CHAPTER 2
SITE OVERVIEW AND UPDATE

2.0 SITE OVERVIEW AND UPDATE

Among the responsibilities of the U.S. Department of Energy/National Nuclear Security Administration (DOE/NNSA) are continued stewardship of the Nation's nuclear weapons stockpile and maintenance of a nuclear weapons testing capability. Historically, the primary mission at the Nevada National Security Site (NNSS) (formerly known as the Nevada Test Site) was to conduct nuclear weapons tests. Since the moratorium on nuclear weapons testing in October 1992, the focus at the NNSS has been to support the Stockpile Stewardship and Management Program. However, under a November 1993 Presidential Decision Directive, DOE/NNSA must be able to resume underground nuclear tests within 24 to 36 months if so directed by the President. The NNSA Nevada Site Office (NSO) maintains this test readiness at the NNSS. Because of its favorable environment and infrastructure, the NNSS also supports DOE waste management and disposal; NNSA counterterrorism training, research, and development; nuclear emergency response; nonproliferation; and other research related to national security and nondefense-related research, development, and testing programs.

This chapter of the *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)* provides background on the NNSS and its main facilities, as well as other locations used to support NNSA missions. These facilities include the Remote Sensing Laboratory (RSL), the North Las Vegas Facility (NLVF), and the Tonopah Test Range (TTR) (see Chapter 1, Figure 1–1). While many programs and activities take place on the NNSS, several administrative and technical operations occur at other locations. Research, testing, and operations at RSL focus on conducting emergency response procedures and support, remote sensing, counterterrorism, and radiological incident response. RSL houses fabrication laboratories, shops, and advanced scientific equipment. NNSA/NSO's primary administrative offices are located at NLVF and house Federal and contractor personnel. In addition, facilities for engineering, fabrication, assembly, and calibration and laboratories are located at NLVF. Activities at the TTR support the Stockpile Stewardship and Management Program, as well as research and design of new weapons and weapon components. An overview of the changes that have occurred since DOE issued the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (1996 NTS EIS)* (DOE 1996c) is also provided. Some of the site 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.

2.1 Nevada National Security Site

The NNSS occupies approximately 1,360 square miles of desert and mountain terrain in southern Nevada at the southern end of the Great Basin. Elevations range from 2,700 feet on Jackass Flats in the southern part of the NNSS to 7,680 feet on Rainier Mesa in the mountainous northern region (DOE/NV 2009d) (see **Figure 2–1**). Sparsely vegetated basins or flats, separated by low mountains, dominate the eastern side and southern end of the NNSS—Jackass Flats in the southwestern quadrant, Frenchman Flat and Mercury Valley in the southeastern quadrant, and Yucca Flat in the northeastern quadrant. Frenchman and Yucca Flats each contain a large playa. The northwestern quadrant of the site comprises mountains with a pinyon-juniper forest and sagebrush shrublands separated by canyons; the dominant topographic features in this area are the Shoshone and Timber Mountains near the center and western border and Rainier Mesa and Pahute Mesas in the northwestern region of the site (DOE 2002f; Wills and Ostler 2001).

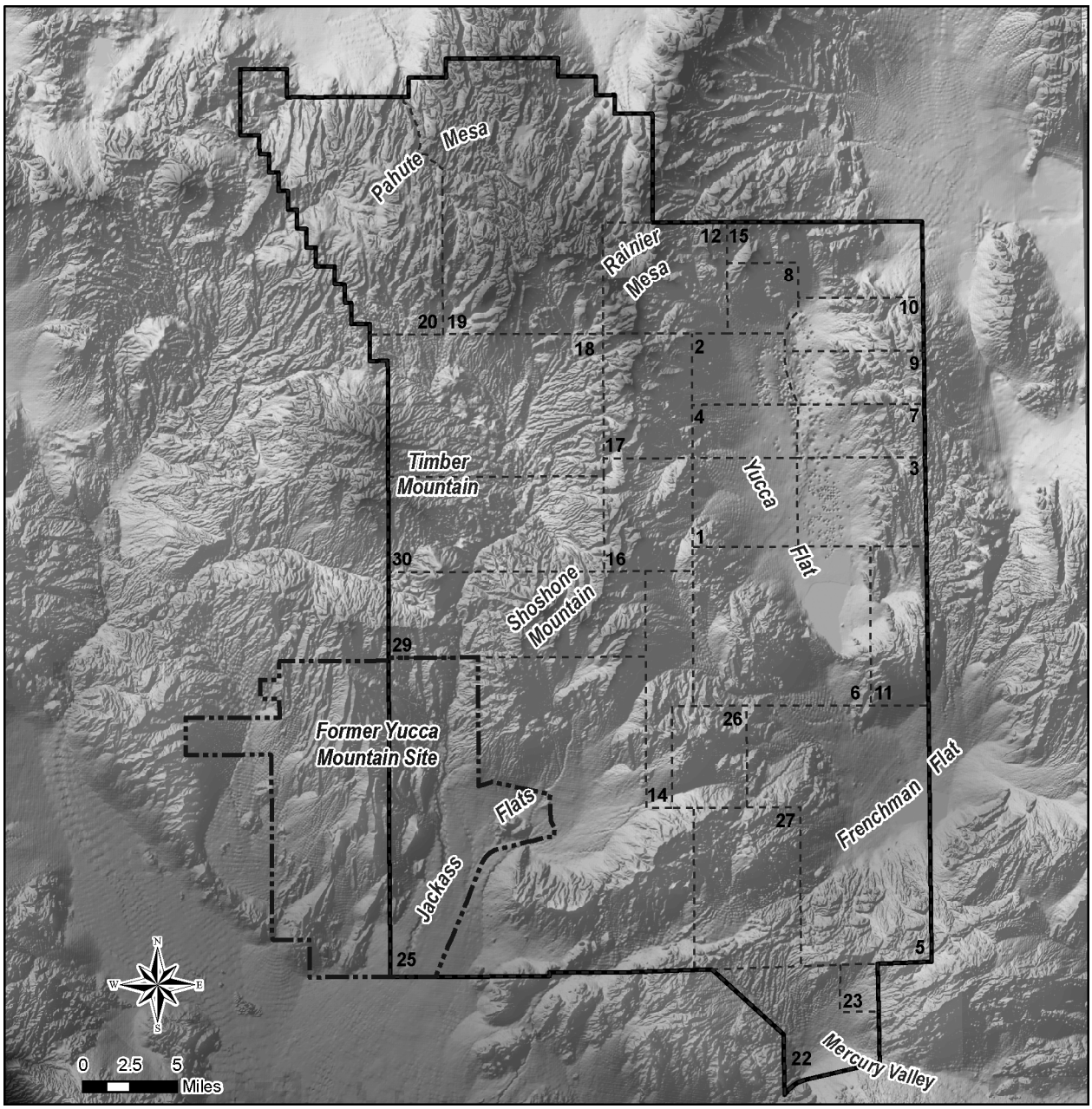

Figure 2–1 Geographic Areas of the Nevada National Security Site

About 6,500 square miles of the U.S. Air Force's (USAF's) Nevada Test and Training Range (formerly the Nellis Air Force Range) and the Desert National Wildlife Refuge surround the NNSS on the northern, western, and eastern sides. Most of the land adjacent to the NNSS is the Nevada Test and Training Range, which is used by the USAF for armament and high-hazard testing; aerial gunnery, rocketry, electronic warfare, and tactical maneuvering training; and equipment and tactics development and training. Public access to this land is restricted, so it serves as an additional buffer between NNSS activities and the general public. The overland distance from the southern edge of the NNSS (Gate 100 near Mercury) to downtown Las Vegas (the intersection of Interstate 15 and U.S. Route 95) is about 57 miles (NNSA 2007).

The NNSS is divided into numbered areas to facilitate management; communications; and the distribution, use, and control of resources (see **Figure 2–2**). The areas are numbered from 1 to 30, although four numbers are missing from the sequence (there are no Areas 13, 21, 24, or 28 on the NNSS). The numbering designations originated when the NNSS was part of the former Nellis Air Force Range (now called the Nevada Test and Training Range). Nellis has since changed the numbers for the Nevada Test and Training Range, but the old numerical designations remain for the NNSS. The missing area numbers previously denoted areas on the range. The approximate size of each area (rounded to whole square miles) and a description of its function are provided in **Table 2–1**.

In addition to dividing the site into administrative areas, NNSA also categorizes the NNSS into land use zones. These zones are discussed in Chapter 4, Section 4.1.1.

American Indian Perspective of the NNSS Area and Offsite Locations

The Nevada National Security Site (NNSS) area and offsite locations are part of the traditional holy lands of the Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone people (Stoffle et al. 1990; Appendix C, Figure C-1). We share this land for medicinal purposes, food, and culturally significant places necessary for traditional narratives and religious ceremonies.

The Consolidated Group of Tribes and Organizations (CGTO) knows these lands contain archaeological remains left by our ancestors. They are home to countless natural resources, such as plants, animals, water, and minerals which are critical to American Indian daily life and religious beliefs. Our ancestral lands contain natural landforms that mark important locations for keeping our history alive and for teaching our children about our culture in detailed Winter Stories. We use traditional sites within these lands to make doctoring tools, stone objects, and ceremonial items. They contain many sites associated with traditional healing ceremonies and power places necessary for our cultural survival. Despite the current physical separation of tribes from our ancestral lands stemming from the actions by the Federal Government, American Indians continue to value and recognize their meaningful role in our culture and continued survival.

Numerous sites have been identified within the NNSS boundaries that are important to American Indian People. For example, Fortymile Canyon is a significant crossroad where trails from distant places such as Owens Valley, Death Valley, and the Avawatz Mountain come together. Black Cone in Crater Flat is an important religious site that is considered an entry to the underworld (AIWS 2005). Prow Pass is a unique ceremonial site and, because of this religious significance, tribal representatives have recommended DOE avoid affecting this area (Stoffle and Evans 1988). Oasis Valley is a known area for trade and doctoring ceremonies. Other locations throughout this area are considered important based on the abundance of artifacts, traditional-use plants and animals, rock art, and potential burial sites (Stoffle et al. 1990).

See Appendix C for more details.

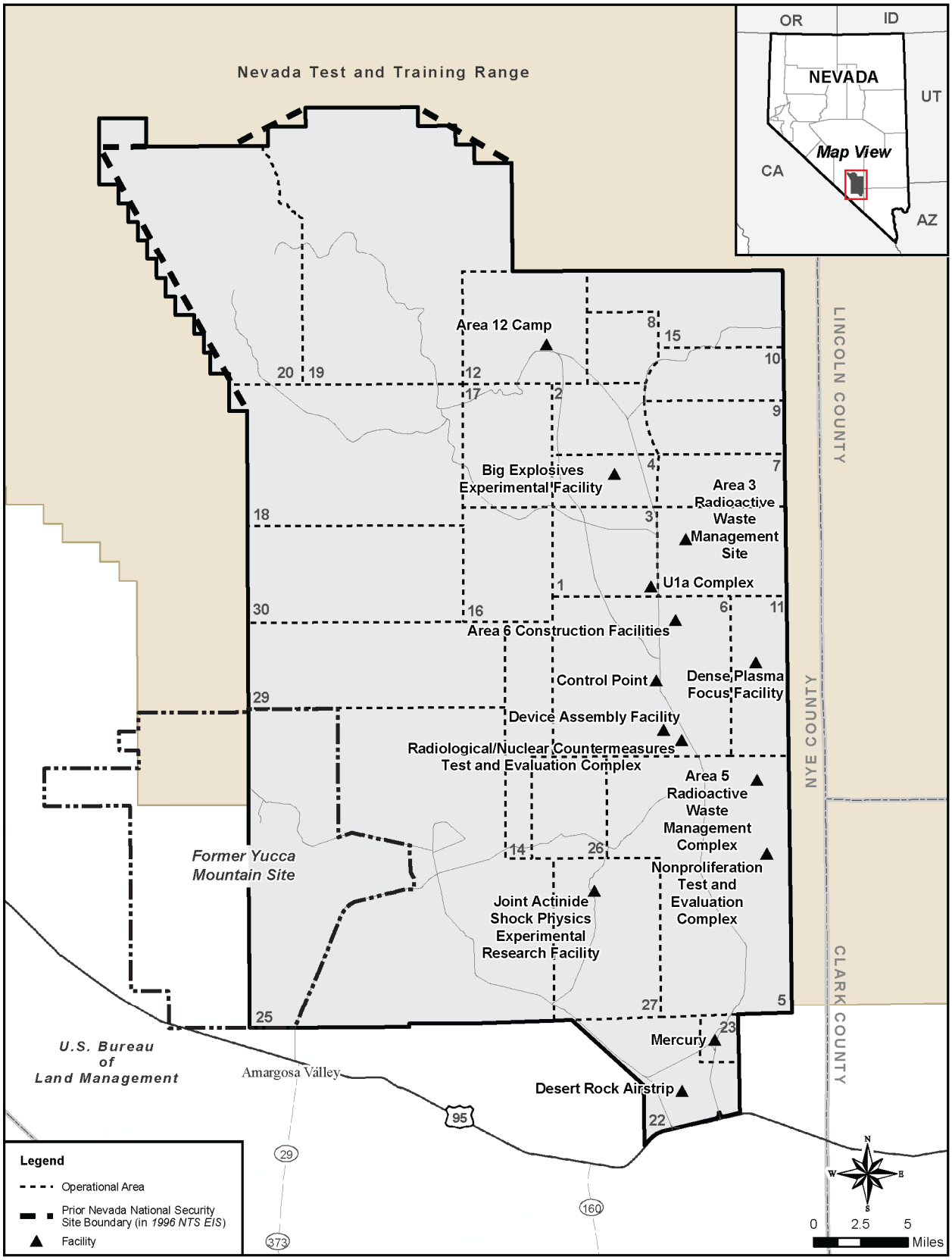

Figure 2–2 Nevada National Security Site Areas and Major Facilities

Table 2–1 Description and Historical Use of Nevada National Security Site Areas

Description of Nevada National Security Site (NNSS) Areas
Area 1—Area 1 occupies approximately 26 square miles of the Yucca Flat basin near the center of the site. The U1a Complex and the Area 1 Industrial Complex are located in Area 1. Area 1 was the site of four atmospheric nuclear tests between 1952 and 1955, and three underground tests (one in 1971 and two in 1990).
Area 2—Area 2 occupies approximately 19 square miles in the northern half of the Yucca Flat basin. The eastern portion of Area 2 was the site of 7 atmospheric nuclear tests conducted between 1952 and 1957. The first of 137 underground nuclear tests in Area 2 took place in late 1962, and tests continued through 1990.
Area 3—Area 3 occupies approximately 32 square miles near the center of the Yucca Flat basin. The Area 3 Radioactive Waste Management Site, which makes use of a group of subsidence craters for low-level radioactive waste disposal, is located in this area. Area 3 was the site of 17 atmospheric tests conducted between 1952 and 1958, and 251 underground nuclear tests from 1958 through 1992.
Area 4—Area 4 occupies approximately 16 square miles near the center of the Yucca Flat basin. The Big Explosives Experimental Facility is located in Area 4. Area 4 was the site of 5 atmospheric nuclear tests conducted between 1952 and 1957. From the mid-1970s through 1991, a total of 35 underground nuclear tests were conducted in Area 4, mainly in the northeastern corner.
Area 5—Area 5 occupies approximately 111 square miles in the southeastern portion of the site and includes the Area 5 Radioactive Waste Management Complex, the Nonproliferation Test and Evaluation Complex, and the Nevada Desert Free Air Carbon Dioxide Enrichment and Mojave Global Change Facility environmental research sites. From 1951 through early 1962, 14 atmospheric tests were conducted at Frenchman Flat. Five underground nuclear weapons tests were conducted at Frenchman Flat between 1965 and 1968.
Area 6—Area 6 occupies approximately 81 square miles from the northern part of Frenchman Flat to the southern part of Yucca Flat, straddling Frenchman Mountain. Facilities in Area 6 include the Control Point Complex, Area 6 Construction Facilities, the Device Assembly Facility, the Radiological/Nuclear Countermeasures Test and Evaluation Complex, the Yucca Lake Aerial Operations Facility, and a Hydrocarbon Contaminated Soils Disposal Site. One atmospheric nuclear test was conducted in Area 6 (in 1957). Between 1968 and 1990, five underground nuclear tests were conducted in this area.
Area 7—Area 7 occupies approximately 19 square miles in the northeastern quadrant of the Yucca Flat basin. Twenty-six atmospheric tests were conducted in this area. From 1964 through 1991, 62 underground nuclear tests were conducted in Area 7.
Area 8—Area 8 occupies approximately 14 square miles in the northern part of the Yucca Flat basin. Area 8 was the site of 3 atmospheric nuclear tests conducted in 1958. From 1966 through 1988, 10 underground nuclear tests were conducted in this area.
Area 9—Area 9 occupies approximately 20 square miles in the northeastern quadrant of the Yucca Flat basin. A construction and demolition debris landfill, using a subsidence crater, operates in Area 9. Area 9 was used extensively for nuclear testing; 17 atmospheric tests were conducted between 1951 and 1958, and 100 underground tests were conducted from 1961 to 1992.
Area 10—Area 10 occupies approximately 20 square miles in the northeastern quadrant of the Yucca Flat basin. Area 10 was the location of the Nation's first nuclear missile system test, an air-to-air rocket, detonated in mid-1957. There were 57 nonatmospheric tests (underground detonations and shallow nuclear testing experiments called cratering) in Area 10 between 1962 and 1991. The Sedan Crater, formed by a thermonuclear device in July 1962 as part of the Plowshare Program, is in Area 10. The Plowshare Program was designed as a research and development activity to explore the technical and economic feasibility of using nuclear explosives for industrial applications. The Sedan Crater is listed in the National Register of Historic Places.
Area 11—Area 11 occupies approximately 26 square miles along the central-eastern border of the NNSS. The Dense Plasma Focus Facility and an explosives ordnance disposal site are located in this area. Because of residual radioactive contamination from historic uses, this area is used intermittently for realistic drills in radiation monitoring and sampling. Four atmospheric safety tests were conducted in the northern portion of Area 11 in 1955 and 1956 in what is now known as Plutonium Valley. In addition to the aboveground safety tests, five underground nuclear weapons effects tests were conducted in Area 11 between 1966 and 1971.
Area 12—Area 12 occupies approximately 40 square miles along the northern boundary of the NNSS on Rainier Mesa. There are a number of tunnel complexes mined into Rainier Mesa that are used for experiments, including E-, G-, N-, P-, and T-Tunnel complexes. The Area 12 Camp was renovated and upgraded and will provide a secure base camp for military units and other government agencies for conducting counterterrorism and other exercises in the northern region of the NNSS. It provides an urban terrain setting utilizing existing commercial, residential, and industrial buildings. The camp includes 200 dormitory rooms, a cafeteria, weapons and munitions storage, and numerous operations and support buildings. The NNSA Office of Secure Transportation currently uses it as a training facility. No atmospheric tests were conducted in Area 12; 61 underground nuclear tests were conducted in Area 12 between 1957 and 1992.

Table 2–1 Description and Historical Use of Nevada National Security Site Areas (continued)

Area 14—Area 14 occupies approximately 26 square miles in the central portion of the NNSS. Various outdoor experiments are conducted in this area. No atmospheric or underground nuclear tests were conducted in Area 14.
Area 15—Area 15 occupies approximately 35 square miles in the northeastern corner of the NNSS. No atmospheric tests were conducted in this area; between 1962 and 1966, three underground nuclear tests were carried out in Area 15. A facility that evaluated the effects of residual radiation on farm animals, called the EPA Farm, previously operated in this area.
Area 16—Area 16 consists of approximately 29 square miles in the central portion of the NNSS. Currently, DoD uses this area for high-explosives research and development in support of programs involving the detonation of conventional or prototype nonnuclear explosives and munitions and for developing tactics to defeat deeply buried and hardened targets. Area 16 was established in 1961 for DoD to conduct nuclear effects experiments. From mid-1962 through mid-1971, six underground nuclear weapons effects tests (all in the U16a Tunnel complex) were conducted in this area.
Area 17—Area 17 occupies approximately 31 square miles in the north-central portion of the NNSS. This area has been used primarily as a buffer between other testing activities. No atmospheric or underground nuclear weapons tests were conducted in Area 17.
Area 18—Area 18 occupies approximately 88 square miles along the western border of the NNSS. The inactive Pahute Airstrip is located in the east-central portion of the area. The airstrip was used for the shipment of supplies and equipment for Pahute Mesa test operations. Area 18 was the site of five nuclear weapons tests from 1962 to 1964, two atmospheric tests, two cratering tests, and one underground test.
Area 19—Area 19 occupies approximately 146 square miles along the northern side of the NNSS. Area 19 was developed for high-yield underground nuclear tests. No atmospheric nuclear tests were conducted in Area 19. From the mid-1960s through 1992, 35 underground nuclear tests were conducted in this area.
Area 20—This area occupies approximately 97 square miles on Pahute Mesa in the northwestern corner of the NNSS. Area 20 was developed in the mid-1960s for high-yield underground nuclear tests. No atmospheric nuclear tests were conducted in Area 20. From the mid-1960s through 1992, a total of 46 underground nuclear weapons tests were conducted in Area 20. In addition, 1 nuclear test detection experiment and 3 Plowshare Program tests were conducted in this area.
Area 22—Area 22 occupies approximately 31 square miles in the southernmost portion of the NNSS and serves as the main entrance (Gate 100) to the NNSS. Before 1958, this area included Camp Desert Rock, a U.S. Army installation used for housing troops taking part in military exercises at the NNSS. After 1958, the camp was removed, with the exception of the Desert Rock Airport. The airport is currently operational, but is only used by those authorized by NNSA.
Area 23—Area 23 occupies approximately 5 square miles near the southeastern corner of the NNSS. It is the location of Mercury, the largest operational support complex on the NNSS. Mercury was established in 1951 and serves as the main administrative and industrial support center at the NNSS. Mercury is located approximately 5 miles from U.S. Route 95. The Area 23 landfill, used to dispose nonhazardous solid waste, is located west of Mercury.
Area 25—Area 25, the largest area on the NNSS, occupies approximately 254 square miles in the southwestern corner of the site and includes an inactive entrance gate to the NNSS. Portions of Area 25 are used by the military for training exercises. The U.S. Army Ballistic Research Laboratory conducts open-air and X-tunnel tests using depleted uranium in Area 25. Research sites within Area 25 include the Treatability Test Facility (inactive) and Bare Reactor Experiment Nevada Tower, a 1,527-foot tower used by a number of organizations for a wide variety of research (e.g., sonic booms, meteorology, gravity drop tests, satellite infrared imaging). Located roughly in the center of Area 25, Jackass Flats was the site of ground experiments for reactors, engines, and rocket stages as part of a program to develop nuclear reactors for use in the Nation's space program.
Area 26—Area 26 occupies approximately 21 square miles in the south-central part of the NNSS. The southern portions of this area were used for nuclear-powered ramjet engine experiments, known as Project Pluto.
Area 27—Area 27 occupies approximately 49 square miles in the south-central portion of the NNSS. The Joint Actinide Shock Physics Experimental Research Facility is located in Area 27. Area 27 was used for weapons assembly and staging.
Area 29—Area 29 occupies approximately 62 square miles on the west-central border of the NNSS and includes portions of Fortymile Canyon. It is used primarily for military training and exercises. No nuclear weapons tests were conducted in Area 29.
Area 30—Area 30 occupies approximately 59 square miles at the center of the western edge of the NNSS. Area 30 has rugged terrain and includes the northern reaches of Fortymile Canyon. It is used primarily for military training and exercises. Area 30 had limited use in support of the Nation's nuclear weapons testing program, but was the site of Project Buggy, an experiment in the Plowshare Program.

DoD = U.S. Department of Defense; NNSA = National Nuclear Security Administration; NNSS = Nevada National Security Site.
Source: DOE 1996c; DOE/NV 2000e.

2.1.1 Major Facilities

The NNSS provides a large area remote from the public at which a broad variety of research, experimentation, and training can be performed. Some of the activities conducted take advantage of the expanses of land at the NNSS. However, a comparatively small part of the NNSS is developed and has facilities that are routinely occupied or visited by NNSS personnel. Following is a list of the more-prominent facilities at the NNSS. The locations of these facilities are shown in Figure 2–2.

U1a Complex – The U1a Complex (formerly called the Lyner Complex) in Area 1 is an underground laboratory used for performing subcritical experiments (see text box) in support of the Stockpile Stewardship and Management Program. **Figure 2–3** shows the aboveground facilities at the U1a Complex. It consists of a series of underground alcoves and test chambers about 960 feet below the ground surface. Three vertical shafts connect to the underground tunnels to provide ventilation, as well as personnel, equipment, instrumentation, and utility access. At the surface are 27 support buildings and a mechanical hoist for accessing the belowground areas. Experiments with high explosives and special nuclear material, including dynamic plutonium experiments (see text box), are conducted in small alcoves mined into the sidewalls or floors of the underground tunnels (DOE/NV 2004b). A Large-Bore Powder Gun for use in conducting shock physics experiments is scheduled to be installed in an alcove of the U1a Complex in 2011.

Area 3 Radioactive Waste Management Site (RWMS) – The Area 3 RWMS consists of five disposal cells that contain waste and two unused disposal cells located in subsidence craters created by previous nuclear weapons tests. The approximately 120-acre site has been used for disposal of bulk and containerized low-level radioactive waste (LLW). The Area 3 RWMS is maintained in a standby condition and could be activated if necessary to dispose nonhazardous solid waste or particular, usually large-volume, LLW streams.

Big Explosives Experimental Facility (BEEF) – BEEF, located in Area 4, is an open-air hydrodynamic experimentation facility (see text box) where high-explosives-driven experiments are performed to provide data to support the Stockpile Stewardship and Management Program (DOE/NV 2005c). The facility consists of two earth-covered bunkers, a control bunker, a camera bunker, a gravel firing table, and other support facilities.

Subcritical Experiments

Subcritical experiments are performed using special nuclear material (for example, plutonium) in a manner that prevents it from achieving a nuclear explosion. Subcritical experiments are designed to improve 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.

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.

Figure 2–3 Aboveground Facilities of the U1a Complex

Diagnostics equipment used to monitor explosions includes high-speed optics and x-ray radiography. Scientists conduct weapons physics experiments using explosives, pulsed laser power, and shaped charges. BEEF is certified to handle high-explosives loads up to 70,000 pounds. Materials used in explosives experiments may include beryllium and depleted uranium, among others.

Nonproliferation Test and Evaluation Complex (NPTEC) – NPTEC (previously called the Liquefied Gaseous Fuels Spill Test Facility and the Hazardous Materials [HAZMAT] Spill Center) supports experimentation using open-air releases of chemical and biological simulants to create realistic environments for experiments and training (see **Figure 2–4**). The main NPTEC facility has the means of releasing materials from stacks, a wind tunnel, or on spill pads. Experimental data are collected using video cameras, arrays of sensors, and meteorological instrumentation. NPTEC is in Area 5, but experiments using low-concentration chemical or biological simulant releases and portable release systems can be performed at various locations at the NNSS. Public and private users perform experiments at NPTEC to independently analyze and evaluate sensor systems to determine their operational characteristics before their transition from the developmental to the operational phase (DOE/NV 2005e).

Figure 2–4 Large-scale Release Experiment Under Way at the Nonproliferation Test and Evaluation Complex

Area 5 Radioactive Waste Management Complex (RWMC) – The Area 5 RWMC comprises about 740 acres, including about 160 acres of existing and proposed disposal cells for burial of LLW and mixed low-level radioactive waste. The Waste Examination Facility and Transuranic (TRU) Pad and TRU Pad Cover Building are also included in the Area 5 RWMC. Approximately 580 acres of land are available for future radioactive waste management facilities and disposal cells.

Control Point Complex – The Control Point Complex is located in Area 6 on the ridge between Yucca Flat and Frenchman Flat. The Control Point Complex consists of facilities to support testing and experiments in the forward areas of the NNSS (i.e., the experimental areas away from Mercury and areas of daily occupancy). It houses the command center used for nuclear tests and experiments (Control Point 1).

Device Assembly Facility (DAF) – DAF, in Area 6, is a collection of more than 30 heavy-steel-reinforced concrete buildings connected by a common corridor (see **Figure 2–5**). The entire 100,000-square-foot complex is covered by compacted earth. Operational buildings in DAF include five assembly cells, three assembly bays (one with a downdraft table and one with a glovebox), four high bays, and two radiography bays. Support buildings include five bunkers for staging nuclear components or high explosives, two shipping/receiving bays, three small vaults, two decontamination areas, two laboratories, and an administration building (DOE/NV 2004c). Operations at DAF include staging and preparing special nuclear material for transportation and preparation of dynamic plutonium experiments and other unique experiments. DAF is approved for nuclear explosives operations and special nuclear material assemblies. DAF is also the home of the Criticality Experiments Facility, which was transferred from Technical Area 18 at Los Alamos National Laboratory in New Mexico and includes critical assemblies and machines used to conduct criticality experiments and training. In addition, DAF provides nuclear weapons assembly and disassembly capabilities; a damaged nuclear weapon could be sent to DAF for disassembly.

Figure 2–5 Device Assembly Facility at the Nevada National Security Site

Radiological/Nuclear Countermeasures Test and Evaluation Complex (RNCTEC) – RNCTEC, in Area 6, is a facility constructed on behalf of the U.S. Department of Homeland Security for analyzing and evaluating countermeasures against potential terrorist attacks using radiological and/or nuclear weapons. The facility consists of several venues that simulate various transportation-related facilities (see **Figure 2–6**) (DOE 2004f).

Area 6 Construction Facilities – The Area 6 Construction Facilities provide craft and logistical support to activities performed in the forward areas of the NNSS (i.e., the experimental areas away from Mercury and areas of daily occupancy). The Area 6 Construction Facilities are also home to the Atlas Facility, a pulsed-power machine used to investigate the properties of nonnuclear materials under extreme conditions. The Atlas Facility can be used to conduct dynamic experiments and produce hydrodynamic data to validate computer models of material response for weapons applications; it was last used for such purposes in 2006. Since 2007, it has been maintained in cold standby, meaning that it can be reactivated, but may require repair and maintenance actions to ready it for use.

Figure 2–6 Radiological/Nuclear Countermeasures Test and Evaluation Complex Provides Capabilities for Evaluating Transportation Monitoring Equipment

Dense Plasma Focus Facility – The Dense Plasma Focus Facility in Area 11 supports research that provides active interrogation (a process that uses an external radiation source to interrogate an unknown object and induce a response) of special nuclear material and calibration of nuclear detection equipment. The focus of this research is enhancement of national security, with the goal of improving capabilities of detecting a smuggled nuclear device or material. The dense plasma focus machines use mixtures of deuterium and tritium.

Area 12 Camp – The Area 12 Camp is generally maintained in a standby condition, but can be reactivated for special projects. Most recently, NNSA activated the Area 12 Camp for use as a training facility by the Office of Secure Transportation. The camp includes 200 dormitory rooms, a full-service cafeteria, weapons and ammunition storage, and support buildings. Office of Secure Transportation training and exercises occur on roadways in Area 12 and throughout the NNSS.

The Area 12 Camp also supports activities at the tunnel complexes in Area 12. NNSA and the Defense Threat Reduction Agency use the various tunnels at the NNSS to conduct experiments and training in support of hard/deeply buried target location and defeat, conventional munitions effects and demilitarization, and other experiments and testing. Additionally, tunnel complexes in the northern area of the NNSS support NNSA programmatic activities, including safe management of improvised nuclear devices, if needed.

Desert Rock Airstrip – Desert Rock Airstrip in Area 22 supports operations of aircraft up to the size of a C-130 (about the length of a Boeing 727-200, but with a much larger wingspan). The airstrip is closed to public carriers, but is used by NNSA and others approved by NNSA for transport of material and personnel to the NNSS.

Mercury – Mercury (formerly called Base Camp Mercury), in Area 23 north of the entrance to the NNSS, is equivalent to a small town. It provides office facilities, dormitories, a cafeteria, classrooms, and various other support facilities for the NNSS. The Homeland Security and Defense Applications Operations and Coordination Center is located in Mercury. This center provides critical information exchange during exercises or real-world events and incidents.

Joint Actinide Shock Physics Experimental Research Facility (JASPER) – JASPER, located in Area 27, houses a two-stage light-gas gun that is designed to propel a projectile into a target at extremely high velocities of up to 8 kilometers per second (see **Figure 2–7**). The JASPER gas gun is specifically designed to conduct research on plutonium and surrogate target materials. JASPER plays an integral role in the certification of the Nation's nuclear weapons stockpile by providing a means of generating and measuring data pertaining to the properties of materials (radioactive chemical elements) at high shock pressures, temperatures, and strain rates. These extreme laboratory conditions approximate those experienced in nuclear weapons. Data from the experiments are used to determine material equations of state (equations that express the relationship among temperature, pressure, and volume of a substance) and to validate computer models of material response for weapons applications. Experiment results are used for code refinement to provide better predictive capability and to ensure confidence in the U.S. nuclear stockpile.

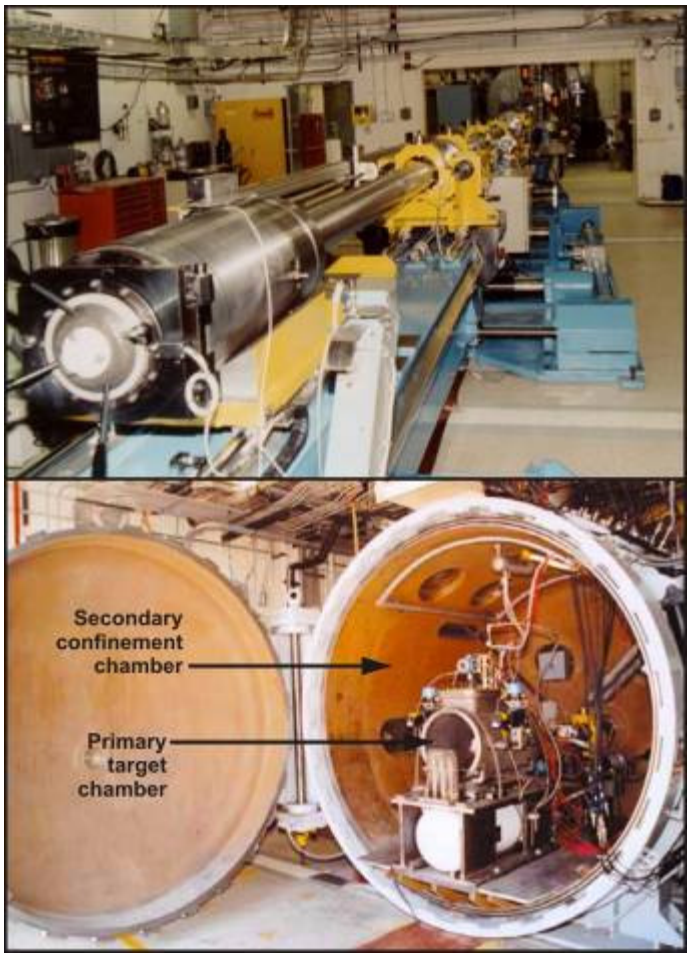

Figure 2–7 The Joint Actinide Shock Physics Experimental Research Facility Two-stage Gas Gun (top) and Target Chamber (bottom)

The nearby Baker Compound supports activities at JASPER, as well as other locations on the NNSS, by providing staging and storage necessary to support high-explosives experiments. The Baker Compound can receive shipments and safely store and transport explosives materials.

2.2 Remote Sensing Laboratory

RSL is located on 35 acres at Nellis Air Force Base in North Las Vegas, approximately 59 miles southeast of the nearest NNSS boundary (60 miles southeast of Gate 100, near Mercury, on the NNSS). RSL is adjacent to the Nellis Air Force Base runway and has seven permanent buildings. Radiological emergency response, the Aerial Measuring System, radiological sensor development and testing, Secure Systems Technologies, nuclear nonproliferation capabilities, and information and communication technologies are maintained at RSL.

2.3 North Las Vegas Facility

NLVF, located approximately 55 miles southeast of the nearest NNSS boundary (56 miles southeast of Gate 100, near Mercury, on the NNSS), comprises 29 buildings that support ongoing NNSS missions. The facility includes office buildings, a high bay, machine shop, laboratories, experimental facilities, and various other mission-support facilities. Among the NLVF buildings is the Nevada Support Facility, the location of most of the NNSA/NSO personnel offices.

2.4 Tonopah Test Range

The TTR, located approximately 12 miles north of the nearest NNSS boundary (73 miles north of Gate 100, near Mercury, on the NNSS), is a USAF facility. It consists of a 280-square-mile area north of the NNSS on the Nevada Test and Training Range. NNSA operations at the TTR are conducted pursuant to a land use permit from the USAF under the direction of Sandia National Laboratories and the NNSA Sandia Site Office. NNSA operations at the TTR include flight-testing of gravity weapons (bombs) and research, development, and evaluation of nuclear weapons components and delivery systems.

In its December 15, 2008, Record of Decision for the *Complex Transformation Supplemental Programmatic Environmental Impact Statement (Complex Transformation SPEIS)* (73 FR 77656), NNSA decided to implement a campaign mode of operations at the TTR, reducing its permitted operating area and upgrading its equipment. The "campaign mode of operations" would continue operations at the TTR but reduce permanent staff and conduct tests and experiments by deploying DOE and national laboratory personnel from other locations, as needed. The intent of reducing the footprint for the TTR and instituting a campaign mode of operations was to continue to meet mission and program requirements and reduce costs. After further review, NNSA, in consultation with the USAF, determined that maintaining the current footprint for the TTR would actually be the most cost-effective option. In addition, NNSA is reviewing implications of instituting a campaign mode of operations. The *Complex Transformation SPEIS* addresses operating with the existing TTR footprint in both campaign mode (Campaign Mode Operation of TTR, Option 2 – Campaign under existing Agreement) and in the existing (non-campaign) mode (No Action).

2.5 Overview of Changes Since the *1996 NTS EIS*

The *1996 NTS EIS* analysis of the potential environmental impacts was based on the physical site, facilities, and activities in existence or contemplated by DOE at the time the environmental impact statement was prepared. The primary missions at the NNSS and other sites in the state of Nevada remain unchanged; however, since the *1996 NTS EIS* was prepared, the administration of the sites and its physical boundaries and facilities have changed and there has been an evolution in the programs and activities conducted in support of the NNSA/NSO missions. This section provides an overview of these changes to bridge the gap between the sites, data, and analyses in the *1996 NTS EIS* and this *NNSS SWEIS*.

2.5.1 Administrative Changes

Creation of NNSA – Established by Congress through the National Nuclear Security Administration Act (Title XXXII of the National Defense Authorization Act for Fiscal Year 2000, Public Law [P.L.] 106-65), NNSA is a separately organized, semiautonomous agency within DOE. NNSA is responsible for the management and security of the Nation's nuclear weapons, certain nuclear nonproliferation programs, and naval reactor programs. It also responds to nuclear and radiological emergencies in the United States and abroad. Additionally, NNSA Federal agents provide safe, secure transportation of nuclear weapons and components and special nuclear material, as well as support for other missions related to national security. NNSA administers the NNSS, RSL, and NLVF and is a tenant on the USAF's TTR.

Transfer of Responsibility for Project Shoal and the Central Nevada Test Area – Responsibility for Project Shoal and Central Nevada Test Area environmental restoration sites was transferred to the DOE Office of Legacy Management in 2006. The DOE/NNSA NSO, Office of Environmental Management, completed cleanup at these sites before the transfer; the remaining work is associated with long-term surveillance (groundwater monitoring) and maintenance. These sites are no longer under NNSA control and, by agreement with the DOE Office of Legacy Management, are not further addressed in this *NNSS SWEIS*.

Renaming the Nevada Test Site – In order to better reflect the diversity of nuclear, energy, and homeland security activities conducted at the site, the former Nevada Test Site was renamed the Nevada National Security Site in 2010.

2.5.2 Physical Changes

The NNSS boundary and land withdrawal changes – The *1996 NTS EIS* identified various public land orders and withdrawals, as well as a Memorandum of Understanding between the USAF and the DOE Nevada Operations Office (the predecessor of NNSA/NSO) as the basis for the NNSS. The Military Lands Withdrawal Act of 1999 (P.L. 106-65) revoked Public Land Order 1662 in its entirety and legislatively withdrew the area that makes up the northwestern corner of the NNSS for exclusive DOE use. The Military Lands Withdrawal Act resulted in changes to the border around the northwestern corner of the NNSS, which was historically used for nuclear weapons testing under the Memorandum of Understanding. Figure 2–2 shows both the current NNSS boundary and the boundary as it existed in 1996.

Area 5 Land Transfer – As part of an April 1997 settlement agreement (which resulted in dismissal of *Nevada v. Pena* [CV-5-94-00576-PMP (RLH)] by the U.S. District Court in Nevada) between the State of Nevada and DOE, consultation with the U.S. Department of Interior was initiated concerning the status of existing land withdrawals with regard to LLW waste storage and disposal. This consultation process concluded with NNSA's formal acceptance of custody and control of the approximately 740 acres constituting the Area 5 RWMC in a land transfer action.

Yucca Mountain Management Agreement – As indicated in the fiscal year 2010, 2011, and 2012 budget requests, the Administration decided to cease funding and activities related to the development of a repository at Yucca Mountain, while developing alternative storage and disposal approaches for spent nuclear fuel (SNF) and high-level radioactive waste (HLW). Proposed actions associated with the former Yucca Mountain Project included construction, operation, monitoring, and eventual closure of a geologic repository at Yucca Mountain for disposal of SNF and HLW already in storage or projected to be generated at 72 commercial and 5 DOE sites across the United States. In 1994, the DOE Nevada Operations Office entered into a management agreement with the DOE Yucca Mountain Site Characterization Office for use of about 58,000 acres of the NNSS land for site characterization activities related to the former Yucca Mountain Project. Under the agreement, the Yucca Mountain Project was responsible for meeting the same environmental requirements that applied to the NNSS independent of, but in coordination with, the NNSS organizations. Until DOE receives appropriations for remediation of the infrastructure and buildings of the former Yucca Mountain Project, NNSA will maintain the infrastructure and buildings and provide security and support to DOE to remain compliant with Federal and state regulations pursuant to existing site permits. Upon receipt of appropriations, DOE will remediate lands and close the infrastructure and buildings, as required by law, regulations, and applicable agreements. At the completion of site closure, DOE will initiate a long-term surveillance program.

Notwithstanding the decision to terminate the Yucca Mountain Project, DOE remains committed to meeting its obligations to manage and ultimately dispose SNF and HLW. The Blue Ribbon Commission

on America's Nuclear Future was established in March 2010 to conduct a comprehensive review of the back end of the fuel cycle and evaluate alternative approaches for meeting these obligations. The Blue Ribbon Commission will provide the opportunity for a meaningful dialogue on how best to address this issue and will produce a final report by January 2012 that will provide recommendations to Congress for developing a safe, long-term solution to managing the Nation's SNF and HLW. The Blue Ribbon Commission will address both commercial and DOE SNF and HLW (DOE 2010e).

Higher-than-expected growth in Clark and Nye Counties – The *1996 NTS EIS* projected that, in 2005, the populations of Clark and Nye Counties would be 1,380,920 and 38,516 persons, respectively (DOE 1996c). The actual populations in mid-2005 were 1,796,380 and 41,302 persons for Clark and Nye Counties, respectively (NSBDC 2010). These numbers represent an approximate 30 percent increase over projected values for Clark County and a 7 percent increase for Nye County. In Clark County, much of the growth occurred in the northwestern portion of the Las Vegas Valley, projecting toward the NNSS. This growth is potentially relevant to the analysis in this *NNSS SWEIS* because it creates a greater demand for resources and a larger number of people closer to the NNSS. Most recently, however, there has been a small decrease in population for both Clark and Nye Counties. Clark County decreased 0.8 percent from a high of 1,967,716 in mid-2008 to 1,952,040 in mid-2009. Nye County decreased 2.1 percent from a high of 47,370 in mid-2008 to 46,360 in mid-2009. The population used as the baseline for analysis in this *NNSS SWEIS* is provided in Chapter 4, Section 4.1.4. Information on the analysis of socioeconomic impacts is located in Chapter 5, Section 5.1.4.

As the populations in Clark and Nye Counties have increased, concern over water rights and water use has also increased. The Southern Nevada Water Authority has sought to purchase water rights in Lincoln, White Pine, and Nye Counties to meet the growing demand in Clark County. Nye County established the Nye County Water District in 2009 to manage, evaluate, and mitigate groundwater and surface-water resources in Nye County and to develop a long-range sustainability plan (Nye 2010). Water consumption at the NNSS has decreased compared with the 2,975 million gallons per year projected in the *1996 NTS EIS*. While NNSS water use has decreased, solar power generation facilities, described in Chapter 3 of this *NNSS SWEIS*, could increase the demand for water in the southern areas of the NNSS. Further information on NNSS water use and groundwater availability is presented in Chapter 4, "Affected Environment," Section 4.1.2.1 and Section 4.1.6.2. Potential impacts from implementation of alternatives are presented in Chapter 5, "Environmental Consequences," Section 5.1.2.1,and Section 5.1.6.2, and in Chapter 6, "Cumulative Impacts," Section 6.3.6.2.

2.5.3 Program and Activity Changes

A number of changes related to NNSS programs and activities have occurred since the *1996 NTS EIS* after conducting the appropriate level of NEPA review. The most important of these changes are described as follows.

- NNSA relocated its operational capabilities associated with Security Category I and II special nuclear material and the critical assembly machines from Technical Area 18 at Los Alamos National Laboratory in New Mexico to DAF at the NNSS. NNSA conducts nuclear criticality operations at DAF to enable personnel to gain knowledge and expertise in advanced nuclear technologies that support nuclear materials management and criticality safety, emergency response, nonproliferation, safeguards, arms control, and stockpile stewardship science.
- NNSA constructed BEEF, as planned and analyzed in the *1996 NTS EIS*, and subsequently modified it to perform explosives-driven, pulsed-power experiments.
- NNSA completed construction and modifications of JASPER to conduct experiments that provide data on the Nation's nuclear weapons stockpile.

- NNSA relocated the Atlas Facility from Los Alamos National Laboratory to the NNSS. The Atlas Facility was used to conduct pulsed-power experiments until it was placed in standby mode in 2007.
- NNSA identified the U12g Tunnel for the activities of the Improvised Nuclear Device Program. If an improvised nuclear device were to be recovered, the tunnel would be used to stage, assess, and safeguard the weapon.
- A Counterterrorism Support Program was instituted that makes use of site facilities for training and adds activities at NPTEC in Area 5 to address emergency response and counterterrorism training.
- RNCTEC was constructed in Area 6 to provide analysis and evaluation capability for radiological and nuclear detection devices.
- NNSA completed upgrades to the Aerial Operations Facility in Area 6, including construction of a runway and a broad variety of infrastructure improvements.
- A Solar Enterprise Zone was identified at the NNSS, as described in the *1996 NTS EIS*, but a proposed commercial solar facility was cancelled by the project proponent.
- The Nevada Desert Free Air Carbon Dioxide Enrichment Facility and the Mojave Global Change Facility were built in Area 5. These facilities are used to perform controlled manipulative experiments (e.g., analyses of carbon dioxide enrichment, increased precipitation, and evolving soil conditions on natural systems) under controlled conditions.
- The U.S. Military Development and Training in Tactics and Procedures for Counterterrorism Threats and National Security Defense Program was instituted to develop methods for combating adversaries in a desert environment. This activity could occur at any location on the NNSS.
- The Area 5 RWMC resumed acceptance of mixed low-level radioactive waste from approved offsite generators in 2006 after a restriction on the receipt of these wastes was lifted by the Nevada Division of Environmental Protection during the renewal of the interim status permit in December 2005.

Overview of Changes to the American Indian Writing Contributions Since the *1996 NTS EIS*

In 1995, the U.S. Department of Energy (DOE) invited the Consolidated Group of Tribes and Organizations (CGTO) to participate in the development of the *Final Environmental Impact Statement for the Nevada Test Site and Off-Site Locations in the State of Nevada (1996 NTS EIS)*, to represent the American Indian perspective of the actions proposed and analyzed by DOE, and to consider and address the resources impacted. In response, the CGTO developed Appendix G for the *1996 NTS EIS* and provided italicized text for selected sections.

Appendix G and the italicized Final Environmental Impact Statement (EIS) text presented the American Indian perspective and recommended impact mitigation approaches for reducing potential impacts to Indian resources and other heritage values within the analyzed areas. American Indian involvement with the *1996 NTS EIS* and the development of Appendix G followed an American Indian Consultation Model[1] for government-to-government interactions among DOE and culturally affiliated American Indian Tribes. This was considered an innovative approach by Federal agencies at that time.

During the 2009 DOE Annual Tribal Meeting with the CGTO, DOE invited the CGTO to revisit the *1996 NTS EIS* and subsequent National Environmental Policy Act (NEPA) Supplemental Analyses, to review the current and proposed activities presented in this site-wide environmental impact statement (SWEIS), and to develop text that reflects the CGTO's perspective and current concerns. DOE also expanded the CGTO's involvement by providing us with the opportunity to write culturally appropriate text summarizing our perspective and concerns for every section and appendix within the SWEIS, as appropriate, in addition to writing Appendix C, "The American Indian Assesment of Resources and Alternatives Presented in the SWEIS".

See Appendix C for more details.

[1] *The American Indian Consultation Model was based on the Consultation Model produced for the DoD Legacy Project (Deloria and Stoffle 1994), which was modified by the American Indian Writers Subgroup (AIWS) for the CGTO and implemented during the development of the 1996 NTS EIS. This model was again revisited and implemented by the AIWS for the CGTO in the development of the SWEIS, and is presented in Section 10.2.1.*