permit issued by NDEP and would accept limited amounts of onsite-generated soil and debris contaminated with hydrocarbons. Onsite-generated hydrocarbon-contaminated LLW would continue to be disposed in the Area 5 RWMC. During routine activities at RSL and NLVF, no hydrocarbon-contaminated waste would be generated. If an accidental release of hydrocarbon-contaminated waste were generated, it would be disposed at a facility permitted to receive such waste. The TTR would continue to dispose hydrocarbon-contaminated soil and debris at an offsite permitted/approved landfill.

**Solid waste management** – DOE/NNSA activities would generate about 9,400,000 cubic feet of sanitary solid waste and construction and demolition waste over the next 10 years. Sanitary solid waste would be disposed at existing permitted facilities at the NNSS. NNSA would continue to operate the Area 23 Solid Waste Disposal Site. This permitted facility accepts less than 20 tons of sanitary waste per day. Industrial solid waste and construction and demolition debris would continue to be disposed at the U10c Solid Waste Disposal Site. An estimated 370,000 cubic feet of sanitary solid waste would be sent off site for recycling, rather than landfill disposal during the next 10 years.

At RSL and NLVF, sanitary solid waste would continue to be disposed off site by a municipal waste service.

At the TTR, sanitary solid waste would continue to be disposed at the USAF sanitary waste landfill. Industrial solid waste such as construction or demolition debris would be disposed at a USAF landfill or shipped off site for disposal at the NNSS or a permitted commercial landfill.

Excess materials that are suitable for recycling or reuse, such as scrap metal, would be shipped off site for recycling.

### Waste Management Program—American Indian Perspective



The Consolidated Group of Tribes and Organizations (CGTO) understands current and proposed waste management activities identified under the Environmental Management Mission include high-hazard experiments involving nuclear material and high explosives, and storing nuclear materials. The CGTO is aware the Nevada National Security Site (NNSS) is used to store hazardous waste, to store and dispose of non-hazardous waste and debris, and to secure and dispose of low-level radioactive waste, low-level mixed radioactive waste (i.e., containing certain hazardous wastes). After many years, the CGTO continues to be greatly concerned with the ongoing storage and disposal of these various waste streams at the NNSS, and the transportation of radioactive waste to the NNSS from locations in Nevada and from other states.

We understand the radioactive and hazardous materials and waste described in this site-wide environmental impact statement (SWEIS) are defined in scientific terms and governed by state and federal regulations. For example, to scientists, radioactive rocks are well understood with specific quantifiable physical properties. Scientists believe if they manage radioactivity in a purely scientifically appropriate manner, they are largely safe for use and disposal at the NNSS, an area often perceived by non-Indian people as a barren wasteland.

Contrary to scientific belief, American Indian people hold complex traditional views of radioactivity, based upon the fundamental knowledge that all resources—including the rocks—are alive. Indian people believe radioactive rocks are very powerful.

We know that radioactive rocks can become “angry rocks” if they are removed without proper ceremony, used in a culturally inappropriate way, disposed of without ceremony, or placed where they do not want to be (Stoffle et al. 1989; Stoffle et al. 1990). The angry rock constitutes a threat that can neither be contained nor controlled by conventional means. It has the power to pollute food, medicine, and places, none of which can be used afterward by Indian people. Spiritual impacts are even more threatening, considering the angry rock would be transported along highways before ultimately being disposed of at the NNSS, affecting animal creation places, access to spiritual beings, and unsung human souls (Stoffle and Arnold 2003).

Indian knowledge and use of radioactive rocks, or minerals, in the western United States goes back for thousands of years. Areas with high concentrations of these minerals are called dead zones. Such areas contain places of power or energy and could only be visited or certain minerals used under the supervision of specially-trained Indian people, who are sometimes referred to in the English language as a shaman or medicine man (Stoffle and Arnold 2003). Therefore, the U.S. Department of Energy would benefit from this knowledge if applied correctly.

Continuing to transport the waste is detrimental to the public and the tribes. We are specifically concerned about the downtown transportation route. According to a tribal elder, “The springs are located there and, if contaminated, can seep into many other water sources and contaminate the people and the environment.”

According to tribal elders, *“We are not sure how long Nellis and the NNSS have been designated as these types of facilities, and how much waste has been created, stored, and transported. This information is necessary for the CGTO to fully understand how significant the people and our resources may have been affected, and to prepare ceremonies, prayers, and culturally appropriate mitigation measures to attempt to restore balance. For example, Sunrise Mountain is a very significant mountain. Behind this mountain is an important cave, Gypsum Cave, which some Indian people fear but is highly respected. There are traditional stories surrounding this area. The mountain and the cave are both culturally significant. Caves are supposed to hold much power. They are supposed to interact with your mind. When you leave a cave, you are much more powerful.”* Gypsum Cave, which is protected and monitored by culturally affiliated tribes and the Bureau of Land Management (BLM), is awaiting designation as a Traditional Cultural Property that may be impacted by the transportation of the waste.

*See Appendix C for more details.*

### 3.1.2.2 Environmental Restoration Program

Under the No Action Alternative, the NNSA Environmental Restoration Program would continue, in compliance with the most recent version of the Federal Facility Agreement and Consent Order (FFACO), to characterize, monitor, and remediate identified contaminated areas, facilities, soils, and groundwater. The Environmental Restoration Program is organized into three projects and supports the Defense Threat Reduction Agency in addressing its environmental restoration sites at the NNSS. The three projects are the Underground Test Area (UGTA) Project, Soils Project (includes contaminated soil sites from the TTR and the Nevada Test and Training Range), and the Industrial Sites Project (includes the Decontamination and Decommissioning Project and facilities to be remediated at the TTR and the NNSS described in the *1996 NTS EIS*). NNSA’s Borehole Management Program work is executed by the Environmental Restoration Program. Activities that would be undertaken over the next 10 years by the Environmental

Restoration Program are described in the following discussion. More-detailed descriptions of these activities are provided in Appendix A of this *NNSS SWEIS*.

**Underground Test Area** – In compliance with the FFACO, the UGTA Project would continue to characterize and monitor groundwater from existing wells, drill new characterization wells, expand groundwater monitoring to include new wells, develop groundwater flow and transport models, and evaluate closure strategies including adaptive monitoring and management. Up to 50 new groundwater characterization and monitoring wells would be developed over the next 10 years. UGTA Project activities would occur on the NNSS, Nevada Test and Training Range, U.S. Bureau of Land Management land, and privately owned land as necessary and as permission is obtained.

**Federal Facility Agreement and Consent Order**

The Nevada National Security Site Environmental Restoration Program includes activities to comply with the Federal Facility Agreement and Consent Order, which was entered into in 1996 by the U.S. Department of Energy, the U.S. Department of Defense, and the State of Nevada. The Federal Facility Agreement and Consent Order provides a process for identifying sites having potential historic contamination, implementing state-approved corrective actions, and instituting closure actions for remediated sites.

**Soils Project** – The Soils Project would continue to investigate and characterize soil sites (using in situ monitoring, air monitoring, surface-water contaminant transport studies, and soil sampling) and perform corrective actions, as necessary. The Soils Project would ensure that proper use restrictions are in place to implement site closure so that worker doses are below the applicable regulatory limits and are kept as low as reasonably achievable. The current closure strategy for soil project sites at the NNSS is based on a future industrial land use scenario with a 25-millirem-per-year exposure action level. Soils sites on the Nevada Test and Training Range, including the TTR, are expected to be remediated to an action level that is mutually agreed upon by DOE/NNSA, the USAF, and NDEP. The potential for stricter cleanup levels is addressed under the Expanded Operations Alternative. NNSA anticipates that all identified Soils Project sites will be closed under the FFACO by the end of 2022.

**Industrial Sites Project** – The Industrial Sites Project would continue its field program to identify, characterize, and remediate industrial sites under the FFACO and to decontaminate and decommission unneeded facilities. The majority of FFACO industrial sites have been closed. Remediation, decontamination, and decommissioning activities are projected to be complete by the end of 2018. Industrial Sites Project activities would continue at present levels, although alternate uses of remediated facilities may require revised cleanup levels.

**Defense Threat Reduction Agency sites** – The Defense Threat Reduction Agency sites are identified as part of the NNSA Environmental Restoration Program because their site activities are considered environmental remediation on the NNSS. However, the Defense Threat Reduction Agency is responsible for implementing and funding these activities in compliance with applicable agreements with NDEP. Surface-disturbing activities associated with these sites have been completed and environmental monitoring, such as water sampling, would continue.

**Borehole Management Program** – Under the No Action Alternative, NNSA would continue to plug unneeded boreholes on the NNSS. Based on the current schedule and known inventory of unneeded boreholes on the NNSS that need to be plugged, the Borehole Management Program would be complete by the end of 2013.

### Environmental Restoration Program—American Indian Perspective



According to tribal elders, *"The Creator placed everything—the land, rocks, plants and animals—where they are for a purpose. However, now that the NNSS land is disturbed and has become upset, we must come up with the appropriate prayers and ceremonies to rebalance the land and its resources."*

The Consolidated Group of Tribes and Organizations (CGTO) views environmental restoration activities attributed to the Environmental Management Mission as a positive effort to rebalance the world as everything is connected. Individual restoration projects are insufficient alone but are starting points and should be considered as stages or steps in a comprehensive and complex spiritual and ecological restoration program. The CGTO's view coincides with the principles of holistic ecosystem management subscribed to by the public and many Federal agencies.

A key component to environmental restoration is revegetating the disturbed areas to resemble its original condition. According to tribal elders, *"Prior to re-vegetation efforts, we talk to the land to apologize for what has been done and to let it know what we plan to do. Then we ask the Creator for its help. We choose our seeds from the sweetest and/or best plants, and store them for the winter to dry. When the winter is over, we place the seeds in a moist towel or sock and allow the new plant to sprout. We then plant the sprouts in small containers with soil until they are strong enough to be transplanted into the ground. This is a long and delicate process, requiring patience and traditional ecological knowledge passed down from our ancestors. If the plants are struggling to grow, we tag them and move them to face the same direction as the Sun."*

The U.S. Department of Energy (DOE) would benefit from this unique knowledge to further enhance their re-vegetation efforts of disturbed sites. The CGTO knows DOE struggles with the success rates of the density and diversity of native plants during their re-vegetation efforts. A co-stewardship approach between the CGTO and DOE to collectively manage this land would enable DOE to enhance their re-vegetation efforts, thereby saving time, money, and resources.

In the 1996 *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (1996 NTS EIS)* and in the 2002 *Supplement Analysis for the Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (2002 NTS SA)*, the CGTO continued to express concerns about the removal of contaminated soils and the need for religious leaders to conduct balancing ceremonies and healing prayers at these disturbed locations. The CGTO recommended that tribal representatives provide information about the re-vegetation of a portion of the Double Tracks Site located on the Tonopah Test Range (TTR). The CGTO maintains our involvement is still necessary for the Double Tracks site as well as for the Clean Slates site located at TTR; however, we are awaiting DOE's approval to proceed. Because of the long lapse of time since the last visits, the CGTO believes it is necessary to revisit and reevaluate site conditions.

As stated earlier, the CGTO is supportive of restoring the environment. However, we are concerned about the future plans to decontaminate and decommission (D&D) some buildings that may have asbestos and other contamination, which will be released during the process. Specifically, the CGTO is concerned about potential impacts to the air, water, plants and animals. In addition, nearby tribes may be performing ceremonies and prayers and need to be notified so the D&D process does not negatively impact these important religious and traditional events through elevated noise, vibration levels and the spreading of dead air.<sup>1</sup>

Over the past 14 years, various initiatives have been undertaken to restore animal habitats and reintroducing certain animals, such as the desert big horn sheep near the southern portion of the Nevada National Security Site (NNSS), without participation from the CGTO. Modification of habitat or the restocking of animals is considered a highly sensitive religious act and requires participation from the CGTO. For these activities to be successful and to properly restore environmental balance, it is essential to have tribal representatives involved throughout this process.

In the 2008 *Draft Supplement Analysis for the Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (2008 Draft NTS SA)*, the AIWS presented information regarding the successful reintroduction of a gray wolf in Idaho during the late 1970's, which was a collaborative effort between American Indians and a Federal agency. On the day of release, a Federal liaison unlatched the door of the cage and the animal scrambled out. Waiting for the wolf was an American Indian holy man in traditional regalia, sitting on a horse and watching. The wolf and man gazed at each other and the man spoke words welcoming the wolf back to its natural habitat. The wolf stood for a few more seconds and accepted the holy man's encouragement and blessing. Then the wolf turned and ran into the forest. Everyone present was very moved by the welcoming back ceremony. They knew that was the right thing to do. The CGTO believes collaborative projects such as this underscores the need for American Indian involvement whenever plant or animal species transplanted from other locations are reintroduced to the NNSS area.

We recommend conducting ethnographic studies involving the CGTO to better understand sites such as, but not limited to, Water Bottle Canyon, Timber Mountain, Shoshone Mountain, and other sites identified by the CGTO. Spiritual and ecological restoration assessments and projects require traditional management practices, and the involvement of tribal cultural experts to be successful. These specialists are needed to conduct initial assessments and site inventories, and to make recommendations for the next steps of the restoration effort. This strategy will result in the identification of resources, features, and other site aspects both tangible and intangible, that are in need of healing and restoration using culturally appropriate steps necessary to achieve restoration and balance.

<sup>1</sup> Refer to Appendix C.2.8, *Air Quality and Climate*, for additional information regarding dead air.

### Environmental Restoration Program—American Indian Perspective (cont'd)



Clearly, members of the CGTO have unique and extensive experience in collaborative spiritual and ecological restoration. We have many examples of successful collaboration among our tribal members and Federal agencies. For example, the Big Warm Spring near the Duckwater Shoshone Tribe has been used throughout history for spiritual cleansing and healing. Young men are taken there during the “coming of age” to wash and cleanse themselves. In 2005, in collaboration with the U.S. Fish and Wildlife Service, the Duckwater Shoshone Tribe restored the Big Warm Spring to its original size and removed the non-native fish species. In 2007, during the final phase of the project, tribal members reintroduced the Railroad Valley Spring Fish to the Big Warm Spring in a culturally appropriate manner, successfully completing the spiritual and ecological restoration for this collaborative effort.

There are many potential spiritual and ecological restoration projects on the NNSS in need of attention, all with the goal of balancing the spiritual, cultural, and ecological inner-workings of those places. Based on CGTO experience with environmental restoration projects, we encourage DOE to implement a more aggressive collaborative environmental restoration program. Potential projects focusing on the protection of wildlife, plant resources, and geological features, include the following:

#### **Restoration of Water Bottle Canyon**

Water Bottle Canyon is a natural water tank area and an exceptional cultural site. Cultural resources include *pohs*, tanks, rock rings, tonal rocks, and traditional-use plants (Stoffle et al. 2006). Any activities impacting the side canyon or Water Bottle Canyon affect the rest of the gully system, which is connected through physical and spiritual flows. Presently, the spiritual aspects of Water Bottle Canyon are out of balance and require cultural interactions to bring the canyon back into balance. The cleaning of the *pohs* and tanks in this canyon system is one of several cultural practices needed to begin spiritual and ecological restoration. This project can reduce drought conditions, and provide spiritual, cultural, and ecological benefits to the area while concurrently fulfilling the primary goal of spiritual and ecological rebalancing. Implementation of this project will require the appropriate cultural experts to identify project sites, inventory and evaluate the conditions, resources, and features of the sites, and develop a compatible restoration plan. The Project would require overnight camping, annual activities, and monitoring of site conditions.

#### **Evaluation of Traditional Cultural Property**

During the DOE Annual Tribal Meeting with the CGTO, held September 12, 2009, the CGTO recommended the DOE support the nomination of a Traditional Cultural Property, previously identified as *Wunjikuda*. The CGTO recommended expanding the studies to enhance previously collected ethnographic information, and determining an appropriate title using knowledgeable tribal elders identified by the CGTO. The CGTO also recommended the DOE sponsor overnight camping activities at this site to elicit additional information from knowledgeable tribal representatives for the development and submittal of the nomination to the National Register of Historic Places.

#### **Cleaning Pohs and Tanks**

The *pohs* and tanks found throughout the NNSS require traditional attention and cultural management to function effectively. The *pohs* and tanks at Water Bottle Canyon and Ammonia Tanks, for example, are interrelated and tie each location to one another. Both sites are used to store water from the rain needed and used for ceremonial purposes to restore balance. American Indian people have Rain Shaman who have the ability to talk to all of the elements responsible for bringing water or rain to the land, people and animals. According to tribal elders, “*When the water arrives, it is approached with great respect and awakened very carefully when prayed upon. In appreciation and in honor of the water’s return, the animals come back, the plants flourish and people will continue to pray and give thanks all ultimately leading to balance and restoration of the area.*” Customarily, Indian people cleaned the *pohs* and tanks through the use of songs, stories and prayers. Cleaning of the *pohs* and tanks were followed by the Rain Shaman who called the rain.

By supporting the CGTO’s proposed project to clean the *pohs* and tanks, DOE will reduce drought conditions and restore balance to the area. It will provide spiritual, cultural, and ecological benefits to the land and environment, thereby facilitating our obligation of spiritual and ecological rebalancing. Implementation of this project will require the appropriate cultural experts to identify project sites, to inventory and evaluate the conditions, resources, and features of the site, and to develop a culturally compatible restoration plan.

*See Appendix C for more details.*

### 3.1.3 Nondefense Mission

The Nondefense Mission generally includes those activities that are necessary to support mission-related programs, such as constructing and maintaining facilities, providing supplies and services, warehousing, and similar activities. Activities related to supply and conservation of energy, including renewable energy and other research and development projects, are included under the Nondefense Mission. Sections 3.1.4.1 and 3.1.4.2 describe Nondefense Mission activities that NNSA would undertake at its facilities in Nevada under the No Action Alternative. A more detailed description of these activities is included in Appendix A of this *NNSS SWEIS*.

#### 3.1.3.1 General Site Support and Infrastructure Program

Like any large facility, the NNSS has a substantial infrastructure that provides all site-support services. Under the No Action Alternative, infrastructure-associated activities would continue, including projects such as repairs and replacements to maintain present facility capabilities. For instance, maintenance and repair projects include: repair Area 23 sewer main, remediate underground storage tanks, replace five roll-up doors, renovate and reactivate several water tanks, replace electric hot water heaters, install water tank security ladders, replace roofs on several buildings, and repair/maintain NNSS roadways.

In addition to maintaining and repairing its infrastructure at the NNSS, RSL, NLVF, and the TTR, NNSA would maintain the existing infrastructure, provide site security, and manage all applicable existing permits and agreements for the former Yucca Mountain site. NNSA would perform these functions pending decisions on the disposition of the former Yucca Mountain site.

Although they are part of NNSA's infrastructure, characterization and monitoring wells developed under the UGTA Project are addressed under the Environmental Management Program, and proposed and potential renewable energy projects are addressed under the Conservation and Renewable Energy Program, rather than the General Site Support and Infrastructure Program.

#### Nondefense Mission—American Indian Perspective



There are a variety of current and proposed actions considered under the Nondefense Mission. Many of these are related to the Nevada National Security Site (NNSS) Environmental Research Park, which allows universities and other Federal agencies to conduct research. Other projects involve solar and geothermal energy development, and constructing the Nevada Desert Free-Air Carbon Dioxide Enrichment and the Mojave Global Change facilities proposed in Area 5. The Consolidated Group of Tribes and Organizations' (CGTO) concerns and perspective regarding the Nondefense Mission, including activities associated with the Infrastructure, Conservation and Renewable Energy, and Other Research and Development Programs, are summarized here.

Indian people view each proposed project under the Nondefense Mission as potentially impacting cultural resources. Non-Indian people unfamiliar with the importance of leaving cultural resources untouched may find and collect artifacts or remove plants that are significant to American Indian people. Construction of the proposed solar generating facility in Area 25 involves draining the Sun of its power unnaturally and making it weak. Construction also involves scraping the land, generating dust emissions, facilitating erosion, and impeding visual resources.

All landforms within the NNSS are highly sensitive to American Indians. The ability to see the land without the distraction of buildings, towers, cables, roads, and other objects is central to the spiritual interaction between Indian people and their traditional lands. Visual resources may be negatively impacted if proposed solar and geothermal projects are pursued. The CGTO must be part of any future discussions of these projects due to potential impacts on visual resources that may impede traditional and cultural ceremonies.

Only Indian people know which places are appropriate for visits by non-Indian people and how to manage plants, animals, and soil samples so that these activities do not disrupt the land and its associated spirituality. Because of the potential effects on the environment and its resources from Nondefense Mission projects, the CGTO must become an integral part of site-specific studies and develop culturally appropriate text for future National Environmental Policy Act (NEPA) analyses, including environmental assessments and mitigation plans.

*See Appendix C for more details.*

### **3.1.3.2 Conservation and Renewable Energy Program**

Under the No Action Alternative, NNSA would continue to identify and implement conservation measures and renewable energy projects in the following areas:

- Energy efficiency
- Renewable energy
- Water conservation
- Transportation/fleet management
- High-performance and sustainable buildings

**Table 3–2** summarizes the NNSS Conservation and Renewable Energy Program.

**Commercial solar power facility** – Under the No Action Alternative, NNSA is evaluating a hypothetical 240-megawatt parabolic trough commercial solar power generation facility at the NNSS. NNSA has determined that the southwestern portion of Area 25 would be the only reasonable location on the NNSS for a commercial solar power generation facility. Area 25 includes an extensive area of suitable terrain for solar power generation facilities, has existing vehicular access from Highway 95 via Lathrop Wells Road and an existing 138-kilovolt transmission line, and is removed from national security-related activities on the NNSS that require limited access to uncleared individuals. Although it possesses many of the same attributes as Area 25, Area 22 is not being considered as a potential location for solar power development in this *NNSS SWEIS* because all current solar power technologies require the use of substantial amounts of water for cooling and other purposes and there would be potential impacts on Devil’s Hole (see Chapter 5, Section 5.1.6) resulting from construction of any facility built in Area 22 that would draw water from the underlying hydrographic basin. Low-water-use renewable energy projects may be considered for Area 22 in the future.

The solar technologies that are most likely to be deployed at utility scale over the next 20 years are photovoltaic and concentrating solar power, such as parabolic trough, power tower, and dish engine (BLM/DOE 2010). It is unknown what technology would be used in a solar power generation facility at the NNSS, but the analysis in this *NNSS SWEIS* assumes a concentrating solar power parabolic trough facility, based on the prevalence of that technology in other operating, proposed, and potential solar energy projects in southern Nevada (see Table 6-2 in Chapter 6). It is estimated that a concentrating solar power facility using parabolic trough technology would require between 9 and 10 acres of land for each megawatt of generating capacity, based on the proposed Amargosa Farm Road Solar Project (BLM 2010c). This acre per megawatt of generating capacity is about double that used in the *Draft Programmatic Environmental Impact Statement for Solar Energy Development in Six Southwestern States (Solar Energy PEIS)* (DOE/BLM 2010), but is consistent with proposed parabolic trough solar power facilities currently being considered in southern Nevada. The assumptions used in the *Solar Energy PEIS* are shown in Section A.1.3.2, in Appendix A. Using the ratio scaled from the Amargosa Farm Road Solar Energy Project, the projected amount of power generated from a 2,400-acre Renewable Energy Zone on the NNSS is about 240 megawatts (West 2010). In addition, electrical transmission capacity would be required to integrate the electricity generated by a 240-megawatt facility onto the regional grid system. Approximately 10 miles of new 230-kilovolt transmission line (all of it from off the NNSS) are assumed to be required for purposes of this analysis. Valley Electric Association is in the process of upgrading parts of its 138-kilovolt transmission line system in Amargosa Valley to 230 kilovolts, and other entities are planning/proposing construction of 500-kilovolt transmission lines into Amargosa Valley (see Chapter 6, Section 6.2.4.4). Currently, there are no specific proposals for commercial-scale solar power-generating projects at the NNSS. Therefore, additional NEPA analysis would be required to identify, analyze, and document project-specific impacts if such a commercial-scale solar power generation facility were proposed.

**Table 3–2 The National Nuclear Security Administration Conservation and Renewable Energy Program Under the No Action Alternative <sup>a</sup>**

<p><b>Energy Efficiency</b> – The NNSA would improve energy efficiency and reduce greenhouse gas emissions at the NNSS by reducing energy intensity by 3 percent annually or a total of 30 percent through the end of FY 2015, relative to the 2003 baseline. Energy efficiency can be defined for a component or service as the amount of energy required in the production of that component or service; for example, the amount of steel that can be produced with one billion British thermal units of energy. Energy efficiency is improved when a given level of service is provided with reduced amounts of energy inputs, or services or products are increased for a given amount of energy input. Energy intensity is defined as the amount of energy used in producing a given level of output or activity. It is measured by the quantity of energy required to perform a particular activity (service), expressed as energy per unit of output or activity measure of service. Energy intensity measures energy consumption per gross square foot of building space, including industrial and laboratory facilities. Additional activities to improve energy efficiency would include the following:</p> <ul style="list-style-type: none"> <li>• Installing advanced electric metering systems to the maximum extent practicable at all NNSS buildings and implementing a centralized data collection, reporting, and management system</li> <li>• Using standardized operations and maintenance and measurement and verification protocols coupled with real-time information collection and centralized reporting capabilities to the extent practicable</li> <li>• Expediting improvement in the quality, consistency, and centralization of data collected and reported through the use of commercially available software</li> <li>• Reducing greenhouse gas emissions by 28 percent by FY 2020</li> </ul>
<p><b>Renewable Energy</b> – NNSA would maximize installation of onsite renewable energy projects at the NNSS where technically and economically feasible. The initial goal would be to acquire at least 7.5 percent of the NNSS’ annual electricity and thermal consumption from onsite renewable sources. In the event commercial-scale renewable energy projects are implemented at the NNSS (following additional National Environmental Policy Act analysis), NNSA would enter into an agreement with a commercial entity to construct a solar power-generating project at the NNSS with the provision that a portion of the electric power generated would be provided to meet NNSS electrical needs.</p>
<p><b>Water</b> – In FY 2007, NNSA established a water production baseline (210.6 million gallons) in accordance with EO 13423 (72 FR 3919). Specific water consumption figures are not available by facility because the NNSS does not meter individual buildings. Instead, water production data were used to provide metrics in this area. NNSA sites began saving water through several conservation measures, including installation of WaterSense™ products, xeric landscaping, use of nonpotable water for dust suppression, and 4-day workweeks. NNSA established a goal of reducing potable water production at the NNSS by 2 percent a year, to 177 million gallons per year, by FY 2015. Water production was reduced by 18 percent in FY 2008 compared with the FY 2007 baseline, thereby exceeding the FY 2015 goal of 16 percent water reduction. Water production was reduced by an additional 8 percent in FY 2009. Efforts to identify water-saving projects and obtain funding to complete them are ongoing to ensure that the water production goals that have been met are maintained.</p>
<p><b>Transportation/Fleet Management</b> – The current NNSA fleet has 540 alternative-fuel vehicles, equal to 96 percent of the covered fleet. NNSA requires that its fleet operate any alternative-fuel vehicles exclusively on alternative fuels to the maximum extent practicable. In FY 2007, NNSA constructed an E85 fuel station in Mercury and implemented a plan to promote the use of E85 fuel (an alcohol–fuel mixture that typically contains a mixture of up to 85 percent denatured fuel ethanol and gasoline or other hydrocarbon by volume). In FY 2007, the total actual usage of E85 was 135,141 gallons; the consumption for FY 2008 was 182,997 gallons, a 35 percent increase in usage. For every gallon of E85 used, 85 percent of the petroleum base fuel is reduced; for every gallon of B-20 Biodiesel used, 20 percent is reduced; and for every gallon of unleaded gasoline used, 10 percent is reduced. Biodiesel fuel is used in all equipment, with the exception of emergency generators and boilers, and is currently at the maximum possible usage level.</p>
<p><b>High-Performance Sustainable Buildings</b> – NNSA would ensure that (1) all new construction and renovation projects implement design, construction, maintenance, and operation practices in support of the high-performance building goals of EO 13423 (72 FR 3919) and statutory requirements and (2) existing facilities' maintenance and operations practices meet the goals of EO 13423. NNSA/NSO’s High-Performance Building Plan would also align with EO 13327 (69 FR 5897) and DOE Order 430.1B, <i>Real Property Asset Management</i>. At a minimum, the High-Performance Building Plan would include employment of integrated design principles, optimization of energy efficiency, use of renewable energy, protection and conservation of water, enhancement of indoor environmental quality, and reduction of environmental impacts of materials in accordance with the guiding principles of DOE Order 430.2B, Attachment 1, and construction related to EO 13423.</p>

EO = Executive Order; FR = *Federal Register*; FY = fiscal year; NNSA = National Nuclear Security Administration; NSO = Nevada Site Office; NNSS = Nevada National Security Site.

<sup>a</sup> Goals and information as of December 2009.

### 3.1.3.3 Other Research and Development Programs

In 1992, the NNSS became the seventh unit of the DOE National Environmental Research Park Program. The NNSS program initially operated under a cooperative agreement between the DOE Nevada Operations Office (now NNSA/NSO); the University of Nevada, Reno; and the University of Nevada, Las Vegas, whereby the DOE Nevada Operations Office's Environmental Management Office provided financial assistance for scientific research projects unique to the Nevada National Environmental Research Park. In addition, scientific research projects conducted by parties other than those in the above-mentioned agreement could be conducted, but would be funded from sources other than NNSA.

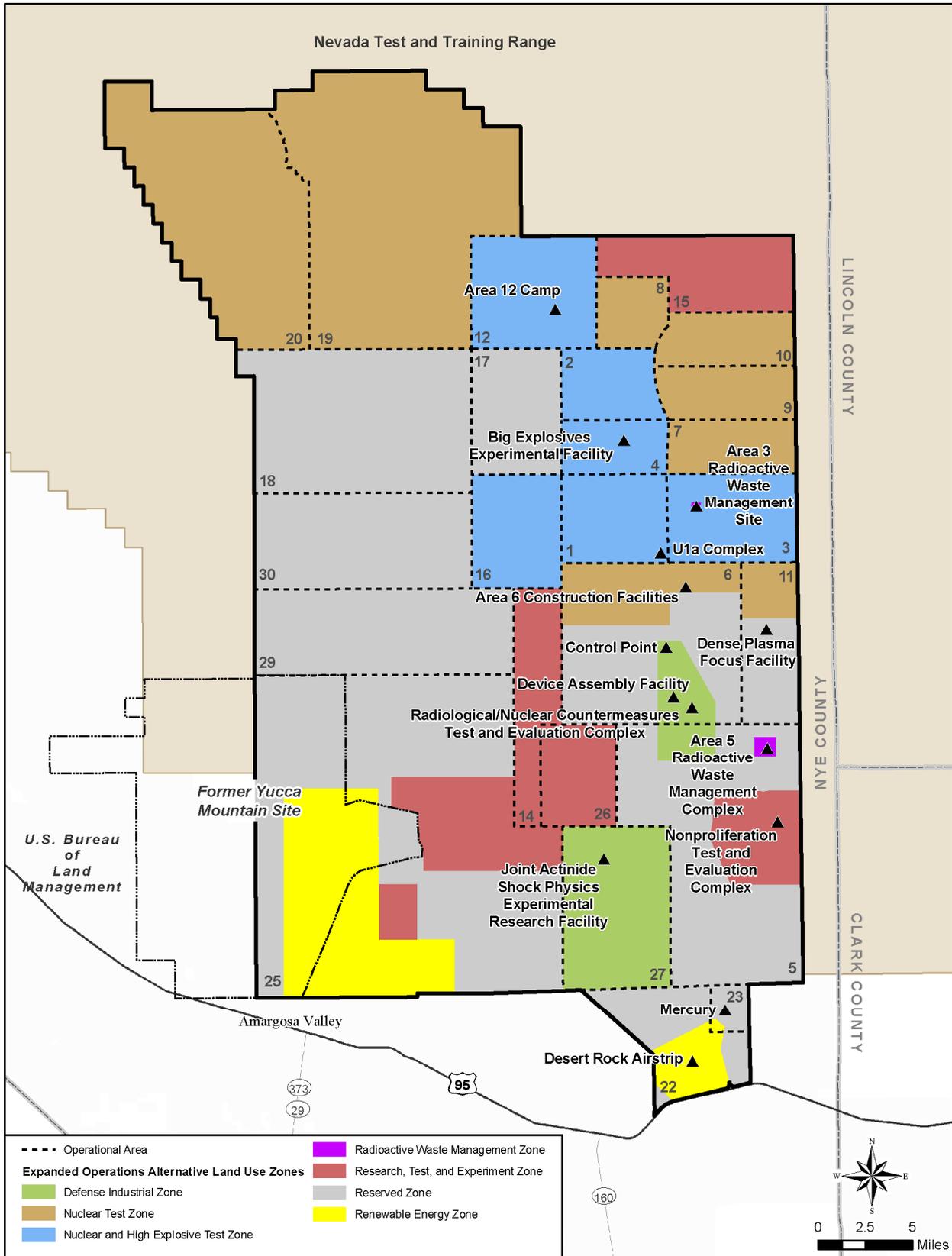
### 3.2 Expanded Operations Alternative

The scope of the Expanded Operations Alternative in this SWEIS is defined to include the capabilities and projects described under the No Action Alternative, plus additional newly proposed capabilities and projects. These additional activities would include modification and/or expansion of existing facilities and construction of new facilities. In addition, some ongoing activities would be conducted more frequently than under the No Action Alternative. For each activity addressed in this section, the differences from the No Action Alternative are noted. In addition to changes in activities, under the Expanded Operations Alternative, there would be two changes in NNSS land use zones: (1) the designated use for Area 15 would be changed from "Reserved" to "Research, Test, and Experiment"; and (2) approximately 39,600 acres within Area 25 would be designated as a Renewable Energy Zone. These land use zone changes would clarify the availability of Area 15 as a location for conducting various types of research, tests, and experiments, and the Renewable Energy Zone would designate an area where NNSA/NSO has determined it would be reasonable and feasible to locate commercial renewable energy projects, as explained in Section 3.1.3.2 of this chapter. **Figure 3–2** depicts the land use zones and major facilities at the NNSS under the Expanded Operations Alternative.

#### **Nevada National Security Site (NNSS) Environmental Research Facilities**

The Nevada Desert Free-Air Carbon Dioxide Enrichment (FACE) Facility and Mojave Global Change Facility (MGCF) are two environmental research facilities located in Area 5 of the NNSS that conduct long-term environmental research. FACE is a state-of-the-art facility designed to study responses of an undisturbed desert ecosystem to increasing levels of atmospheric carbon dioxide. This facility is in a standby condition due to lack of funding.

MGCF was established in Area 5 of the NNSS to examine the impact of global climate change factors other than increased carbon dioxide (i.e., increasing summer monsoon rains, increased nitrogen deposition, and disturbance or destruction of the desert soil crust) on the Mojave Desert ecosystem.



**Figure 3–2 Nevada National Security Site Land Use Zones and Major Facilities Under the Expanded Operations Alternative**

### **3.2.1 National Security/Defense Mission**

Under the Expanded Operations Alternative, NNSA would pursue additional activities associated with the Stockpile Stewardship and Management, Nuclear Emergency Response, Nonproliferation, Counterterrorism, and Work for Others Programs.

#### **3.2.1.1 Stockpile Stewardship and Management Program**

Stockpile Stewardship and Management Program activities are described in more detail in Appendix A of this *NNSS SWEIS*. Under the Expanded Operations Alternative, there would be no changes from the No Action Alternative for the following Stockpile Stewardship and Management Program projects and activities:

- Maintenance of readiness to conduct an underground nuclear test (A generic description of underground nuclear testing is provided in Appendix H.)
- Criticality experiments in DAF
- Drillback operations
- Disposition of damaged U.S. nuclear weapons
- Stockpile stewardship and management activities at the TTR

Stockpile stewardship and management activities that would change relative to the No Action Alternative under the Expanded Operations Alternative include the following:

**Dynamic experiments** – NNSA would conduct up to 20 dynamic experiments per year. Over the next 10 years, a total of 5 dynamic experiments would be conducted in emplacement holes and cause new land disturbances.

**Conventional explosive experiments at BEEF and other locations in the Nuclear and High Explosives Test Zone** – NNSA would conduct up to 100 explosives experiments per year. NNSA would add a second firing table and ancillary features within the already developed area at BEEF, and would develop and test for proof-of-concept a high-energy x-ray capability at BEEF. Following successful testing, the new x-ray system would be moved to the U1a Complex for operational use.

In addition to explosives experiments at BEEF (limited to 70,000 pounds TNT-equivalent based on facility design), at the request of the Defense Threat Reduction Agency, NNSA would support experiments using up to 120,000 pounds TNT-equivalent of explosives at various locations other than BEEF within the Nuclear and High Explosives Test Zone at the NNSS. These detonations would be conducted both underground and in the open air. Conventional explosives operations supporting other programs at the NNSS are described under those programs. All explosive operations would be conducted in compliance with DOE Manual 440.1-1A, *DOE Explosives Safety Manual*.

NNSA would establish one or more areas dedicated to conducting explosives experiments with depleted uranium. Up to three depleted uranium experiment areas, each about 40 acres in size, may be established in Areas 2, 4, 12, or 16. An annual maximum of 4,000 pounds of depleted uranium and 12,000 pounds of explosives (TNT-equivalent) would be used to conduct up to 20 of these experiments per year.

**Shock physics experiments** – NNSA would make the shock physics experimental facilities available for academic and other research on a no-conflict basis and would increase the number of experiments with actinide materials up to 36 per year at JASPER and 24 at the Large-Bore Powder Gun.

**Pulsed-power experiments** – The Atlas Facility would be activated, and up to 24 pulsed-power experiments per year would be conducted.

**Fusion experiments at the NNSS and NLVF** – New experimental uses would be pursued for the Dense Plasma Focus Machines that require deuterium-deuterium, deuterium-tritium, and tritium-tritium fusion and pulsed x-ray production. These experiments would require a much larger capacitive energy storage bank than the one currently in use at the Area 11 facility. To facilitate the new uses for the Dense Plasma Focus Machine currently located in Area 11 of the NNSS, it would be relocated to an existing building in Area 6 of the NNSS. Following the relocation, the Area 11 facility would be placed in standby. NNSA would conduct up to 1,650 plasma physics and fusion experiments per year: 1,000 would use the Dense Plasma Focus Machine at NLVF, and 650 would use the machine in Area 11 (or Area 6 if it were moved).

**Stockpile management activities** – NNSA would conduct nuclear explosives operations at the NNSS in association with conducting an underground nuclear test, if so directed by the President. In addition, under the Expanded Operations Alternative, NNSA would conduct the following activities:

- Stage (i.e., maintain programmatic material, such as SNM, or other materials, in a safe and secure manner until needed in a test, experiment, or other activity; staging does not include maintaining material with no reasonable expectation of use in the foreseeable future) nuclear devices pending disassembly, modification/maintenance, and/or transportation to another location
- Conduct dismantlement of select weapons or weapon systems to aid the United States in meeting its commitment to reduce its nuclear weapons stockpile (weapons shipments to the NNSS under this activity would not exceed 100 per year)
- Modify and maintain nuclear devices at DAF, including replacing limited-life components in selected nuclear weapons systems (weapons shipments to the NNSS under this activity would not exceed 360 per year)
- Test weapons components for quality assurance purposes at DAF

**SNM Staging, including pits** – NNSA would continue to stage SNM at appropriate facilities on the NNSS. SNM would be relocated from other DOE/NNSA sites. For example, the following materials would be moved to the NNSS: up to 4 metric tons of SNM currently part of the Zero Power Physics Reactor Program at Idaho National Laboratory (for use in criticality experiments); about 200 kilograms of global security SNM currently stored at Lawrence Livermore National Laboratory (for use in detector development and as radiation test objects); 2 kilograms of uranium-233 currently stored at Los Alamos National Laboratory (associated with test readiness); and 500 kilograms of highly enriched uranium, depleted uranium, and uranium stored at Lawrence Livermore National Laboratory (associated with criticality safety). In addition, NNSA would stage weapon pits at DAF, pending their transport to the Pantex Plant in Texas or another appropriate location.

**Training for the Office of Secure Transportation** – In addition to hosting training and exercises on NNSS roads, NNSA would construct new facilities in Area 17 to support Office of Secure Transportation training programs. The new facilities would occupy approximately 10,000 acres. A total of about 25 miles of roads and fire breaks would be developed surrounding active training areas and between individual training venues. Potable water would be obtained from an existing well approximately 4.5 miles away, requiring construction of a water pipeline. An electrical distribution line would also be constructed to extend electrical service from the vicinity of the well to the new facilities. Main access to the complex would be from the Tippipah Highway.

Facilities would be expanded in the 12 Camp (Area 12), Area 6 Control Point, or Mercury (Area 23), and maintenance and administrative buildings and a dormitory would be constructed to support training

operations. These facilities would also be available to other NNSS customers when not in use by the Office of Secure Transportation.

These new and expanded facilities projects are conceptual at this time and would require an appropriate level of NEPA analysis before they could be implemented.

### **3.2.1.2 Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs**

Nuclear Emergency Response, Nonproliferation, and Counterterrorism Program projects and activities are described in detail in Appendix A of this *NNSS SWEIS*. Under the Expanded Operations Alternative, there would be no changes from the No Action Alternative for the following Nuclear Emergency Response, Nonproliferation, and Counterterrorism Program projects and activities:

- Support for the Nuclear Emergency Support Team
- Consequence management support for FRMAC, the Aerial Measuring System, Accident Response Group, and Radiological Assistance Program
- Training for weapons of mass destruction emergency responders
- Equipment provision and technical support for the DOE-dedicated Emergency Communications Network

Nuclear emergency response, nonproliferation, and counterterrorism activities that would change relative to the No Action Alternative under the Expanded Operations Alternative include the following:

**Disposition of improvised nuclear devices on an as-needed basis** – In addition to improvised nuclear devices, radiological dispersion devices would be dispositioned on an as-needed basis at the NNSS under the Expanded Operations Alternative.

**Nonproliferation- and counterterrorism-related activities** – NNSA nonproliferation- and counterterrorism-related activities would include four related areas: arms control, nonproliferation, nuclear forensics, and counterterrorism. Although the purpose of nonproliferation- and counterterrorism-related activities would be the same as that under the No Action Alternative, new nonproliferation and counterterrorism facilities, described below, would be constructed at various locations on the NNSS to undertake enhanced activities. Because the new nonproliferation and counterterrorism facilities (Arms Control Treaty Verification Test Bed, nonproliferation test bed, and Urban Warfare Complex) are still conceptual in nature and their locations are unknown, they are not fully analyzed in this *SWEIS*, and an appropriate level of NEPA analysis would be required before they could be implemented.

**Arms control** – The Arms Control Treaty Verification Test Bed would require construction of both indoor and outdoor laboratory space and test areas for design and certification of treaty verification technologies, training of inspectors, and development of arms control-related confidence-building measures. These facilities would be sited at various locations at the NNSS, and construction of new facilities would require a total of about 100 acres of land. A new facility for data fusion, analysis, and visualization would be constructed. The new building would have approximately 10,000 square feet of floor space and would be integrated with a building constructed to house other Arms Control Treaty Verification functions.

**Nonproliferation** – A Nonproliferation Test Bed would require construction of a new facility for simulations of chemical and radiological processes that could be conducted clandestinely by an adversary.

**Counterterrorism** – In addition to counterterrorism training at existing facilities, an Urban Warfare Complex would be constructed at the NNSS. This complex would include full-scale, modular replicas of

the types of urban areas where terrorists and insurgents typically seek refuge. The Urban Warfare Complex would be constructed on about 100 acres in a remote area on the NNSS.

### 3.2.1.3 Work for Others Program

Work for Others Program activities are described in more detail in Appendix A of this *NNSS SWEIS*. Under the Expanded Operations Alternative, there would be no changes from the No Action Alternative for the following Work for Others Program activities:

- Treaty verification
- Military training and exercises
- Work for Others Program activities at the TTR

Work for Others Program activities that would change relative to the No Action Alternative under the Expanded Operations Alternative include the following:

**Nonproliferation projects and counterproliferation research and development** – Support would be provided for development of radiation detection capabilities, additional sensor technologies, and active interrogation programs to detect nuclear material.

**Counterterrorism** – Counterterrorism activities would include research, development, testing, and evaluation of unmanned aerial vehicles and/or unmanned aircraft systems, as well as integration of training and exercises. Other activities would include development and testing of sensors for detection and defeat of improvised explosive devices, which would require construction of test beds (roads, intersections, small towns, etc.) and support facilities. Construction of these facilities would include new buildings with about 10,000 square feet of new floor space and would disturb about 75 acres of land.

DHS counterterrorism operations support would include construction of new training facilities (about 10,000 square feet of floor space). In addition, RNCTEC would be operated up to the level of a Hazard Category 2 nonreactor nuclear facility, which would allow larger amounts of radioactive material in alternative configurations to be used in tests and experiments. A high-speed road, a short section of full-scale railroad line, a simulated seaport facility, and a mock urban area would also be added to RNCTEC (DOE 2004f), requiring about 125 acres of additional land in Area 6. These new facilities are still conceptual in nature and their potential locations have not been identified. An appropriate level of additional NEPA analysis (beyond this SWEIS) would be required before NNSA makes any decision regarding these facilities.

**Support for NASA** – NNSA would support NASA nuclear rocket motor development, including using existing boreholes to examine for proof of concept the use of deep alluvial basins for sequestering radionuclides released as part of emissions from tests of a yet-to-be-developed prototype nuclear rocket motor. Over about a 10-year period, NASA would not likely test a nuclear rocket motor, but may conduct proof-of-concept tests using a surrogate, such as spiked xenon, in a borehole to evaluate the effectiveness of the alluvium for this purpose. NNSA would identify and comply with all applicable regulatory requirements for both proof-of-concept experiments and any actual test of a nuclear rocket motor. If NASA proposes to test an actual nuclear rocket motor, additional NEPA analysis would be prepared.

**Aviation Work for Others** – Activities would include increased research, development, and use of aerial platforms at the NNSS. To support these activities, additional facilities would be required at Desert Rock Airport (hangars, shops, and other buildings occupying approximately 200,000 square feet) and the Area 6 Aerial Operations Facility (a hangar occupying approximately 20,000 square feet). Additional facilities

occupying approximately 5,000 square feet may be required at other locations to support air operations, including testing of various types of manned and unmanned aerial vehicles such as small, remote-controlled, fixed-wing airplanes and helicopters. Unmanned aerial vehicles would be tested for potential use carrying sensors for collecting environmental data (e.g., multi- and hyperspectral imagery) to be used in digital environmental model development and for terrain analysis in arid and semiarid regions.

**Active interrogation** – Active interrogation involves the use of a radiation source to detect nuclear material. Under the Expanded Operations Alternative, Work for Others Program activities would include support for development of active interrogation systems to detect nuclear material and other materials of interest. NNSA would support research and development of active interrogation equipment, including accelerators and other radiation-generating devices and associated radiation detection systems/methods, and training. DHS would conduct active interrogation activities at RNCTEC, but other Federal agencies would require an additional facility, most likely located in Area 12 or 16. In addition to fixed facilities, temporary test beds would be used to provide various terrain, roadway patterns, and other factors to simulate conditions that may be encountered in actual deployment of the active interrogation system. The temporary test beds would be used primarily for testing mobile accelerators and other radiation-generating devices (from man-portable up to units housed in large transportation containers) and detectors. In general, temporary active interrogation test beds would use existing NNSS roads, but could also include some off-road areas. Construction of additional support facilities and temporary test beds would disturb about 100 acres of previously undisturbed land over the next 10 years.

Active interrogation research and development would involve operation of accelerators/radiation-generating devices at energy levels in the range of 10 to 100 million electron volts to irradiate various materials using, for example, electrons, protons, or other types of radiation such as x-rays or neutrons (proton-generating units may attain energy levels of up to 4 billion electron volts). The devices would be used for either radiography or for interrogation of objects to detect and identify such things as fissionable materials, chemicals, or contraband. Other devices may produce gamma rays to be used for the same purposes. Still other systems would include deuterium-deuterium or deuterium-tritium neutron generators (see description of fusion experiments in Sections 3.1.1.1 and 3.2.1.1) that produce from 2.5 to 14 million-electron-volt neutrons.

Test objects would be irradiated using interrogation beams produced by the accelerators/radiation-generating devices. Test objects would consist in part of fissionable materials such as uranium and plutonium. Fissionable material in a test object would be limited to quantities that can be demonstrated to be subcritical under all normal, abnormal, and accident conditions (quantity and nature of process activities must preclude the potential for a nuclear criticality). Test objects that incorporate fissionable material would be used in either shielded or unshielded configurations or surrounded by, for example, naturally occurring radioactive material. The interrogation beams would also be used to irradiate non-fissionable materials, such as chemicals or simulated contraband, to determine signatures produced by the real materials. Test objects would be placed up to 1.25 miles from the beam source and radiation and other detection systems would be placed at various distances away to detect radiation from the test objects.

**Radioactive tracer experiments** – Radioactive tracer experiments would be conducted to validate sensor technology. These experiments would include both underground releases and open-air releases of radioactive noble gases and nonradioactive gases (i.e., helium and sulfur hexafluoride). The underground experiments would release up to 27 curies of radioactive noble gases with short half-lives (5 to 36 days); nonradioactive releases would include from about 300 gallons of helium to about 2,000 gallons of sulfur hexafluoride. The underground experiments would include explosive gas releases, pressurized releases, explosive radioactive particulate releases, and a baseline survey of contamination from previous activities.

The open-air experiments would release small quantities of radionuclides with short half-lives. Up to 12 experiments involving open-air releases would be conducted each year. NNSA would comply with all relevant regulatory and reporting requirements, including applicable requirements of 10 CFR Part 61, Subpart H, for all experiments that could result in a release of radioactive material to the air. NNSA would ensure that the cumulative annual radiological dose at the boundary of the NNSS resulting from all activities involving radioactive materials would comply with the U.S. Environmental Protection Agency's annual emission standard of 10 millirem (40 CFR 61.92).

**New test beds** – Additional test beds would be developed to support research and development for sensors, high-power microwaves, and high-power lasers. New test beds (including approximately 50,000 square feet of new building spaces) would be constructed at various locations on the NNSS and would disturb approximately 200 acres of previously undisturbed land. Because there are no specific plans for construction of these new test beds at this time, additional NEPA analysis would be necessary before they could be implemented.

The following new test beds would be developed at the NNSS under the Expanded Operations Alternative:

**Nuclear-Fuel-Cycle-Related Radionuclide Release, Diagnostics and Solids Detection, and Characterization Test Bed** – In support of the various nuclear nonproliferation treaties in which the United States participates or anticipates participation, NNSA would create test beds for use in developing sensors to support treaty verification and nonproliferation validation. Facilities to support deployment of fixed uranium oxides and controlled amounts of depleted uranium would include static concrete display pads, static target display pans, thermal targets, and ponds and pools of water.

**Specialized Explosive Testing and Manufacture Test Bed** – Support for DoD and the U.S intelligence community would expand to include development of sensors and techniques for detection and defeat of improvised explosive devices, homemade explosives, conventional military ordnance, and chemical explosives, as well as explosives-driven, shaped-charge development and evaluation.

**Radio Frequency Generation Test Bed** – Technologies would be developed to detect, sample, characterize, and identify radio frequency signatures and observables. The test bed would be used to develop the ability to generate specific signals, to characterize the radio frequency environment, and to monitor tests.

**Infrasonic Observations Test Bed** – Technologies would be developed to monitor earthquakes and underground disturbances. This test bed would be used to develop the ability to detect specific signals, characterize the seismic environment, and monitor tests.

**Chemical Test Bed** – Activities at this test bed would include simulated manufacture and release of illegal drugs by authorized Federal organizations to develop detection and prevention technologies. An existing facility would be used to train personnel and test sensors and procedures for detection of toxic industrial chemicals.

**Biological Simulants Test Bed** – These operations would include production of biological simulants in an appropriate laboratory by authorized Federal organizations for use in detection technology development. Biological simulant releases to the soil, the air, or an NNSS sewer/septic system would emulate anticipated real-world scenarios. Construction to support these functions would disturb up to 50 acres of land.

### **3.2.2 Environmental Management Mission**

The DOE/NNSA Environmental Management Mission includes the Waste Management and Environmental Restoration Programs. Under the Expanded Operations Alternative, the Waste Management Program would accept greater volumes of LLW and MLLW from both offsite and onsite sources. As under the No Action Alternative, the Environmental Restoration Program would continue to meet the requirements of the most recent FFAO.

#### **3.2.2.1 Waste Management Program**

In response to increased levels of operations at NNSA facilities in Nevada under the Expanded Operations Alternative, waste management activities associated with some waste types would increase. In particular, up to approximately 48,000,000 cubic feet of LLW and 4,000,000 cubic feet of MLLW would be disposed at the NNSA over the next 10 years. Within the existing Area 5 RWMC and the Area 3 RWMS, new disposal units would be constructed, filled, and closed to accommodate these additional waste volumes and types. The basis for these estimated volumes is described in Appendix A, Section A.2.2.1. New MLLW disposal cells would require a new RCRA permit(s) from the Nevada Division of Environmental Protection.

Use of rail-to-truck transloading would increase, including the use of transloading facilities within Nevada, should commercial vendors establish such a facility. DOE/NNSA would not establish or promote establishment of any transloading facilities.

Under the Expanded Operations Alternative, NNSA would treat and store various types of MLLW received from on- and offsite generators. MLLW treatment capacity would be developed within the Area 5 RWMC, including macroencapsulation, stabilization/microencapsulation, sorting/segregating, and bench-scale mercury amalgamation of both onsite- and offsite-generated MLLW. Initially, MLLW storage capacity would be developed on the TRU Pad to accommodate MLLW treatment (for either onsite- or offsite-generated wastes), pending development of MLLW storage capacity in existing or new facilities within the Area 5 RWMC. To handle the increased volumes and more-frequent shipment receipt rates of LLW and/or MLLW, a waste offloading and staging area would be established at the Area 5 RWMC. Appropriate permits would be obtained before expanding MLLW storage capacity or implementing any of these treatment technologies.

In addition, waste management activities at the NNSA under the Expanded Operations Alternative would include the following:

- Because of the projected increased annual number of experiments at JASPER and other national security activities, somewhat larger quantities of TRU waste would be generated annually (about 1,500 cubic feet per year). As with the No Action Alternative, TRU waste generated by DOE/NNSA activities in Nevada would be safely stored at the TRU Pad pending shipment off site for disposition along with other legacy waste (waste or contamination resulting from previous nuclear weapons-related activities) or newly generated environmental restoration waste.
- Continued treatment by evaporation of liquids containing small concentrations of tritium; and continued management of hazardous waste, asbestos and PCB wastes, and hydrocarbon-contaminated soil and debris in compliance with applicable regulations and permits. An estimated 170,000 cubic feet of hazardous waste would be generated by DOE/NNSA activities.
- Continued treatment of explosives at the Explosives Ordnance Disposal Unit in Area 11.

- Continued operation of the Area 23 Class II Solid Waste Disposal Site, the Area 6 Class III Solid Waste Disposal Site (Hydrocarbon Landfill), and the U10c Class III Solid Waste Disposal Site. To accommodate the potential increases in solid wastes (up to about 9,400,000 cubic feet over the next 10 years) that may be generated by various operations at the NNSS under the Expanded Operations Alternative, NNSA would seek permits to construct and operate new solid waste disposal facilities, as needed. A new sanitary waste landfill in Area 23 would require approximately 15 acres of land. To support environmental restoration work in Area 25, NNSA would obtain appropriate permits to construct and operate a construction/demolition debris landfill that would disturb up to 20 acres in Area 25 of the NNSS. Approximately 970,000 cubic feet of the generated sanitary solid waste would be sent off site for recycling during the next 10 years.

### **3.2.2.2 Environmental Restoration Program**

Under the Expanded Operations Alternative, the DOE/NNSA Environmental Restoration Program would continue in compliance with the FFACO in the form of characterization, monitoring, and, if necessary, remediation of identified contaminated areas, facilities, and environmental media. The UGTA and Industrial Sites Projects, remediation of Defense Threat Reduction Agency sites, and Borehole Management Program would all continue as under the No Action Alternative, although the pace of cleanup activities could be accelerated. Cleanup standards for Soils Project sites on lands under the jurisdiction of the USAF are subject to agreement among the USAF, NDEP, and DOE. The No Action Alternative addressed cleanup levels consistent with current land uses; however, if more-stringent cleanup standards are adopted than currently planned or additional sites are included under the FFACO, the volumes of waste requiring transport and disposal would increase. For purposes of analysis under the Expanded Operations Alternative, this SWEIS assumes that a number of contaminated soil sites on the Nevada Test and Training Range and the TTR (i.e., Clean Slate 2, and 3, Project 57, and Small Boy), a total of about 504 acres, would be excavated to a depth of 0.5 feet and the removed soil would be disposed as LLW. The impact of this estimated additional volume of waste that would need to be disposed at the NNSS is analyzed in Chapter 5, Section 5.1.11.

### **3.2.3 Nondefense Mission**

The Nondefense Mission generally includes those activities that are necessary to support mission-related programs, such as construction and maintenance of facilities, provision of supplies and services, warehousing, and similar activities. Activities related to energy supply and conservation, including renewable energy, are considered part of the Nondefense Mission, as are other research and development activities that may occur at NNSA facilities in Nevada, including activities at the Nevada National Environmental Research Park. As described in the following paragraphs, all Nondefense Mission programs would be modified to some extent under the Expanded Operations Alternative.

#### **3.2.3.1 General Site Support and Infrastructure Program**

Under the Expanded Operations Alternative, in addition to small projects to maintain the present capabilities of the NNSS, infrastructure-associated activities would include increasing capacities and capabilities or extending the ranges of facilities and/or services to accommodate new operational programs and projects. A detailed description of new activities associated with the General Site Support and Infrastructure Program and the reasons they are proposed under the Expanded Operations Alternative may be found in Appendix A, Section A.2.3.1.

In addition to accommodating operational requirements and constructing the new facilities described in Sections 3.2.1 and 3.2.2, the following infrastructure enhancements would be implemented:

- A security building in Area 23 would be constructed to replace outdated facilities and consolidate security facilities and functions into a new, approximately 85,000-square-foot, two-story facility. The buildings replaced would be evaluated and either demolished or used for another purpose.
- The existing 138-kilovolt electrical transmission system would be replaced between Mercury Switching Center in Area 23 and Valley Substation in Area 2 to increase the capacity of the system from about 40 megawatts to 100 megawatts. The efficiency of the system would be improved, but the system operating voltage would not increase.
- The telecommunication system on the NNSS would be upgraded to better integrate wired and wireless systems.
- Buildings in Mercury are typically 30 to 50 years old. To maintain an efficient and effective operation in support of national security activities, it is necessary to replace most of these facilities and supporting infrastructure due to their lack of energy efficiencies and deteriorating condition. Under the Expanded Operations Alternative, Mercury would be reconfigured to provide the modern facilities and infrastructure necessary to support advanced experimentation and production at the NNSS. Because the reconfiguration of Mercury is conceptual in nature, an appropriate level of NEPA analysis and documentation would be required before it could be implemented.

These projects would contribute to meeting NNSA Strategic Goal 2.1: Transform the Nation's nuclear weapons stockpile and supporting infrastructure to be more responsive to the threats of the twenty-first century.

As under the No Action Alternative, in addition to maintaining and repairing its infrastructure at the NNSS, RSL, NLVF, and the TTR, NNSA would maintain the existing infrastructure, provide site security, and manage all applicable existing permits and agreements for the former Yucca Mountain site. NNSA would perform these functions pending decisions on the disposition of the former Yucca Mountain site.

As noted under the No Action Alternative, although considered infrastructure, characterization and monitoring wells developed under the UGTA Project are addressed as part of the Environmental Management Program and proposed and potential renewable energy projects are addressed under the Conservation and Renewable Energy Program, rather than the General Site Support and Infrastructure Program.

### **3.2.3.2 Conservation and Renewable Energy Program**

Under the Expanded Operations Alternative, NNSA would continue to identify and implement energy conservation measures and renewable energy projects as described under the No Action Alternative. In addition, NNSA would pursue renewable energy projects, including geothermal and solar.

**NNSS Photovoltaic Power Project** – Under the Expanded Operations Alternative, NNSA proposes to build a 5-megawatt photovoltaic solar power system near the Area 6 Construction Facilities. The 5-megawatt photovoltaic system would require about 50 acres of land, based on a similar project at Nellis Air Force Base (USAF 2006c).

**Commercial solar power generation** – Under the Expanded Operations Alternative, NNSA would allow development of one or more full-scale commercial solar power generation facilities in Area 25 of the

NNSS. As shown in Figure 3–2, the solar power generation facilities would be located within an area of about 39,600 acres in the southwestern part of the NNSS. The reasons for NNSA’s consideration of commercial solar power development only in Area 25 and decision to assess the concentrating solar power parabolic trough technology in this *NNSS SWEIS* are addressed in Section 3.1.4.2. The facility(ies) could use a variety of solar power-generating technologies (i.e., parabolic trough, power tower, dish engine, photovoltaic) with a combined generating capability of up to 1,000 megawatts. Approximately 10 miles of new 500-kilovolt electrical transmission line (outside of the NNSS) would be required to integrate the electricity generated into the regional system. The existing regional electrical transmission system does not have sufficient capacity to accommodate an additional 1,000 megawatts of power. Development of the solar power generation facilities in Area 25 would require construction of additional transmission infrastructure in the region. Independent of and unrelated to the commercial solar power generation facilities considered in this *NNSS SWEIS*, NV Energy, a commercial electrical energy company, and Renewable Energy Transmission Company are planning separate new large capacity transmission line projects that would accommodate the additional electrical generation (see Chapter 6, Section 6.2.4.4, for additional information). The analysis in this SWEIS is based on assumptions for a representative commercial solar project (West 2010). Because there is no specific proposal for a commercial solar power-generating project, additional NEPA analysis would be required to evaluate any such proposals in the future.

**Geothermal Demonstration Project** – There are no proposals to develop a Geothermal Demonstration Project at the NNSS, at this time; however, there has been recent interest in such a project. Under such a project, the NNSS would be evaluated to determine the feasibility of demonstrating an enhanced geothermal electrical generating system. If the initial evaluation were favorable, the location for a Geothermal Demonstration Project on the NNSS would depend on a combination of factors, including the system’s potential, land use zone restrictions, and environmental and economic considerations. Approximately 30 to 50 acres of land would be disturbed by construction of a Geothermal Demonstration Project. Several boreholes would be drilled up to 20,000 feet deep. Up to 20 acre-feet of water would be required to initially prime the system. A continuously operating 50-megawatt power plant would require an estimated 50 acre-feet of water per year. As a separate but related project, a geothermal research center, would be established in Mercury using existing facilities. A Geothermal Demonstration Project would be interconnected to the NNSS electrical transmission system, but would not generate sufficient power to exceed the capacity of the rebuilt NNSS 138-kilovolt transmission system addressed in Section 3.2.3.1. Because there are no specific proposals for geothermal exploration or development on the NNSS at this time, additional NEPA analysis would be required before such work could be conducted.

### **3.2.3.3 Other Research and Development Programs**

Under the Expanded Operations Alternative, NNSA would continue to host existing environmental research projects at the NNSS and would actively promote and expand the National Environmental Research Park Program. NNSA would consider new environmental or other proposed research and/or development projects not related to the DOE or NNSA National Security/Defense or Environmental Management missions on a case-by-case basis.

### Expanded Use Alternative—American Indian Perspective



The Consolidated Group of Tribes and Organizations' (CGTO) concerns and perspective regarding the Expanded Use Alternative include those discussed previously under Sections 3.0, 3.1.1, 3.1.2, 3.1.2.1, 3.1.2.2, and 3.1.3, as well as those summarized here. Under the Expanded Use Alternative, the U.S. Department of Energy (DOE) would pursue geothermal electrical generation in a variety of locations depicted in Figure A.2.3-1, and solar energy systems and facilities in Areas 6 and 25, respectively.

The CGTO understands that DOE is proposing to construct modular geothermal power plants that have a relatively small surface footprint. However, the initial project support activities will reportedly impact 30 to 50 acres. The CGTO also understands that DOE may pursue solar power by constructing a 5 megawatt photovoltaic system, and commercial solar power generating facilities. These proposed solar power electrical generation projects would impact approximately 50 acres and 39,600 acres of land, respectively. The CGTO is particularly concerned with the land and resources potentially impacted by these projects.

Construction of the proposed solar power electrical generation system and facilities, and the geothermal electrical generation facility involves scraping the land, irreparably destroying the land and vegetation. Facility construction will facilitate erosion, impede visual resources, and will emit dust and other potentially hazardous pollutants into the air. This will, in turn, impact the land, water, air, plants, animals, and cultural resources, and will affect the solitude and cultural integrity of the land. Some examples of resources impacted have been highlighted throughout this section.

The CGTO is concerned that DOE's proposed activities unnaturally harnesses the earth's power without understanding the implications of these actions or all that is necessary to begin to prepare the earth and its resources. Numinous people have a complex understanding of *power* and believe it is special force that was placed in all things at the time the world was created. It is that spark which keeps the world going and all of its elements thinking, talking, moving, and interacting. This special *power* moves and has the ability to move down hill, often concentrating or pooling in certain places like mineral outcrops, cliffs, and caves. It has characteristics similar to water, and can be understood as having the ability to return to the sky to become like rain and snow, which are called down from the sky by the highest mountains. This special *power* has a rotation of movement similar to the hydrological cycle and has the ability to impact all things (Carroll et al. 2006).

The CGTO is concerned about unnaturally harnessing the power of the Sun. According to tribal elders, *"The Sun is like a big battery. Once you drain its power, will it die? For those of us spiritually connected to the Sun, what will happen to us if it is killed? We know the Sun has only so much energy. If the Sun is drained, how will it be replenished? If the Sun goes away, everything will die. Because of the complexity and potential implications to the environment, cultural landscape, and our own survival, we strongly encourage the DOE to pursue a study that evaluates the cultural implications of pursuing solar energy. The stories and activities of our ancestors are tied greatly to the Sun. Today, our prayers and ceremonies still travel or rely on its strength."*

According to information presented throughout the site-wide environmental impact statement, the proposed geothermal electrical generation facilities would use the power of rocks that are hot. Rocks, or minerals, are culturally important and have significant roles in many aspects of Indian life. For example, the Chalcedony would have made an attractive offering acquired and then left at the vision quest or medicine site located to the north on top of a volcano like Scrugham Peak. In particular, Indian people have observed the presence of the following minerals used as offerings on the Nevada National Security Site (NNSS): (1) Obsidian, (2) Chalcedony, (3) Yellow Chert (otherwise known as Jasper), (4) Black Chert, (5) Pumice, (6) Quartz Crystal, and (7) Rhyolite Tuff.

Obsidian is a glass-like stone produced by volcanoes when they talk. According to information obtained by Dr. Richard Stoffle with the University of Arizona and presented in the report *Black Mountain: Traditional Uses of Volcanic Landscapes* (Carroll et al. 2006), Southern Paiutes use a green volcanic glass during curing ceremonies that involved bleeding the patient. Volcanic glass found below Scrugham Peak was used in the first arrow making lessons for young men. Such lessons were held in small rock shelters found along the base of the basalt flow that constitutes Buckboard Mesa. Obsidian flakes were placed before important rock art panels as offering to the spirits who lived on the other side of the passageway provided by the panel. Small obsidian stones, commonly called *Apache Tears*, cover a depth of 4 inches on the face of Shoshone Mountain in southern Nevada. This massive deposit of obsidian stones is interpreted by Indian people as being provided by the mountain as both a spiritual backdrop and a location for vision quests.

Volcanic rocks are used in a wide range of ceremonial activities. According to a tribal elder, *"Indian women enhance the quality of breast milk by squirting it on heated rocks."* Volcanic rocks are used for medicine society sweat lodge meetings (Zedeño et al. 2001). Indian people call some volcanic rocks "grandfather stones," a designation that reflects reverence as well as wisdom. Such rocks are sought in special places of power and carried over long distances to serve as the heated stones in sweat lodges (Carroll et al. 2006).

Other traditional use minerals are known to exist throughout the NNSS and offsite locations. In order to document the cultural significance of these areas, additional ethnographic mineral studies are needed to fully understand the location and importance of these minerals at the proposed project site locations prior to any surface disturbing activities. The CGTO is particularly apprehensive about the potential impacts or use of these minerals resulting from proposed geothermal activities.

### Expanded Use Alternative—American Indian Perspective (cont'd)



Some of the locations proposed for geothermal electrical power plants are recognized as traditionally or spiritually important. In particular, the CGTO is concerned about activities that have the potential to impact Oasis Valley, Amargosa River, Timber Mountain Caldera Complex, Black Mountain, Gold Meadows, Cane Springs, Calico Hills area, Crater Flats, Scrugham Peak, Shoshone Mountain, Devil's Hole, Ash Meadows, and Death Valley. The CGTO is concerned about locating the proposed geothermal project along hydrological basins, whose power is derived from volcanic activity.

We know the forces of power in the world move along channels and combine into specific nodes or places of power. A common set of these channels follows the path of water. From this beginning, the water moves downhill in rivulets, washes, and streams. The water often goes underground where it forms similar networks of channels moving in various directions, corresponding to hydrological basins. Water is often attracted to volcanic activity, thus producing power places like hot mineral springs.

The CGTO is concerned the DOE may impact hot springs in their pursuit of geothermal power. According to information obtained by Dr. Richard Stoffle with the University of Arizona and presented in the report *Black Mountain: Traditional Uses of Volcanic Landscapes* (Carroll et al. 2006), hot springs come from the earth where volcanic activity still occurs even if the magma cannot be seen on the surface. Such springs are a combination of water and volcanoes producing a special place where both ceremonial and medicine activities occur. Indian people from Owens Valley have a single origin story for all of the hot springs in the southern Great Basin and northern Mohave Desert. According to traditional stories, a great ball of fire came from the sky and landed at Coso Hot Springs and then splashed to form at once all of the other hot springs.

#### **Hydrological Impacts**

According to information presented in the Site-Wide Environmental Impact Statement, the proposed solar and geothermal projects will require a tremendous amount of water. A modular geothermal power plant alone will require up to 20 acre-feet to initially prime the system.

Indian people believe water is a living being that is fully sentient and willful. Water is already stressed throughout the region. The CGTO is concerned about the use of this very limited and important resource.

Because water is a powerful being it is associated with other powerful beings, such as water babies, a supernatural being that lives in and protects the water. These beings are like the people of the water. They are highly respected by American Indian culture. If water is contaminated and misused, the water babies may cause harm and move to other areas that are not contaminated.

#### **Air Quality and Climate Impacts**

Construction of these proposed facilities will impact large areas of land, potentially emitting dust and contaminants. The CGTO knows the air is alive. The Creator puts life into the air, which is shared by all living things. Air can be destroyed, causing pockets of dead air. There is only so much living air that surrounds the world. If it is destroyed, it is gone forever and cannot be restored. Dead air lacks the spirituality and life necessary to support other life forms. The CGTO is concerned about emitting things into the air that are unnatural, and raises the potential health and environmental issues associated with these emissions.

#### **Visual Resource Impacts**

All landforms within the NNSS have high sensitivity levels for American Indians. The ability to see the land without obstructions like buildings, towers, cables, roads, and other objects is essential for the spiritual interaction between Indian people and their traditional homelands. Visual resources may be negatively impacted if proposed solar and geothermal projects are pursued. The CGTO must be part of any future discussions as these may impact visual resources and may impede traditional and cultural ceremonies.

#### **Final Thoughts**

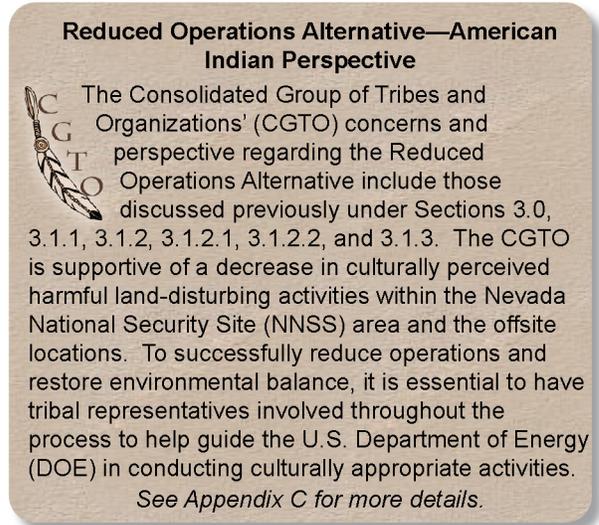
Only Indian people have traditional ecological knowledge that tells us how and where to interact with plants and animals, water sources, and collect soil samples to minimize impacts to the land while maintaining its spiritual integrity. Because of the potential effects to our ancestral land and its delicate resources, the CGTO must be an integral part of the solar power electrical generation and geothermal electrical generating power projects by conducting systematic ethnographic studies before the ground is disturbed.

The CGTO strongly encourages DOE to evaluate the cultural impacts of pursuing solar and geothermal energy in culturally sensitive areas because of the complexity and potential implications to the environment, cultural landscape, and our survival. The CGTO recommends developing culturally appropriate text for future National Environmental Policy Act (NEPA) analyses, including the environmental assessments and mitigation plans required for these proposed undertakings.

See Appendix C for more details.

### 3.3 Reduced Operations Alternative

The Reduced Operations Alternative addressed in this SWEIS includes the same types of activities as the No Action Alternative; however, for many programs, the levels of operations would be reduced. Perhaps the most important change from No Action under the Reduced Operations Alternative would be cessation of all activities other than environmental restoration, environmental monitoring, site security operations, military training and exercises, and maintenance of Well 8 and critical communications and electrical transmission systems in the northwestern portion of the NNSS (Areas 18, 19, 20, 29, and 30). Maintenance of Pahute Mesa, Stockade Wash, and Buckboard Mesa Roads would be terminated and operations at Pahute Mesa Airstrip would be limited to those necessary to provide access for the activities that would continue in these areas. The electrical transmission/distribution system beyond the Echo Peak Substation in Areas 19 and 20 would be de-energized. Ceasing all activities other than those mentioned in Areas 18, 19, 20, 29, and 30 would reduce NNSA's maintenance requirements at the NNSS and allow scarce resources to be focused on the more used areas of the NNSS. It may also reduce impacts on some resources, relative to the No Action and Expanded Operations Alternatives. **Figure 3-3** illustrates the configuration of the NNSS under the Reduced Operations Alternative.



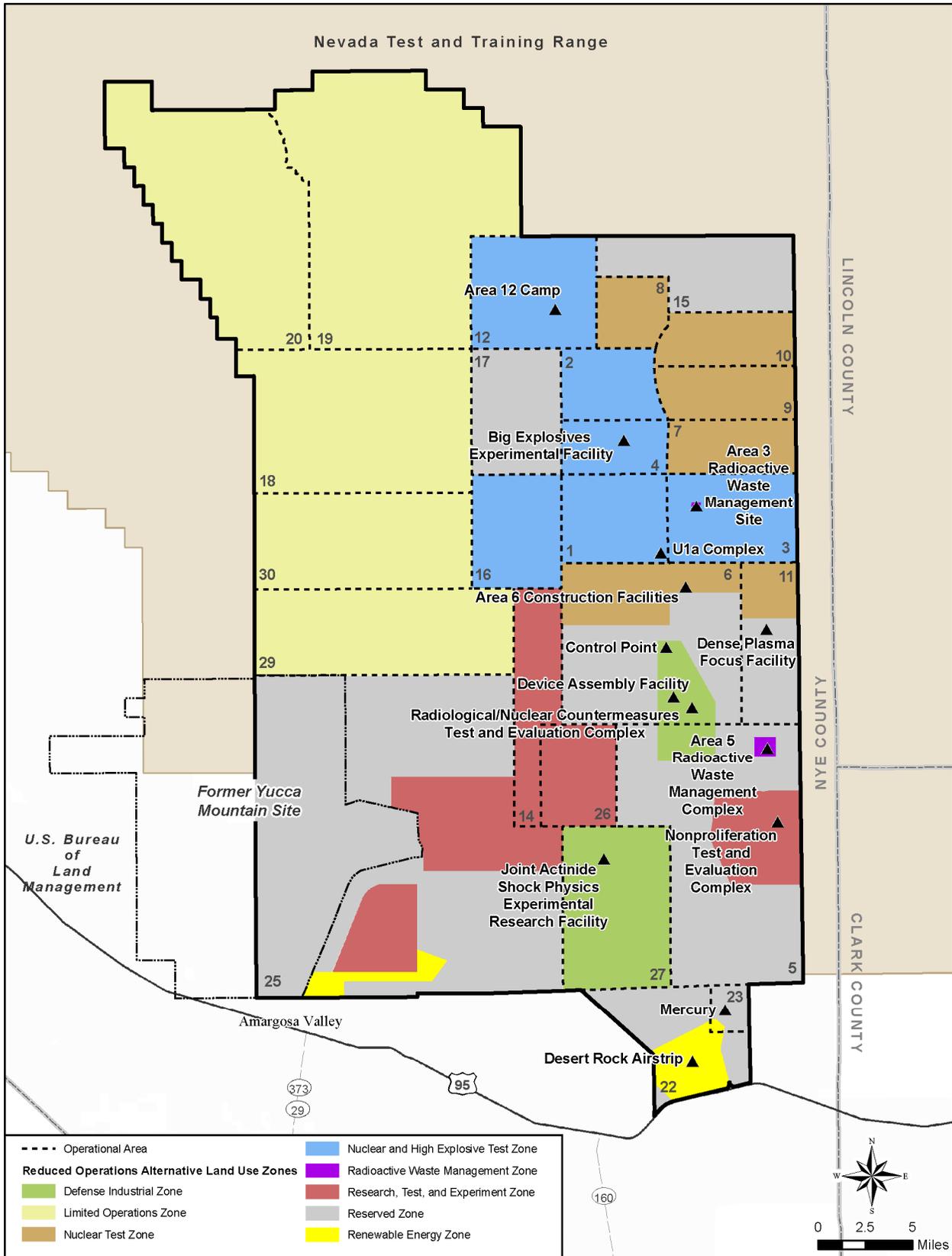
The following description of the missions, programs, capabilities, projects, and activities that would be conducted under the Reduced Operations Alternative primarily addresses only this alternative's differences from the No Action Alternative; that is, those projects and activities that would be conducted at a lower level of intensity or not at all.

#### 3.3.1 National Security/Defense Mission

Under the Reduced Operations Alternative, NNSA would continue to pursue activities in support of the Stockpile Stewardship and Management, Nuclear Emergency Response, Nonproliferation, Counterterrorism, and Work for Others Programs.

##### 3.3.1.1 Stockpile Stewardship and Management Program

Stockpile stewardship and management operations would continue under the conditions of the ongoing nuclear testing moratorium. As under the No Action Alternative, NNSA would continue to maintain its readiness to conduct an underground nuclear weapon test if so directed by the President. A generic description of underground nuclear testing is provided in Appendix H. Detailed descriptions of Stockpile Stewardship and Management Program activities under the Reduced Operations Alternative are provided in Appendix A, Section A.3.1.1.



**Figure 3-3 Nevada National Security Site Land Use Zones and Major Facilities Under the Reduced Operations Alternative**

Under the Reduced Operations Alternative, there would be no change from the No Action Alternative for the following Stockpile Stewardship and Management Program projects and capabilities:

- Shock physics experiments at the Large-Bore Powder Gun
- Criticality experiments at DAF
- Disposition of damaged nuclear weapons
- Storage and staging of nuclear devices
- Staging of SNM, including pits
- Readiness-related training and exercises using various kinds of nuclear weapon simulators

In addition to maintaining these capabilities, under the Reduced Operations Alternative, the following changes in stockpile stewardship and management capabilities at NNSA facilities in Nevada would occur:

**Dynamic experiments** – NNSA would annually conduct no more than six of these experiments per year. Over the next 10 years, a total of five dynamic experiments would be conducted in emplacement holes and cause land disturbances. No dynamic experiments would occur in Areas 19 or 20 of the NNSS.

**Conventional explosives experiments** – NNSA would annually conduct up to 10 conventional explosives experiments in the Nuclear and High Explosives Test Zone to directly support the Stockpile Stewardship and Management Program. No other explosives experiments would be conducted.

**Shock physics experiments** – No more than six shock physics experiments with SNM would be annually conducted at JASPER.

**Pulsed Power Experiments at Atlas** – The Atlas Facility would be decommissioned and dispositioned.

**Fusion experiments at the NNSS and NLVF** – NNSA would conduct up to 375 plasma physics and fusion experiments per year: 350 would use the Dense Plasma Focus Machine at NLVF, and 25 would use the machine in Area 11.

**Support for Office of Secure Transportation Training** – The number of times per year that Office of Secure Transportation training and exercises would be supported would be reduced to four.

**Stockpile stewardship and management activities at the TTR** – NNSA would not conduct fixed rocket launcher operations, cruise missile operations, or fuel-air explosives operations at the TTR.

### **3.3.1.2 Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs**

There would be no change from the No Action Alternative for Nuclear Emergency Response, Nonproliferation, or Counterterrorism Program activities. See Appendix A, Section A.1.1.2, for a detailed description of these activities.

### **3.3.1.3 Work for Others Program**

Under the Reduced Operations Alternative, NNSA would continue to host the projects of other Federal agencies, state and local governments, and nongovernmental organizations; however, certain activities, such as large-scale explosives tests and experiments, would not be conducted. NNSA also would no longer support the following Work for Others Program activities, which are associated with nonproliferation projects and counterproliferation research and development:

- Conventional weapons effects tests, including live-drop and static high-explosives detonations
- Development and demonstration of capabilities and technologies to attack and defeat military targets protected in tunnels and other deeply buried hardened facilities
- Explosives experiments
- Experiments requiring explosive releases of chemical and biological simulants

No Work for Others Program activities, except military training and exercises, would be conducted in Areas 18, 19, 20, 29, and 30 of the NNSS under the Reduced Operations Alternative. The reason for this exception is that military training and exercises are currently conducted primarily in the western half of the NNSS to ensure adequate separation and avoid interference with other DOE/NNSA activities. This separation would need to be continued for safety and security considerations.

### **3.3.2 Environmental Management Mission**

The NNSA Environmental Management Mission includes the Waste Management and Environmental Restoration Programs. Under the Reduced Operations Alternative, both of these programs would be the same as under the No Action Alternative, except that less TRU waste would be generated annually (about 250 cubic feet per year) because of the projected reduced annual number of experiments at JASPER and other national security activities. As with the No Action Alternative, this waste would be safely stored at the TRU Pad pending shipment off site for disposition along with other legacy or newly generated environmental restoration waste. DOE/NNSA activities would generate an estimated 170,000 cubic feet of hazardous waste. Smaller quantities of solid wastes (3,600,000 cubic feet) are also projected (compared to the No Action Alternative) because of reduced employment and construction activities. About 360,000 cubic feet of sanitary solid waste would be sent off site for recycling.

### **3.3.3 Nondefense Mission**

The Nondefense Mission generally includes those projects and capabilities necessary to support NNSA-related programs such as construction and maintenance of facilities, provision of supplies and services, warehousing, and similar activities. Activities related to supply and conservation of energy, including renewable energy and other research and development, are considered part of the Nondefense Mission. Activities under the Reduced Operations Alternative would be the same as the No Action Alternative, including maintenance of the “cold standby” status of the former Yucca Mountain site, but at a lower level of effort, reflective of operational levels and establishment of the “Limited Operations Zone.”

#### **3.3.3.1 General Site Support and Infrastructure Program**

Under the Reduced Operations Alternative, infrastructure-associated activities would include repairs, replacements, and projects to maintain the reduced capabilities of the NNSS. NNSA would maintain only critical infrastructure within Areas 18, 19, 20, 29, and 30, including the Echo Peak, Motorola, and Shoshone communications facilities; the Echo Peak, Castle Rock, and Stockade Wash Substations; electrical transmission lines interconnecting these substations; and Well 8. Roads within Areas 18, 19, 20, 29, and 30 would be minimally maintained to provide the basic access necessary to maintain the noted infrastructure. As noted under the No Action Alternative, although considered infrastructure, characterization and monitoring wells developed under the UGTA Project are addressed under the Environmental Management Program and proposed and potential renewable energy projects are addressed under the Conservation and Renewable Energy Program, rather than the General Site Support and Infrastructure Program.

### **3.3.3.2 Conservation and Renewable Energy Program**

**Commercial Solar Power Generation** – Under the Reduced Operations Alternative, NNSA assumes development of a 100-megawatt commercial solar power generation plant in Area 25 of the NNSS. As explained under the No Action Alternative, the southwestern portion of Area 25 is considered the only reasonable location for a commercial solar power generation facility on the NNSS. NNSA estimates 1,200 acres of land would be required for a 100-megawatt parabolic trough solar power generation facility. The existing electrical transmission system has sufficient capacity to transmit the electrical energy produced by a 100-megawatt facility. Minor infrastructure construction and maintenance may be required to support the development of up to 100 megawatts of solar power generation within Area 25. The analysis in this SWEIS is based on assumptions for a representative commercial solar project. Because there are no current proposals for a commercial solar power generation facility on the NNSS, a separate NEPA analysis would be required for any specific proposal

### **3.3.3.3 Other Research and Development Programs**

Under the Reduced Operations Alternative, NNSA would continue to host existing environmental research projects at the NNSS, but would not actively promote the National Environmental Research Park Program. NNSA would consider any new environmental or other proposed research and/or development projects not related to the DOE or NNSA National Security/Defense or Environmental Management Missions in all areas of the NNSS except Areas 18, 19, 20, 28, and 29 on a case-by-case basis.

## **3.4 Comparison of Potential Consequences of the Alternatives**

A summary of the potential impacts of the alternatives evaluated in this SWEIS is provided in this section. **Tables 3–3** through **3–6** present side-by-side comparisons of the impacts under the alternatives at the NNSS, RSL, NLVF, and the TTR, respectively. The information presented in Tables 3–3 through 3–6 is a summary only; for detailed discussion, please refer to the appropriate resource section(s) of Chapter 5.

**Table 3–3 Summary of Potential Impacts at the Nevada National Security Site**

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Land Use</b> (for details go to Chapter 5, Sections 5.1.1.1, 5.1.1.2, and 5.1.1.3)			
National Security/Defense Mission	No impacts were identified from the continuation of activities at the current levels of operations or foreseeable actions because activities under this alternative would continue to be compatible with existing land use designations on the NNSS and primary land uses adjacent to the site.	No impacts were identified from the increased activities and change in land use designations under this alternative because activities would be compatible with the proposed land use designations and primary land uses adjacent to the NNSS. The Reserved Zone would decrease in area by 5.5 percent; the Research, Test, and Experiment Zone would increase by 21 percent.	No impacts were identified from the decreased activities and change in land use designations under this alternative because activities would be compatible with the proposed land use designations and primary land uses adjacent to the NNSS. The Reserved Zone would decrease in area by 71 percent and Areas 18, 19, 20, and 30 would change from Reserved to Limited Operations, which is a new land use zone designation.
	<i>Airspace</i> No new impacts were identified from airspace activities because these activities would be maintained at the current level of air traffic, navigational aid services, and airspace structure, and would be coordinated and scheduled by the controlling entity responsible for NNSS airspace, the Nellis Air Traffic Control Facility.	<i>Airspace</i> Minimal impacts would result from increased usage of aerial platforms and airspace usage, as these activities would continue to be coordinated with the Nellis Air Traffic Control Facility.	<i>Airspace</i> Same as under the No Action Alternative.
Environmental Management Mission	No impacts were identified from the continuation of activities at the current levels of operations because activities under this alternative would not change.	No impacts were identified from the increased activities under this alternative, as these activities would be compatible with land use designations and primary land uses adjacent to the site.	Same as under the No Action Alternative.
Nondefense Mission	No impacts were identified from the continuation of activities at the current levels of operations or foreseeable actions because activities under this alternative would continue to be compatible with existing land use designations on the NNSS and primary land uses adjacent to the site. The Solar Enterprise Zone would be renamed the Renewable Energy Zone.	Same as the No Action Alternative, plus:  Area 15 would be changed from a Reserved Zone to a Research Test and Experiment Zone and the Solar Enterprise Zone would be renamed the Renewable Energy Zone and increase in area by 276 percent.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Infrastructure and Energy</b> (for details go to Chapter 5, Sections 5.1.2.1 and 5.1.2.2)			
<i>Infrastructure</i>	Buildings, transportation, water supply, and services are adequate to handle temporary increases in demands during construction and long-term demands during operations. Infrastructure would be maintained as needed to accommodate ongoing activities. In addition, new LLW cells would be developed to accommodate disposal of those waste types. Up to 50 new wells would be developed by the UGTA Project.	Same as under the No Action Alternative, plus:  New buildings (about 479,000 square feet), ranges and training facilities (13,455 acres), water distribution lines, wastewater treatment systems (septic tanks), power lines, and communication systems would be added and improvements would be made to existing infrastructure. In addition, new LLW/MLLW cells would be developed to accommodate disposal of increased volumes of those waste types and new sanitary and construction/D&D waste landfills in Areas 23 and 25. An upgrade to the NNSC electrical transmission system would increase capacity from 40 to 100 megawatts.  A 5-megawatt photovoltaic solar power generation facility would be developed in Area 6.	Same as under the No Action Alternative, except:  Buildings, transportation, water supply, and services would experience reduced demands. Because most operations in the northwestern portion of the NNSC (within Areas 18, 19, 20, 29, and 30) would be discontinued, non-essential infrastructure in those areas would be shut down or removed.
	A commercial 240-megawatt solar power generation plant would be developed in Area 25 of the NNSC. The commercial facility would provide a portion of the electrical power at the NNSC. Sanitary needs of construction and operational employees would be provided by the commercial entity and are not expected to affect the NNSC solid waste or wastewater infrastructure.	Up to 1,000 megawatts of commercial solar power generating capacity would be developed in Area 25 of the NNSC. The commercial facilities would provide a portion of the electrical power at the NNSC. Sanitary needs of construction and operational employees would be provided by the commercial entity and are not expected to affect the NNSC solid waste or wastewater infrastructure.	A commercial 100-megawatt solar power generation plant would be developed in Area 25 of the NNSC. The commercial facility would provide a portion of the electrical power at the NNSC. Sanitary needs of construction and operational employees would be provided by the commercial entity and are not expected to affect the NNSC solid waste or wastewater infrastructure.
<i>Energy</i>	Average electric power demand would be 22 megawatts, with a peak demand of 30 megawatts.	Average electrical power demand would be 28 megawatts with a peak demand of 41 megawatts. As noted under Infrastructure, NNSA would rebuild the 138-kilovolt transmission system on the NNSC to accommodate increased loads.	Average electrical power demand would be 20 megawatts with a peak demand of 27 megawatts.
	Estimated annual usage of various liquid fuels is estimated, as follows: Fuel oil for heating – 66,000 gallons Unleaded gasoline – 427,000 gallons Ethanol/E85 – 217,000 gallons #2 Diesel – 65,000 gallons Biodiesel – 343,000 gallons	Estimated annual usage of various liquid fuels is estimated as follows: Fuel oil for heating – 83,000 gallons Unleaded gasoline – 534,000 gallons Ethanol/E85 – 271,000 gallons #2 Diesel – 81,000 gallons Biodiesel – 429,000 gallons	Estimated annual usage of various liquid fuels is estimated as follows: Fuel oil for heating – 59,000 gallons Unleaded gasoline – 384,000 gallons Ethanol/E85 – 195,000 gallons #2 Diesel – 59,000 gallons Biodiesel – 309,000 gallons
	NNSA would maintain and repair energy infrastructure.	NNSA would maintain and repair energy infrastructure.	NNSA would maintain and repair energy infrastructure.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Transportation <sup>a</sup> and Traffic</b> (for details go to Chapter 5, Sections 5.1.3.1 and 5.1.3.2 and Appendix E)			
<b>Transportation</b> (for details go to Chapter 5, Sections 5.1.3.1.1, 5.1.3.1.2, and 5.1.3.1.3 and Appendix E)			
Out-of-state LLW/MLLW			
<i>Truck transport</i>			
worker risk (LCF)	1 (1.2)	3 (3.1)	1 (1.2)
population risk (LCF)	0 (0.2)	1 (0.6)	0 (0.2)
Radiological Accident (LCF)	0 (0.0002)	0 (0.01)	0 (0.0002)
Traffic fatality	2	6	2
<i>Rail transport only</i>			
worker risk (LCF)	0 (0.3)	1 (1.1)	0 (0.3)
population risk (LCF)	0 (0.09)	0 (0.3)	0 (0.09)
Radiological Accident (LCF)	0 (0.00004)	0 (0.005)	0 (0.00004)
Traffic fatality	6	15	6
<i>Combined rail-truck transport</i>			
worker risk (LCF)	0 (0.5)	1 (1.5)	0 (0.5)
population risk (LCF)	0 (0.1)	0 (0.3)	0 (0.1)
Radiological Accident (LCF)	0 (0.00006)	0 (0.005)	0 (0.00006)
Traffic fatality	6	16	6

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Traffic</b> (for details go to Chapter 5, Sections 5.1.3.2.1, 5.1.3.2.2, and 5.1.3.2.3)			
Onsite traffic impacts	<p>There would be about 20 additional vehicle trips per day on Mercury Highway, which would operate at a level of service A during peak traffic hours.</p> <p>Construction of a 240-megawatt commercial solar power generation facility would result in 250 (average over the period of construction) and 500 (during the peak of the construction period) additional vehicle trips on a daily basis during the peak commute hours on Lathrop Wells Road; increased roadway maintenance or improvements may be required.</p>	<p>There would be about 800 additional vehicle trips per day on Mercury Highway, which would operate at a level of service B or better during peak traffic hours.</p> <p>Construction of 1,000 megawatts of commercial solar power generation facilities would result in 750 (average over the period of construction) and 1,500 (during the peak of the construction period) additional vehicle trips on a daily basis during the peak commute hours on Lathrop Wells Road; increased roadway maintenance or improvements may be required.</p>	<p>There would be about 150 fewer vehicle trips per day on Mercury Highway, which would operate at a level of service A during peak traffic hours.</p> <p>Construction of a 100-megawatt commercial solar power generation facility would result in 400 (average over the period of construction) and 800 (during the peak of the construction period) additional vehicle trips on a daily basis during the peak commute hours on Lathrop Wells Road; increased roadway maintenance or improvements may be required.</p>
Regional traffic impacts	<p>U.S. Route 95, State Route 160, and State Route 372 would experience the greatest increases in daily traffic volumes in the area around the NNSS; however, these would be relatively minor and would not affect the levels of service on regional roadways.</p> <p>Overall traffic volumes would increase during peak hours because of additional traffic attributable to the construction of a solar power generation facility.</p>	<p>Segments of Nevada State Route 372, State Route 160, U.S. Route 95, and State Route 164 would experience moderately high percent increases in daily traffic compared to the No Action Alternative. Most of the increase in daily traffic volumes during the peak hours would be attributable to workers commuting to the NNSS, any detectable changes in traffic volumes would primarily occur during the main commuting hours and at the entry gates of the NNSS (the main entrance gate for regular NNSS employees and Gate 510 for those associated with the construction and operation of the commercial solar power generation facilities in Area 25). However, the levels of service on public roadways in the region would not change.</p>	<p>Although the number of commuter trips for the reduced NNSS workforce would decrease, overall traffic volumes would increase slightly during peak hours because of additional traffic volumes attributable to construction and operation of the solar power generation facility. Impacts on regional traffic under this alternative would, therefore, be slightly less than or similar to those described under the No Action Alternative; volume-to-capacity ratios and levels of service would not change.</p>

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Socioeconomics</b> (for details go to Chapter 5, Sections 5.1.4.1, 5.1.4.2, and 5.1.4.3)			
	Operation of a 240-megawatt commercial solar power facility would increase employment by 150 FTEs, of which about 15 solar power facility employees would relocate from outside of the region. Sufficient housing exists to support the increased population. A total of 22 new students relocating to Clark County would create a need for 1 additional teacher to maintain the student to teacher ratio. An increase of 6 new students in Nye County would not result in a need for additional teachers. Direct jobs would reduce unemployment by 0.07 and 0.99 percent, respectively, in Clark and Nye Counties.	Site employment would increase by 625 FTEs; about 63 employees would relocate from outside of the region. Sufficient housing exists in the area to support the increased population. A total of 92 new students relocating to Clark County would create a need for 4 new teachers to maintain the student to teacher ratio. An increase of 27 new students in Nye County would create the need for 1 new teacher to maintain the student-to-teacher ratio. Direct jobs would reduce unemployment by 0.31 and 4.2 percent, respectively, in Clark and Nye Counties.	Site employment would decrease by 45 FTEs, increasing unemployment in Clark County by about 0.03 percent and in Nye County by about 0.39 percent. Additional employees would not relocate to Clark or Nye County and there would be no need for new housing or teachers.
	Approximately 500 FTEs over 35 months, with a peak of 1,000 FTEs, would need to be hired for construction of the solar power generation facility.	Approximately 750 FTEs over 42 months, with a peak of 1,500 FTEs, would need to be hired for construction of the solar power generation facility. Other construction projects at the NNSS would require approximately 250 FTEs over the 10-year period.	Approximately 400 FTEs over 32 months, with a peak of 800 FTEs, would need to be hired for construction of the solar power generation facility.
	Direct jobs, indirect jobs, and construction materials purchases would reduce unemployment and have a beneficial effect on local government revenues.	Direct jobs, indirect jobs, and construction materials purchases would have a beneficial effect on the local economy and government revenues.	Direct construction jobs and indirect jobs would reduce the unemployment rate in the region and would have a beneficial impact on the economy in the region.  Job loss would have a small negative impact on the local economy; construction material purchases for the solar power generation facility would have a small positive economic impact, including generating additional revenues for local governments.
	Buildings associated with construction and operation of a solar power generation facility and increased site personnel would create a modest increase in demand for onsite security and fire and rescue services.	Buildings associated with construction and operation of a larger solar power generation facility and other facilities on site and the increase in personnel would create a greater demand for onsite security and fire and rescue services.	Buildings associated with construction and operation of a solar power generation facility would create a greater demand for onsite security and fire and rescue services.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Geology and Soils</b> (for details go to Chapter 5, Sections 5.1.5.1, 5.2.5.2, and 5.1.5.3)			
National Security/Defense Mission	About 700 acres of soil would be disturbed by dynamic experiments in boreholes, explosives experiments, drillback operations, OST training and exercises, experiments involving biological stimulants, and counterterrorism training.	About 13,455 acres of soil would be disturbed by the same kinds of activities as under the No Action Alternative, including:  Up to 10,000 acres of soil would be disturbed for an OST training facility, 120 acres for depleted uranium experiment sites, and 3,335 acres for additional explosives experiments, new test beds and training facilities, drillback operations, and additions to existing aviation facilities at the NNSS.	About 430 acres of soil would be disturbed by many of the same kinds of activities as under the No Action Alternative, except:  There would be 50 percent fewer explosive experiments and 33 percent less OST training and exercises.
Environmental Management Mission	About 190 acres of soil would be disturbed for construction of new waste cells at the Area 5 RWMC.  Up to 420 acres of soil would be disturbed as part of the Environmental Restoration Program, Soils Project cleanup. Up to 500 acres of soil would be disturbed for development of UGTA project monitoring wells.	About 600 acres of soil would be disturbed for construction of new waste cells at the Area 5 RWMC. About 35 acres of soil would be disturbed for new sanitary and D&D/construction waste landfills in Areas 23 and 25.  Environmental Restoration would be the same as under the No Action Alternative.	Same as under the No Action Alternative.
Nondefense Mission	Construction of a commercial solar power generation facility and associated transmission lines would disturb approximately 2,650 acres.	Construction of 1,000 megawatts of commercial solar power generation facilities and associated transmission lines would disturb up to 10,300 acres.  Replacing the existing 138-kilovolt NNSS electrical transmission line would disturb about 467 acres of soil.  Construction of a DOE photovoltaic solar power generation facility would disturb about 50 acres of land. Minor soil disturbance expected from several additional research projects.  Development of a geothermal demonstration project would disturb up to 50 acres of soil.	Construction of a commercial solar power generation facility could disturb up to 1,200 acres.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Hydrology</b> (for details go to Chapter 5, Section 5.1.6)			
<i>Surface Water Resources</i> (for details go to Chapter 5, Sections 5.1.6.1, 5.1.6.1.1, 5.1.6.1.2, and 5.1.6.1.3)			
National Security/Defense Mission	Disturbance of about 700 acres of land by dynamic experiments in boreholes, explosives experiments, drillback operations, OST training and exercises, experiments involving releases of chemicals and biological simulants, and counterterrorism training would cause alterations of natural drainage pathways, contamination of ephemeral surface waters via chemical agents, and sedimentation to ephemeral surface waters.	About 13,455 acres of soil and near surface geologic media would be disturbed by the same kinds of activities as under the No Action Alternative, plus:  Up to 10,000 acres of disturbance for OST training facilities, 120 acres for depleted uranium experiment sites, and 3,335 acres for additional explosives experiments, new test beds and training facilities, drillback operations and additions to existing aviation facilities at the NNSS. This would result in proportionately larger impacts on ephemeral waters compared to the No Action Alternative.	About 430 acres of soil and near surface geologic media would be disturbed by many of the same kinds of activities as under the No Action Alternative, except:  There would be 50 percent fewer explosives experiments, and 33 percent less OST training and exercises. This would result in proportionately smaller impacts on ephemeral waters compared to the No Action Alternative.
Environmental Management Mission	Disturbance of up to 190 acres of soil to construct, use, cover, and close disposal units within the existing Area 5 RWMC would result in impacts on ephemeral waters due to alteration of natural drainage pathways, increased erosion, and subsequent sedimentation.	Same as under the No Action Alternative, except:  Disturbance of up to 600 acres of soil to construct, use, cover, and close disposal units within the existing Area 5 RWMC, plus up to 35 acres of disturbance for new sanitary /D&D/ construction waste landfills would result in impacts on ephemeral waters due to alteration of natural drainage pathways, increased erosion, and subsequent sedimentation.	Same as under the No Action Alternative for both Waste Management and Environmental Restoration.
	The Soils Project would reduce or stabilize legacy contamination in soil and could result in disturbance of up to 420 acres. Soil disturbance on about 500 acres of land from drilling additional wells for the UGTA Project could cause localized erosion, as could D&D of industrial sites, remediation of Defense Threat Reduction Agency sites, and the borehole management program. These activities would affect ephemeral waters by altering natural drainage pathways and increasing sedimentation. Stabilization and/or removal of contaminated facilities and soils would reduce the potential for contamination of ephemeral waters.	Environmental Restoration impacts would be the same as under the No Action Alternative.	

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
Nondefense Mission	No new land disturbances would occur during infrastructure-related activities under the No Action Alternative.	Up to 517 acres of land would be disturbed by rebuilding the existing 138-kilovolt transmission line on the NNSS and construction of a 5-megawatt photovoltaic solar generating facility. These disturbances would result in alterations of natural drainage pathways and increased sedimentation of ephemeral waterways.	Same as under the No Action Alternative, except:  The land area associated with the solar power generation facility would be 1,200 acres.
	Development of a 240-megawatt commercial solar power generation facility and associated transmission lines would alter natural drainage pathways over 2,650 acres in Area 25, though it is expected that larger ephemeral waters (e.g., Fortymile Wash) would be avoided; however, there would be a potential for chemical contamination of and sedimentation to ephemeral waters during construction-related land preparation.	Development of up to 1,000 megawatts of commercial solar power generation facilities and associated transmission lines would disturb drainage pathways over 10,300 acres and increased erosion and construction/operational activities would potentially increase sedimentation to and chemical contamination of ephemeral waterways.  Development of a Geothermal Demonstration Project would disturb up to 50 acres and cause sedimentation to ephemeral waters, as well as long-term alteration of natural drainage pathways.	

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<i>Groundwater Resources</i> (for details go to Chapter 5, Sections 5.1.6.2, 5.2.6.2.1, 5.1.6.2.2, and 5.1.6.2.3)			
<i>Total water use (excluding solar power facility)</i>			
	Total water use for DOE/NNSA activities would not exceed 691 acre-feet per year. This water demand would be below the sustainable yield of all affected hydrologic basins.	Total water use for DOE/NNSA activities would increase by 25 percent from the No Action Alternative to 862 acre-feet per year. This water demand would be below the sustainable yield of all affected hydrologic basins.	Total water use for DOE/NNSA activities would decrease by 10 percent from the No Action Alternative to 622 acre-feet per year. This water demand would be below the sustainable yield of all affected hydrologic basins.
National Security/Defense Mission	No new or additional impacts on groundwater resources.	The following would be additional impacts on the groundwater resource, compared to the No Action Alternative: <ul style="list-style-type: none"> <li>• 5.5 acre-feet per year of potable water for construction workers.</li> <li>• Water use for new construction of facilities included in the overall 25 percent increase in all water uses.</li> </ul>	Same as under the No Action Alternative.
Environmental Management Mission	Through 2020, 30 acre-feet per year of nonpotable water for the drilling of new wells under the UGTA Project.  Less than 7 acre-feet of total water use for dust suppression during D&D of facilities.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Nondefense Mission	Positive impact of reducing potable water production 16 percent by 2015 utilizing water conservation measures.	Same as under the No Action Alternative, plus: <ul style="list-style-type: none"> <li>• A 5-megawatt photovoltaic solar power system near Area 6 would use 0.5 acre-feet per year of nonpotable water.</li> <li>• A one-time nonpotable water demand of 20 acre-feet to prime a geothermal power plant.</li> </ul> Once operational, the geothermal power plant would use 50 acre-feet of water per year.	Same as under the No Action Alternative.
<i>Commercial Solar Power Generation Facilities</i>			
<i>Construction</i>	350 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision	1,000 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision	200 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision
<i>Operation</i>	250 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision  These water demands are below the sustainable yield of the Fortymile Canyon, Jackass Flats Subdivision Basin (3,944 acre-feet per year).	700 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision  These water demands are below the sustainable yield of the Fortymile Canyon, Jackass Flats Subdivision Basin (3,944 acre-feet per year).	175 acre-feet per year from Fortymile Canyon, Jackass Flats Subdivision  These water demands are below the sustainable yield of the Fortymile Canyon, Jackass Flats Subdivision Basin (3,944 acre-feet per year).

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Biological Resources</b> (for details go to Chapter 5, Sections 5.1.7, 5.1.7.1.1, 5.1.7.2, and 5.1.7.3)			
National Security/Defense Mission	Approximately 295 acres of currently undisturbed desert tortoise habitat would be affected by activities in Frenchman, Yucca, and Jackass Flats; Mercury Valley; and Fortymile Canyon. Estimated number of desert tortoises affected ranges from 4 to 21; all by harassment.	Approximately 1,930 acres of currently undisturbed desert tortoise habitat would be affected in the same areas as under the No Action Alternative. Estimated number of desert tortoises affected ranges from 30 to 136; all by harassment.	Approximately 160 acres of currently undisturbed desert tortoise habitat would be affected in the same areas as under the No Action Alternative. Estimated number of desert tortoises affected ranges from 2 to 11; all by harassment.
	Total new disturbed area (about 700 acres) would be 0.09 percent of undisturbed land on the NNSS.	Total new disturbed area (about 13,455 acres) would be 1.70 percent of undisturbed land on the NNSS.	Total new disturbed area (about 430 acres) would be 0.05 percent of undisturbed land on the NNSS.
Environmental Management Mission	Approximately 760 acres of currently undisturbed desert tortoise habitat would be affected, primarily by environmental restoration activities in Frenchman Flat, Yucca Flat, Jackass Flats, and Mercury Valley. Estimated number of desert tortoises affected ranges from 4 to 26; all by harassment.	Approximately 1,205 acres of currently undisturbed desert tortoise habitat would be affected because of additional waste management activities. Estimated number of desert tortoises affected ranges from 4 to 33; all by harassment.	Same as under the No Action Alternative.
	Total new disturbed area (about 1,110 acres) would be 0.14 percent of undisturbed land on the NNSS.	Total new disturbed area (about 1,555 acres) would be 0.2 percent of undisturbed land on the NNSS.	
Nondefense Mission	Over the next 10 years, up to 125 desert tortoises would be taken on NNSS roadways, due to non-project vehicle travel. Fewer than 20 of these desert tortoises are expected to be taken by injury or mortality.	Over the next 10 years, up to 125 desert tortoises would be taken on NNSS roadways, due to non-project vehicle travel. Fewer than 20 of these desert tortoises are expected to be taken by injury or mortality.	Over the next 10 years, up to 125 desert tortoises would be taken on NNSS roadways, due to non-project vehicle travel. Fewer than 20 of these desert tortoises are expected to be taken by injury or mortality.
	Approximately 2,650 acres of currently undisturbed desert tortoise habitat in Jackass Flats, Mercury Valley, and Frenchman Flats would be affected by DOE/NNSA activities, including a 240-megawatt commercial solar power generation facility in Jackass Flats. Estimated number of desert tortoises affected ranges from 0 to 41; all by harassment.	Approximately 10,535 acres of currently undisturbed desert tortoise habitat in Jackass Flats, Mercury Valley, and Frenchman Flats would be affected by DOE/NNSA activities, including 1,000 megawatts of commercial solar power generation facilities in Jackass Flats. Estimated number of desert tortoises affected ranges from 4 to 178; all by harassment.	Approximately 1,200 acres of currently undisturbed desert tortoise habitat in Jackass Flats, Mercury Valley, and Frenchman Flats would be affected by DOE/NNSA activities, including a 100-megawatt commercial solar power generation facility in Jackass Flats. Estimated number of desert tortoises affected ranges from 0 to 19; all by harassment.
	Total new disturbed area (about 2,650 acres) would be 0.34 percent of undisturbed land on the NNSS.	Total new disturbed area (about 10,867 acres) would be 1.37 percent of undisturbed land on the NNSS.	Total new disturbed area (about 1,200 acres) would be 0.15 percent of undisturbed land on the NNSS.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Air quality</b> (for details go to Chapter 5, Sections 5.1.8, 5.1.8.1, 5.1.8.2, and 5.1.8.3 and Appendix D)			
<i>Annual Average Operational Emission in 2015 (tons per year)</i>			
<i>PM<sub>10</sub></i>	6.8	20.1	4.4
<i>PM<sub>2.5</sub></i>	3.4	8.1	2.6
<i>CO</i>	123.3	160.9	109.8
<i>NO<sub>x</sub></i>	39.7	56.6	36.3
<i>SO<sub>2</sub></i>	0.73	1.1	0.43
<i>VOC</i>	5.9	11.0	4.8
<i>Lead</i>	0.030	~0.010	0.0024
<i>Hazardous Air Pollutants</i>	0.41	0.53	0.40
<i>CO<sub>2</sub>-equivalent</i>	39,300	49,700	37,500
<i>Peak Year Construction Emissions (tons per year)</i>			
<i>PM<sub>10</sub></i>	20.0	129.1	8.4
<i>PM<sub>2.5</sub></i>	6.0	35.6	2.6
<i>CO</i>	44.8	296.5	24.4
<i>NO<sub>x</sub></i>	56.0	388.6	24.4
<i>SO<sub>2</sub></i>	0.14	0.68	0.08
<i>VOC</i>	6.2	41.6	2.8
<i>Lead</i>	0.0000089	0.000013	0.0000071
<i>Hazardous Air Pollutants</i>	0.038	0.058	0.030
<i>CO<sub>2</sub>-equiv (tons per year)</i>	45,000	74,800	40,300
<i>Radiological Air Quality</i>			
	No activities are expected to produce aboveground radiation beyond those documented for 2008 baseline conditions.	Except for depleted uranium and radiotracer experiments, no additional activities are expected to produce aboveground radiation beyond those documented for 2008 baseline conditions.	No activities are expected to produce aboveground radiation beyond those documented for 2008 baseline conditions.
<b>Visual Resources</b> (for details go to Chapter 5, Sections 5.1.9, 5.1.9.1, 5.1.9.2, and 5.1.9.3)			
National Security/Defense Mission	No impacts on visual resources.	No impacts on visual resources.	No impacts on visual resources.
Environmental Management Mission	No impacts on visual resources.	No impacts on visual resources.	No impacts on visual resources.
Nondefense Mission	Construction and operation of a solar power generation facility over 2,400 acres of land would reduce the visual quality from a Class B to a Class C rating in portions of Area 25 visible to viewers on U.S. Route 95.	Construction of approximately 200,000 square feet of additional facilities would be added to Desert Rock Airport that would have an adverse effect on visual resources visible from U.S. Route 95. Construction and operation of commercial solar power generation facilities and associated transmission lines over about 10,300 acres of land would reduce the visual quality from a Class B to a Class C rating in portions of Area 25 visible to viewers on U.S. Route 95. A Geothermal Power Project could alter the visual character and reduce visual quality if facilities are built along U.S. Route 95.	Construction and operation of a commercial solar power generation facility over 1,200 acres of land may occur; if so, it would reduce the visual quality from a Class B to a Class C rating in portions of Area 25 visible to viewers on U.S. Route 95.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Cultural Resources</b> (for details go to Chapter 5, Section 5.1.10, 5.5.1.10.1, 5.1.10.2, and 5.1.10.3)			
National Security/Defense Mission	Approximately 700 acres of undisturbed land would be affected by activities in Frenchman, Yucca, and Jackass Flats; Mercury Valley; and Fortymile Canyon. An estimated 24 cultural resource sites would be involved, of which an estimated 10 may be NRHP-eligible.	Approximately 13,455 acres of undisturbed land would be affected in the same areas as under the No Action Alternative. An estimated 624 cultural resource sites would be involved, of which an estimated 265 may be NRHP-eligible.	Approximately 430 acres of undisturbed land would be affected in the same areas as under the No Action Alternative. An estimated 16 cultural resource sites would be involved, of which an estimated 6 may be NRHP-eligible.
Environmental Management Mission	Approximately 1,110 acres of undisturbed land would be affected, primarily by environmental restoration activities in Frenchman, Yucca, and Jackass Flats; Emigrant and Mercury Valleys; and Fortymile Canyon. An estimated 29 cultural resource sites would be involved, of which an estimated 7 may be NRHP-eligible.	Approximately 1,555 acres of undisturbed land would be affected because of additional waste management activities. An estimated 43 cultural resource sites would be involved, of which an estimated 12 may be NRHP-eligible.	Same as under the No Action Alternative.
Nondefense Mission	No impacts on cultural resources for DOE/NNSA infrastructure and energy conservation activities.	Approximately 517 acres of undisturbed land would be affected by DOE/NNSA infrastructure and renewable energy projects. An estimated 15 cultural resource sites may be involved, of which an estimated 6 would be NRHP-eligible.	Same as under the No Action Alternative for DOE/NNSA activities.
	Approximately 2,650 acres of undisturbed land in the Jackass Flats area would be affected by commercial renewable energy development. An estimated 1,802 cultural resource sites would be involved, of which an estimated 557 would be NRHP-eligible.	Approximately 10,300 acres of undisturbed land would be affected by commercial renewable energy projects. An estimated 7,004 cultural resource sites would be involved, of which an estimated 2,163 would be NRHP-eligible. Approximately 50 acres of undisturbed land would be affected by development of a Geothermal Power Demonstration Project in the Yucca Flat area. An estimated 2 cultural resource sites may be involved, of which 1 would be NRHP-eligible	Approximately 1,200 acres of undisturbed land in the Fortymile Canyon–Jackass Flats area would be affected by commercial renewable energy development. An estimated 816 cultural resource sites would be involved, of which an estimated 252 may be NRHP-eligible.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Waste Management (10-year volumes)</b> (for details go to Chapter 5, Sections 5.1.11.1, 5.1.11.2, and 5.1.11.3)			
LLW	15,000,000 cubic feet of LLW is within the disposal capacity of the Area 5 RWMC.	48,000,000 cubic feet of LLW is within the disposal capacity of the Area 3 RWMS and the Area 5 RWMC.	Same as under the No Action Alternative.
MLLW	900,000 cubic feet of MLLW is within the permitted disposal capacity of Cell 18 in the Area 5 RWMC.	Disposal of 4,000,000 cubic feet of MLLW would require additional permitted MLLW disposal capacity at the Area 5 RWMC	Same as under the No Action Alternative.
TRU waste	9,600 cubic feet generated by DOE/NNSA activities in Nevada. All TRU waste disposed within available capacity at WIPP.	19,000 cubic feet generated by DOE/NNSA activities in Nevada. All TRU waste disposed within available capacity at WIPP.	7,100 cubic feet generated by DOE/NNSA activities in Nevada. All TRU waste disposed within available capacity at WIPP.
Hazardous waste	Total of 210,000 cubic feet, includes 42,000 cubic feet generated by a commercial solar power generation facility. All would be recycled, treated, and/or disposed within available offsite capacity.	Total of 340,000 cubic feet, includes 170,000 cubic feet generated by commercial solar power generation facilities. All would be recycled, treated, and/or disposed within available offsite capacity.	Total of 190,000 cubic feet, includes 17,000 cubic feet generated by a commercial solar power generation facility. All would be recycled, treated, and/or disposed within available offsite capacity.
Solid waste	Total of 3,800,000 cubic feet, includes 3,700,000 cubic feet generated by DOE/NNSA activities in Nevada and 160,000 cubic feet generated by construction and operation of a 240-megawatt commercial solar power generation facility. DOE/NNSA solid waste disposed at the NNSC would not exceed the disposal capacity at NNSC landfills. Included in the DOE/NNSA volume are 370,000 cubic feet that would be transported off site to be recycled within available offsite capacity. Disposal of waste generated by a commercial solar power generation facility would be the responsibility of that project. NNSC disposal capacity would not be impacted under current permit conditions.	Total of 10,000,000 cubic feet, includes 9,400,000 cubic feet generated by DOE/NNSA activities in Nevada and 630,000 cubic feet generated by construction and operation of 1,000 megawatts of commercial solar power generation facilities. DOE/NNSA solid waste disposed at the NNSC would not exceed the disposal capacity at NNSC landfills. Included in the DOE/NNSA volume are 970,000 cubic feet that would be transported off site to be recycled within available offsite capacity. Disposal of waste generated by a commercial solar power generation facility would be the responsibility of that project. NNSC disposal capacity would not be impacted under current permit conditions.	Total of 3,700,000 cubic feet, includes 3,600,000 cubic feet generated by DOE/NNSA activities in Nevada and 77,000 cubic feet generated by construction and operation of a 100-megawatt commercial solar power generation facility. DOE/NNSA solid waste disposed at the NNSC would not exceed the available capacity at NNSC landfills. Included in the DOE/NNSA volume are 360,000 cubic feet that would be transported off site to be recycled within available offsite capacity. Disposal of waste generated by a commercial solar power generation facility would be the responsibility of that project. NNSC disposal capacity would not be impacted under current permit conditions.
<b>Human Health</b> (for details go to Chapter 5, Sections 5.1.12, 5.1.12.1, 5.1.12.2, and 5.1.12.3 and Appendix G)			
<i>Annual Radiological Impacts of Normal Operations</i> (for details go to Chapter 5, Sections 5.1.12.1.1, 5.1.12.1.2, 5.1.12.1.3, and 5.1.12.1.4 and Appendix G)			
Offsite Population			
	Dose (person-rem)	0.50	0.89
	Risk (LCFs)	$3 \times 10^{-4}$	$5 \times 10^{-4}$
MEI			
	Dose (millirem)	2.8	4.8
	Risk (LCFs)	$2 \times 10^{-6}$	$3 \times 10^{-6}$
Workers			
	Collective Dose (person-rem)	5.2	6.6
	Risk (LCFs)	$3 \times 10^{-3}$	$4 \times 10^{-3}$

	<i>No Action Alternative</i>		<i>Expanded Operations Alternative</i>		<i>Reduced Operations Alternative</i>	
<i>Annual Industrial Accident Incidence Rate</i> (unless noted otherwise)						
	<i>TRC</i>	<i>DART</i>	<i>TRC</i>	<i>DART</i>	<i>TRC</i>	<i>DART</i>
Nevada National Security Site, including Commercial Solar Power Facility Operations	32	14	44	20	28	13
Commercial Solar Power Facility Operations only	6.2	3.2	8.3	4.2	5.2	2.7
Commercial Solar Power Generation Facility – Construction (per project duration) <sup>d</sup>	60	31	110	56	44	23
<i>Annual Industrial Accident Fatality Rates</i>						
Nevada National Security Site, including Commercial Solar Power Facility Operations (maximum annual incidence)	0.019 <sup>e</sup>		0.031 <sup>f</sup>		0.015 <sup>g</sup>	
Commercial Solar Power Generation Facility Construction (during construction period)	0.019		0.029 <sup>h</sup>		0.015	
<i>Noise Impacts</i>						
Workers	Mitigated through worker protection practices.		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
Public	Minimal due to remoteness of site and distance to receptors.		Same as under the No Action Alternative, but there would be some increased traffic noise due to larger workforce and increase in daily truck trips.		Similar to the No Action Alternative, but slightly reduced due to smaller workforce.	
<i>Facility Accident – Dose Consequence and Annual Risk</i> <sup>b</sup> (for details go to Chapter 5, Sections 5.1.12.2.1, 5.1.12.2.2, and 5.1.12.2.3 and Appendix G)						
Highest Risk Facility Accident – DAF explosion involving 55 pounds of high explosive and 1 kilogram of plutonium (assumed frequency 1 in 1,250 years)						
<i>Offsite Population</i>						
Dose (person-rem)	23		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
Risk (LCFs per year)	$1 \times 10^{-5}$		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
<i>MEI</i>						
Dose (rem)	0.18		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
Risk (LCFs per year)	$9 \times 10^{-8}$		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
<i>Noninvolved Workers</i>						
Dose (rem)	6.5		Same as under the No Action Alternative.		Same as under the No Action Alternative.	
Risk (LCFs per year)	$3 \times 10^{-6}$		Same as under the No Action Alternative.		Same as under the No Action Alternative.	

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Environmental Justice</b> (for details go to Chapter 5, Sections 5.1.13.1, 5.1.13.2, and 5.1.13.3)			
	Impacts on low-income and minority populations would be identical to those of the general population. Therefore, no disproportionately high and adverse impacts on minority and low-income populations are expected. An increase in construction jobs for the solar power generation facility could provide jobs for unemployed individuals, which would have a beneficial impact on low-income individuals.	Same as under the No Action Alternative, except there would be a larger number of construction jobs created.	Same as under the No Action Alternative, except there would be fewer construction jobs created.

CO = carbon monoxide; CO<sub>2</sub>-equivalent = carbon dioxide-equivalent; DAF = Device Assembly Facility; DART = days away, restrictive, or transferred; D&D = decontamination and decommissioning; FTE = full-time equivalent; LCF = latent cancer fatality; LLW = low-level radioactive waste; MEI = maximally exposed individual; MLLW = mixed low-level radioactive waste; NNSA = National Nuclear Security Administration; NO<sub>x</sub> = nitrogen oxides; NRHP = National Register of Historic Places; NNSS = Nevada National Security Site; OST = Office of Secure Transportation; PM<sub>n</sub> = particulate matter with an aerodynamic diameter of *n* micrometers or less; rem = roentgen equivalent man; RWMC = Radioactive Waste Management Complex; RWMS = Radioactive Waste Management Site; SO<sub>2</sub> = sulfur dioxide; TRC = total recordable cases; TRU = transuranic waste; UGTA = Underground Test Area; VOC = volatile organic compound; WIPP = Waste Isolation Pilot Plant.

<sup>a</sup> The reported radiological risks are the projected number of LCFs in the population and are therefore presented as whole numbers. The calculated value is shown in parentheses.

<sup>b</sup> The risk is the annual increased likelihood of an LCF in the MEI or the noninvolved worker or the increased likelihood of a single LCF occurring in the offsite population, accounting for the estimated probability (frequency) of the accident occurring.

<sup>c</sup> Increased risk of an LCF to an individual, assuming the accident occurs. The risk value is doubled for individual doses exceeding 20 rem (NCRP 1993).

<sup>d</sup> Based on 500 full-time equivalent workers for a 35-month construction period for the No Action Alternative; 750 full-time equivalent workers for a 42-month construction period for the Expanded Operations Alternative; and 400 full-time equivalent workers for a 32-month construction period for the Reduced Operations Alternative.

<sup>e</sup> Annualized value based on 500 full-time equivalent workers for a 35-month solar power facility construction period.

<sup>f</sup> Annual value includes value from NNSA construction activities and an annualized rate from solar power facility construction (see footnote h).

<sup>g</sup> Annualized value based on 400 full-time equivalent workers for a 32-month solar power facility construction period.

<sup>h</sup> Annualized value based on 750 full-time equivalent workers for a 42-month solar power facility construction period.

Sources: BLS 2010a; DOE 2010i.

**Table 3–4 Summary of Potential Impacts at the Remote Sensing Laboratory**

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Land Use</b> (for details go to Chapter 5, Section 5.2.1)			
	No impacts were identified from the continuation of activities at the current levels of operations or foreseeable actions because activities under this alternative would continue to be compatible with existing land use designations on Nellis Air Force Base.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Infrastructure and Energy</b> (for details go to Chapter 5, Sections 5.2.2.1, and 5.2.2.2, and 5.2.2.3)			
	<p>Infrastructure would be maintained as needed to accommodate ongoing activities. No new buildings or facilities are planned.</p> <p>Energy demand is expected to continue at about 4,850 megawatt-hours per year and the existing electrical distribution is adequate to support this demand.</p> <p>Natural gas use is expected to continue to be about 33,673 therms per year. There is adequate capacity to serve this demand and the condition of the gas lines is satisfactory.</p> <p>Approximately 11,000 gallons of JP-8 jet fuel are used each year for aircraft operations. An adequate supply of JP-8 is available directly through Nellis Air Force Base.</p>	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Transportation and Traffic</b> (for details go to Chapter 5, Sections 5.2.3.1, and 5.2.3.2)			
<i>Transportation</i>	No radioactive materials transported. Nonradioactive material transports are included in Nevada National Security Site impacts.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>Traffic</i>	The number of personnel at RSL is expected to remain the same and there are no construction or other projects proposed that would result in increased traffic. There would be no additional impacts on onsite or regional traffic	Same as under the No Action Alternative.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
	conditions.		
<b>Socioeconomics</b> (for details go to Chapter 5, Section 5.2.4)			
	There would be no change in employment; therefore, there would be no change in socioeconomic impacts.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Geology and Soils</b> (for details go to Chapter 5, Section 5.2.5)			
	There would be no impacts on geological and soil resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Hydrology</b> (for details go to Chapter 5, Sections 5.2.6.1, 5.2.6.2, and 5.2.6.3)			
<i>Surface Water Resources</i>	No proposed activities would affect surface hydrology.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>Groundwater Resources</i>	No proposed facilities or activities would adversely affect groundwater quality or supply.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Biological Resources</b> (for details go to Chapter 5, Section 5.2.7)			
	All activities would occur in previously disturbed, developed areas and would not affect biological resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Air Quality</b> (for details go to Chapter 5, Sections 5.2.8.1.1, 5.2.8.1.2, and 5.2.8.1.3)			
<i>Annual Average Operational Emission in 2015 (tons per year)</i>			
<i>PM<sub>10</sub></i>	0.084	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>PM<sub>2.5</sub></i>	0.067		
<i>CO</i>	4.1		
<i>NO<sub>x</sub></i>	1.6		
<i>SO<sub>2</sub></i>	0.034		
<i>VOC</i>	0.3		
<i>Lead</i>	~0.01		
<i>Hazardous Air Pollutants CO<sub>2</sub>-equivalent</i>	0.19 3,147		
<i>Radiological Air Quality</i>	No activities are expected to produce radiation beyond those documented for 2008 baseline conditions.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Visual Resources</b> (for details go to Chapter 5, Sections 5.2.9.1, 5.2.9.2, and 5.1.9.3)			
	There would be no impacts on visual resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Cultural Resources</b> (for details go to Chapter 5, Section 5.2.10)			
	All activities would occur in previously disturbed, developed areas and would not affect cultural resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Waste Management</b> (for details go to Chapter 5, Section 5.2.11)			
Hazardous waste	Annually, about 680 cubic feet of hazardous waste generated and transported to be recycled, treated, and/or disposed within available offsite capacity.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Solid waste	Annually, about 4,550 cubic feet generated and transported to be recycled or disposed within available offsite capacity.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Human Health</b> (for details go to Chapter 5, Sections 5.2.12, 5.2.12.1, and 5.2.12.2)			
Normal Operations	There would be no radiological or hazardous chemical risks.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Annual Industrial Accident Incidence Rate	<b>TRC</b>	Same as under the No Action Alternative.	Same as under the No Action Alternative.
	<b>DART</b>		
	32	14	
Noise	Noise from Remote Sensing Laboratory activities and traffic would be minimal compared to ambient traffic noise and aircraft noise at Nellis Air Force Base.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Facility Accidents	There would be no radiological or hazardous chemical accident risks.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Environmental Justice</b> (for details go to Chapter 5, Section 5.2.13, 5.2.13.1, 5.2.13.2, and 5.2.13.3)			
	Impacts on low-income and minority populations would be identical to those of the general population. Therefore, no disproportionately high and adverse impacts on minority and low-income populations are expected.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

CO = carbon monoxide; CO<sub>2</sub>-equivalent = carbon dioxide-equivalent; DART = days away, restrictive, or transferred; NO<sub>x</sub> = nitrogen oxides; PM<sub>n</sub> = particulate matter with an aerodynamic diameter of *n* micrometers or less; RSL = Remote Sensing Laboratory; SO<sub>2</sub> = sulfur dioxide; TRC = total recordable cases; VOC = volatile organic compound.

**Table 3–5 Summary of Potential Impacts at the North Las Vegas Facility**

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Land Use</b> (for details go to Chapter 5, Section 5.3.1)			
	No impacts were identified from the continuation of activities at the current levels of operations or foreseeable actions because activities under this alternative would continue to be compatible with existing land use designations.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Infrastructure and Energy</b> (for details go to Chapter 5, Sections 5.3.2.1 and 5.3.2.2)			
	Infrastructure would be maintained as needed to accommodate ongoing activities. No new buildings or facilities are planned.  Electric energy demand is expected to continue at about 15,000 megawatt-hours per year and the existing electrical distribution is adequate to support this demand.  Natural gas use is expected to continue to be about 48,000 therms per year. There is adequate capacity to serve this demand.	Same as under the No Action Alternative for infrastructure, plus.  Electric energy demand would increase by no more than 10 percent. The capacity of the electrical distribution system and the capability of commercial providers are adequate to supply the needed electrical energy.	Same as under the No Action Alternative for infrastructure.  Electrical energy demand is expected to be the same as under the No Action Alternative or slightly lower.
<b>Transportation</b> (for details go to Chapter 5, Sections 5.3.3.1 and 5.3.3.2)			
<i>Transportation</i>	No radioactive materials analyzed. Nonradioactive material transports are included in NNSS impacts.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>Traffic</i>	No increase in traffic volume due to NLVF-related traffic compared to the projected baseline; levels of service would remain the same.	Approximately a 2 percent increase in daily traffic volumes during peak hours on local roads, when compared to the projected baseline; levels of service would remain the same.	Less than 1 percent decrease in daily traffic volumes during peak hours on local roads; levels of service would remain the same.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Socioeconomics</b> (for details go to Chapter 5, Sections 5.3.4.1, 5.3.4.2, and 5.3.4.3)			
	There would be no change in employment; therefore, there would be no change in socioeconomic impacts.	<p>Employment would increase by 361 FTEs; about 36 employees would relocate from outside the region. Up to 3 new teaching jobs would need to be filled to maintain the current student-to-teacher ratio. Sufficient housing exists in the region to support the increased population.</p> <p>Direct jobs would reduce unemployment by 0.27 and 0.12 percent in Clark and Nye Counties, respectively.</p> <p>Direct jobs and indirect jobs would have a beneficial effect on the local economy and government revenues.</p> <p>The addition of 361 employees would result in an increase in the number of service calls, but would have a negligible impact on area hospitals and hospital personnel.</p>	<p>Employment would decrease by 45 FTEs, increasing unemployment in Clark County by about 0.12 percent and in Nye County by about 0.04 percent. Additional employees would not relocate to Clark or Nye County and there would be no impact on student-to-teacher ratios.</p> <p>Job loss would have a small negative impact on the local economy and government revenues. There would be no impact on public services.</p>
<b>Geology and Soils</b> (for details go to Chapter 5, Sections 5.3.5.1, 5.3.5.2, and 5.3.5.3)			
	Proposed activities would not affect geological and soil resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Hydrology</b> (for details go to Chapter 5, Sections 5.3.6.1, and 5.3.4.2)			
<i>Surface Water Resources</i>	Proposed activities would not affect surface hydrology.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>Groundwater Resources</i>	Proposed activities would not adversely affect groundwater quality or supply.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Biological Resources</b> (for details go to Chapter 5, Sections 5.3.7)			
	All activities would occur in previously disturbed, developed areas and would not affect native biological resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Air Quality</b> (for details go to Chapter 5, Sections 5.3.8.1, 5.3.8.2, and 5.3.8.3)			
<i>Annual Average Operational Emission in 2015 (tons per year)</i>			
<i>PM<sub>10</sub></i>	0.36	0.44	0.33
<i>PM<sub>2.5</sub></i>	0.24	0.28	0.21
<i>CO</i>	24.4	30.5	22.0
<i>NO<sub>x</sub></i>	5.9	7.2	5.4
<i>SO<sub>2</sub></i>	0.079	0.095	0.072
<i>VOC</i>	0.77	0.96	0.70
<i>Lead</i>	<0.01	<0.01	<0.01
<i>Hazardous Air Pollutants</i>	0.062	0.078	0.056
<i>CO<sub>2</sub>-equivalent</i>	8,378	9,031	8,118
<i>Radiological Air Quality</i>	No activities are expected to produce radiation beyond those documented for 2008 baseline conditions.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Visual Resources</b> (for details go to Chapter 5, Sections 5.3.9.1, 5.3.9.2, and 5.3.9.3)			
	There would be no impacts on visual resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Cultural Resources</b> (for details go to Chapter 5, Section 5.3.10)			
	All activities would occur in previously disturbed, developed areas and would not affect cultural resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Waste Management</b> <sup>b</sup> (for details go to Chapter 5, Section 5.3.11)			
LLW	150 cubic feet generated over the next 10 years and disposed within available capacity at the NNSS in the Area 5 RWMC.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Hazardous waste	1,100 cubic feet generated over the next 10 years and shipped off site to be recycled, treated, and/or disposed within available capacity.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Solid waste	500,000 cubic feet generated over the next 10 years and shipped off site to be recycled or disposed within available capacity.	590,000 cubic feet generated over the next 10 years and shipped off site to be recycled or disposed within available capacity.	460,000 cubic feet generated over the next 10 years and shipped off site to be recycled or disposed within available capacity.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>			
<b>Human Health</b> (for details go to Chapter 5, Sections 5.3.12.1 and 5.3.12.2)						
Offsite Population Dose (person-rem) Risk (LCFs)	$4.1 \times 10^{-5}$ $2 \times 10^{-8}$	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
MEI or noninvolved worker Dose (millirem) Risk (LCFs)	$3.5 \times 10^{-4}$ $2 \times 10^{-10}$					
<i>Annual Industrial Accident Incidence Rate</i>						
	<i>TRC</i>	<i>DART</i>	<i>TRC</i>	<i>DART</i>	<i>TRC</i>	<i>DART</i>
North Las Vegas Facility – Site Operations	22	9.5	27	12	20	8.6
Noise	Noise from NLVF-related activities and traffic would not exceed ambient traffic noise.	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
Facility Accidents	There would be negligible radiological or hazardous chemical accident risks.	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
<b>Environmental Justice</b> (for details go to Chapter 5, Sections 5.3.13.1, 5.3.13.2, and 5.3.13.3)						
	Impacts on low-income and minority populations would be identical to those of the general population. Therefore, no disproportionately high and adverse impacts on minority and low-income populations are expected.	Same as under the No Action Alternative.	Same as under the No Action Alternative.			

CO = carbon monoxide; CO<sub>2</sub>-equivalent = carbon dioxide-equivalent; DART=days away, restrictive, or transferred; FTE = full-time equivalent; LCF = latent cancer fatality; LLW = low-level radioactive waste; MEI = maximally exposed individual; MLLW = mixed low-level radioactive waste; NLVF = North Las Vegas Facility; NO<sub>x</sub> = nitrogen oxides; NNSS = Nevada National Security Site; PM<sub>n</sub> = particulate matter with an aerodynamic diameter of *n* micrometers or less; rem = roentgen equivalent man; RWMC = Radioactive Waste Management Complex; SO<sub>2</sub> = sulfur dioxide; TRC=total recordable cases; VOC = volatile organic compound.

<sup>a</sup> Does not include tritiated liquids shipped from NLVF to the NNSS for treatment.

<sup>b</sup> The volumes of LLW generated at NLVF under the three alternatives shown in this table are included in the volumes of LLW to be disposed at the NNSS under the appropriate alternatives in Table 3–3.

**Table 3–6 Summary of Potential Impacts at the Tonopah Test Range**

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Land Use</b> (for details go to Chapter 5, Section 5.4.1)			
	There would be no impact on land use from the continuation of activities at the current levels of operations because activities would continue to be compatible with existing land use designations on the TTR and primary land uses on the Nevada Test and Training Range.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
	<i>Airspace</i> No new impacts were identified for airspace activities because these activities would be maintained at the current level of air traffic, navigational aid services, airspace structure, and coordinated and scheduled by the Nellis Air Traffic Control Facility.	<i>Airspace</i> Same as under the No Action Alternative.	<i>Airspace</i> Impacts would be slightly reduced compared to the No Action Alternative because of the discontinuation of fixed rocket and missile launches, cruise missile operations, and detonation of fuel-air explosives at the TTR, which would increase the restricted airspace availability for other military uses as coordinated and scheduled by the Nellis Air Traffic Control Facility.
<b>Infrastructure and Energy</b> (for details go to Chapter 5, Sections 5.4.2.1 and 5.3.4.2)			
	Infrastructure would be maintained as needed to accommodate ongoing activities. No new buildings or facilities are planned.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Transportation <sup>a</sup> and Traffic</b> (for details go to Chapter 5, Sections 5.4.3.1 and 5.4.3.2)			
TTR LLW/MLLW			
<i>Incident-free truck transport</i>			
worker risk (LCF)	0 (0.0008)	0 (0.003)	0 (0.0001)
population risk (LCF)	0 (0.00004)	0 (0.0002)	0 (0.00001)
<i>Transport accidents</i>			
radiological risk (LCF)	0 ( $3 \times 10^{-9}$ )	0 ( $1 \times 10^{-8}$ )	0 ( $1 \times 10^{-7}$ )
nonradiological fatalities	0 (0.03)	0 (0.1)	0 (0.03)
Nonradiological waste transport fatalities	Nonradioactive material transports included in Nevada National Security Site impacts.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Traffic	Up to 2 additional truck trips per day from Environmental Restoration radioactive waste transport; minimal impacts on onsite and regional traffic conditions.	Up to 10 additional truck trips per day from Environmental Restoration radioactive waste transport; minimal impacts on onsite and regional traffic conditions.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Socioeconomics</b> (for details go to Chapter 5, Sections 5.4.4.1, 5.4.4.2, and 5.4.4.3)			
	No change in employment; therefore, no change in socioeconomic impacts.	Employment would decrease by 63 FTEs, which would increase the unemployment rate by about 0.01 percent in Clark County and about 1.64 percent in Nye County.  Local spending would decrease and revenues for Clark and Nye Counties could decrease. This small decrease would have a negligible adverse impact on local economies. There would be no impact on public services.	Employment would decrease by 67 FTEs, which would increase the unemployment rate by about 0.01 percent in Clark County and about 1.76 percent in Nye County.  Local spending would decrease and revenues for Clark and Nye Counties could decrease. This small decrease would have a negligible adverse impact on local economies. There would be no impact on public services.
<b>Geology and Soils</b> (for details go to Chapter 5, Sections 5.4.5.1, 5.4.5.2, and 5.4.5.3)			
National Security/Defense Mission	There would be localized impacts on soil and geology from tests using gravity weapons, joint test assemblies, and inert projectiles. Some soil contamination could occur. Work for Others – Some localized soil disturbance from a variety of site activities.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Environmental Management Mission	Environmental restoration – Possible disturbance of soil from environmental restoration of contaminated sites. Overall, however, environmental restoration would reduce or stabilize the inventory of legacy contamination.	Same as under the No Action Alternative, plus,  Up to 11,000,000 cubic feet of soil could be removed during environmental restoration activities at the Clean Slate I, II, and III sites. Overall, however, environmental restoration would reduce or stabilize the inventory of legacy contamination.	Same as under the No Action Alternative.
Nondefense Mission	There would be no impacts on geological and soil resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Hydrology</b> (for details go to Chapter 5, Sections 5.4.6.1 and 5.4.5.2)			
<i>Surface Water Resources</i>			
National Security/Defense Mission	Gravity weapons drops and rocket and missile testing could cause alterations of natural drainage pathways and chemical contamination of ephemeral waters. Operation of ground-based remote control vehicles could cause sedimentation to ephemeral waters.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Environmental Management Mission	Environmental restoration projects could cause beneficial restoration of natural drainage pathways and adverse impacts of chemical contamination of and sedimentation to ephemeral waters.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Nondefense Mission	No proposed activities would affect surface hydrology.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<i>Groundwater Resources</i>			
	Proposed activities would not adversely affect groundwater quality or supply.	Same as under the No Action Alternative.	Potable water use would decrease by 50 percent compared to current use because several testing activities would cease.
<b>Biological Resources</b> (for details go to Chapter 5, Section 5.4.7.1)			
	All work would occur in previously disturbed areas and there would be no additional impacts on biological resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Air Quality and Climate</b> (for details go to Chapter 5, Sections 5.4.8.1, 5.4.8.2, and 5.4.8.3)			
<i>Annual Average Operational Emission in 2015 (tons per year)<sup>b</sup></i>			
<i>PM<sub>10</sub></i>	<4.0	<3.8	<3.8
<i>PM<sub>2.5</sub></i>	<4.0	<3.8	<3.8
<i>CO</i>	<10.8	<6.1	<5.8
<i>NO<sub>x</sub></i>	<17.1	<14.8	<14.7
<i>SO<sub>2</sub></i>	<0.93	<0.92	<0.92
<i>VOC</i>	<1.4	<1.1	<1.1
<i>Lead</i>	<0.010	<0.010	<0.010
<i>Hazardous Air Pollutants</i>	<1.1	<1.1	<1.1
<i>CO<sub>2</sub>-equivalent</i>	3,652	1,790	1,671
<i>Radiological Air Quality</i>	No activities are expected to produce radiation beyond those documented for 2008 baseline conditions.	Remediation activities would likely result in increased suspended particulates and higher radiological air emissions relative to those observed in the 2008 baseline conditions. Monitoring would be performed to assess the potential for offsite impacts and the need for mitigating action.	Same as under the No Action Alternative.

	<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>
<b>Visual Resources</b> (for details go to Chapter 5, Sections 5.4.9.1, 5.4.9.2, and 5.4.9.3)			
	No impacts on visual resources.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Cultural Resources</b> (for details go to Chapter 5, Section 5.4.10)			
	All work would occur in previously disturbed areas. DOE/NNSA would consult with the State Historic Preservation Officer prior to environmental restoration of Clean Slate sites I, II, and III because they are considered to be historically significant.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
<b>Waste Management</b> <sup>e</sup> (for details go to Chapter 5, Section 5.4.11)			
LLW	200,000 cubic feet generated by Environmental Restoration activities would be disposed within available capacity at the NNSA Area 5 RWMC.	11,000,000 cubic feet generated by Environmental Restoration activities would be disposed within available capacity at the NNSA Area 5 RWMC and Area 3 RWMS.	Same as under the No Action Alternative.
Hazardous waste	About 4,500 cubic feet of hazardous waste would be generated over the next 10 years that would be transported to permitted offsite facilities to be recycled, treated, and/or disposed within available capacity.	Same as under the No Action Alternative.	Same as under the No Action Alternative.
Solid waste	33,000 cubic feet disposed at onsite landfills within available capacity. An additional 61,000 cubic feet recycled or disposed at the NNSA or other offsite facilities within available capacity.	16,000 cubic feet disposed at onsite landfills within available capacity. An additional 61,000 cubic feet recycled or disposed at the NNSA or other offsite facilities within available capacity.	15,000 cubic feet disposed at onsite landfills within available capacity. An additional 61,000 cubic feet recycled or disposed at the NNSA or other offsite facilities within available capacity.

		<i>No Action Alternative</i>	<i>Expanded Operations Alternative</i>	<i>Reduced Operations Alternative</i>			
<b>Human Health</b> (for details go to Chapter 5, Sections 5.4.12.1 and, 5.4.5.12.2)							
<i>Annual Radiological Impacts of Normal Operations due to Legacy Soil Contamination</i>							
<i>Offsite Population</i>	Dose (person-rem) Risk (LCFs)	<1 <6 × 10 <sup>-4</sup>	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
<i>MEI</i>	Dose (millirem) Risk (LCFs)	0.024 1.4 × 10 <sup>-8</sup>					
<i>Annual Industrial Accident Incidence Rate</i>							
Tonopah Test Range Industrial – Site Operations		<b>TRC</b>	<b>DART</b>	<b>TRC</b>	<b>DART</b>	<b>TRC</b>	<b>DART</b>
		1.6	0.7	0.7	0.3	0.6	0.3
<i>Noise Impacts</i>							
	<i>Workers</i>	Mitigated through worker protection practices.	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
	<i>Public</i>	Large noises and traffic noise mitigated due to remoteness of site and distance to receptors.	Same as under the No Action Alternative, plus: Minimal increase from higher level of traffic	Same as under the No Action Alternative, except; No large noises – fuel-air explosive experiments would not occur.			
<i>Facility Accidents – Dose Consequence and Annual Risk<sup>c</sup></i>							
<i>Highest Risk Accident (Aircraft crash and fire into multiple containers of contaminated soil - estimated frequency 1 in 590,000 per year)</i>							
<i>Offsite Population</i>	Dose (person-rem) Risk (LCFs per year) <sup>c</sup>	0.012 1 × 10 <sup>-11</sup>	Same as under the No Action Alternative.	Same as under the No Action Alternative.			
<i>MEI</i>	Dose (rem) Risk (LCFs per year) <sup>c</sup>	0.00034 3 × 10 <sup>-13</sup>					
<i>Noninvolved Worker</i>	Dose (rem) Risk (LCFs per year) <sup>c</sup>	1.5 2 × 10 <sup>-9</sup>					
<b>Environmental Justice</b>							
Impacts on low-income and minority populations would be identical to those of the general population. Therefore, no disproportionately high and adverse impacts on minority and low-income populations are expected.							

CO = carbon monoxide; CO<sub>2</sub>-equivalent = carbon dioxide-equivalent; DART = days away, restrictive, or transferred; FTE = full-time equivalent; LCF = latent cancer fatality; LLW = low-level radioactive waste; MEI = maximally exposed individual; NNSA = National Nuclear Security Administration; NO<sub>x</sub> = nitrogen oxides; NNSS = Nevada National Security Site; PM<sub>n</sub> = particulate matter with an aerodynamic diameter of *n* micrometers or less; rem = roentgen equivalent man; RWMC = Radioactive Waste Management Complex; RWMS = Radioactive Waste Management Site; SO<sub>2</sub> = sulfur dioxide; TRC = total recordable cases; TTR = Tonopah Test Range; VOC = volatile organic compound.

<sup>a</sup> The reported radiological risks are the projected number of LCFs in the population and are therefore presented as whole numbers. The calculated value is shown in parentheses.

<sup>b</sup> The emissions under the Expanded Operations would be less than the levels projected under the No Action Alternative, as the Record of Decision for the *Complex Transformation Supplemental Programmatic Environmental Impact Statement* would occur under this Expanded Operations Alternative, resulting in smaller, more-efficient operations and fewer employees at the TTR.

<sup>c</sup> The risk is the annual increased likelihood of an LCF in the MEI or noninvolved worker or the increased likelihood of a single LCF occurring in the offsite population, accounting for the estimated probability (frequency) of the accident occurring.

### **3.5 Alternatives Eliminated from Detailed Study**

A NEPA review specifies the purpose and need for an agency to take action, describes the action that the agency proposes to meet that purpose and need, and identifies reasonable alternatives to meet all or part of the purpose and need. Potential alternatives that would not achieve the purpose and need for an action may be eliminated from detailed consideration. The Council on Environmental Quality's guidance states that reasonable alternatives include those that are practical or feasible from a common sense, technical, and economic standpoint (CEQ 1981). Accordingly, a potential alternative may be eliminated from detailed consideration if it would result in stated objectives not being met within a reasonable timeframe, such that the underlying purpose and need would not be achieved. A potential alternative may also be eliminated from detailed consideration if it would take too long to implement or would be prohibitively expensive or highly speculative in nature. During scoping for this SWEIS, commenters suggested several alternatives that should be considered in the document. NNSA considered those alternatives but did not analyze them in detail in this SWEIS. This section identifies the alternatives that were considered but eliminated from detailed study and provides a brief explanation of the reason for elimination.

#### **3.5.1 Discontinue Operations at the Nevada National Security Site**

Ceasing operations at the NNSS would result in a loss of support for a number of missions and other activities that are critical to national security, including Stockpile Stewardship and Management, Nonproliferation and Counterterrorism, and Homeland Security. In addition, as the only U.S. nuclear weapons testing facility, the NNSS must be available to conduct an underground nuclear test if so directed by the President. Because these activities are vital to national security and are among the major components of the missions assigned to the NNSS by NNSA, discontinuing operations at the NNSS would not achieve the purpose and need stated in Chapter 1.

#### **3.5.2 Transfer the Nevada National Security Site to Another Agency**

One organization provided a scoping comment that suggested that the NNSS should be transferred "out of NNSA control and, indeed, out of the 'active' nuclear weapons complex altogether." The comment cited statements by the President, United Nations resolutions, the Comprehensive Test Ban Treaty, and U.S. initiatives to strengthen the Nonproliferation Treaty as support for considering such an alternative. Although the United States has not ratified the Comprehensive Test Ban Treaty, since 1992, it has observed a moratorium on underground nuclear testing. However, there have been no new policies or legislative direction to abandon the capability to conduct an underground nuclear test if extraordinary events jeopardize the supreme national interests, which, if the United States were a signatory, would be allowed by Article IX of the Comprehensive Test Ban Treaty. Further, transferring the NNSS from NNSA as part of a larger plan to consolidate the Nuclear Weapons Complex is not being considered. NNSA completed the *Complex Transformation SPEIS* (DOE/EIS-0236-S4) (DOE 2008) in October 2008 and announced its Record of Decision (ROD) in December 2008. The *Complex Transformation SPEIS* addressed alternatives for consolidating Nuclear Weapons Complex facilities and activities. Closure of the NNSS and/or transfer of responsibility to another organization were not addressed in the *Complex Transformation SPEIS* or in the ROD. A SWEIS is not an appropriate NEPA document to address a portion of a broader programmatic decision that has not been made or is not under active consideration by the agency. This SWEIS updates previous environmental impact statements (EISs) and other NEPA documents that have provided environmental information supporting a number of decisions about operations at the NNSS. In such situations, an alternative that assumes NNSS operations would cease or be transferred from NNSA would not achieve the purpose and need stated in Chapter 1.

### 3.5.3 Prepare a Programmatic Environmental Impact Statement

In scoping comments for this *NNSS SWEIS*, the Nevada Attorney General expressed that a programmatic EIS should be prepared for the NNSS. DOE defines a site-wide NEPA document as “a broad scope EIS or Environmental Assessment (EA) that is programmatic in nature and identifies and assesses the individual and cumulative impacts of ongoing and reasonably foreseeable future actions at a DOE site.” Although this *NNSS SWEIS* is “programmatic in nature” with regard to DOE/NNSA facilities and activities in the state of Nevada, it would not provide the basis for a DOE programmatic decision, but would provide the basis for site-specific implementation of programmatic decisions that have already been made in existing programmatic EISs and other NEPA documents. Those EISs and other NEPA documents include the *Final Programmatic Environmental Impact Statement for Stockpile Stewardship and Management* (DOE 1996e), the *Final Waste Management Programmatic Environmental Impact Statement for Managing Treatment, Storage, and Disposal of Radioactive and Hazardous Waste* (DOE 1997), *Complex Transformation SPEIS* (DOE 2008l), *Final Environmental Impact Statement for the Proposed Relocation of Technical Area 18 Capabilities and Materials at the Los Alamos National Laboratory* (DOE 2002h), as well as a number of project-specific environmental assessments. With regard to this *NNSS SWEIS*, DOE NEPA regulations (10 CFR 1021.330(c)) require large, multiple-facility DOE sites, such as the NNSS, to prepare SWEISs. This *NNSS SWEIS* addresses the full range of missions, programs, capabilities, projects, and activities under the purview of NNSA in Nevada. Where project information is sufficiently specific, the analyses are similarly specific and will support implementing decisions by NNSA. Where project information is insufficient to support an implementing decision, or if there are statutory or regulatory uncertainties, a more programmatic description is provided and implementation would require an appropriate level of additional NEPA analysis.

### 3.5.4 Renewable Energy Alternative

NNSA announced in its Notice of Intent for this SWEIS (74 *Federal Register* [FR] 36691) that it would address a Renewable Energy Alternative. During the scoping meetings, several suggestions were made to include renewable energy in each of the alternatives addressed in this SWEIS. NNSA recognizes the need to incorporate, as appropriate, conservation and renewable energy planning as part of the activities it undertakes at the NNSS. Therefore, the Renewable Energy Alternative was not addressed as a separate alternative, but was made part of each of the alternatives addressed in detail in this SWEIS.

### 3.5.5 1996 Record of Decision-Based No Action Alternative

As indicated in its Notice of Intent to prepare this SWEIS, dated July 24, 2009 (74 FR 36691), NNSA initially defined the No Action Alternative as “the continued implementation of the 1996 *NTS EIS* ROD, and the amendment to the ROD for the 1996 *NTS EIS* (65 FR 10061 at 10065) at DOE/NNSA sites in Nevada over the next 10 years.” The Notice of Intent also stated that No Action would “include the implementation of other decisions supported by separate NEPA analyses completed since the issuance of the 1996 *NTS EIS*” as well as “actions analyzed in eight environmental assessments and their associated Findings of No Significant Impacts, as well as actions categorically excluded from the preparation of either an EA or EIS.” The original No Action Alternative considered for analysis in this SWEIS would have addressed significantly higher numbers of many DOE/NNSA activities, based on levels of activities analyzed in the 1996 *NTS EIS*. As development of this SWEIS progressed, it became apparent that those potential levels of activities were unrealistically high in some cases. For this reason, DOE/NNSA decided to base the analysis for the No Action Alternative in this SWEIS on actual levels of operations known to have occurred since 1996. For instance, the 1996 *NTS EIS* analyzed 1,100 potential dynamic plutonium experiments over a 10-year period. Under the No Action Alternative, this SWEIS considers up to 10 such experiments per year, or 100 over the next 10 years.

### **3.6 Identification of the Preferred Alternative**

Council on Environmental Quality regulations for implementing NEPA (40 CFR 1502.14(e)) require an agency to identify its preferred alternative or alternatives, if one or more exists, in the draft EIS. At this time, NNSA has not selected a preferred alternative. NNSA will evaluate the information presented in this *NNSS SWEIS*, the comments received on the draft SWEIS, and other factors before selecting a preferred alternative, which will be identified in the final SWEIS. NNSA may identify an alternative in its entirety, or may identify a “hybrid” preferred alternative comprising various capabilities, projects and activities selected from among the three alternatives.