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Final Supplement Analysis 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

National Nuclear Security Administration

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ACRONYMS AND ABBREVIATIONS

AICP	American Indian Consultation Program
AIWS	American Indian Writers Subgroup
ARL	Air Resources Laboratory
BEEF	Big Explosives Experimental Facility
BLM	Bureau of Land Management
BMP	best management practices
CAA	*Clean Air Act*
CAIRS	Computerized Accident/Incident Reporting System
CAS	corrective action site
CAU	corrective action unit
CEI	compliance evaluation inspection
CEQ	Council on Environmental Quality
CFE	carbon pollution-free electricity
CFR	Code of Federal Regulations
CGTO	Consolidated Group of Tribes and Organizations
CO_2e	carbon-dioxide equivalent
CPC	Certified Packaging Center
CRMP	Cultural Resources Management Program
CTOS	Counter Terrorism Operations Support
cUAS	counter uncrewed aircraft system
CX	categorical exclusions
DAF	Device Assembly Facility
DAG	Dry Alluvium Geology
DART	Days Away with Restricted Time
DD&D	decontamination, decommissioning, and demolition
DHS	Department of Homeland Security
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DOE	U.S. Department of Energy
DOE-LM	DOE Office of Legacy Management
DPFF	Dense Plasma Focus Facility
DRI	Desert Research Institute
DTRA	Defense Threat Reduction Agency
ECSE	enhanced capability for subcritical experiments
EIS	environmental impact statement
EM	Environmental Management
EMAC	Ecological Monitoring and Compliance Program
E-MAD	Engine Maintenance Assembly and Disassembly
ESP	Enhanced Staging Program
ESS	Engagement Simulation System
ETDS	E Tunnel Discharge System
EV	electric vehicle
FAA	Federal Aviation Administration
FBI	Federal Bureau of Investigation

FFACO	Federal Facility Agreement and Consent Order
FOAV	Finding of Alleged Violation
FRMAC	Federal Radiological Monitoring and Assessment Center
g	gravity
GAU	geographic corrective action units
GHG	greenhouse gas
GS	Global Security
GSOW	Global Security Operations West
GW	groundwater
IDA	intentional destructive acts
JASPER	Joint Actinide Shock Physics Experimental Research Facility
kV	kilovolt
LANL	Los Alamos National Laboratory
LAO	Los Alamos Office
LCF	latent cancer fatality
LIDAR	Light Detection and Ranging
LLNL	Lawrence Livermore National Laboratory
LLW	low-level radioactive waste
LOS	level of service
M&O	management and operating
MBTA	*Migratory Bird Treaty Act*
MCL	maximum contaminant level
MEI	maximally exposed individual
MGCF	Mojave Global Change Facility
MHD	Mercury Historic District
MLLW	mixed low-level radioactive waste
MM	Mercury Modernization
MOA	Memorandum of Agreement
MSTS	Mission Support and Test Services, LLC
NAAQS	national ambient air quality standards
NAD	Nuclear Accident Dosimetry
NASA	National Aeronautics and Space Administration
NCERC	National Criticality Experiments Research Center
NDEP	Nevada Division of Environmental Protection
NDEP-BFF	Nevada Division of Environmental Protection-Bureau of Federal Facilities
NDFF	Nevada Desert FACE Facility
NDNH	Nevada Division of Natural Heritage
NEPA	*National Environmental Policy Act of 1969*
NESHAP	National Emission Standards for Hazardous Air Pollutants
NFO	Nevada Field Office
NFS	Nuclear Fuel Services
NHPA	*National Historic Preservation Act*
NLVF	North Las Vegas Facility
NMO	New Mexico Operations
NNSA	National Nuclear Security Administration

NNSS	Nevada National Security Site
NNSSER	NNSS Environmental Report
NPDES	National Pollutant Discharge Elimination System
NPS	National Park Service
NPTEC	Nonproliferation Test and Evaluation Complex
NRDS	Nuclear Rocket Development Station
NRHP	National Register of Historic Places
NSPG	Nevada Space Proving Ground
NSROC	NASA Sounding Rocket Operations Contract
NSTec	National Security Technologies, LLC
NTS	Nevada Test Site
NTTR	Nevada Test and Training Range
NWLV	Northwest Las Vegas
OA	Operational Area
PA	Programmatic Agreement
PCP	non-regulated polychlorinated biphenyl
PFAS	per- and polyfluoroalkyl substances
PWS	public water system
RAM	Radiological Material
RCRA	*Resource Conservation and Recovery Act*
RNCTEC	Radiological/Nuclear Countermeasures Test and Evaluation Complex
ROD	Record of Decision
ROI	region of influence
RSL	Remote Sensing Laboratory
RSL-A	Remote Sensing Laboratory at Joint Base Andrews
RSL-Nellis	Remote Sensing Laboratory at Nellis Air Force Base
RTR	Real-Time Radiography
RV	Revision
RVDC	Rock Valley Direct Comparison
RWMC	Radioactive Waste Management Complex
RWMS	Radioactive Waste Management Site
SA	Supplement Analysis
SCE	subcritical experiments
SCIF	Sensitive Compartmented Information Facility
SDWA	*Safe Drinking Water Act*
SHPO	State Historic Preservation Office/Officer
SMEs	subject matter experts
SNL/NM	Sandia National Laboratories New Mexico
SNM	special nuclear material
SORD	Special Operations Research Division
SPE Phase III	Source Physics Experiments Phase 3
SPARCS	Spectral Advanced Radiological Computer System
SPP	Strategic Partnership Projects
SSMP	Stockpile Stewardship Management Plan
STL	Special Technologies Laboratory
sUAS	Small Uncrewed Aircraft Systems

SWPPP	Stormwater Pollution Prevention Plan
THPO	Tribal Historic Preservation Officer
TEK	Traditional Ecological Knowledge
TNT	2,4,6-trinitrotoluene
TPC	Tribal Planning Committee
TPCB	TRU Pad Cover Building
TRC	Tribal Revegetation Committee
TRU	transuranic
TRUPACT	Transuranic Package Transporter
TSCA	*Toxic Substances Control Act*
TSD	treatment, storage, and disposal
TTR	Tonopah Test Range
TUM	Tribal Update Meeting
UCEP	U1a Complex Enhancement Project
U.S.	United States
U1a-M	U1a Modernization
UAS	uncrewed aircraft system (formerly unmanned aircraft system)
UGT	underground test
UGTA	underground test area
UNR	University of Nevada, Reno
USAF	U.S. Air Force
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USFS	U.S. Forest Service
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
UXO	Unexploded Ordnance
VZM	vadose zone monitoring
WIPP	Waste Isolation Pilot Plant
WMD	weapon of mass destruction.
ZEUS	Z-Pinch Experiment Underground System
ZEV	zero-emission vehicle

1.0 INTRODUCTION AND PURPOSE AND NEED FOR AGENCY ACTION

1.1 Introduction

The National Nuclear Security Administration (NNSA), a semi-autonomous agency within the United States (U.S.) Department of Energy (DOE), is responsible for meeting the national security requirements established by the President and Congress to maintain and enhance the safety, reliability, and performance of the U.S. nuclear weapons stockpile (NNSA 2022). The Nevada National Security Sites (NNSS) supports the NNSA nuclear stockpile stewardship and management (SSMP) mission as well as other DOE/NNSA programs, national security programs and other Federal agency work. In 2013, DOE/NNSA prepared the *Sitewide 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* (DOE/EIS-0426; NNSA 2013a) (hereafter, "2013 SWEIS" or "2013 NNSS SWEIS") to analyze the potential environmental impacts of continued management and operation of the NNSS. A Record of Decision (ROD) was announced in the *Federal Register* on December 30, 2014 (79 FR 78421).

Stockpile Stewardship and Management Program (SSMP)

The Stockpile Stewardship and Management Program enables NNSA to extend the lifespan and ensure the continued safety, reliability, and performance of nuclear weapons that have reached the end of their original design life through life extension and modification programs.

DOE/NNSA/Nevada Field Office (NFO) prepared this Supplement Analysis (SA) in accordance with DOE's *National Environmental Policy Act* (NEPA) implementing procedures (10 CFR Part 1021) to assess the potential environmental impacts of continued operations at NNSS. The SA focuses on the projects/changes that have occurred at NNSS since publication of the 2013 SWEIS and ROD, or are expected to occur within approximately the next five years. This SA evaluates the impacts of these projects/changes against the impacts presented in the 2013 SWEIS. Based on this SA, DOE/NNSA/NFO will determine whether the existing 2013 SWEIS remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented.

Introduction – American Indian Perspectives

Sixteen culturally affiliated tribes identified by treaty, congressional action, or executive order have ancestral ties to the NNSS, TTR, and RSL-Nellis locations. According to traditional stories, affiliated tribes have occupied the lands encompassing the NNSS and off-site locations since the beginning of time. As such, the tribes believe it is necessary for DOE to properly acknowledge the ancestral homelands of the Southern Paiute/Chemehuevi, Western Shoshone, and Owens Valley Paiute and Shoshone people now residing in Nevada, California, Utah, and Arizona.

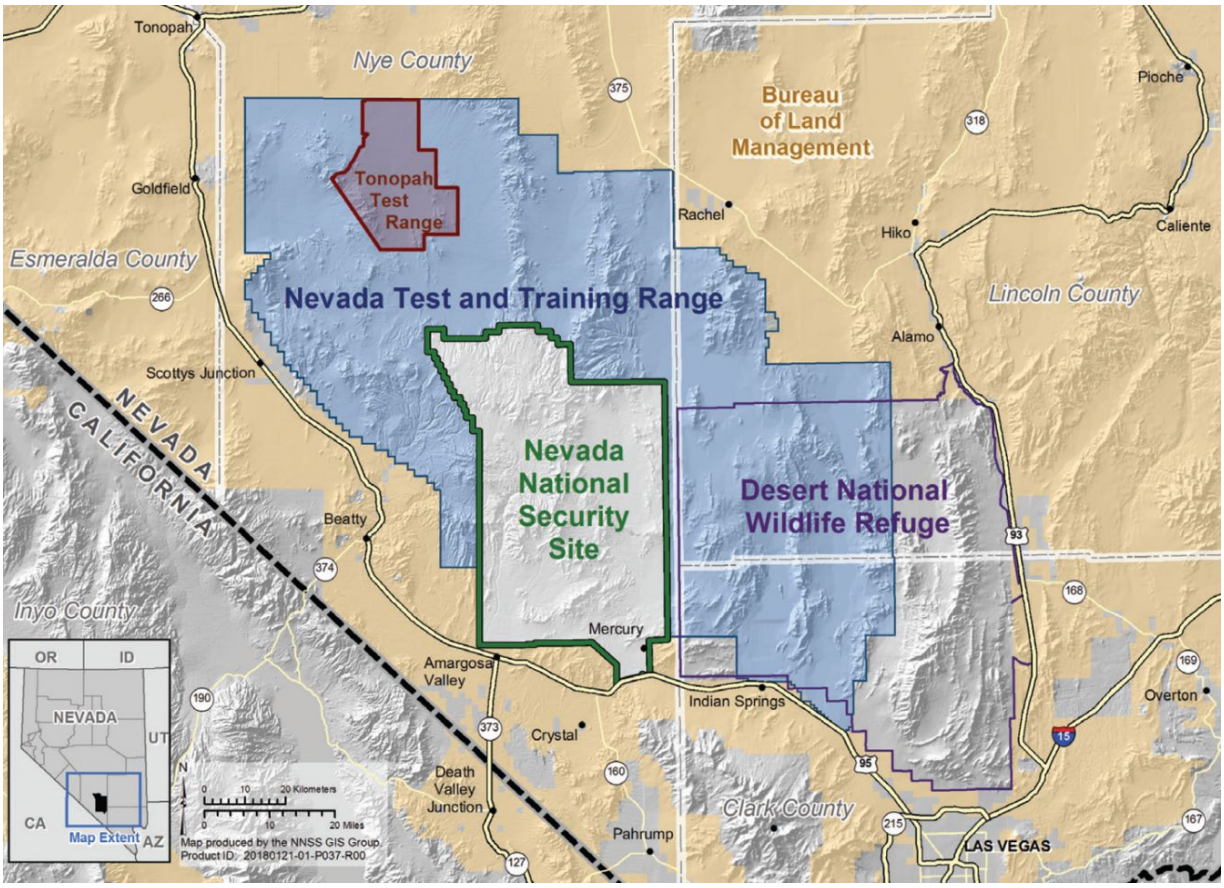
The NNSS falls within the traditional holylands of the culturally affiliated tribes that elevate the cultural and religious significance of the area. American Indian people must access their holylands to sustain the cultural and religious integrity of the resources. The area contains religious, ceremonial, hunting, gathering, and recreational areas that are used and understood by American Indian people. The land has abundant ecological and cultural resources, which includes power places that are central in the continuation of American Indian culture, religion, and society. In accordance with *Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships* (January 20, 2021) and DOE Order 144.1 *American Indian Tribal Government Interactions and Policy* (November 11, 2009), the NNSA/NFO invited the American Indian Writers Subgroup (AIWS) to share tribal perspectives for inclusion in the 2023 Supplement Analysis (SA) in the spirit of engaging culturally affiliated tribes. Figure 1-3 shows the region of influence of the three ethnic groups, represented by the 16 culturally affiliated tribes, that participate in the NNSA/NFO American Indian Consultation Program (AICP).

Throughout the SA, tribal perspectives can be found in designated text boxes to distinguish it from U.S. Department of Energy (DOE) text.

1.2 Background

The NNSS (formerly the Nevada Test Site [NTS]) is located in a remote, highly secure area in southern Nevada approximately 65 miles northwest of Las Vegas. Totaling an area larger than the state of Rhode Island, the approximately 1,360-square mile site represents one of the largest restricted access areas in the United States (Figure 1-1). It is surrounded by both federal installations with strictly controlled access and lands that are open to public entry. The NNSS is divided into 26 operational areas[1] (Areas); Figure 1-2 depicts the site, its operational areas and major facilities, and identifies areas where past nuclear testing was conducted. NNSA/NFO oversees facility management and program operations at the NNSS, North Las Vegas Facility (NLVF) and the Remote Sensing Laboratory–Nellis (RSL-Nellis) in Nevada (as well as selected operations at sites outside of Nevada which are not analyzed in this SA). Los Alamos National Laboratory (LANL), Lawrence Livermore National Laboratory (LLNL), Sandia National Laboratories/New Mexico (SNL/NM) and the NNSS Management & Operating (M&O) Contractor are the principal organizations that sponsor and implement the nuclear stockpile stewardship, stockpile management and national security programs at the NNSS. The 280-square mile Tonopah Test Range (TTR), which is operated by SNL/NM, is used for testing, research and development, and evaluation of weapons components and delivery systems. Because the TTR site is located 12 miles north of NNSS on the United States Air Force's (USAF) Nevada Test and Training Range (NTTR), it was included in the 2013 NNSS SWEIS.

[1] Four numbers (i.e., 13, 21, 24, and 28) are not used in the sequence of NNSS operational areas.

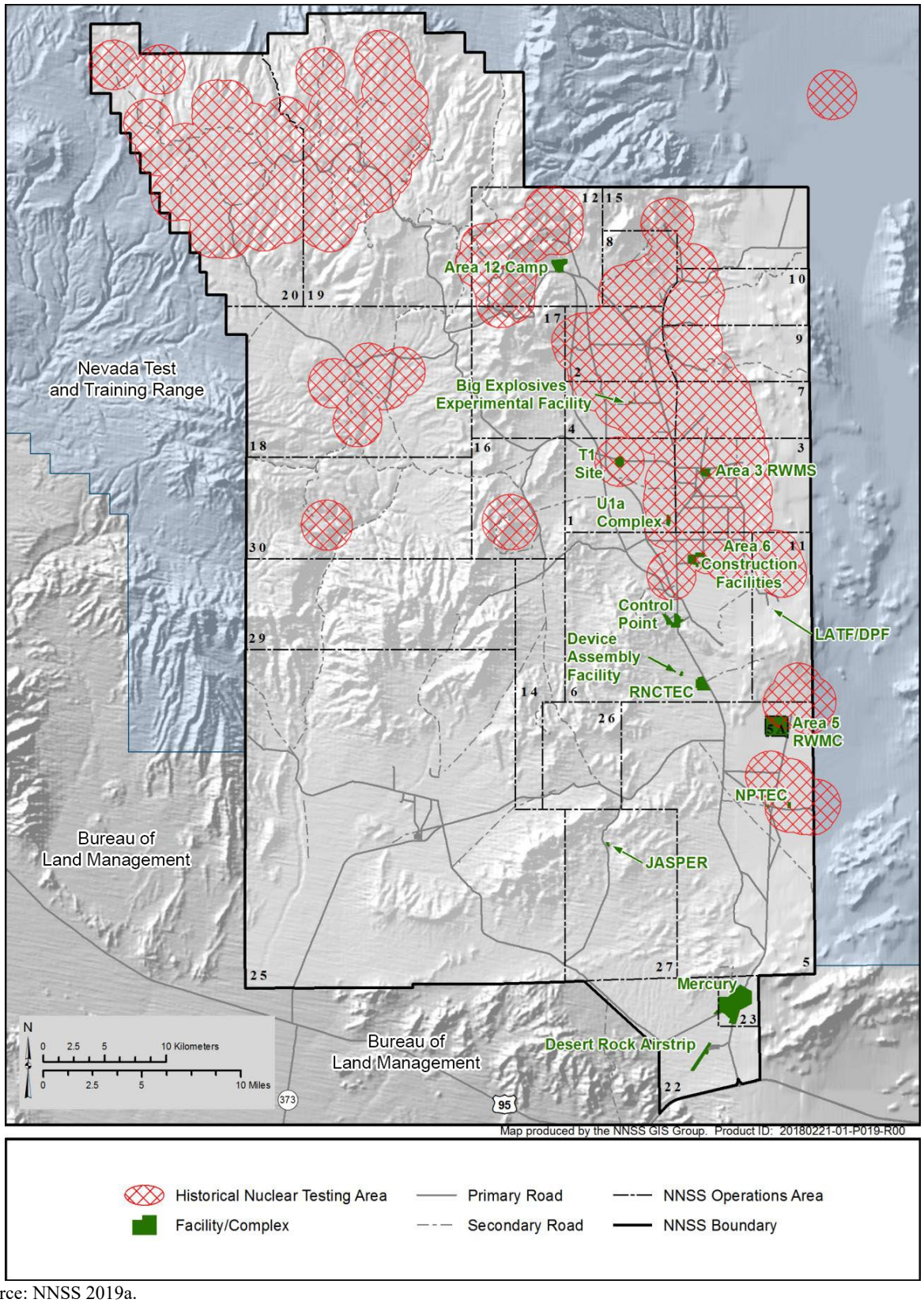


Source: NNSS 2022.

Figure 1-1. Nevada National Security Site Location

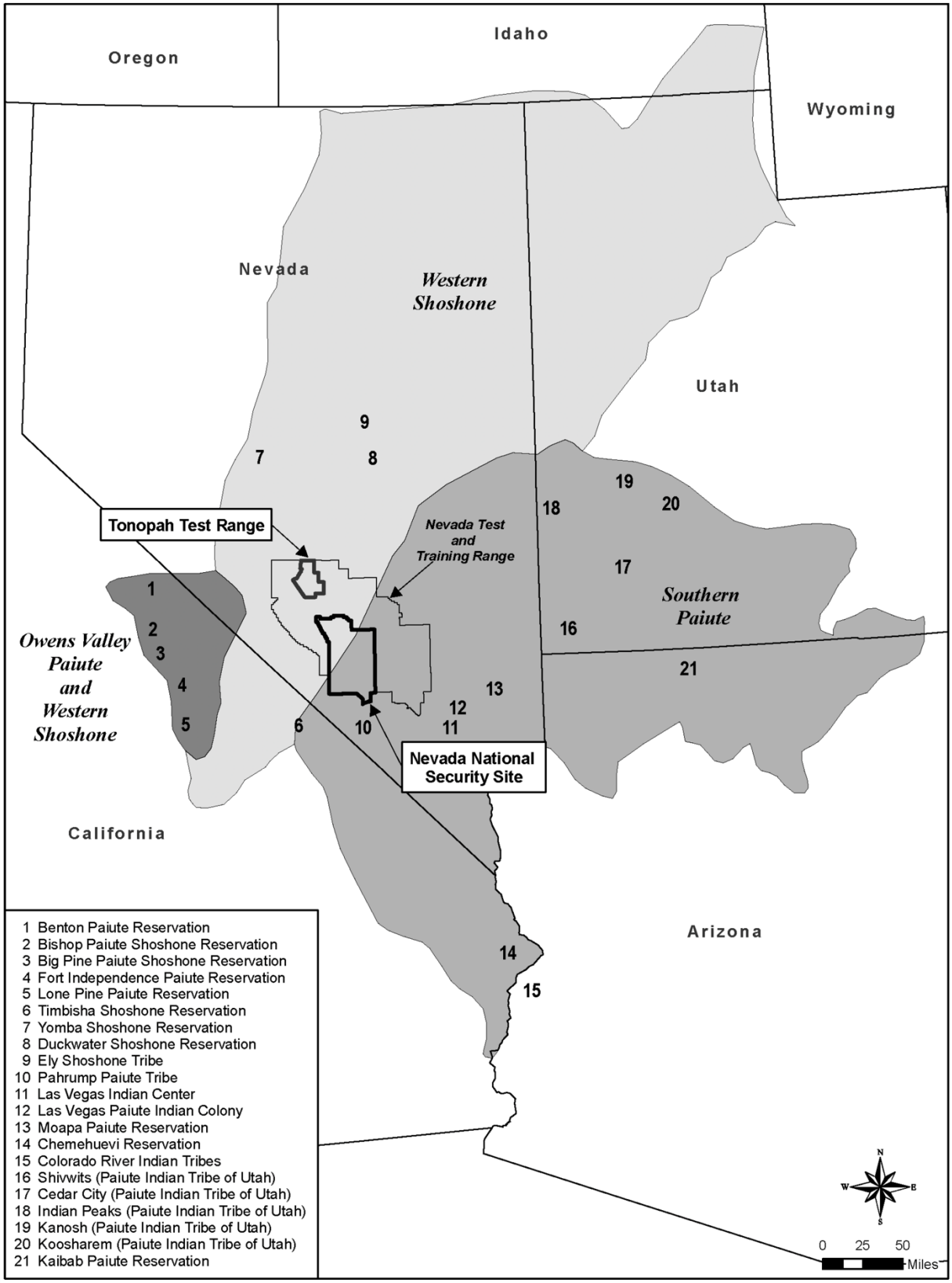
The NNSS has a long history of supporting national security objectives by conducting nuclear tests and other nuclear and nonnuclear activities. Since October 1992, the U.S. observed a unilateral moratorium on nuclear explosive testing. As depicted in the 2013 SWEIS and ROD, the NNSS's role evolved to become a stronger partner site for national security objectives. As part of that program, the NNSS maintains readiness and the capability to conduct nuclear explosive testing; such testing would be conducted only if so directed by the President in the interest of national security. DOE/NNSA's primary mission at the NNSS is supporting nuclear weapons stockpile reliability through subcritical experiments. Additionally, changes in national security priorities resulted in the introduction and expansion of other national security missions, programs, and activities at the NNSS and offsite locations in Nevada (NLVF, RSL-Nellis, and TTR). In 2010, the site was renamed from NTS to NNSS to accurately reflect the modern mission.

Mission Support and Test Services, LLC (MSTS) has been the M&O contractor for NNSS since 2017. The NNSS employs approximately 2,700 people and has a current budget of about -$800 million per year. Approximately $518 million of the NNSS budget is used to support stockpile stewardship activities (NNSA 2022). The NFO oversees MSTS and manages their contract activities.



Source: NNSS 2019a.

Figure 1-2. NNSS Operational Areas, Major Facilities, and Past Nuclear Testing Areas



Source: NNSA 2013

Figure 1-3. Tribal Cultural Affiliation Map – Region of Influence

The three major DOE/NNSS missions at NNSS are: (1) National Security/Defense; (2) Environmental Management; and (3) Non-defense. The programs associated with each mission are discussed below.

National Security/Defense Missions:

- Stockpile Stewardship and Management Program – Conducts operations in support of defense-related nuclear and national security experiments and maintains the capability to resume underground nuclear weapons testing, if directed.
- Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs – Provides support facilities, training facilities, and capabilities for NNSA and other government agencies involved in nuclear emergency response, nonproliferation, national security technology development, and counterterrorism activities.
- Strategic Partnership Projects (SPP) (previously known as "Work for Others Program") – This work is performed for both DOE and non-DOE entities by DOE/NNSA personnel and/or their respective DOE/NNSA site/facility management contractor personnel, or for the use of NNSA/NFO facilities for work that is not directly funded by DOE/NNSA appropriations.

Table 1-1 identifies the major national assets and facilities that currently support the National Security/Defense Mission.

Table 1-1. Assets/Facilities in Nevada Supporting the National Security/Defense Mission

Facility Name	Location	Description
Big Explosives Experimental Facility (BEEF)	NNSS – Area 4	BEEF is a hydrodynamic testing facility that provides data through explosive experiments and supports non-nuclear capabilities through the conduct of dynamic experiments.
Device Assembly Facility (DAF)	NNSS – Area 6	DAF is used for national criticality experiments research, and uses nuclear materials to conduct nuclear experimental work and counterterrorism training.
Joint Actinide Shock Physics Experimental Research (JASPER)	NNSS – Area 27	JASPER features a two-stage, light gas gun to assess behaviors of materials under various conditions. The JASPER facility predicts performance of aging weapons and analyzes effects of shockwaves on nuclear material.
U1a Complex	NNSS – Area 1	The U1a Complex is an underground laboratory used for subcritical experiments and physics experiments to obtain technical information about the U.S. nuclear weapons stockpile in an environmentally-safe manner.
Counter Terrorism Operations Support (CTOS)	NNSS – Area 1	CTOS develops and conducts radiological and nuclear response training in support of homeland security for more than 13,000 emergency responders each year.
Nonproliferation Test and Evaluation Complex (NPTEC)	NNSS – Area 5	NPTEC is the largest facility in the world used for training and open-air testing of hazardous materials and biological simulants in addition to light aircraft and uncrewed aerial system (UAS) support.
Radiological/Nuclear Countermeasures Test and Evaluation Complex (RNCTEC)	NNSS – Area 6	RNCTEC conducts nuclear detection test and evaluation using special nuclear materials (SNM) during testing. RNCTEC provides the Nation with the necessary facilities and capabilities to validate the performance of systems used to protect the U.S. from the threat of a terrorist radiological or nuclear attack.

Facility Name	Location	Description
Remote Sensing Laboratory (RSL)-Nellis	Nellis AFB, NV	The RSL-Nellis provides emergency response operations, remote sensing activities, and counterterrorism capabilities in response to the loss, theft or release of nuclear or radioactive material.
Tonopah Test Range (TTR)	NTTR – Area 52*	TTR operations include flight-testing of gravity weapons (bombs) and research, development, and evaluation of nuclear weapons components and delivery systems.
Global Security Operations West (GSOW)	NNSS – Area 25-27	The GSOW range supports UAS and counter-UAS (cUAS) RDT&E operations and cyber-physical and non-proliferation experiments and training for a wide range of organizations.

*The TTR is located on the NTTR, owned by USAF, and operated by SNL/NM.

Environmental Management Missions:

- Environmental Restoration Program – Characterizes and remediates the environmental legacy of nuclear explosive and other testing at NNSS and NTTR locations.
- Waste Management Program – Manages and safely disposes of low-level radioactive waste (LLW), mixed low-level radioactive waste (MLLW), and classified waste/matter received from DOE-approved, NNSA-approved, and Department of Defense (DoD)-approved facilities throughout the U.S. Safely manages and characterizes hazardous and transuranic (TRU) wastes for offsite disposal.

Non-defense Missions:

- General Site Support and Infrastructure Program – Maintains the buildings, roads, utilities, and facilities required to support all NNSS programs and to provide a safe environment for NNSS workers. The program also includes the pollution prevention program and renewable energy and sustainability initiatives at the NNSS.
- Other Research and Development and SPP – Provides support facilities and NNSS access to universities and organizations conducting environmental and other research unique to the regional setting.

1.3 Purpose and Need for Agency Action

The primary mission supported by NNSS is ensuring the U.S. stockpile of nuclear weapons remains safe and reliable. Other activities conducted on the NNSS include experiments aimed at improving national nonproliferation objectives, arms control and treaty verification; weapons of mass destruction first responder training; experiments involving the controlled release and monitoring of hazardous material; remediation of legacy contamination sites; preparing waste for compliant disposition at the Waste Isolation Pilot Plant (WIPP) in Carlsbad, New Mexico, including waste that will be processed at the Idaho National Laboratory in Idaho Falls, Idaho to meet the WIPP waste acceptance criteria; and disposal of LLW and MLLW (NNSS 2022). The purpose and need for the continued operation of NNSS is to support the national security/defense, environmental management, and non-defense missions described in Section 1.2. That purpose and need has not changed since the 2013 NNSS SWEIS was prepared.

The Council on Environmental Quality (CEQ) regulations that implement the NEPA stipulate that a federal agency shall prepare a supplement to a final environmental impact statement (EIS) if "(i) the agency makes substantial changes in the Proposed Action that are relevant to environmental concerns; or (ii) there are significant new circumstances or information relevant to environmental concerns and bearing on the Proposed Action or its impacts" [40 Code of Federal Regulations (CFR) 1502.9(c)(1)]. An SA is a document NNSA prepares in accordance with the CEQ and DOE regulations to determine if a supplemental or new EIS should be prepared or if no further NEPA documentation is required. This SA fulfills NNSA's requirement to review the SWEIS at least every five years as required by 10 CFR §1021.330(d). This SA accomplishes that requirement by comparing the information presented in the 2013 SWEIS with any changes in programs/operations/impacts that are expected to occur in the next five years (through approximately 2028). The purpose of this SA is to document whether these changes constitute a substantial change that is relevant to environmental concerns, or if there are significant new circumstances or information relevant to environmental concerns. Based on this SA, NNSA/NFO will determine whether the existing SWEIS remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented.

Purpose and Need for Agency Action – American Indian Perspectives

The culturally affiliated tribes know American Indian people are charged by the Creator to interact with the environment to sustain resources in culturally appropriate ways beyond the stated purpose and need. American Indians believe these lands contain life-sustaining characteristics that must be properly respected and nurtured to ensure harmony.

The culturally affiliated tribes do not support the harmful land-disturbing activities currently conducted or proposed on the NNSS and off-site locations. These lands are part of a broader cultural landscape that includes holylands traditionally used by Southern Paiute/Chemehuevi, Western Shoshone, and Owens Valley Paiute and Shoshone people. The tribes believe that harmful land disturbing activities threaten the health and welfare of American Indian people through possible contamination or resource destruction.

1.4 Scope of this Supplement Analysis

Uninterrupted operations at NNSS are needed to efficiently and safely support the missions assigned to the site. This SA assesses the potential environmental impacts of continued operations at NNSS, with a focus on the changes that have occurred at NNSS since publication of the 2013 SWEIS and ROD, or are expected to occur within approximately the next five years. This SA evaluates the impacts of these changes against the impacts presented in the 2013 SWEIS. The actions are categorized within the same four geographical areas analyzed in the 2013 SWEIS:

- NNSS;
- TTR;
- NLVF/Northwest Las Vegas (NWLV) location; and
- Remote Sensing Laboratory at Nellis AFB.

In preparing this SA, NNSA/NFO considered multiple sources of information and utilized the best available information. Numerous sources and approaches were used to evaluate which projects and programs would be incorporated into this SA including:

- A review of NEPA documentation prepared after issuance of the 2013 SWEIS;
- An evaluation of institutional and other plans to identify major new plans, proposals, or projects that would be implemented within the 2023 through 2028 timeframe;
- Identification and consideration of any changes in applicable federal, state, and local regulations;
- Consultations with program/project managers; and
- Identification of evolving information on the natural and human environment at NNSS.

In general, the descriptions of the missions/facilities/operations presented in the 2013 SWEIS are still accurate and are not repeated in this SA. However, any relevant changes that may give rise to changes in environmental impacts in comparison to those presented in the 2013 SWEIS are described in Chapter 2 of this SA. For example, Section 2.1 updates the status of projects and operations that were analyzed in the 2013 SWEIS and selected in the ROD. Section 2.2 discusses projects/actions that were initiated after the 2013 SWEIS and ROD. Section 2.3 discusses new projects and operations anticipated in the next 5 years (2023-2028).

Chapter 3 of this SA contains the comparative environmental analysis of these changes against the environmental impacts presented in the 2013 SWEIS. As part of that analysis, Chapter 3 also discusses any relevant changes in the environment baseline that have occurred since publication of the 2013 SWEIS and ROD.

This SA is organized as follows:

- Chapter 1 contains the introduction and purpose and need;
- Chapter 2 describes any projects/actions that have occurred at NNSS since publication of the 2013 SWEIS and ROD, and the projects/operations that are expected to occur within approximately the next five years;
- Chapter 3 contains the comparative environmental impact analyses;
- Chapter 4 presents potential cumulative impacts;
- Chapter 5 includes the preliminary conclusion and determination;
- Chapter 6 identifies references used;
- Appendix A provides a list and description of categorical exclusions (issued for actions that occurred over the period 2013-2022); and
- Appendix B contains responses to comments received on the Draft SA.

1.5 Relevant *National Environmental Policy Act* Documents

This section identifies and discusses NEPA documents that are potentially relevant to this SA. Decisions as a result of previous (and future) NEPA documents have affected (or will affect) operations/activities at NNSS. With respect to previous NEPA documents that have been completed, the most important document is as follows:

Site-Wide Environmental Impact Statement for Continued Operation of the Department of Energy/ National Nuclear Security Administration Nevada National Security Site and Off-Site Locations in the State of Nevada (DOE/EIS-0426; NNSA 2013). DOE/NNSA prepared the 2013 SWEIS to analyze all capabilities and operations at NNSS that support existing and reasonably foreseeable missions. The 2013 SWEIS analyzes three alternatives: (1) No-Action Alternative; (2) Expanded Operations Alternative; and (3) Reduced Operations Alternative. The three alternatives include similar types of programs, capabilities, projects, and activities, but differ primarily in their levels of operations and facilities requirements. In the ROD, DOE/NNSA decided to implement a hybrid decision based on all three alternatives. Section 2.1 summarizes the decisions announced in the ROD and provides a current status of implementing those decisions. The environmental impacts of the changes identified in this SA are compared against the 2013 SWEIS.

Numerous Categorical Exclusions (CXs) have been issued for projects at NNSS since publication of the 2013 SWEIS. CXs are applicable to classes of actions that normally do not require EAs or EISs (10 CFR 1021.410). Section 2.2 of this SA identifies these projects. Projects that are addressed by applicable CXs would not result in significant environmental impacts. As such, these projects are not likely to constitute substantial changes that are relevant to environmental concerns. Besides these CXs, no other NEPA documents have been prepared for NNSS since publication of the 2013 SWEIS and ROD.

1.6 Tribal Participation and Review of the Draft SA

The NNSA/NFO consultation efforts for the 2013 SWEIS included the Consolidated Group of Tribes and Organizations (CGTO) tribal perspectives about information and activities described in the document. Using the same participatory format for the 2023 SA, NNSA/NFO invited the American Indian Writers Subgroup (AIWS) to share tribal perspectives related to text in this document. The tribal perspectives are provided in "American Indian Perspectives" textboxes embedded throughout this SA. The views expressed by the AIWS are their own and do not necessarily reflect the views of the DOE or NNSA.

Although publication of a Draft SA is not required, NNSA/NFO provided the Draft SA to the Nevada Division of Environmental Protection (NDEP), Nye and Clark county representatives, the AIWS, and 16 culturally affiliated tribes (listed in alphabetical order below):

1. Benton Paiute Tribe
2. Big Pine Paiute Tribe of the Owens Valley
3. Bishop Paiute Tribe
4. Chemehuevi Indian Tribe
5. Colorado River Indian Tribes
6. Duckwater Shoshone Tribe
7. Ely Shoshone Tribe
8. Fort Independence Indian Reservation
9. Kaibab Band of Paiutes
10. Las Vegas Paiute Tribe
11. Lone Pine Paiute-Shoshone Reservation
12. Moapa Band of Paiutes

13. Pahrump Paiute Tribe
14. Paiute Indian Tribe of Utah
15. Timbisha Shoshone Tribe
16. Yomba Shoshone Tribe

Tribal Participation and Review of the Draft SA – American Indian Perspectives

Sixteen culturally affiliated tribes with ancestral ties to the NNSS, TTR, and RSL -Nellis participate in the NNSA/NFO American Indian Consultation Program (AICP). In 1995, the tribes formed the American Indian Writers Subgroup (AIWS) which consisted of designated members to develop tribal text or perspectives for the NNSA/NFO. Tribal interests are not limited to cultural resources and extend to other topics. In 2023, the tribes directed the AIWS to resume participation by developing tribal text for the 2023 SA to sustain consistency in participation and format.

NNSA provided a 30-day review process for the Draft SA. During that review process, NNSA received one comment document from the NDEP. The NDEP comments and NNSA's corresponding responses are provided in Appendix B.

1.7 Copy of Supplement Analysis

DOE/NNSA requires that each SA and the resulting determination be made available to the public (10 CFR 1021.314(c)). Copies of the Final SA will be posted on the DOE NEPA web page (https://www.energy.gov/nepa) and the NNSA NEPA reading room web page (https://www.energy.gov/nnsa/nnsa-nepa-reading-room).

2.0 CHANGES AT NNSS SINCE 2013 SWEIS AND PROJECTS/ OPERATIONS ANALYZED IN THIS SUPPLEMENT ANALYSIS

This chapter includes a discussion of current operations and proposed projects at NNSS. Section 2.1 updates the status of projects and operations that were analyzed in the 2013 SWEIS and selected in the ROD. Section 2.2 identifies actions initiated after the 2013 SWEIS and ROD. Section 2.3 discusses actions anticipated in the next 5 years (2023-2028), which are the focus of the comparative analysis in Chapter 3 of this SA.

2.1 Projects and Operations Analyzed in the 2013 SWEIS and Selected in the ROD

Table 2-1 lists the actions and operations included in the 2013 SWEIS and ROD and provides an updated status in implementing those actions and conducting operations. Table 2-1 also identifies the alternative in the 2013 SWEIS that included those projects and operations. As shown in that table, NNSA has been conducting operations in accordance with the ROD, with no notable changes. To demonstrate compliance with the 2013 SWEIS/ROD, DOE/NNSA prepares an annual tracking plan to ensure that NNSS activities remain below the upper bounds of the SWEIS impact analysis.[2] The most recent tracking plan was completed for calendar year 2022 (MSTS 2023a). As shown in Table 2-1, all operational parameters have remained well below the upper bounds of the SWEIS impact analysis.

[2] NNSA began preparation of the annual tracking plan in calendar year 2018.

Table 2-1. 2013 SWEIS ROD and Implementation Status

Preferred Alternative/ROD from 2013 SWEIS	Alternative Selected in ROD	Implementation Status/ Operational Data for 2018-2022
Stockpile Stewardship and Management Program		
Maintain readiness to conduct underground nuclear tests.	No-Action	Ongoing
Conduct up to 10 dynamic experiments per year within Areas 1-4, 6-12, 16, 19, or 20.	No-Action	Ongoing/0-3 annually
• Conduct up to 100 conventional explosives experiments per year within Areas 1-4, 12, or 16 using up to 120,000 pounds TNT-equivalent of explosive charges (50 of these would be at BEEF with a TNT-equivalent limitation of 70,000 pounds); would also support SPP (previously "Work for Others Program"). • Add second firing table and high-energy x-ray capability at BEEF. • Establish up to three areas at the NNSS for conducting explosive experiments with depleted uranium and conduct up to 20 experiments per year.	Expanded Operations	Ongoing/0-52 annually with conventional explosives; 0-4 annually with depleted uranium; a second firing table (Kapa West) and the Febetron high-energy x-ray capability were added at BEEF.
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.	Expanded Operations	Ongoing/less than 36 annually. Note: the Large Bore Powder Gun project has yet to be implemented.
Conduct up to 500 criticality operations (experiments, training, and other operations) per year at the National Criticality Experiments Research Center at DAF in Area 6.	No-Action	Ongoing/133-340 annually
Decommission and disposition the Atlas Facility.	Reduced Operations	Completed (note: the 6-922 High Bay Facility is still in operation)
Conduct up to 600 plasma physics and fusion experiments annually at NLVF and 50/year in Area 11.	No-Action	Ongoing/<600 annually
Conduct five drillback operations at the NNSS over about a 10-year period.	No-Action	Ongoing/0 annually
Conduct SSMP activities in Areas 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, or 16.	Reduced Operations	Ongoing
• Disposition damaged U.S. nuclear weapons on an as-needed basis. • Test weapons components for quality assurance under the Limited Life Component Exchange Program.	Expanded Operations	Ongoing
Transfer special nuclear material, including nuclear weapon pits, to and from other parts of the DOE complex for staging and use in experiments at the NNSS.	Expanded Operations	Ongoing
Conduct training for the Office of Secure Transportation up to four times per year at various locations on NNSS roads.	Reduced Operations	Ongoing
Conduct the following stockpile stewardship operations at the TTR: • Conduct tests and experiments, including flight test operations for gravity weapons (i.e., bombs). • Conduct ground/air-launched rocket and missile operations. • Conduct impact testing. • Conduct passive testing of joint test assemblies and conventional weapons. • Conduct fuel-air explosives testing.	Expanded Operations	Ongoing

Preferred Alternative/ROD from 2013 SWEIS	Alternative Selected in ROD	Implementation Status/ Operational Data for 2018-2022
• Certain safeguards and security functions and other administrative functions would be returned to the U.S. Air Force.		
Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs		
Provide support for the Nuclear Emergency Support Team, the Federal Radiological Monitoring and Assessment Center, the Accident Response Group, and the Radiological Assistance Program. Most of this support is out of RSL at Nellis Air Force Base.	No-Action	Ongoing
Conduct Aerial Measuring System activities from RSL at Nellis Air Force Base.	No-Action	Ongoing
Conduct WMD emergency responder training at various NNSA/NFO venues.	No-Action	Ongoing
Support the DOE Emergency Communications Network.	No-Action	Ongoing
• Disposition improvised nuclear devices and deploy the DOE/NNSA Disposition Program and FBI Disposition Forensic Program to the NNSS for training/exercises or for an actual event, as needed. • Disposition of radiological dispersion devices, as needed.	Expanded Operations	Ongoing
• 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. • 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. • Develop and construct new facilities to support a Nonproliferation Test Bed to simulate chemical and radiological processes that an adversary would clandestinely conduct.	Expanded Operations	Ongoing
Strategic Partnership Projects (formerly "Work for Others Program")		
• Continue to conduct SPP activities in in appropriate locations on the NNSS, RSL and NLVF. • The NNSS land use zone designation for Area 15 would be changed from "Reserved Zone" to "Research, Test, and Experiment Zone."	Expanded Operations	Ongoing
Host treaty verification activities.	No-Action	Ongoing
Conduct nonproliferation projects and counterproliferation research and development at the NNSS, including: • Conduct conventional weapons effects and other explosives experiments. • Support development of capabilities to detect/defeat military assets in deep 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). • Support training, research and development of equipment, specialized munitions, and tactics related to counterterrorism.	No-Action	Ongoing/0-10 annually
Develop and construct new facilities to support counterterrorism training and research and development activities.	Expanded Operations	Ongoing

Preferred Alternative/ROD from 2013 SWEIS	Alternative Selected in ROD	Implementation Status/ Operational Data for 2018-2022
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. Support NASA's deep space power source development, including conducting experiments using existing boreholes at the NNSS to sequester emissions such as radionuclides.	Expanded Operations	Ongoing
• Increase use of various aerial platforms, such as airplanes, uncrewed aerial systems, and helicopters, for research and development, training, and exercises, including constructing additional hangars, shops, and buildings at existing airports at the NNSS. • Conduct up to 3 underground and 12 open-air radioactive tracer experiments per year. • Host treaty verification activities, including development of a facility for simulating nuclear fuel cycle-related radionuclide release detection and characterization. • Develop a facility for specialized explosive experiments and simulated manufacture to support high-explosives experiments. • Support increased R&D of active interrogation equipment, methods, and training. • Develop new facilities to support research and development in radio frequency generation and infrasonic observations. • Develop new facilities, including simulated clandestine laboratories, to support chemical and biological simulant experiments.	Expanded Operations	Ongoing
Conduct SPP activities at the TTR, including robotics testing, smart transportation-related testing, smoke obscuration operations, infrared tests, and rocket development. Certain safeguards and security functions and other administrative functions would be turned over to the U.S. Air Force.	Expanded Operations	Ongoing
Waste Management Program		
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.	Expanded Operations	Ongoing/7,828,867 cubic feet of LLW as of 2022; 832,443 cubic feet of MLLW as of 2022
Open the Area 3 RWMS for disposal of authorized waste	Expanded Operations	Ongoing
• Repackage onsite-generated MLLW. • At the Area 5 RWMC, store MLLW received from onsite and offsite generators pending treatment via macroencapsulation and microencapsulation (i.e., repackaging), sorting/segregating, and bench-scale mercury amalgamation, as appropriate, and/or dispose this waste.	Expanded Operations	Ongoing
Store onsite-generated TRU waste (up to 19,000 cubic feet over the next 10 years) generated by increased activities at NNSS facilities, such as JASPER.	Expanded Operations	Ongoing/1,175 cubic feet of TRU waste as of 2022
Store onsite-generated hazardous waste at the Area 5 Hazardous Waste Storage Unit pending offsite treatment or disposal. Up to 170,000 cubic feet would be generated over the next 10 years.	No-Action	Ongoing/3,582 cubic feet of hazardous waste as of 2022

Preferred Alternative/ROD from 2013 SWEIS	Alternative Selected in ROD	Implementation Status/ Operational Data for 2018-2022
Operate the Area 11 Explosives Ordnance Disposal Unit. No more than 41,000 pounds of explosives would be treated over the next 10 years.	No-Action	Ongoing/1,799 pounds of explosives as of 2022
Operate the Area 6 Solid Waste Disposal Site.	No-Action	Ongoing
Operate the Area 23 Solid Waste Disposal Site and the U10c Solid Waste Disposal Site. 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.	Expanded Operations	Ongoing/2,495,748 cubic feet of solid waste as of 2022
Environmental Restoration Program		
Underground Test Area Project – Comply with the FFACO; monitor groundwater from existing wells; drill and develop new characterization and monitoring wells; develop groundwater flow and transport models; and continue to evaluate closure strategies.	Expanded Operations	Ongoing
Soils Project – Identify and characterize areas with contaminated soils and perform corrective actions in compliance with the FFACO.	Expanded Operations	Ongoing
Industrial Sites Project – Identify, characterize, and remediate industrial sites under the FFACO and continue decontaminating and decommissioning facilities.	No-Action	Ongoing
Defense Threat Reduction Agency sites – In accordance with the FFACO, perform remediation activities at sites that are the responsibility of the Defense Threat Reduction Agency.	No-Action	Ongoing
Execute the Borehole Management Program.	No-Action	Ongoing
General Site Support and Infrastructure Program		
Conduct small projects to maintain the present capabilities of NNSA/NFO facilities in all areas of the NNSS and at NLVF, RSL, and the TTR including: • Construct a new 85,000-square-foot multi-story security building in Area 23. • Replace the NNSS 138-kilovolt electrical transmission system. • Expand cellular telecommunication system on the NNSS. • Reconfigure Mercury. • Maintain existing infrastructure, manage permits/agreements, and provide security for the former Yucca Mountain site.	Expanded Operations	Ongoing/this SA analyzes the 138-kilovolt electrical transmission system replacement and the reconfiguration of Mercury.
Conservation and Renewable Energy Program		
Reduce energy intensity by 3 percent annually through fiscal year 2015; a total 30 percent reduction.	No-Action	Ongoing/in 2009, NNSS consumed 84,577 megawatt hours (MWh). In 2015, NNSS consumed 47,643 MWh, which is a 43.6 percent reduction. In 2021, NNSS consumed approximately 36,823 MWh.
Reduce greenhouse gas (GHG) emissions by 28 percent by fiscal year 2020.	No-Action	Ongoing/in 2021, GHG emissions were 30,551 metric tons. This represents a 53.5 percent decrease

Preferred Alternative/ROD from 2013 SWEIS	Alternative Selected in ROD	Implementation Status/ Operational Data for 2018-2022
		in GHG emissions from the 2008 baseline of 65,632 metric tons.
Install advanced electric metering systems.	No-Action	Ongoing
Support development of a 240-megawatt commercial solar power generation facility in Area 25. Construct a 5-megawatt photovoltaic (PV) solar power generation facility near Area 6.	Expanded Operations	NNSA/NFO has not received or solicited proposals for any commercial solar power generation projects; consequently, a 240-megawatt commercial solar power generation facility in Area 25 has not been implemented. This SA evaluates solar projects in Area 2, 5, 6, and 23 that would provide 3 to 5 MW each (see Section 2.3.1).
Reduce water use by 16 percent by 2015.	No-Action	Ongoing/potable water consumption at NNSS has been reduced by 24 percent over the past 10 years.
Maximize use of alternative fuels (e.g., E85 and biodiesel).	No-Action	Ongoing
Ensure all new construction and renovation projects implement high-performance building goals.	No-Action	Ongoing
Other Research and Development Programs		
Support the DOE National Environmental Research Park Program and other non-DOE/NNSA research and development activities in all areas of the NNSS.	No-Action	Ongoing

BEEF = Big Explosives Experimental Facility; DAF = Device Assembly Facility; FBI = Federal Bureau of Investigation; FFACO = Federal Facility 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; NNSS = Nevada National Security Site; NSO = Nevada Site Office; RSL = Remote Sensing Laboratory; RWMC = Radioactive Waste Management Complex; RWMS = Radioactive Waste Management Site; TNT = 2,4,6-trinitrotoluene; TRU = transuranic; TTR = Tonopah Test Range; WMD = weapon of mass destruction.

2.2 Actions initiated after the 2013 SWEIS and ROD

Since publication of the 2013 SWEIS and ROD, DOE/NNSA initiated several actions associated with the continued operations at NNSS. Some examples of these actions include: installation of sensors in various areas of the NNSS for diagnostic monitoring; upgrades to existing parking areas; construction/modification and operation of support buildings; and demolishment of excess facilities. Appendix A, Table A-1, provides a list and description of all relevant actions that have occurred over the period 2013-2022. As shown in Table A-1, all of those actions were covered by a categorical exclusion (CX) (see text box), and were determined to not individually or cumulatively have a significant effect on the human environment.

Categorical Exclusions (CXs)

Categorical exclusion means a category of actions, as defined at 40 CFR 1508.4 and listed in appendix A or B to subpart D of 10 CFR 1021, for which neither an EA nor an EIS is normally required. DOE has determined that actions covered by a CX do not individually or cumulatively have a significant effect on the human environment.

In addition to the CXs listed in Table A-1, NNSA/NFO also documented and evaluated (in the form of NEPA checklists[3]) other Federal actions in support of DOE/NNSA activities at NNSS, NLVF, and RSL-Nellis. For example, in 2022, NNSA/NFO prepared 52 checklists for various activities such as routine maintenance. Of these 52 actions addressed in the NEPA checklists, NNSA determined that 39 of the actions were covered by the 2013 NNSS SWEIS and 13 actions were covered by CXs. Because the actions are covered by a CX or a NEPA checklist, they are now considered part of the existing operations and are not further analyzed in this SA. Besides the CXs listed in Table A-1, and the NEPA checklists, no other NEPA documents (Environmental Assessments or Environmental Impact Statements) were prepared for NNSS since publication of the 2013 SWEIS and ROD.

Because TTR is managed by SNL/New Mexico (SNL/NM), NEPA compliance activities are administered separately from NNSS, NLVF, and RSL. Since the completion of the 2013 NNSS SWEIS, NNSA documented and evaluated (in the form of NEPA checklists and CXs) numerous federal actions in support of DOE/NNSA activities at TTR. Those NEPA checklists covered activities such as routine maintenance, test activity, site operations, decontamination, decommissioning, and demolition (DD&D),[4] and site improvements such as installation of concrete pads, communication lines (e.g., fiber optic cables), facilities improvements, new structures, and support buildings. Of the actions addressed in the NEPA checklists, DOE/NNSA determined that many of the actions were covered by the 2013 NNSS SWEIS and other actions were covered by CXs. Because these actions are covered by the previous SWEISs or a CX, they are now considered part of the existing operations at TTR and are not further analyzed in this SA. Appendix A, Table A-2, provides a description of the CXs that have been applied to TTR actions over the period 2013-2022

[3] A NEPA checklist is used by DOE/NNSA sites, as needed, to document NEPA compliance for a given activity. For example, a NEPA checklist could be prepared for a project to document that a specific CX would apply to that action. As another example, a NEPA checklist could be provided to document that a given project is covered by the scope of the existing SWEIS.

[4] The term DD&D is used in this SA to define the disposition activities associated with excess facilities. If a facility is not contaminated (radiologically or chemically), decontamination would not be required.

Actions Initiated After the 2013 SWEIS and ROD – American Indian Perspectives

Beginning in the mid-2010s and following the 2013 SWEIS but not specified in the ROD, NNSA/NFO expanded tribal interactions through quarterly Tribal Planning Committee (TPC) meetings and semi-annual tribal field visits. Additionally, EM NV supported a Tribal Revegetation Project with assistance from the Tribal Revegetation Committee (TRC). This project blended traditional ecological knowledge (TEK) with western science to examine methods for developing a vegetative cover at CAU 111 at the Radioactive Waste Management Complex (RWMC) in Area 5.

2.3 Actions Evaluated in this Supplement Analysis

As discussed in Section 1.4, DOE/NNSA reviewed and evaluated institutional and other plans to identify actions that could occur within the next five years (2023-2028) at NNSS, NLVF, RSL, and TTR. DOE/NNSA also consulted with program/project managers and subject matter experts (SMEs) from NFO, DOE Office of Environmental Management (EM) - Nevada (EM NV), MSTS (the management and operating [M&O] contractor at NNSS), and Navarro Research and Engineering, Inc. (Navarro), the EM NV contractor. Through this process, DOE/NNSA identified the actions anticipated for 2023-2028 that are addressed in this SA (see Table 2-2). These actions are categorized within the same four geographical areas analyzed in the 2013 SWEIS:

- NNSS;
- TTR;
- NLVF; and
- Remote Sensing Laboratory at Nellis AFB.

2.3.1 Nevada National Security Site (NNSS)

As shown in Table 2-2, DOE/NNSA is evaluating a variety of actions at NNSS. Many of the actions involve modernizing/upgrading existing facilities and infrastructure. Modernization activities include construction of replacement facilities that would enable DOE/NNSA to consolidate operations from older facilities and support growth. More than 600,000 square feet of new/replacement facility construction could occur between 2023-2028. Consolidating operations into new/replacement facilities would facilitate DD&D activities for the older, vacated facilities, and approximately 194,000 square feet of facilities are scheduled to undergo DD&D between 2023 and 2028.

Infrastructure projects also include the replacement of up to 55 miles of prioritized segments of the 138kV power transmission structures from the Jackass Flats Substation West and North to the U1a Complex area. The project scope would include replacing and modernizing the existing wooden pole structures and transmission line. Water well upgrades are also proposed, as identified in Table 2-2.

NNSA is also proposing actions to increase energy security and reduce greenhouse gas (GHG) emissions at the NNSS by constructing solar projects, installing electric vehicle (EV) charging stations across the site, and transitioning to 100 percent zero-emission vehicle acquisitions by

approximately 2035 (NFO 2023). If the entire fleet of vehicles is converted to EVs, GHG emissions are estimated to be reduced by approximately 3.8 million pounds of carbon-dioxide equivalent ($C0_{2e}$).

DOE/NNSA is also proposing a new NNSS Main Gate Complex, which would provide a modern, secure and sustainable entry control facility to the NNSS. That complex, which would be located between US 95 and the current Mercury gate location, would include a traffic calming entry road, new ID Checkpoint with a hardened guard shack, a new badge office and an option for a new warehouse or warehouse transfer center. NNSA is also proposing to expand existing solid waste disposal facilities at the Area 23 Waste Disposal Site and/or the U10c Solid Waste Disposal Site.

NNSA is also proposing to establish a Space Proving Ground for the National Aeronautics and Space Administration (NASA) and the broader space community. That proving ground would enable NASA and its partners to conduct a variety of activities, including field work, hiking traverses with scientific data collection equipment (e.g., drilled rock samples, digging), rover operation, temporary habitat construction, simulated lunar and Mars activity, spacesuit testing, NASA software testing, technical equipment demos/testing, UAS operations, simulated emergency response training, and weather balloon research.

Operations at NNSS would continue in accordance with the 2013 SWEIS and ROD. Notable changes in operations include an expansion of SNM process capability in the Device Assembly Facility (DAF) to meet mission needs. Construction/installation of gloveboxes to support LLNL missions would begin in 2026 with operations commencing in 2031. Radiological air emissions during operations are not expected, consistent with current glovebox operations. However, there is a potential for increased worker dose and radiological waste generation, which are analyzed in this SA.

A second operational change at DAF would be the implementation of an Enhanced Staging Program (ESP). The existing staging locations in the DAF are nearing capacity, leaving inadequate space for additional Radiological Material (RAM) staging to support the growing DAF mission needs. The ESP would improve handling and staging of radiological material at the DAF and enable the consolidation and support of current, transitory, and enduring RAM inventory.

Another notable operational change at NNSS involves the expansion of the current subcritical experiment (SCEs) program at the U1a Complex. SCEs involve SNM, typically plutonium, driven by high explosives to study dynamic material properties and assess the current stockpile. There is a scientific need for SCE diagnostics to obtain data in late-stage plutonium implosion. The first project is the Z-Pinch Experiment Underground System (ZEUS), which would use a pulsed neutron source with gamma ray detectors. The ZEUS test bed would enable integral tests on late-stage implosion SCEs. The second is the Advanced Sources and Detectors (ASD)/Scorpius Project, a new large scale accelerator that would be able to provide additional, currently unavailable, information to assess the U.S. nuclear stockpile. These projects include new mined areas, new electrical and ventilation upgrades. Also required for ASD is the design, construction, and excavation of a new utility borehole (the U1j borehole) from the U1a Complex surface in a vertical alignment to a total depth of nominally 990 feet below the ground surface. The purpose of the U1j borehole would be to provide ventilation and power for the U1a Complex Enhancement

Project (UCEP) and enhanced capability for subcritical experiments (ECSE) operations. Additionally, over the next 5 years, the Complex Access Shaft and a new hoist would be built and a shaft (approximately 990 feet deep) would be drilled to augment the aging and limited hoists at U1a.

The Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs operations are covered under the existing 2013 SWEIS or recent CXs, and are not expected to notably change, with the exception of a project known as the Source Physics Experiments Phase 3/Rock Valley Direct Comparison Project [SPE Phase III/RVDC Project]). That project would use conventional explosives for experiments in Rock Valley to address the key obstacles that hamper the detection of low yield, decoupled evasive nuclear tests. NNSA also notes that UAS operations have expanded to the entire site and cUAS operations are now being conducted. Potential impacts associated with these increased operations are addressed in this SA.

The DOE EM activities proposed at the NNSS Area 5 RWMC include construction of a new *Resource Conservation and Recovery Act* (RCRA)-permitted cell and associated groundwater monitoring well, construction of 2-3 new office structures, and installation and operation of a portal radiography unit (real-time radiography).

As shown in Table 2-1, the 2013 SWEIS analyzed the disposal of up to 48,000,000 cubic feet of LLW and 4,000,000 cubic feet of MLLW at the Area 5 RWMC and the Area 3 RWMS. As of 2022, a total of approximately 7,828,867 cubic feet of LLW and 832,443 cubic feet of MLLW has been disposed of in those disposal areas. LLW disposal volumes at the NNSS from continued operations are projected to average about 750,000 cubic feet per year until at least 2028. In addition, NNSA is analyzing the disposal of three special LLW volumes over the planning period for this SA: (1) approximately 3-4 million cubic feet of soils from the Santa Susana Field Laboratory, California; (2) approximately 2.5 million cubic feet of LLW soils from Palomares, Spain; and (3) approximately 2.0 million cubic feet of LLW from the Industrial Sites environmental restoration activity.

Nevada National Security Site (NNSS) – American Indian Perspectives

Culturally affiliated tribes have participated in tribal interactions with NNSA/NFO as part of the AICP since 1991. The tribes rely on extensive TEK to understand the complex cultural landscape within the NNSS. These lands, an integral part of our religion, which integrated sensitive resources that require ongoing tribal interactions to keep the land in balance.

Tribes have participated in the NNSA/NFO American Indian Consultation Program through systematic interactions and quarterly interactions with the TPC participating field visits to culturally sensitive areas at the NNSS. Involvement from the AIWS to develop tribal text for the 2023 SA provided a mechanism for sustaining progressive tribal involvement in the NEPA process. Culturally affiliated tribes participated in an EM NV-supported Tribal Revegetation Project at the Radioactive Waste Management Complex in Area 5. The project demonstrated the importance of blending TEK and western science to address challenges associated with restoring a vegetative cover and the 92-acre site.

2.3.2 Tonopah Test Range (TTR)

As shown in Table 2-2, DOE/NNSA is evaluating operational changes and increased maintenance activities at the TTR. In general, operations would remain consistent with past operations, but there is the potential for increases in support for ballistic and guided freefall testing, powered guided testing, explosive asset testing, magnetic levitation acceleration testing, and projectile testing from artillery systems. Increased operations associated with rockets and missile operations, RF spectrum projects (various waveforms), remotely-piloted air and/or ground systems, and data-capture projects/systems (telemetry) could also occur. Maintenance activities would increase as the site continues to age. Site improvements at TTR include installation of fiber optic cables, building utility lines above and below ground, and concrete pads to support test activities. There would also be increased DD&D activities as older facilities are phased-out.

Tonopah Test Range (TTR) – American Indian Perspectives

The culturally affiliated tribes have not been directly involved in TTR activities and unaware of any corresponding tribal consultation in accordance with NHPA Section 106, DOE Order 144.1 *American Indian Tribal Government Interactions Policy*, and *Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relationships* (January 26, 2020). Tribal representatives recommend TTR provide activity briefings at the annual NNSA/NFO Tribal Update Meeting (TUM) and TPC quarterly meetings to meet regulatory requirements, bridge the information gap, and strengthen nation-to-nation relationships.

2.3.3 North Las Vegas Facility (NLVF)/Northwest Las Vegas (NWLV) Campus

The existing NLVF campus includes 25 operational buildings that are dispersed across 78 contiguous acres. The inefficiently designed campus layout, the oversized property, and its portfolio of outdated buildings (>50 years old) inadequately support the current NNSA mission. This SA evaluates the potential construction and relocation of personnel and light laboratory spaces to a new campus that has not yet been built, referred to as the Northwest Las Vegas (NWLV) Campus.[5] The NWLV Campus would be located at a site that is approximately 12 to 15 miles northwest of the existing NLVF Campus. Construction will potentially begin in 2026 and would last approximately three years. The NWLV Campus would require up to 40 acres and include approximately 300,000 to 800,000 square feet of building floor area.[6] At its peak, the number of construction workers at the new campus would be approximately 400 workers.

[5] Disposition of the NLVF is not expected to occur within the next five years and is therefore not addressed in this SA.

[6] This SA analyzes a 300,000 square feet NWLV Campus because that action could occur within the next five years. Any potential expansion of the NWLF significantly beyond 300,000 square feet of building floor area is not reasonably foreseeable and is not ripe for decision-making at this time.

2.3.4 Remote Sensing Laboratory-Nellis (RSL-Nellis)

There are no actions or notable changes in operations expected at RSL-Nellis. Therefore, this SA does not analyze any changes at RSL-Nellis.

Remote Sensing Laboratory-Nellis (RSL-Nellis) – American Indian Perspectives

The culturally affiliated tribes are aware of limited RSL-Nellis activities that are identified in the SA. The culturally affiliated tribes recommend activity briefings during quarterly TPC meetings and at the annual NNSA/NFO Tribal Update Meeting to expand knowledge and gain an understanding of ongoing activities.

Table 2-2. Actions and Operations Evaluated in this SA (2023 – 2028)

Project Name	Program[a]	Project Description
NNSS		
DAF LLNL Gloveboxes	SEO	This project entails facility construction and equipment acquisition and installation (e.g., new gloveboxes) in a building at the DAF to provide for an expansion of special nuclear material process capability to meet mission needs. Construction/installation would begin in 2026 with operations commencing in 2031.
ESP at DAF	SEO	This project would construct a new modular rack system to allow shipping and staging packages to be placed vertically or horizontally, which will upgrade staging configurations in the DAF and allow NNSA to assist stakeholders within the DOE community to address RAM staging space challenges. The rack system would enable safe and effective staging of containers, within the limits of the DAF Documented Safety Analysis (DSA) and Technical Safety Requirements (TSR).
U1a ZEUS development/installation/operation	SEO	ZEUS would use a pulsed neutron source with gamma ray detectors to enable integral tests on late-stage implosion SCEs. ZEUS test bed construction would mine two new drifts within the U1a.03 section of the underground. New electrical and ventilation upgrades would be included.
ASD/Scorpius Project	SEO	The ASD/Scorpius Project would include a new large scale accelerator that would be able to provide additional, currently unavailable, information to assess the U.S. nuclear stockpile. Also required for ASD is the design, construction, and excavation of a new utility borehole (the U1j borehole) from the U1a Complex surface in a vertical alignment to a total depth of nominally 990 feet below the ground surface. The purpose of the U1j borehole would be to provide ventilation and power for the UCEP and ECSE operations.
Complex Access Shaft	SEO	A new hoist would be built and a shaft (approximately 990 feet deep) would be drilled to augment the aging and limited hoists at U1a.
Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs	GS	Operations would remain consistent with past operations, which have existing NEPA coverage. Some operational changes could occur, but are not expected to result in quantifiable changes in environmental impacts. Operations would include: the use of conventional explosives experiments; the use of UAS and cUAS for R&D activities performed by both commercial and governmental developers; research that assists in protecting the U.S. power grid from cyber-attack; and periodic training events designed to develop the skills of responders.
SPE Phase III/RVDC Project	GS	NNSA is currently implementing this Global Security project that would use conventional explosives for experiments in Rock Valley to address the key obstacles that hamper the detection of low yield, decoupled evasive nuclear tests.
Development of Nevada Space Proving Ground (NSPG)	Non-defense Mission (SPP)	In support of NASA and the broader space community, NNSA would establish the NSPG for conducting research, development, and testing. The specific area on the NNSS where the proving ground would be located has not been determined, but is expected to be a remote area with minimal existing infrastructure or leveraging existing infrastructure with excess capacity. Vegetation could be removed from up to 600 acres of land at three different locations (Areas 7, 18, 20) and would be maintained free of vegetation for off-road use. Portable generators would provide power to support remote field work.

Project Name	Program[a]	Project Description
U1a Modernization and New Facilities	EIP	A new Mission Support Complex is proposed to consolidate and modernize mission services and workforce amenities for the forward area (e.g., Security, Food Service, Training, Administrative, Dorms, Storage). Current plans would locate this complex at U1a, just north of the current location where new administrative buildings are being constructed. Total square footage of the complex would likely be 80,000-120,000 square feet once completely built out. The complex would consist of several buildings supporting the various functions (Cafeteria, Security, Administrative, and Dorms) including parking, sidewalks, and campus integration elements to support the new support complex environment. In addition to the support campus, additional storage space would be developed to meet mission needs. Siting of storage space has not been defined, but could include up to 100,000 square feet of new storage space, located within the current U1a Area. The new facilities would enable NNSS to consolidate operations from other facilities and support growth.
NNSS Main Gate Replacement	EIP	The new NNSS Main Gate Complex would provide a modern, secure and sustainable entry control facility to the NNSS. The complex, which would be located between US 95 and the current Mercury gate location, would include a traffic calming entry road, new ID Checkpoint with a hardened guard shack, a new badge office and an option for a new warehouse or warehouse transfer center. New facilities would enable consolidation out of older, unsustainable facilities. Upon being vacated, legacy facilities would be dispositioned. Construction would also include the modernization of underground utilities (water, electricity, and sewer). Up to 5 acres of land could be disturbed.
P-Tunnel Infrastructure Improvements	EIP	This project includes: demolition of the current P-Tunnel rail system and replacement with a concrete invert throughout the underground facility; installation of six new fire barriers to seal off and isolate the developed DFEAT mission alcove from other areas within the underground facility; substation transformer replacement; upgrades to the power distribution system and lighting; installation of a new potable water line from Area 12 to the apron of the P-Tunnel facility; underground utility connections, grading, and new building pad construction for two new facilities; constriction of a climate control storage facility and an access control and administrative support building.
Area 6 Industrial Consolidation	EIP	Consolidation of industrial space within Area 6 could include up to 200,000 square feet of new space. This project would also modernize underground utilities (water, electrical, and sewer) as needed.
Mercury Industrial Asset Modernization & Mercury Campus Modernization	EIP	This project would consolidate the current legacy industrial space located in Mercury into a modern footprint of new industrial facilities to replace many existing facilities. In addition, new industrial space would be developed to enable relocation of the NLV Machine Shop capability to Mercury. All new facilities would be within the existing disturbed footprint of Mercury. Work would also include the modernization of underground utilities (water, electrical, and sewer). Total square footage added/consolidated would be up to 300,000 square feet.
Expand the Area 23 Solid Waste Disposal Site and/or the U10c Solid Waste Disposal Site	EIP	NNSA proposes to expand the existing Area 23 Solid Waste Disposal Site and/or the U10c Solid Waste Disposal Site to support environmental restoration activities on the NNSS. The expansion

Project Name	Program[a]	Project Description
		would occur within the existing facilities and enable up to 10,000,000 cubic feet of solid waste to be disposed of compared to 8,500,000 cubic feet announced in the ROD.
New National Security Enterprise Responsive Testing Complex	EIP	This project would construct a new multipurpose, configurable complex (National Security Enterprise Responsive Testing Complex - NSERTC) within the NNSS Mission Corridor to support multiple national security missions.
NNSS 138kV Power Transmission System Upgrade - Future	EIP	This project would replace up to 55 miles of prioritized segments of the 138kV power transmission structures from the Jackass Flats Substation West and North to the U1a Complex area. The project scope would include replacing and modernizing the existing wooden pole structures, transmission line and fiber with reliable alternatives. No other changes to the 138kV system are expected, and there would be no anticipated increase in the power supply.
Energy Resilient Infrastructure and Climate Adaptation (ERICA) Solar PVs and Storage Installations in Areas 2, 3, 5, 6, and 23	EIP	Area 2, 5, 6, and 23 solar projects would provide 3 to 5 MW of PV and up to 4 hours of storage each. The Area 3 solar project could provide more than 5 MW of PV and longer duration (10+ hours) storage. These will contribute to the overall compliance with Executive Order 14008 and 14057 resulting in annual electricity savings, reducing greenhouse gas emissions, and increase energy security at the NNSS. The existing 0.4 MW of PV at Building 23-640 (Fire Station No.1) would be incorporated into the microgrid island.
ERICA Redundant Well Installation in Area 12 and Area 25, and Water Well Upgrades	EIP	Many water wells within the NNSS are at or near end of service life. Well 8 and Well J-14 are single point of failure wells serving customers in Area 25 and Area 12. These projects would install new water wells to supply 200-400 gallons per minute to existing facilities. Water supply in Areas 25 and 12 would remain the same due to maintaining pump rates of existing booster stations.
NNSS Electrical Vehicle Charging Station Installations - Various Locations	EIP	Multiple projects will provide EV Charging stations across the site. Some would be solar-powered and others would be grid-powered depending on location. The EV charging stations would support the action to electrify DOE's fleet and comply with Executive Order 14008 and 14057 in reducing greenhouse gas emissions. NNSA expects to have 100 percent zero-emission vehicle (ZEV) acquisitions by 2035. Once the entire fleet of vehicles is converted to ZEVs, greenhouse gas (GHG) emissions are estimated to be reduced by approximately 1,724 metric tons of carbon-dioxide equivalent ($C0_2e$).
NNSS Building Disposition - Various Locations	EIP	This project dispositions: 12 buildings in Area 23 (Mercury) in 2024; 13 buildings in Areas 1, 5A, 12, 15, and 23 in 2025; 8 buildings in Areas 1, 6, and 25 in 2026; 6 buildings in Areas 2, 6, and 11 in 2027; and 15 buildings in Areas 1, 2, and 23 in 2028. Approximately 194.000 square feet of facilities would undergo DD&D between 2023 and 2028.
Construction of new RCRA-permitted cell/groundwater (GW) well in 2027-2028	EM	A new RCRA-permitted disposal cell would be constructed at the Area 5 RWMC. This would be the third such cell built and would be designed to hold over 1.5M cubic feet of waste. The disposal cell would have a footprint of about 8-10 acres, and would be located in the western portion of the landfill in a previously disturbed area. In addition, a fifth GW monitoring well will be installed at the RWMC at a depth of about 900 feet. The cell would have a leachate collection system that would require power form the nearby line for the controls. The well would also have power run to it for the pump.

Project Name	Program[a]	Project Description
Construction of 2-3 new office structures at Area 5 RWMC	EM	The structures (a radiography control building, radiography support offices, and potential new radiological control structure) would be less than 20,000 square feet total and would be installed in 2024-2028 on already disturbed land. The only infrastructure requirements would be power.
Installation and operation of portal radiography unit (real-time radiography) at Area 5 RWMC	EM	Installation would occur in 2023-2024. Unit would be used for radiography operations on incoming waste trucks/packages. There would be a negligible dose to workers and no waste generated from operations.
Long-term monitoring and maintenance activities associated with environmental restoration sites	EM	Continued monitoring and maintenance of environmental restoration sites closed with contamination left in place.
LLW Disposal: Santa Susana Field Laboratory	EM	LLW soils from the Santa Susana Field Laboratory, California. The project is awaiting final disposal decisions based on negotiations with the State of California. The volume of soils has not yet been determined but is expected to be approximately 3-4 million cubic feet. Note: the soils may not even be considered to be radioactively contaminated; however, there is a current agreement between the State of California and DOE that indicates the soil will be sent to a licensed radioactive disposal facility such as NNSS.
LLW Disposal: Palomares, Spain	EM	LLW soils from potential radiological remediation at Palomares, Spain.[b] Volume of soils is approximately 2.5 million cubic feet and would require approximately 5,000 shipments which could take more than a year to complete once started.
LLW Disposal: Industrial Sites Environmental Restoration Activity	EM	The Industrial Sites Environmental Restoration Activity would continue to identify, characterize, and remediate industrial sites under the FFACO and to decontaminate and decommission unneeded process contaminated facilities. Industrial Sites Project activities would continue at present levels, although alternate uses of remediated facilities may require revised cleanup levels, which could increase the volume of LLW that could require disposal at NNSS. Disposal of Nevada-generated LLW in the Area 3 and Area 5 disposal facilities was evaluated in the SWEIS. However, EM can dispose of Nevada-generated LLW at the Area 3 RWMS when discussed and agreed to by the State of Nevada.
Tonopah Test Range		
Operational changes and increased maintenance	TTR	Operations would remain consistent with past operations but with potential increases in support for ballistic and guided freefall testing, powered guided testing, explosive asset testing, magnetic levitation acceleration testing, and projectile testing from artillery systems. Increased operations associated with rockets and missile operations, RF spectrum projects (various waveforms), remotely-piloted air and/or ground systems, and data-capture projects/systems (telemetry) could also occur. Maintenance activities would increase as the site continues to age.
Infrastructure improvements	TTR	Site improvements are proposed, such as communication lines (e.g., fiber optic cables), subsurface building infrastructure, utility lines above and below ground, and concrete pads to support test activities.
Increased DD&D activities	TTR	Approximately 67 properties are scheduled for demolition over the next ten years, including 40 buildings, 23 other structures and facilities (e.g., concrete pads, towers, shelters, and related

Project Name	Program[a]	Project Description
		support infrastructure), 3 trailers, and 1 parking lot. This SA analyzes DD&D activities over approximately the next five years. Over that period, approximately 10,000 square feet of facilities would undergo DD&D.
North Las Vegas Facility		
New administrative campus (referred to as the NWLV Campus) at a new location	NFO	Potential relocation of administrative personnel to a new right-sized administrative campus at a site approximately 12 miles northwest of the existing NLVF.
Remote Sensing Laboratory-Nellis		
Continued operations	N/A	No new projects are proposed; operations would remain the same as existing operations.

SEO = Stockpile Experimentation and Operations; GS = Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs; EIP = Enterprise Infrastructure Program; EM = Environmental Management; NFO = Nevada Field Office.

a. In January 1966, two U.S. Air Force aircraft collided over Palomares, Spain, during mid-air refueling; plutonium contamination resulted. The U.S. military remediated the site to criteria agreed upon with Spanish authorities and LLW was shipped to U.S. and disposed at the Savannah River Site (SRS) in South Carolina. The remaining LLW soils from any further remediation would be sent to NNSS.

Source: MSTS 2023b.

3.0 ENVIRONMENTAL ANALYSIS

As discussed in Chapter 2, DOE/NNSA identified new or modified projects and operational changes anticipated through approximately 2028 that could give rise to environmental impacts at the NNSS. Through that process, DOE/NNSA defined the actions addressed in this SA. This SA evaluates the potential environmental impacts of these actions against the information presented in the 2013 SWEIS to document whether the actions would constitute a substantial change that is relevant to environmental concerns, or if there are significant new circumstances or information relevant to environmental concerns. Based on this SA, NNSA will determine whether the existing SWEIS remains adequate, if a new SWEIS is warranted, or if the existing SWEIS should be supplemented.

Because there are distinct and geographically different locations considered in this SA (NNSS, TTR, and NLVF/NWLV Campus), Chapter 3 is organized to address each of those operational areas as follows:

- Section 3.1 presents the analysis for the NNSS. For each environmental resource addressed, NNSA summarizes the 2013 SWEIS impacts; discusses any notable changes in that resource that have occurred since the 2013 SWEIS; analyzes the potential changes in impacts for that resource that could result from the actions in this SA; and presents a conclusion regarding the significance of the potential impacts of the actions compared to the 2013 SWEIS analysis.

- Section 3.2 presents the analysis for TTR. Because the actions in this SA only include minor projects at TTR (e.g., upgrades/modification of utilities and existing facilities, and demolition of excess facilities), the TTR analysis is less detailed than the NNSS and NWLV Campus analyses. Such an approach is consistent with the "sliding scale" method of analysis, in which potential impacts are discussed in proportion to their significance (40 CFR 1502.2(b)).

- Section 3.3 presents the analysis for the proposed NLVF/NWLV Campus. Because the actions in this SA includes the potential relocation of administrative personnel to the new NWLV Campus, this SA analyzes the potential environmental impacts of construction and operation of the new NWLV Campus. This analysis provides NNSA the basis for determining whether proceeding with the new NWLV Campus would result in significant impacts compared to continued operations at the existing NLVF.

3.1 Nevada National Security Site (NNSS)

3.1.1 Land Use

Land use is the term used to describe the designation, current use, and future development of land. It represents the economic and cultural activities (e.g., agricultural, residential, commercial, industrial, recreational, and conservation) that are practiced at a given place. Land use planning is conducted at a local level; communities limit allowable land uses by implementing general plans and zoning codes to ensure property compatibility, predictable development, and orderly growth. Land use impacts are based on the extent and type of land that would be affected. The analysis

addresses potential direct and indirect impacts to land use resources located within the boundaries of NNSS as well as adjacent and proximate properties. Airspace was incorporated in the land use analysis in the 2013 SWEIS. The existing environment and impacts for airspace are discussed herein.

This section summarizes the 2013 SWEIS land use impacts (Section 3.1.1.1), discusses changes in land use impacts since the 2013 SWEIS (Section 3.1.1.2), analyzes the potential changes in land use that could result from the actions evaluated in this SA (Section 3.1.1.3), and presents a conclusion regarding the potential future land use changes compared to the 2013 SWEIS analysis (Section 3.1.1.4).

Land Use – American Indian Perspectives

The culturally affiliated tribes are aware that the 2013 SWEIS included a preferred alternative that changed the land use designation of Area 15 from "Reserved" to "Research, Test and Experiment." Furthermore, 36,900 acres within Area 25 were designated as a "Renewable Energy Zone" for the development of a solar power generation facility on 32,800 acres. The culturally affiliated tribes are aware of culturally sensitive areas and resources in Areas 15 and 25 that require ongoing tribal involvement. The tribes recommend tribal monitors be present to evaluate ground disturbing activities that have the potential to modify the land or resources.

3.1.1.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of land use at NNSS in Sections 4.1.1 (affected environment) and Section 5.1.1 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

NNSS is located in Nye County, Nevada, in the southwestern United States (*see* SWEIS Figure 1-1 in Chapter 1). The site covers an area of approximately 1,360 square miles and is situated about 65 miles northwest of Las Vegas. The site is located at an elevation of around 3,500 feet above sea level and is surrounded by arid basins or flats, rocky hills, and mountains with elevations up to 10,000 feet. Jackass Flats is in the southwestern quadrant of the site, Frenchman Flat is in the southeastern quadrant, and Yucca Flat is in the northwestern quadrant. The high desert landscape is mostly uninhabited and characterized by vast, open spaces and rugged mountain ranges. The Federal Government (primarily the U.S. Bureau of Land Management [BLM], the U.S. Department of Defense [DoD], DOE/NNSA, and the U.S. Forest Service [USFS]) manages more than 85 percent of the land in Nevada, and 93 percent in Nye County.

The lands adjacent to the NNSS include the Nevada Test and Training Range (NTTR) (formerly Nellis Air Force Range), Desert National Wildlife Refuge, and Nye County. NTTR, a vast training range that spans over 2.9 million acres of land and airspace, is one of the largest military training ranges in the world. The range is used by all branches of the U.S. military, as well as various government agencies and international partners, for training exercises. The Desert National Wildlife Refuge is a protected area of 1.6 million acres. It was established in 1936 to protect desert bighorn sheep and is managed by the U.S. Fish and Wildlife Service (USFWS). The portion of the refuge within the NTTR is closed to public access (blue on Figure 1-1). Lands in light brown on Figure 1-1 are managed by BLM. Land uses occurring on BLM-managed lands include

agriculture, energy and mineral extraction, livestock grazing, and recreation. These lands also provide resources for fish and wildlife habitat; wilderness areas; and archaeological, paleontological, and historic sites.

As of 2009, the NNSS had 486 buildings, 113 trailers, a 340-mile onsite network of paved roads, and over 300 miles of unpaved roads within its 880,000 acres footprint. Most of the experimental facilities are consolidated along a central corridor leading to Mercury Highway (the main thoroughfare on the NNSS). To help simplify the distribution, use, and control of resources, the NNSS is also divided into 7 land use designations and 26 numbered operational Areas. Under the Preferred Alternative of the 2013 SWEIS, the designation for Area 15 was changed from "Reserved" to "Research, Test, and Experiment." Additionally, 36,900 acres within Area 25 were designated as a Renewable Energy Zone for the development of a solar power generation facility on 32,800 of the designated acreage in the 2013 SWEIS.

Approximately 40 percent of the airspace within Nevada is military "special use" airspace. Airspace above NNSS was withdrawn and designated as Restricted Area 4808 (R-4808), special use airspace, by Federal Aviation Administration (FAA) and DOE/NNSA. The restricted area within this airspace is used by DOE/NNSA 24 hours a day, 365 days per year, and is not accessible by the public, except under certain conditions. NNSS contains multiple airstrips and helipads. Under the 2013 SWEIS, the current level of air traffic control and radar, radio, and navigational aid services was proposed to be maintained with no changes to the restricted airspace.

3.1.1.2 Changes since the 2013 SWEIS (2013 through 2022)

Overall, no other meaningful land uses changes occurred since the publication of the 2013 SWEIS. The land area of NNSS remains unchanged from the 2013 SWEIS, at approximately 1,360 square miles. Adjacent land ownership also remains unchanged; NNSS is surrounded on all sides by federal installations with strictly controlled access and lands that are open to public entry. Land uses at NNSS remain compatible with the existing land uses and approved land use designations and policies surrounding the site. Furthermore, the types of land uses at NNSS did not change and the open space character of the site was retained. Impacts from DD&D and development during this period are negligible and land uses remains consistent with the present-day mission and historic uses of the site.

3.1.1.3 Analysis of Projected Changes (2023 through 2028)

During the five-year period from 2023 through 2028, NNSS would undergo continued development as aging utilities and facilities are modernized, replaced, and consolidated. This modernization would enable NNSS to continue to support its mission needs, improve operational efficiencies, and meet future growth requirements. Notable projects with potential land use impacts include:

a. U1a ZEUS development and ASD/Scorpius Project. These projects would occur within the U1a in Operating Area 1. They are underground mining projects. No above-surface land disturbance is expected.

b. U1a Modernization and New Facilities. This project would consolidate and modernize mission services and workforce amenities. Current plans would locate this complex at U1a, just north of the current location where new administrative buildings are being constructed. Total square footage of the complex would likely be 80,000-120,000 square feet once completely built out.

c. SPE Phase III/RVDC Project. The SPE Phase III/RVDC Project would disturb about 100 acres of mostly previously undisturbed land. Three drill pads and a new road would be built to support the tests and vegetation would need to be cleared in these areas.

d. NNSS Main Gate Replacement. The new gate would include an array of features to meet current DoD Standards including: new ID Checkpoint with hardened guard shack, new badge office and option for new warehouse or warehouse transfer center. It would also include a new traffic calming entry road. The existing land use at NNSS would remain unchanged and use of the land for the gate and road would be consistent with the present-day mission and historic uses of the site. NNSA would coordinate with the Nevada Department of Transportation (DOT) for all required permits and approvals. Up to 5 acres of land could be disturbed.

e. ERICA Solar PVs and Storage Installations. In addition to the net land disturbance summarized for facility DD&D and construction, the erection of new solar PV generation infrastructure would result in new land disturbance of approximately 200 acres net or 40 acres annually. These proposed solar PVs are unaffiliated with the 240-MW commercial solar power generation facility that was analyzed in the 2013 SWEIS in Area 25.

ERICA Solar PVs and Storage Installations – American Indian Perspectives

The culturally affiliated tribes know that Solar PV generation will result in new land disturbance of approximately 200 acres net or 40 acres annually. Culturally affiliated tribes possess traditional ecological knowledge about the land and associated resources that may be potentially impacted by DOE projects. Culturally affiliated tribes recommend systematic examination of the land associated with this project by qualified tribal monitors who have the ability to identify culturally sensitive locations and resources beyond NHPA Section 106 archaeological survey findings.

f. NNSS 138kV Power Transmission System Upgrade. The project scope includes the modernization and/or replacement of the existing wooden pole structures, transmission line and fiber with like-kind replacements. This project would generally follow the existing path of existing transmission lines with no expected effects on land use.

NNSS 138kV Power Transmission System Upgrade – American Indian Perspectives

The culturally affiliated tribes understand the 138kV Power Transmission System Upgrade will generally follow the path of the existing transmission line with no anticipated effects on land use. It is important to note that culturally affiliated tribes have extensive experience and traditional ecological knowledge about land resources that may be impacted by DOE projects and not recognized as culturally sensitive resources. NNSA/NFO has not established a tribal monitoring program to involve tribal representatives to examine areas/resources during archaeological surveys.

g. Nevada Space Proving Ground (NSPG). NNSA would establish areas on the NNSS in which NASA and the space community would conduct a variety of research, development, and testing activities.

Within the next five years, NNSA estimates that construction of new and replacement utilities and facilities would disturb approximately 150 acres of previously undisturbed land (30 acres annually). DD&D of aging facilities would restore approximately 5 acres (1 acre per year). Net, new land disturbance from facility development and utility upgrades would be approximately 145 acres, or 29 acres annually. One-hundred and forty-five (145) acres of new net land disturbance represents a negligible amount (0.017 percent) of NNSS's total land area. In addition to these new land disturbances, the NSPG is expected to remove vegetation from approximately 600 acres of land (approximately 0.07 percent of NNSS's total land area) at three different remote locations (Areas 7, 18, 20) and maintain the areas free of vegetation for off-road use. Development of solar power generation infrastructure in Areas 2, 3, 5, 6 and 23 would disturb approximately 200 acres, or 0.02 percent, of NNSS's total land area. Overall, because the NNSS site is vast in size, with development concentrated in clusters, land disturbance over the next five years would not result in perceivable changes to existing land uses.

3.1.1.4 Conclusion

The new facilities, infrastructure, and overall security enhancements proposed for the period of 2023-2028 represent a continuation of existing land uses and would be compatible with proposed future development. The proposed facilities and projects would be dispersed in different areas throughout NNSS and would not represent a substantial change of land uses. The existing open character and undeveloped nature of the approximately 1,360 square miles site would remain unaltered. No additional impacts to land use are expected to occur.

3.1.2 Infrastructure and Energy

Site infrastructure includes those basic resources and services required to support the construction and operation of the NNSS site and facilities. The 2013 SWEIS defined infrastructure as both the built environment of NNSS and the site utilities supporting the facilities. Infrastructure utilities include potable water, wastewater, electrical generation, electrical distribution, communication utilities, natural gas, and liquid fuels. This section summarizes the 2013 SWEIS infrastructure impacts (Section 3.1.2.1), discusses changes in infrastructure impacts since the 2013 SWEIS (Section 3.1.2.2), analyzes the potential changes in infrastructure that could result from the actions

evaluated in this SA (Section 3.1.2.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.2.4).

3.1.2.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of infrastructure at NNSS in Sections 4.1.2 (affected environment) and Section 5.1.2 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

Built Environment. The 2013 SWEIS included the built environment of NNSS under the umbrella of infrastructure. As of November 2009, there were 486 buildings and 113 trailers that supported activities at NNSS. The total floor space of these facilities totaled 2,231,602 square feet. Table 3.1.2-1 details facility square footage by function. Most of the facilities and supporting infrastructure were 30 to 50 years old at the time and rapidly deteriorating. According to the 2013 SWEIS analysis, up to approximately 28 percent of the existing square footage at NNSS could be dispositioned. Approximately 400,000 square feet of new building space was proposed in the 2013 SWEIS, a 16 percent increase over the existing total floor area of facilities (NNSA 2013).

The built environment at NNSS also included flight-support facilities. Under the 2013 SWEIS, several improvements to these facilities were proposed to include: Desert Rock Airport expansion, Aerial Operations Facility expansion, Pahute Mesa Airstrip improvements, and New Air Operations Facility construction.

Table 3.1.2-1. NNSS Building Square Footage by Function

Function	On-site Square Feet	Off-site Square Feet
Administrative	383,336	117,263
Storage	332,877	1,104
Industrial & Production Process	359,980	8,253
Research & Development	486,405	87,451
Service Buildings	413,948	0
Other	255,056	0
Total	**2,231,602**	**214,071**

Source: NNSA 2013.

Potable Water and Wastewater. Drinking water needs at NNSS are met by deep-well groundwater withdrawals from two major aquifers (volcanic and alluvial aquifers) that are not influenced by surface waters. The NNSS is serviced by three permitted water systems: (1) NV0000360, which serves Areas 23 and 6, but is one water system, as indicated by its Permit number; (2) NV0004098 (Area 25); and, (3) NV0004099 (Area 12), There are also two wildlife preservation reservoirs, numerous water storage tanks, fill stands, and construction water open pit reservoirs, as well as approximately 140 miles of pipeline throughout the site. Based on the 2013 SWEIS analysis, the annual maximum production capacity of the site's potable supply wells (based on equipment capacity) is approximately 2.1 billion gallons per year. In 2011, potable water consumption for NNSS was approximately 184,073,000 gallons (NNSA 2013).

The NNSS sanitary sewer system consists of approximately 100 linear miles of cast iron or polyvinyl chloride mains and service laterals. Domestic and industrial wastewater is treated using either sewage treatment lagoon systems or septic tanks with leach field systems. The septic tank systems at NNSS are currently being used at approximately six percent of their collective capacity. The Nevada Department of Environmental Protection-Bureau of Federal Facilities (NDEP-BFF) has permitted six wastewater treatment pond locations on the NNSS as of January 2022 under Permit GNEV93001. The worker population at NNSS generates 34,000 gallons of wastewater per day which represented approximately 17 percent of the collective total capacity of wastewater treatment at NNSS (NNSA 2013).

Electrical and Communications. Per the 2013 SWEIS analysis, electrical service at NNSS is supplied by two power sources: (1) NV Energy and (2) the Valley Electric Association. The onsite infrastructure includes a 138-kilovolt transmission loop with eight substations, one switching center, one 138-kilovolt radial, and 600 miles of transmission and distribution lines. Total electrical capacity at NNSS is approximately 45 megawatts and the 2013 load was 20 megawatts. The 2013 SWEIS also analyzed plans for upgrading 39 miles of the existing 138-kilovolt electrical distribution system and the construction of a 240-megawatt commercial solar power generation facility. The 2013 SWEIS concluded that there were no expected electrical capacity issues at NNSS (NNSA 2013).

NNSS telecommunications/information technology infrastructure is composed of fiber optic and copper cabling and microwave systems. The distribution architecture is composed of approximately 205 miles of fiber optic cabling, thousands of circuit miles of legacy copper telecommunications cabling, and seven major microwave links. The systems include telephone network, data transmission, and storage systems, as well as video, radio, and mail systems. Proposed in the 2013 SWEIS were upgrades to modernize the telecommunications infrastructure at NNSS (NNSA 2013).

Natural Gas and Fuels. As of 2013, there was no infrastructure for natural gas supply at NNSS. There are two vehicle service stations onsite, each with the capacity to store 10,000 gallons of gasoline and 9,500 gallons of biodiesel. Area 6 contains large storage tanks that can hold approximately 100,000 gallons of biodiesel and 40,000 gallons of unleaded gasoline. These tanks are filled and regularly serviced to ensure that they can sustain the consumption of biodiesel for four weeks and unleaded fuel for two weeks in the event of a fuel shortage. Fuel usage from 2009 is outlined in Table 3.1.2-2 (NNSA 2013).

Table 3.1.2-2. Fuel Usage in 2009 at NNSS

Fuel Type	Quantity (gallons)
Unleaded Gasoline	426,964
#2 Diesel	64,844
Biodiesel	343,191
Ethanol/E85	216,616
Total	**1,051,615**

Source: NNSA 2013.

3.1.2.2 Changes since the 2013 SWEIS (2013 through 2022)

Built Environment. NNSS continues to become more sustainable as the site modernizes and aging structures are replaced with new facilities. The NNSS observed a 2.7 percent rise in energy intensity in 2022 when compared to the 2013 baseline. To address this and enhance energy efficiency, NNSS has shut off power and deactivated 45 buildings, totaling approximately 315,000 square feet. As of 2022 and outlined in Table 3.1.2-3, 17 facilities at NNSS totaling 517,074 square feet are compliant with the Guiding Principles for High Performance Sustainable Buildings (HPSB). In 2018, NNSA completed construction on its first net-zero energy facility, Mercury Fire Station No. 1, powered from the Mercury solar field at NNSS.

Table 3.1.2-3. High Performance Sustainable Buildings

Year	2017	2018	2019	2020	2021	2022
Number of facilities	13	13	13	13	14	17

Source: NNSS 2018, NNSS 2019, NNSS 2020, NNSS 2021, NNSS 2022.

Potable Water and Wastewater. Per the 2023 Site Sustainability Plan, potable water consumption at NNSS was 139,174,019 gallons (NFO 2023). This represents a 24 percent reduction in potable water usage from the SWEIS. Table 3.1.2-4 shows the percentage of facilities at NNSS with water metering. Utility metering is important because it allows a benchmark to be established, enabling the site to monitor and compare their energy consumption over time. Because the aged infrastructure and lack of lift stations presents a problem for new expansion possibilities in Area 12 and forward Areas 5, 25, 26, and 27, NNSA is studying water resources sustainability and availability to better address this issue in the future (MSTS 2023b).

Table 3.1.2-4. Potable Water Metering

	2017	2018	2019	2020	2021	2022
Facilities metered for potable water	29%	30%	30%	30%	30%	30%

Source: NNSS 2018, NNSS 2019, NNSS 2020, NNSS 2021, NNSS 2022.

Electrical and Communications. NNSS consumed a total of 36,823 megawatt-hours of energy in 2022 (NNSS 2022), a 57 percent reduction over 2009 electrical consumption (84,577 megawatt-hours). The 138-kilovolt electrical distribution system upgrade and the construction of a 240-megawatt solar power generation facility have not been completed. Table 3.1.2-5 shows the current status of facility metering and renewable energy consumption as a percentage of total electrical consumption. Prior to 2022, the renewable energy for NNSS was primarily met with purchased renewable energy credits (REC). Due to inflation of REC prices, NNSA/NFO stopped purchasing RECs in 2022. In 2022, electrical consumption at NNSS was sourced as follows: 1 percent self-supplied carbon pollution-free electricity (CFE),[7] 34 percent grid-supplied CFE, and 65 percent grid-supplied fossil-based electricity (NNSS 2022).

[7] CFEs include electricity generated from sources that do not emit carbon dioxide or other greenhouse gases into the atmosphere. This type of electricity is generated from clean, renewable energy sources such as solar, wind, hydro, geothermal, and nuclear power, as well as energy storage technologies such as batteries.

Table 3.1.2-5. Electrical Metering and Renewable Energy Consumption

	2017	2018	2019	2020	2021	2022
Facilities metered for electricity	81%	79%	81%	80%	80%	80%
Renewable energy consumption[a]	17%	19%	11%	4%	26%	35%[b]

a. includes RECs.
b. In 2021, electrical consumption at NNSS was sourced from: 1 percent on-site CFE and 34% grid-supplied CFE.
Source: NNSS 2018, NNSS 2019, NNSS 2020, NNSS 2021, NNSS 2022.

Natural Gas and Fuels. Fuel usage has decreased since the 2013 SWEIS. Total petroleum use during the last five years (2017-2021) averaged 879,970 gallons. This represents a 16 percent reduction from the 2009 usage (over 1 million gallons) detailed in the SWEIS. Although there has been a decline in the usage of both traditional petroleum-based fuels (gasoline and diesel) and alternative fuels (biodiesel and ethanol/E85), the drop in petroleum usage has been more significant. As a result, alternative fuels constitute a smaller proportion of the overall fuel consumption as compared to 2009. Fuel consumption from 2017-2021 is detailed in Table 3.1.2-6.

Table 3.1.2-6. NNSS Fuel Consumption

Fuel Consumption	2009 (2013 SWEIS)	2017	2018	2019	2020*	2021*	Average (2017-2021)
Petroleum	491,808	302,356	765,743	579,075	354,204	366,550	473,586
Alternative fuels	559,807	448,143	401,537	507,035	323,439	351,770	406,385
Total	**1,051,615**	**750,499**	**1,167,280**	**1,086,110**	**677,643**	**718,320**	**879,970**

* COVID-19 is likely responsible for the decline in these years.
Source: NNSS 2018, NNSS 2019, NNSS 2020, NNSS 2021, NNSS 2022.

3.1.2.3 Analysis of Projected Changes (2023 through 2028)

Built Environment. NNSS is a large site with a building footprint exceeding 2.2 million square feet of facility space. To ensure mission readiness, NNSA systematically replaces aging facilities with modern ones. Over the course of the next five years (2023-2028), NNSA intends to construct approximately 600,000 square feet of new and replacement facilities and DD&D approximately 194,000 square feet of obsolete structures. The net increase in the footprint of the built environment would be approximately 406,000 square feet (approximately 18 percent). This annual expansion rate of 3.6 percent is considered typical for the site.

Potable Water and Wastewater. No major changes to potable water usage and wastewater generation are anticipated through 2028. During this period and in the course of normal construction activities, water infrastructure would be replaced as facilities are constructed. Many of the site's wells are at or near the end of their service life. Through 2028, NNSA plans to install new, redundant wells in Areas 12 and 25 as replacements for Wells 8 and J-14. During this period, NNSA would also increase water supply in Area 12 and forward Areas 5, 25, 26, and 27 through the construction of additional lift stations. Pump rates at existing booster stations would be maintained, resulting in a consistent water supply.

Electrical and Communications. The only notable project that would increase electrical usage at NNSS would be the ASD/Scorpius Project, which would include a new large scale accelerator.

Although accelerators require relatively large power input (typically several megawatts), the demands are generally short-term and can be managed within the existing electrical capacity of a site. Because NNSS's current electrical consumption is about 57 percent less than in 2009, the existing electrical capacity is expected to adequately support accelerator operations. In addition, increases in solar PV generation would lead to a reduction in grid-sourced electricity purchases. NNSA is committed to increasing its CFE on site through the implementation of the Energy Resilient Infrastructure and Climate Adaptation (ERICA) program projects. Consistent with the analysis in the 2013 SWEIS, NNSA plans to install 20-megawatts of new solar PV arrays and battery storage by 2028 to strengthen site resiliency and autonomy.

Natural Gas and Fuels. No major changes to fuel usage are expected to occur through the period ending in 2028. Petroleum and alternative fuel consumption are expected to be in line with the 2017-2021 averages detailed above in Section 3.1.2.2.

3.1.2.4 Conclusion

NNSA plans to maintain the current NNSS infrastructure, i.e., electrical, water, and fuel systems, with no significant changes or alterations to existing framework or usage. As infrastructure components age, NNSA plans to replace them with modern equivalents and incorporate new technologies as they emerge. The water infrastructure upgrades planned for this period are considered routine and would not result in significant changes to water supply or usage. The site would strive to meet its sustainability goals as outlined in its annual Site Sustainability Plan (NFO 2023) by reducing petroleum usage and increasing use of alternative fuels, reducing potable water consumption, and reducing grid-sourced electricity purchases. As the site's electrical infrastructure is modernized with PV and battery installations, the NNSS would become more resilient and less reliant on grid-supplied electricity. The site's built environment is continually modernizing as new facilities replace aging structures.

3.1.3 Transportation and Traffic

This section summarizes the 2013 SWEIS transportation and traffic impacts (Section 3.1.3.1), discusses changes in transportation and traffic impacts since the 2013 SWEIS (Section 3.1.3.2), analyzes the potential changes in transportation and traffic that could result from the actions evaluated in this SA (Section 3.1.3.3), and presents a conclusion regarding the potential future transportation and traffic changes compared to the 2013 SWEIS analysis (Section 3.1.3.4).

3.1.3.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of transportation and traffic at NNSS in Section 4.1.3 (affected environment) and Section 5.1.3 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

Transportation. According to the 2013 SWEIS, transportation of LLW and MLLW from offsite locations was the primary contributor to the total radiological and nonradiological impacts of transportation activities. Under the Expanded Operations Alternative, the 2013 SWEIS concluded that transportation of radioactive materials was not likely to cause a fatality as a result of radiation (LCF of less than 1) either from incident-free operations or accidents.

Nonradiological accident risks for transporting LLW and MLLW would range from 7 to 16 fatalities to the general population for all truck transport and a combination of rail and truck transport, respectively. Nonradiological risks for all radioactive wastes and materials other than LLW and MLLW would cause less than 1 (0.2) fatality.

The impacts of transporting sanitary waste, hazardous waste, and other wastes and recyclables generated at NNSS facilities to onsite or offsite disposal or reuse facilities would be 3 (2.8) traffic accidents and less than 1 (0.11) traffic accident fatality in 3.8 million two-way miles traveled.

Traffic. The 2013 SWEIS analyzed traffic impacts by evaluating changes in the traffic volume of privately owned vehicles, trucks transporting radioactive waste and nonradioactive waste, and miscellaneous service vehicles. According to the 2013 SWEIS, potential on-site impacts from increased daily vehicle trips would include increased traffic congestion and delays, increased need for road maintenance and improvements, and increased risks regarding road safety. For regional traffic impacts, increases in traffic volumes could potentially result in traffic congestion and delays, degradation of operating capacities on roadways, degradation of road surfaces and increased frequency in road maintenance, and increased traffic accidents.

Under the Expanded Operations Alternative, the total daily vehicle trips projected for three segments of Mercury Highway would increase by approximately 50 percent above current traffic levels, mainly due to the 25 percent increase in NNSS personnel and traffic from construction-related vehicles. Based on the traffic volumes during peak hours, it was expected that Mercury Highway would operate at a level of service (LOS) of B or better and other key roadways would not have any capacity issues.

According to the 2013 SWEIS, roadways in Nye and Clark Counties would generally experience higher increases in traffic volumes. Only Mercury Highway would experience a substantially high increase in traffic and degrade in LOS (from Level A to Level B). Because most of the increases 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 to the NNSS.

3.1.3.2 Changes since the 2013 SWEIS (2013 through 2022)

Transportation. The 2013 SWEIS Expanded Operations Alternative projected a total of about 94,800 truck shipments of LLW and MLLW to disposal facilities at the NNSS. However, the actual volume of LLW and MLLW disposed of at NNSS between 2013 and 2022 was about 17 percent of the 2013 SWEIS projection. Therefore, with respect to the number of shipments and volumes of waste, the impacts under the Expanded Operations Alternative in the 2013 SWEIS remain conservative and bounding.

Traffic. Traffic volumes on Mercury Highway at a location 0.2 miles north of the Mercury interchange are available from the Nevada DOT and are considered representative of the average daily traffic volumes generated by the NNSS because this highway serves as the main roadway onto the site. From 2013 to 2022, average daily traffic volumes on this section of Mercury Highway ranged from 730 to 1,100 (NDOT 2022), compared to the 2013 SWEIS projected traffic volume of 2,548 for the Expanded Operations Alternative.

The Las Vegas area has experienced significant population growth over the past decade, which has affected traffic in the region. Traffic on SR-160, which is one of the most widely used transport routes for LLW destined for the NNSS, has increased notably. Near the NNSS, the 2022 actual traffic volumes remain below the projections in the SWEIS; however, closer to Las Vegas the 2022 traffic volumes surpass the SWEIS projections by up to 62 percent (NDOT 2023).

Transportation and Traffic – American Indian Perspectives

The culturally affiliated tribes know that TRU waste could increase with the expansion of special nuclear process capability at the DAF, resulting in increased transportation of TRU waste from the NNSS to the WIPP facility. Culturally affiliated tribes impacted by any WIPP shipments should be included in the DOE Carlsbad Office WIPP Tribal Program to support tribal emergency management operations.

3.1.3.3 Analysis of Projected Changes (2023 through 2028)

None of the actions evaluated in this SA would notably change the facilities, operations, or activities at NNSS. The same types of operations are expected to occur in the same or similar facilities analyzed in the 2013 SWEIS. Accordingly, potential impacts on transportation and traffic would be similar to those analyzed in the 2013 SWEIS.

Actions and operations (Table 2-2) considered for transportation and traffic include:

- NNSS Modernization and New Facilities.
- NNSS Building Disposition.
- Potential disposal of three special LLW volumes include: (1) approximately 3-4 million cubic feet of soils from the Santa Susana Field Laboratory, California; (2) approximately 2.5 million cubic feet of soils from Palomares, Spain;[8] and (3) approximately 0.5 million cubic feet from the Industrial Sites environmental restoration activities.
- Increased TRU waste transportation from the NNSS to the WIPP as a result of the expansion of special nuclear material process capability at the DAF.

Transportation. Radioactive, hazardous, and solid wastes would continue to be transported on-site and to off-site locations for disposal. Between 2013 and 2021, approximately 7.8 million cubic feet of LLW and 0.8 million cubic feet of MLLW were transported to NNSS for disposal. The projected total volume of LLW from 2023 through 2028 (for routine operations and special projects) is approximately 11.5 million cubic feet, and for MLLW approximately 0.6 million cubic feet. For the potential disposal of three special LLW volumes, the transportation requirements are:

- For the approximately 3-4 million cubic feet of soils from the Santa Susana Field Laboratory, California, approximately 8,000 truck trips to NNSS would be required;
- For the approximately 2.5 million cubic feet of soils from Palomares, Spain, after those soils arrive at the U.S. East or Gulf Coast via ship, approximately 5,000 truck trips to NNSS would be required;

[8] As described in footnote "a" to Table 2-2, the source of the radioactive material that caused the contamination in Spain is U.S. origin material and therefore is eligible for disposal at the NNSS.

- For the approximately 2.0 million cubic feet from the Industrial Sites environmental restoration activities, approximately 4,000 truck trips within the NNSS would be required (MSTS 2023b).

The 2013 SWEIS analyzed up to 54,000 out of state shipments of LLW and MLLW to NNSS. Based on these 54,000 shipments, approximately 96.9 million miles of transportation impacts were analyzed. The dose to the transportation crew was calculated to be approximately 0.00005 person-rem/mile, and the dose to the public along the transportation route was calculated to be 0.000009 person-rem/mile (NNSA 2013). The transportation of the three special LLW volumes described above would require approximately 20.8 million miles of transport.[9] Based on that amount of transport, impacts to the transportation crew and the public along the transportation route was calculated to be approximately 21 percent of the estimates presented in the 2013 SWEIS.

The cumulative waste volumes from 2013 through 2028 are expected to be 19.3 million cubic feet (LLW) and 1.4 million cubic feet (MLLW). These cumulative volumes are less than half of the projected waste volumes for transport under the Expanded Operations Alternative [48 million cubic feet (LLW) and 4 million cubic feet (MLLW)]. As such, required waste shipments from 2013 through 2028 are expected to be less than the 2013 SWEIS Expanded Operations projection, and therefore transportation impacts described in the 2013 SWEIS remain conservative and bounding.

TRU waste generation could increase as a result of the expansion of special nuclear material process capability at the DAF, which could increase the transportation of TRU waste from the NNSS to the WIPP. NNSA estimates that approximately 10 additional drums of TRU waste could be generated annually (MSTS 2023b). Approximately 3 additional shipments to WIPP from NNSS would be expected every ten years as a result of this increased work in the DAF. The 2013 SWEIS estimated that there would be 42 shipments of TRU waste from the NNSS to the WIPP every 10 years (approximately 4 shipments annually). The additional 3 shipments of TRU waste every 10 years would represent a 7.1 percent increase in TRU waste shipments from the NNSS to the WIPP. Doses to the transport crew could increase from 2.1 person-rem to 2.2 person-rem, while the dose to the population along the transportation route would not statistically change.

Traffic. From 2023 through 2028, the operational workforce of about 2,300 employees is not expected to change significantly. However, about 200 additional temporary construction workers would be needed during NNSS Modernization and DD&D activities. Assuming 50 percent of the construction workers carpool, this would result in an additional 200 daily trips along Mercury Highway. As of 2021, the annual average daily traffic count on Mercury Highway was 1,100 compared to the 2013 SWEIS projected traffic volume of 2,548 under the Expanded Operations Alternative. The combined operational and construction workforce would result in about 1,300 trips daily along Mercury Highway, which would represent an increase of approximately 18 percent compared to current traffic volumes, and approximately 51 percent of the traffic volume projected in the 2013 SWEIS. An 18 percent increase in traffic volume would not reduce the LOS along Mercury Highway. In general, traffic would need to increase by at least 20 percent to cause

[9] Based on 8,000 shipments from Baltimore to Las Vegas (2,400 miles per shipment); 5,000 shipments from the California coast to Las Vegas (270 miles per shipment); and 4,000 shipments within the NNSS (50 miles per shipment).

a LOS change (Traffic 2023).[11] Therefore, traffic impacts under the 2013 SWEIS remain conservative and bounding. Closer to Las Vegas, the addition of 200 additional temporary construction workers would add to the traffic congestion, but would represent an increase of much less than 1 percent of the average daily traffic on roads.

3.1.3.4 Conclusion

The new and continuing projects and site operations would not significantly change impacts to traffic and transportation at NNSS and are consistent with the impacts analyzed in the 2013 SWEIS. Therefore, further supplementation of the 2013 SWEIS for potential impacts to traffic and transportation is not needed.

3.1.4 Socioeconomics

This section summarizes the 2013 SWEIS socioeconomic impacts (Section 3.1.4.1), discusses changes in socioeconomics since the 2013 SWEIS (Section 3.1.4.2), analyzes the potential changes in socioeconomics that could result from the actions evaluated in this SA (Section 3.1.4.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.4.4).

3.1.4.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of the region of influence's (ROI) economic activity, population, housing, public finances, and public services at NNSS. The socioeconomic ROI is defined on the basis of current residential location of full-time NNSS workers directly involved in NNSS activities and encompasses the area in which most of these workers spend their wages and salaries. The ROI was defined as Nye and Clark counties, Nevada. Total employment for NNSS, the NLVF, RSL-Nellis, and TTR was 3,379. Onsite employment at the NNSS was 1,699 workers. Socioeconomic characteristics from the 2013 SWEIS are summarized in Table 3.1.4-1.

Table 3.1.4-1. 2013 SWEIS Socioeconomic Characteristics and Employment

Socioeconomic Characteristics	2013 SWEIS
Clark County	
Per Capita	$28,138.00
Unemployment Rate	6.0%
Population	1,821,359
Housing Units	784,892
Sales Tax Rate	8.0%
Nye County	
Per Capita	$21,071.00
Unemployment Rate	5.0%
Population	43,555
Housing Units	16,592

[11] The distinctions between LOS ratings are subjective, and many factors can affect how a given traffic change will affect the LOS on a given road, including road design, number of lanes, number of intersections, speed limit, and signalization. Consequently, the ability to make definitive conclusions about an LOS change on a given road is limited.

Socioeconomic Characteristics	2013 SWEIS	
Sales Tax Rate	7.10%	
Total Onsite Employment	**Operation**	**Construction**
No Action Alternative	3,379	Average of 500 FTE over 35 months/Peak of 1,000 Full Time Equivalent (FTE)
Expanded Operations Alternative	4,102	Average of 750 FTE over 42 months/Peak of 1,500 FTE; 250 addition FTE from other projects
Reduced Operations Alternative	2,998	Average of 400 FTE over 32 months/Peak of 800 FTE

Source: NNSA 2013.

Under the No Action Alternative and Expanded Operations Alternative the filling of new jobs would decrease unemployment in the ROI (i.e., Clark and Nye counties). Daily spending by these new employees would positively affect the immediate area of the NNSS creating a minor beneficial impact on economic activity. Projected rates of population growth would not be altered as a result of these alternatives. Sufficient housing exists in the area to support an increase in population and would result in a reduction in housing vacancy rates. Only negligible impacts on population and housing were anticipated. Based on an increase of children to the Clark County School District additional teachers may be required in Clark County. Construction and operation activities under these alternatives could result in additional calls for fire protection. This impact is expected to be minor and would not affect levels of service at the Clark County Fire Department, the Las Vegas Fire Department, or the Nye County volunteer fire departments and would not displace any health care facilities or conflict with local and regional plans for health care or emergency services (NNSA 2013).

Under the Reduced Operation Alternative, it was assumed that total employment at the NNSS would decrease. This decrease would increase unemployment in the ROI (i.e., Clark and Nye counties). In addition, daily spending in the immediate area of the NNSS would decrease and would have a minor adverse impact on economic activity. Housing vacancies would increase and demand for public services would decrease due to the reduction in the permanent workforce (NNSA 2013).

Socioeconomics – American Indian Perspectives

The culturally affiliated tribes believe it is important to diversify the federal workforce by utilizing tribal communities. Tribes believe DOE should expand hiring practices to increase tribal representation and promote contracting services with qualified Indian-owned businesses or enterprises that meet the needs of DOE.

In an effort to mitigate socioeconomic impacts to tribal communities, tribes can serve as points of contact to assist DOE in identifying suitable contractors or potential federal employees at the NNSA/NFO, NNSS, and RSL.

3.1.4.2 Changes since the 2013 SWEIS Analysis (2013 through 2022)

The majority of NNSS employees continue to reside within the two-county region of Clark and Nye counties. This ROI includes most of the residential distribution of the employees of DOE/NNSA, its contractor personnel, and supporting government agencies.

The size of the NNSS workforce has remained below what was projected in the 2013 SWEIS. As of the end of fiscal year 2020, there are approximately 2,700 employees at NNSS (NNSA 2022) which represents less than one percent of the employment in Clark and Nye counties. Table 3.1.4-2 presents a summary of socioeconomic characteristics from 2013 through 2021. Overall, the NNSS provides nearly $1 billion in economic impact in the state of Nevada (NNSS 2021b).

Table 3.1.4-2. Socioeconomic Characteristics, 2013-2021

Socioeconomic Characteristics	2013 SWEIS	2013	2014	2015	2016	2017	2018	2019	2020	2021
Clark County										
Per Capita	$28,138.00	$26,217.00	$26,040.00	$26,048.00	$26,661.00	$27,719.00	$29,256.00	$30,704.00	$30,704.00	$33,461.00
Unemployment Rate	6.0%	10.0%	8.2%	6.9%	5.9%	5.2%	4.6%	4.2%	15.5%	8.3%
Population	1,821,359	1,976,925	2,003,613	2,035,572	2,070,153	2,112,436	2,141,574	2,182,004	2,265,461	2,343,156
Housing Units	784,892	844,979	851,131	857,131	864,164	877,617	888,556	899,870	912,465	910,667
Sales Tax Rate	8%	8.10%	8.10%	8.10%	8.15%	8.25%	8.25%	8.25%	8.375%	8.375%
Nye County										
Per Capita	$21,071.00	$21,838.00	$23,035.00	$23,085.00	$23,075.00	$23,740.00	$25,092.00	$25,558.00	$25,558.00	$28,337.00
Unemployment Rate	5.0%	12.6%	10.0%	8.9%	7.4%	6.4%	5.6%	5.3%	10.2%	6.1%
Population	43,555	43,368	42,938	42,625	43,198	43,296	43,705	44,380	51,591	48,934
Housing Units	16,592	21,957	22,051	21,903	21,786	22,348	22,339	22,404	22,448	24,793
Sales Tax Rate	7.10%	7.10%	7.60%	7.60%	7.60%	7.60%	7.60%	7.60%	7.60%	7.60%

Source: BLS 2023, Nevada 2023, USCB 2013a, USCB 2013b, USCB 2014a, USCB 2014b, USCB 2015a, USCB 2015b, USCB 2016a, USCB 2016b, USCB 2017a, USCB 2017b, USCB 2018a, USCB 2018b, USCB 2019a, USCB 2019b, USCB 2020a, USCB 2020b, USCB 2021a, USCB 2021b

3.1.4.3 Analysis of the Projected Changes (2023 through 2028)

As shown in Table 3.1.4-3, Clark County's total population is projected to be 2,393,678 in 2023, an increase of 128,217 individuals, or approximately 5.7 percent, from the 2020 Decennial Census. Population projections indicate an increase of 157,801 individuals, or approximately 6.6 percent between 2023 and 2028 (Nevada 2021). In 2023, Nye County's total population is projected to be 50,200, a decrease of 1,391 individuals, or approximately 2.7 percent, from the 2020 Decennial Census. Population projections indicate an increase of 4,184 individuals, or approximately 8.3 percent between 2023 and 2028 (Nevada 2021).

Table 3.1.4-3. Population Projections in Clark and Nye Counties

County	2023	2024	2025	2026	2027	2028
Clark County	2,393,678	2,427,565	2,460,051	2,491,910	2,522,706	2,551,479
Nye County	50,200	51,038	51,868	52,701	53,541	54,384

Source: Nevada 2021.

As discussed in Section 2.3.1, more than 600,000 square feet of new/replacement facility construction could occur at the NNSS between 2023-2028. Consolidating operations into new/replacement facilities would facilitate DD&D activities for the older, vacated facilities, and approximately 194,000 square feet of facilities are scheduled to undergo DD&D. Proposed construction activities at the NNSS would employ a peak workforce of 200 workers per year between 2023 and 2028. In addition to the direct jobs created by the construction workforce, additional jobs would be created in other supporting industries.

While construction activities may necessitate an increase in the temporary workforce, they would not result in permanent changes to the size of the NNSS workforce. The filling of new jobs would decrease unemployment in the ROI. Daily spending by these new workers would positively affect the immediate area of the NNSS creating a minor beneficial impact on economic activity. Projected rates of population growth would not be altered as a result of new workers. Sufficient housing exists in the area to support an increase in population and would result in a reduction in housing vacancy rates. Only negligible impacts on population and housing are anticipated. The demand for public services would increase during construction, however, the impact would be negligible and would not affect the level of service provided. No additional operational workforce would be required.

3.1.4.4 Conclusion

The new, modified, and continuing projects and modifications are not expected to significantly change the socioeconomic impacts bounded by the 2013 SWEIS. The projected socioeconomic impacts are therefore consistent with those analyzed by the 2013 SWEIS.

3.1.5 Geology and Soils

The NNSS is located in the southern part of the Great Basin, the northernmost subprovince of the Basin and Range Physiographic Province. The region is characterized by north to south trending, linear mountain ranges that are separated by broad sediment-filled basins. The mountain ranges,

formed by tilted, fault-bounded blocks of bedrock, can extend as much as 50 miles in length and 15 miles in width. Extensive fault zones affect the area topography. Vertical relief at the NNSS varies from 3,280 feet above sea level at Frenchman Flat and Jackass Flats to 7,216 and 7,675 feet above sea level on Pahute and Rainier Mesas, respectively.

The Great Basin is an internally draining basin with no outlet to the Pacific Ocean. Two deserts, the Mojave Desert and the Great Basin Desert, are located within the Great Basin and are characterized by their arid conditions and landforms formed by wind and water. The northern section of the NNSS is located in the Great Basin Desert; the southern third is located in the Mojave Desert, with transitional valleys in between. The topography of the region includes rugged mountain and mesas with steep sides. Eroded material from the ranges collects on alluvial fans that extend into the valley floors. The sediments in the alluvial fans and valleys are typically composed of coarse to fine alluvial debris (boulders, cobbles, sand, silt, and clay).

Several NNSS facilities are located in the Yucca Flat and Frenchman Flat, which are alluvium- and tuff-filled valleys bounded by mountain ranges composed of Paleozoic sedimentary and Tertiary volcanic rocks. Thick layers of sand and gravel, up to 8,200 feet, have collected at the base of these valleys. From the edge of the mountain ranges, coarse-grained deposits in alluvial fans grade laterally to clay deposits at playas in the lowest part of the valleys.

Seismic activity occurs in the Basin and Range Physiographic Province, and there have been earthquakes in the recent past around the NNSS. Seismic activity in the Great Basin tends to be concentrated towards the west and, to a lesser extent, the east margins of the basin. The southern Great Basin contains many Quaternary fault traces, but few indications of movement in the last 10,000 years.

Soils at the NNSS are similar to those throughout southern Nevada. Most of the soils form on the alluvial fans and valley floors, with thin soils forming on mesa and mountain surfaces. The most common soils at the NNSS are aridisols and entisols. Underlying the surface of more well-developed soils is a layer of caliche.

This section summarizes the 2013 SWEIS impacts to geology and soils (Section 3.1.5.1), discusses changes in impacts to geology and soils since the 2013 SWEIS (Section 3.1.5.2), analyzes the potential changes in geology and soils that could result from the actions evaluated in this SA (Section 3.1.5.3), and presents a conclusion regarding the potential future changes to geology and soils compared to the 2013 SWEIS analysis (Section 3.1.5.4).

3.1.5.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of geology and soils at NNSS in Sections 4.1.5 (affected environment) and Section 5.1.5 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

The 2013 SWEIS impact assessment criteria evaluated whether the alternatives would have an adverse impact on the geology or soils if they result in any of the following effects:

- Substantial soil erosion or loss of topsoil;

- Contamination of soil or mineral resources;
- Increased instability of a geologic unit or soil due to project activities, potentially leading to an onsite or offsite landslide, subsidence, or collapse;
- Exposure of people or structures to substantial adverse effects from seismic activity;
- Direct conversion of prime and unique farmland to nonagricultural uses; and
- Loss of availability of a known mineral resource that would be of value to the region and/or the residents of the state.

Based on the above criteria, no significant impacts to geology and soils were expected from the proposed programs under the 2013 SWEIS analysis, as summarized below. The identified impacts were primarily related to increased potential for soil erosion from new construction, explosives testing, and training exercises; however, most activities would occur in previously disturbed areas. There were no impacts associated with loss of farmland, mineral resources, or seismic activity.

According to the 2013 SWEIS, maintenance of facilities and utilities would occur at already disturbed outdoor or enclosed locations, and would not impact geologic or soil resources. Similarly, high-explosives experiments would impact soils and geology; however, most of the potential experiment locations (Areas 1, 2, 3, 4, 12, and 16) were previously disturbed, so the surface disturbance would be minor. Surface soils would be disturbed if explosives experiments were to occur at previously undisturbed locations. This would increase the potential for soil erosion by wind and water at the experiment location. If soils were significantly contaminated by explosives experiments, they would be identified as a corrective action site and would be remediated, as necessary.

There would be no impact on geology and soils from shock physics experiments, which would occur within existing facilities at JASPER in Area 27 and the U1a Complex in Area 1. Any additional construction required at the U1a Complex to accommodate the Large-Bore Powder Gun would occur in areas that were previously disturbed by surface construction and would likely use alluvial materials previously excavated from the complex. Similarly, geology and soils would not be impacted from criticality experiments, training, and other activities or pulsed-power and plasma physics and fusion experiments because these tests would occur within current facilities.

Some localized impacts on the surface soil structure would occur in off-road locations from DOE/NNSA and DoD conducting training activities for the Office of Secure Transportation. Driving vehicles through undisturbed soils and vegetation would disturb the soil structures and increase soil erosion by wind. Joint counterterrorism training between DoD, DHS, and other Federal agencies would occur in the remote areas of the NNSS. Small arms live-fire and small explosions would be used as part of the training. There would be a potential for increased soil erosion and surface instability where training occurs in the rugged terrain and previously undisturbed areas of the NNSS.

DOE/NNSA would perform up to five drillback operations. Each operation would disturb approximately 5 acres for the construction laydown area, borehole, and temporary storage of excavated material. Access roadways to the drillback sites would be constructed as needed. The drillback sites would be located adjacent to an existing underground test area (UGTA), so the surface disturbance would be minimal compared to the original test area.

The 2013 SWEIS also discussed the possibility of constructing a 240-megawatt commercial solar power generation facility in Area 25 as part of the non-defense mission. Construction of the commercial solar power generation facility and associated transmission lines could disturb up to 2,650 acres. Most of the soils in Area 25 had not been previously disturbed through construction or other uses, so construction of the solar power generation facility, if ever implemented, would affect topsoil and increase the potential for erosion in Jackass Flats. To date, DOE/NNSA has not received or solicited proposals for any commercial solar power generation projects; consequently, a 240-megawatt commercial solar power generation facility in Area 25 has not been implemented, and is currently not in the new accelerated solar plan for the site.

The Soils Project under the Environmental Restoration Program has been completed. At present, all environmental restoration work at the Soils sites is complete, and long-term monitoring and maintenance of closed sites continues.

3.1.5.2 Changes since the 2013 SWEIS (2013 through 2022)

Geology and Soils – American Indian Perspectives

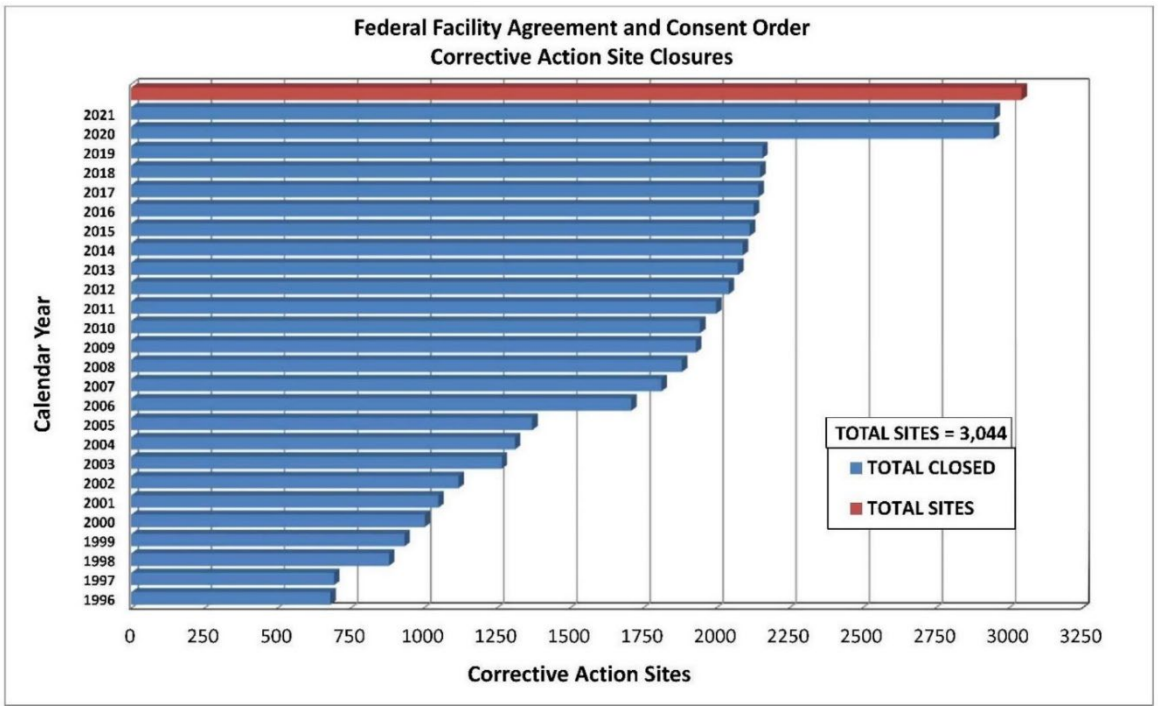
The culturally affiliated tribes are aware some localized impacts on the surface soil structure would occur in associated off-road locations from DOE/NNSA and DoD training activities for the Office of Secure Transportation, DHS, and other federal agencies. Tribes are concerned about proposed activities that may cause disturbance to culturally sensitive resources on the land. NNSA/NFO should continue providing regular briefings to the TPC about land disturbance and during annual NNSA/NFO Tribal Update Meetings. The TPC has expressed interest in examining disturbed areas associated with training activities to evaluate damages for proper context and determining the condition of the land.

The culturally affiliated tribes are aware the 2013 SWEIS Analysis described local impacts on surface soils from DOE/NNSA and DoD training activities. However, other changes have occurred from 2013 through 2022. The tribes believe it is important for the TPC to visit training areas and receive briefings for additional context and expanded understanding of culturally sensitive resources that may have been impacted.

The DOE EM Nevada Program is responsible for evaluating and implementing corrective actions at sites identified in the *Federal Facility Agreement and Consent Order* (FFACO) that were impacted by historical nuclear testing, research, and development activities. These corrective action sites (CASs) are located on NNSS and NTTR, and are grouped into larger, geographic corrective action units (CAUs) according to location, physical and geological characteristics, and/or contaminants. In 2020, long-term monitoring of 70 CASs on the NTTR and TTR was transferred to the DOE Office of Legacy Management (DOE-LM). Additionally, as described later in this section, the United States Geological Survey (USGS) published its 2018 Update of the U.S. National Seismic Hazard Model, which incorporates new findings on earthquake ground shaking, seismicity, and long-period amplification over deep sedimentary basins.

Figure 3.1.5-1 depicts the progress made since 1996 to complete environmental corrective actions at historically contaminated sites managed under the FFACO (1996, as amended). A total of 2,952 of the 3,044 CASs managed under the FFACO (1996, as amended) have been closed. Of the 92 CASs yet to be closed under the FFACO, 82 (89 percent) are UGTA CASs. The agreed-upon

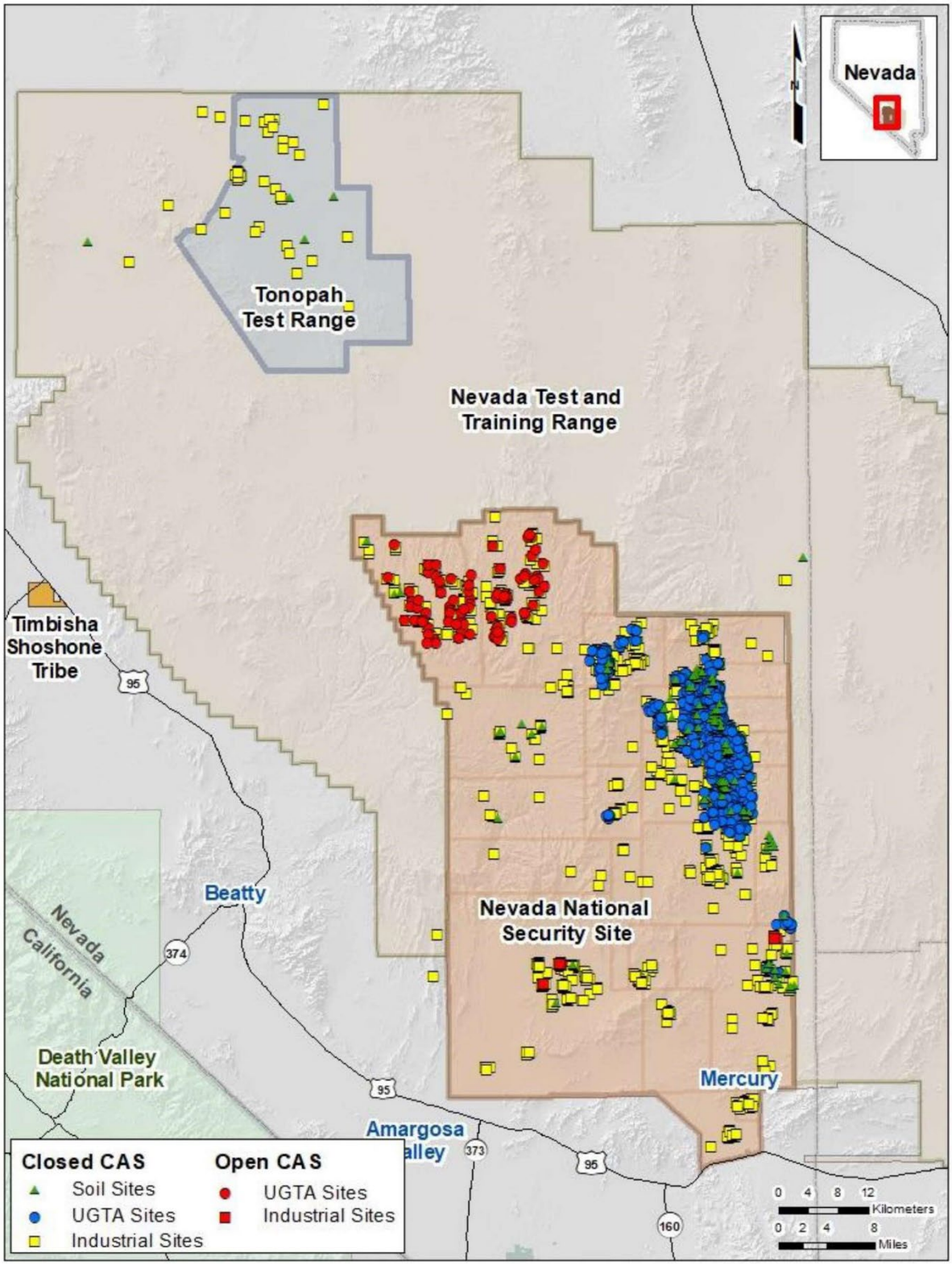
corrective action for UGTA CASs is closure in place with institutional controls and monitoring. Environmental corrective actions at 13 Industrial Sites CASs continued in 2021. Five of these CASs are Chromium Containing Waste Disposal Cells (CAU 577) located at the Area 5 RWMC. The remaining eight active Industrial Site CASs are Test Cell C Ancillary Buildings and Structures (CAU 572) and the Engine Maintenance, Assembly, and Disassembly (E-MAD, CAU 114) site, which are planned for DD&D. Figure 3.1.5-2 shows a map of FFACO closure status for UGTA, Industrial Sites, and Soils CASs (NNSS 2022a).[10]



Source: NNSS 2022.

Figure 3.1.5-1. Federal Facility Agreement and Consent Order Corrective Action Site Closures at NNSS

[10] The numbers presented on FFACO CASs are a snapshot in time, and it is possible that additional CASs could be added in the future.

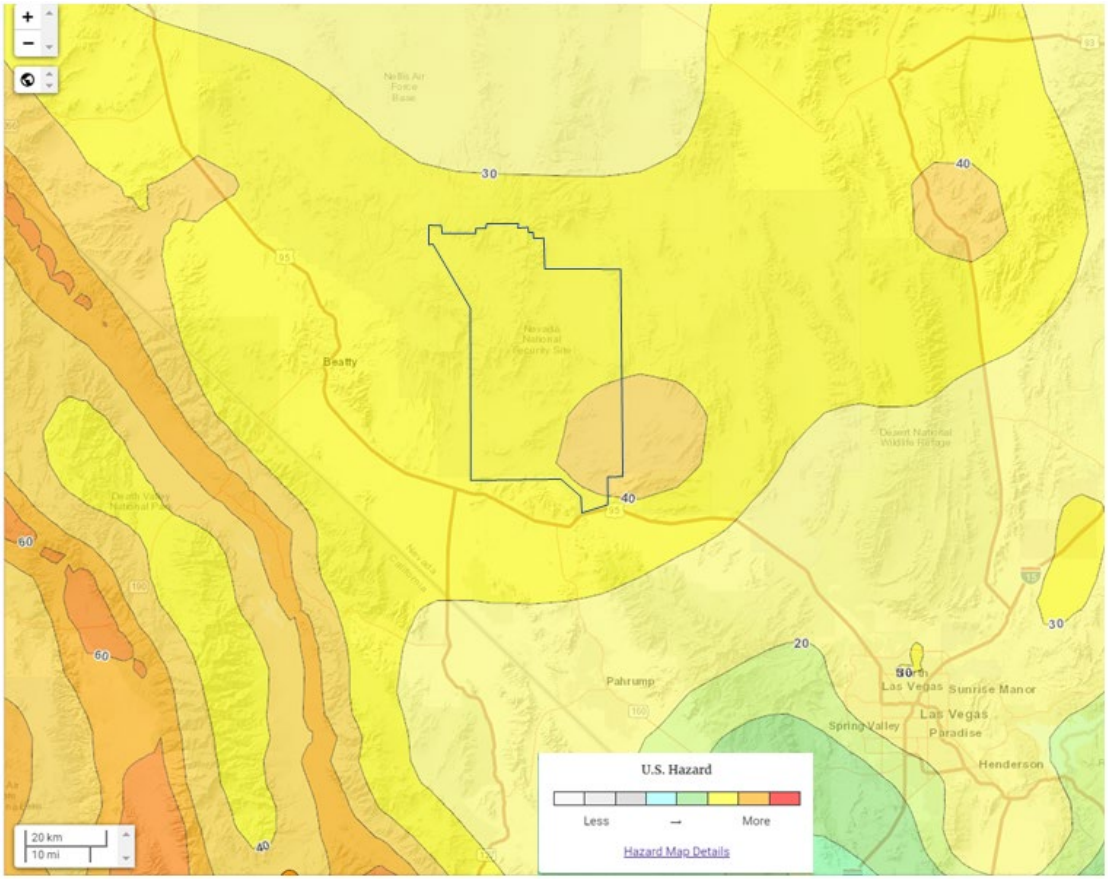


Source: NNSS 2022.

Figure 3.1.5-2. Map of FFACO closure status for UGTA, Industrial Sites, and Soils CASs

The USGS 2018 Update of the U.S. National Seismic Hazard Model defines the potential for earthquake ground shaking for various probability levels across the conterminous United States and is applied in seismic provisions of building codes, insurance rate structures, risk assessments, and other public policy. The updated model represents an assessment of the best available science in earthquake hazards and incorporates new findings on earthquake ground shaking, seismicity, and long-period amplification over deep sedimentary basins. The new model represents an update of the seismic hazard model; previous versions were developed in 1996, 2002, 2008, and 2014. The seismic hazard model estimates peak ground accelerations having a 2 percent probability of being exceeded in 50 years, for a firm rock site. The model is based on seismicity and fault-slip rates and consider the frequency of earthquakes of various magnitudes (USGS 2018).

From 2013 through 2022, 95 earthquakes, ranging from 2.5 to 4.5 in magnitude, were recorded within 62 miles of the NNSS. Most of the earthquakes were low magnitude events, between 2.5 and 3.0. The U.S. Geological Survey (USGS) Earthquake Hazards Program's 2018 Long-term Model (USGS 2018) for the Conterminous U.S. shows earthquake ground motions for various probability levels across the U.S. The USGS 2018 Seismic Hazard Model indicates that the NNSS is within an area of moderate seismic risk (USGS 2018)(see Figure 3.1.5-3).



Source: USGS 2018.

Figure 3.1.5-3. 2018 National Seismic Hazard Model near NNSS, Peak horizontal acceleration (% of gravity) with a 2% probability of exceedance in 50 years from earthquake

The USGS rates ground motions using peak ground acceleration, which is the maximum acceleration experienced during the course of an earthquake and is measured in units of acceleration due to gravity ("g"). The Seismic Hazard Model indicates that the NNSS is located in an area with a moderate seismic hazard class rating: 0.32g peak horizontal ground acceleration with a 2 percent probability of exceedance in 50 years; and 0.15g peak horizontal ground acceleration with a 10 percent probability of exceedance in 50 years. An earthquake generating 0.3g would produce very strong perceived shaking. Damage would be slight in specially designed structures. An earthquake generating 0.10g would be perceived by all, with minimal damage to well-built ordinary structures (USGS 2018, USGS 2023).

DOE policy is to design, construct, and operate its facilities so that workers, the general public, and the environment are protected from the impacts of natural phenomena hazards (including seismic events) in accordance with applicable DOE orders and standards, including DOE Order 420.1C (Facility Safety), and DOE-STD-1020-2016 (Natural Phenomena Hazards Analysis and Design Criteria for DOE Facilities).

3.1.5.3 Analysis of Projected Changes (2023 through 2028)

The actions evaluated in this SA would consist of the same types of operations that were analyzed in the 2013 SWEIS, and would occur in the same or similar facilities. Accordingly, potential impacts on geology and soils would be similar to those analyzed in the 2013 SWEIS.

Actions and operations (*see* Table 2-2 in Chapter 2) considered for geology and soils include:

- NNSS Modernization and New Facilities;
- SPE Phase III/RVDC Project;
- Construction of 2-3 new office structures at the Area 5 Radioactive Waste Management Complex (RWMC);
- Construction of a new *Resource Conservation and Recovery Act* (RCRA)-permitted disposal cell at the Area 5 RWMC;
- Expansion of existing solid waste disposal facilities at Area 23 and/or the U10c Solid Waste Disposal Site;
- ERICA Solar PVs and Storage Installations; and
- NSPG.

Within the next five years, NNSA estimates that construction of new and replacement utilities and facilities would disturb approximately 150 acres of previously undisturbed land, which represents a negligible amount (0.017 percent) of NNSS's total land area. Most projects would generally occur in previously disturbed areas. However, the SPE Phase III/RVDC Project would disturb about 100 acres of mostly previously undisturbed land. The SPE Phase III /RVDC Project would be located about 3.1 miles from the southern boundary of the NNSS. For this project, three drill pads and a new road would be built to support the tests and vegetation would need to be cleared in these areas. The project would involve two surface and two subsurface tests using high explosives. Although subsurface drilling would be required, contamination from drilling equipment and drilling fluids are not expected, as the drilling fluids are non-hazardous and drilling would be conducted in accordance with NDEP drilling regulations (NAC 534). During testing, all of the

high explosives would be consumed, so no contamination is expected. Local surface drainage patterns cross the southern boundary approximately five miles from the location of the project; therefore, the potential to contaminate downgradient receptors is low. Testing at Rock Valley would result in surface and subsurface disturbance but there would be no adverse impacts to soils and geological resources.

New soil disturbance would also occur during development of solar power generation infrastructure (approximately 200 acres, or 0.02 percent, of NNSS's total land area), and off-road training areas associated with the NSPG would impact approximately 600 acres of land, or 0.07 percent of NNSS's total land area. Soil and erosion controls would be installed during construction. During restoration, operational areas would be revegetated to the extent possible. The potential for soil impacts from loss of soil structure and increased erosion exists in areas that will be used for off-road vehicles, especially since these areas will be maintained free of vegetation for training. Overall, these areas of new soil disturbance represent a small percentage (much less than 0.1 percent) of the NNSS's total land area and would be in remote areas. Therefore, adverse impacts to geology and soils are not expected.

3.1.5.4 Conclusion

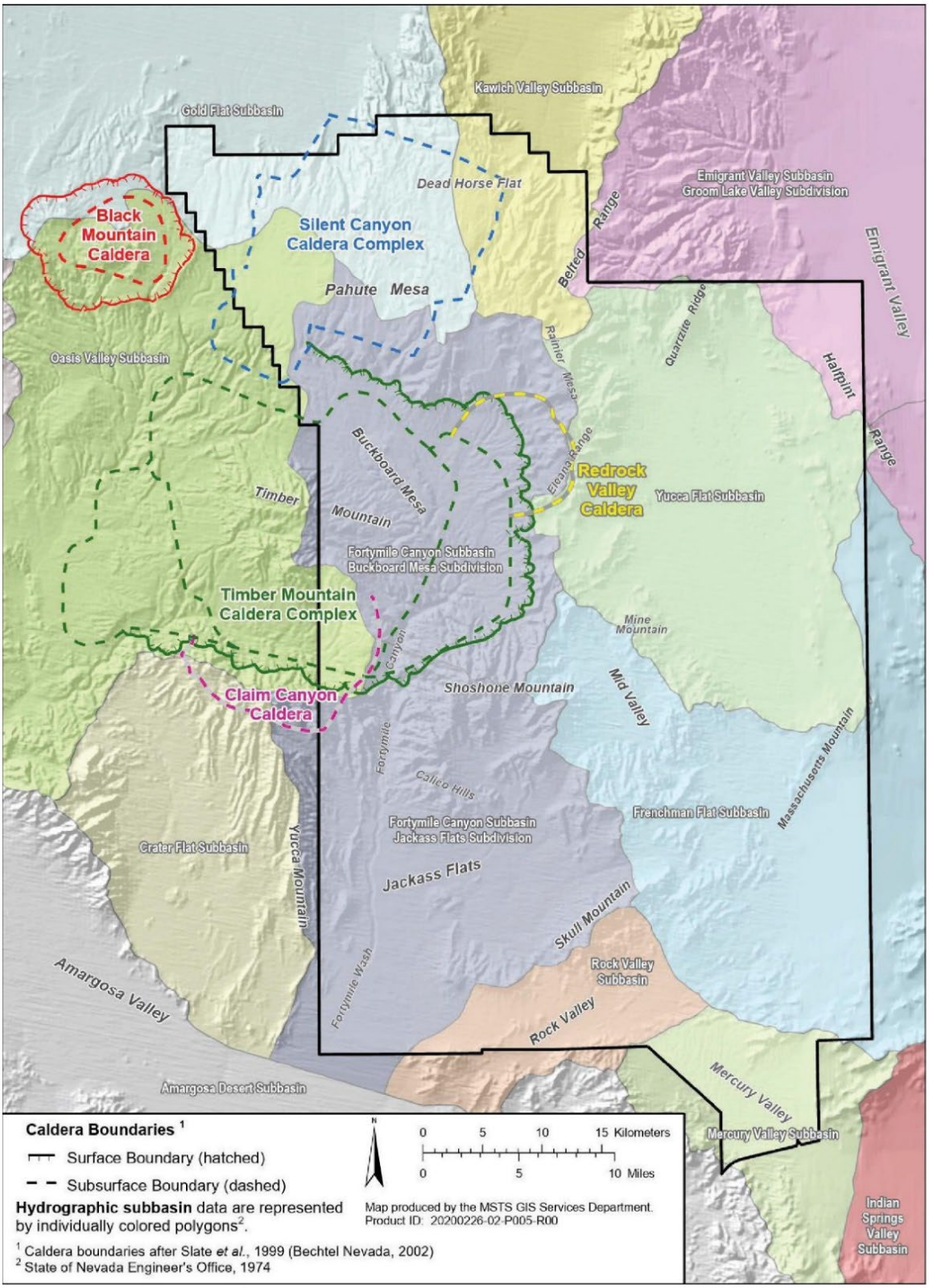
The new and continuing projects and site operations would not significantly change impacts to geology and soils at NNSS and are consistent with the impacts analyzed in the 2013 SWEIS; therefore, further supplementation of the 2013 SWEIS for potential impacts to geology and soils is not needed.

3.1.6 Hydrology

Surface Water. The NNSS lies within the southern part of the Great Basin Desert and northern portion of the Mojave Desert. The region is classified as a temperate desert with hot, dry summers and snowy winters. Within the Great Basin, all precipitation evaporates, infiltrates into the ground, or flows into lakes. Creeks, streams, or rivers have no outlet to either the Gulf of Mexico or the Pacific Ocean. Streams within NNSS are ephemeral and are fed by runoff from snowmelt and precipitation during storm events. Springs are the only perennial surface-water sources throughout the region. At some large springs, perennial surface water discharges occur as pools. Flash flooding occurs on the NNSS in response to heavy precipitation events, especially during summer thunderstorms. The runoff from these storms is typically of short duration; however, the storms do result in large peak discharge rates. On occasion, ephemeral channel systems in the western half and southernmost parts of the NNSS carry runoff beyond the NNSS boundaries. There is no known human consumption of surface water on the NNSS.

Groundwater. In general, groundwater flows south and southwest on the NNSS. The depth to groundwater at the NNSS varies from approximately 30 feet at Fortymile Wash, 700 feet in Frenchman Flat, greater than 1,500 feet in portions of Yucca Flat, and more than 2,000 feet under portions of Pahute Mesa (*see* Figure 3.1.6-1). Groundwater is the only local source of potable water on the NNSS.

This section summarizes the 2013 SWEIS impacts to hydrology (Section 3.1.6.1), discusses changes in impacts to hydrology since the 2013 SWEIS (Section 3.1.6.2), analyzes the potential



Source: NNSS 2022a.

Figure 3.1.6-1. Major topographic features, calderas, and hydrographic subbasins of NNSS

changes in hydrology that could result from the actions evaluated in this SA (Section 3.1.6.3), and presents a conclusion regarding the potential future changes to hydrology compared to the 2013 SWEIS analysis (Section 3.1.6.4).

3.1.6.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of hydrology at NNSS in Sections 4.1.6 (affected environment) and Section 5.1.6 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

Surface Water. The 2013 SWEIS Impact Assessment Criteria evaluated whether the alternatives would have an adverse impact on surface-water hydrology if they result in any of the following effects:

- Alteration of natural drainage pathways (pools, channels, or the ground surface);
- Sedimentation to surface waters;
- Contamination of surface waters with chemical and/or biological agents;
- Conflict with the provisions of approved water discharge permits; and/or
- Alteration of 100-year or 500-year floodplains or other flood hazard areas in a manner that would endanger lives and property.

Based on the above criteria, no significant impacts to surface water were expected from the proposed programs under the 2013 SWEIS analysis, as summarized below.

The 2013 SWEIS determined that explosives testing could cause surface disturbances that could alter natural drainage pathways in terms of storm-generated sheetflow and flows in ephemeral waters. However, explosives testing would be limited to previously disturbed areas. Additionally, new facility construction activities would result in land disturbance, which could cause localized sedimentation in ephemeral waters and long-term alteration of natural drainage pathways by introducing structures that would impede natural flows. However, pre-construction contours would be restored following construction, to the extent practicable. Lastly, up to five drillback operations would occur within the area adjacent to former UGTAs and would require approximately 5 acres of land. Earth-disturbing activities during site preparation and drilling (e.g., vehicle and equipment movements) could result in a small degree of sedimentation in nearby ephemeral waters. In general, sedimentation to ephemeral waters could occur but would be mitigated on a site-specific basis using erosion and sediment controls such as filter sock, diversion berms, and silt fence and disturbed areas would be revegetated in a timely manner. Where practicable, DOE/NNSA would use areas disturbed by past activities to minimize the areal extent of new soil disturbance and erosion.

The 2013 SWEIS concluded there was negligible potential for existing onsite contamination to be transported off site via surface water or through flood events. Flooding events were described as infrequent and contaminated soil sites were closed and stabilized, and a distance away from the Fortymile wash, the primary conveyance for surface water exiting NNSS. Testing with explosives would be conducted within hydrographic basins that drain internally within the NNSS and thus contaminants generated from testing would not affect offsite areas during rare flooding events.

No permanent change in surface-water quality was expected because springs are located outside of experiment areas and are generally upgradient. Continued wastewater discharges were not expected to cause any impacts on surface hydrology. Wastewater would be contained within lagoons and ponds and effluent would meet permit requirements. Lastly, new construction would not be located within areas prone to flooding.

Groundwater. The 2013 SWEIS Impact Assessment Criteria evaluated whether the alternatives would have adverse impacts on groundwater resources if they result in any of the following:

- Water level declines in areas adjacent to operating wells that adversely affect other uses in that aquifer;
- Alteration of groundwater recharge to another downgradient aquifer to the degree that it reduces that aquifer's sustainable yield or adversely affects current uses of that aquifer;
- Exceedance of the sustainable withdrawal capacity of an aquifer; or
- Noncompliance with applicable water quality standards.

Based on the above criteria, the 2013 SWEIS analysis determined that no significant impacts to groundwater were expected, as summarized below.

DOE/NNSA estimated that groundwater use would be 281 and 225 million gallons per year, under the Expanded Operations and No Action Alternatives, respectively. According to the 2013 SWEIS, the demands on each basin would be unlikely to reduce groundwater recharge to another downgradient aquifer to the degree that it reduces that aquifer's sustainable yield or adversely affects current uses of that aquifer. However, DOE/NNSA would continue to monitor groundwater levels and flow patterns across the NNSS, would employ site-specific modeling to estimate specific impacts of future projects, and would modify the points of diversion and pumping rates if needed to avoid adversely impacting any single aquifer. Therefore, no adverse effects on groundwater supply were expected. Table 3.1.6-1 shows Projected Groundwater Use under the Expanded Operations Alternative and sustainable groundwater yield.

Table 3.1.6-1. Projected Groundwater Use under the Expanded Operations Alternative

Hydrographic Basin	Water Demand (gallons per year)	Sustainable Yield of Basin (gallons per year)
Frenchman Flat	192,578,196	32,585,143 to 596,308,120[a]
Fortymile Canyon, Buckboard Mesa subdivision	17,270,126	1,173,065,154
Fortymile Canyon, Jackass Flats subdivision	19,225,234	1,303,405,727
Yucca Flat	51,810,378	114,048,001
Total	280,883,934	2,623,104,026

a. The sustainable yield estimate varies by model from 32,585,143 to 596,308,120 gallons per year; Nevada State Engineer model and USGS model, respectively.

According to the 2013 SWEIS, NNSA's Groundwater Management Protection Plan includes measures for continued sustainable use of groundwater through the installation, closing, or

buffering of wells to prevent groundwater contamination from testing activities; locating equipment maintenance and fueling areas away from groundwater wells; and conducting periodic groundwater sampling to identify adverse impacts on groundwater during current operations. In particular, dynamic experiments and explosives testing can release hazardous materials at or below ground surface. The NNSS operates under standard operating procedures that ensure no experiments are conducted within approximately 300 feet of the groundwater table. Given these operational restrictions and the depth of groundwater at the NNSS (up to 2,000 feet below the ground surface), these experiments were not expected to result in any adverse impacts on groundwater quality. Any potential impacts associated with substances (i.e., fuels, oils, and other lubricants) leaking into soils and entering groundwater aquifers would be avoided through the use of best management practices (BMPs) to prevent spills or leaks. Such BMPs would include regular inspection of vehicles, equipment, and routine maintenance checks to limit adverse impacts. The depth to groundwater in most areas of the NNSS and the stringent operating controls and inspection programs in place would preclude contamination of groundwater resources from a release.

Although waste management activities would increase, LLW and MLLW disposal operations were not expected to adversely affect groundwater resources, because of the absence of a groundwater pathway, depth to groundwater at waste disposal facilities at Areas 3 and 5, and stringent operating controls and monitoring programs.

3.1.6.2 Changes since the 2013 SWEIS (2013 through 2022)

Surface Water. The NNSS has six permitted wastewater treatment pond systems (sewage lagoons): Area 1 U1a Complex, Area 6 Yucca Lake Complex, Area 6 DAF, Area 12 Camp, Area 23 Mercury, and Area 25 Engine Test Stand 1 (ETS 1). Industrial waste and hazardous waste are not permitted to be discharged into the sewage lagoons. The construction of the ponds allows these systems to operate as fully contained, evaporative, non-discharging systems. The sewage lagoons operate in compliance with Water Pollution Control Groundwater Discharge General Permit GNEV93001, issued by the NDEP-BFF. Recently, NNSA completed the construction of the two newest sewage lagoons at the U1a Complex, but the system has not yet been put into operation due to the low population at the U1a Complex. Once the U1a Complex population is at a sustainable level for the lagoons, the lagoons will be placed into operation.

NNSA/NFO manages and operates the NNSS Area 12 E Tunnel Discharge System (ETDS) in accordance with the Water Pollution Control Wastewater Discharge Permit NEV96021, issued by NDEP-BFF. The permit governs the management of radionuclide-contaminated wastewater that discharges from the E Tunnel portal into a series of conveyance pipes and earthen holding/infiltration ponds. The permit requires chemical and radiological constituents monitoring of the ETDS effluent. In 2021, radiological and nonradiological parameters were all within their permissible and threshold limits. From 2013 through 2020, monitoring results were similar with only minor exceedance (of manganese in 2020) (NNSS 2014a, NNSS 2015a, NNSS 2016a, NNSS 2017a, NNSS 2018a, NNSS 2019a, NNSS 2020a, NNSS 2021a, NNSS 2022a).

Groundwater. Groundwater monitoring for contamination from historical nuclear underground tests (UGTs) continues in accordance with NNSA/NFO and EM Nevada requirements. Risks associated with groundwater contaminated by UGTs remain low because of the slow groundwater movement, physical and chemical processes that slow radionuclide movement, immobility of some

contaminants, radioactive decay, and long distances to publicly accessible groundwater supplies. Contaminated groundwater at levels exceeding the *Safe Drinking Water Act* Maximum Contaminant Levels (SDWA MCLs) for all radionuclides is not expected to reach publicly accessible areas. Results from the NNSS public water system (PWS) water wells sampled quarterly in 2021 and previous years (2013 to 2020) continue to indicate that historical underground nuclear testing has not impacted the NNSS water supply network. Potential nonradiological parameters concerning drinking water and wastewater monitored on the NNSS in 2021 and previous years were all less than permit limits. Well drilling, waste burial, chemical storage, and wastewater management are the only current NNSS activities that have the potential to contaminate groundwater with nonradiological contaminants. This potential is very low, however, due to engineered and operational deterrents and natural environmental factors (NNSS 2022a). Groundwater sampling results continue to indicate that waste disposal in Area 5 has not contaminated local groundwater (NNSS 2022a).

In addition to the monitoring required under the PWS permits, NNSA/NFO continues to evaluate the potential for per- and polyfluoroalkyl substances (PFAS) contamination in the drinking water supply, an emerging concern across the nation. While the NNSS is generally considered a low risk for PFAS contamination of the groundwater, the six permitted wells and PWS points of entry were monitored in 2020, with the samples analyzed by a Nevada certified laboratory. All results were non-detect at less than 1 nanogram per liter (part per trillion) (NNSS 2022a).

Current water usage, monitored annually, has dropped to levels that have not been seen since the early 1960s (*see* Figure 3.1.6-2), due mainly to changes in site operations, and to some extent, recent conservation actions. Total groundwater withdrawal from NNSS wells in 2021 was about 126 million gallons. Although groundwater withdrawals were less than the projected usage under the Expanded Operations and No Action Alternatives, water usage from the Frenchman Flat aquifer is exceeding the yearly recharge amount (MSTS 2023b). Within the past several years, NNSA/NFO has taken actions to conserve groundwater by addressing DOE's water efficiency and water management goals, which include reducing both potable and non-potable water use (NNSS 2022a).

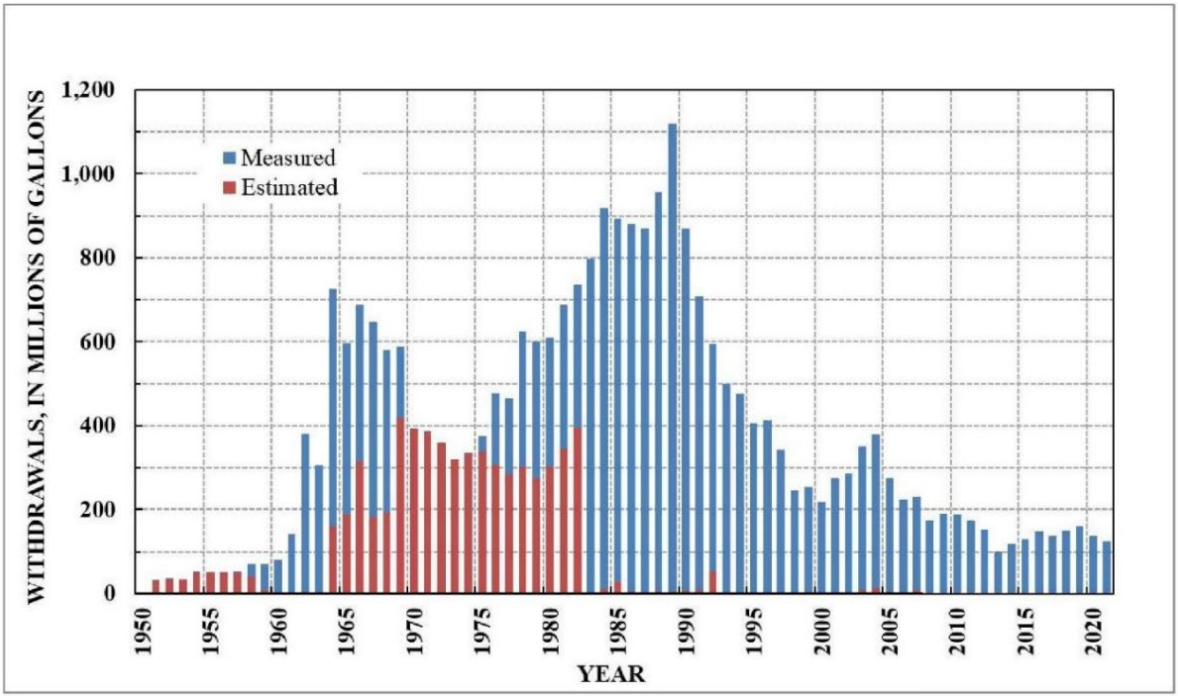


Figure 3.1.6-2. Annual groundwater withdrawals from NNSS, 1951-2021

Hydrology – American Indian Perspectives

The culturally affiliated tribes integrate traditional ecological knowledge to properly manage resources within their traditional homelands including those within the NNSS boundaries. The tribes know hydrological resources are interconnected and must be managed effectively and kept in balance. Tribes recognize DOE uses qualified laboratories to conduct scientific analysis as deemed necessary. However, according to Section 3.1.6.2 of the SA, such analysis is conducted by a "Nevada certified laboratory" without disclosing the name of the laboratory. The tribes believe NNSA/NFO should identify the preferred laboratory to promote transparency among the culturally affiliated tribes and the general public.

Culturally affiliated tribes are aware that DOE conducts groundwater monitoring activities to evaluate contamination associated with historical nuclear underground tests. The tribes should be involved in DOE monitoring activities to minimize impacts to hydrological resources. The tribes believe if the water is mistreated, it will remove itself from the NNSS. To expand awareness, groundwater monitoring activity briefings should be provided to the TPC and tribal representatives during annual NNSA/NFO Tribal Update Meetings.

3.1.6.3 Analysis of Projected Changes (2023 through 2028)

None of the actions evaluated in this SA would significantly change the facilities, operations, or activities at NNSS. The same types of operations are expected to occur in the same or similar facilities analyzed in the 2013 SWEIS. Accordingly, potential impacts on water resources would be similar to those analyzed in the 2013 SWEIS.

Actions and operations (*see* Table 2-2) considered for water resources include:

- NNSS Modernization and New Facilities;
- SPE Phase III/RVDC Project; and
- Construction of a new RCRA-permitted disposal cell at the Area 5 RWMC.

As a result of NNSS Modernization activities, more than 600,000 square feet of new/replacement facility construction could occur between 2023-2028. Potential impacts to stormwater quality (e.g., introduction of silt, changes to water temperatures, flow rates, flow volumes, and flow duration) and alteration of existing hydrology from new facility construction would be reduced through implementation of requirements specified in Section 438 of the *Energy Independence and Security Act* which addresses stormwater management and requires any development/redevelopment project involving a federal facility with a footprint over 5,000 gross square feet to maintain or restore pre-construction hydrology to the maximum extent feasible. Therefore, stormwater management would be incorporated into new facility construction to reduce impacts to stormwater quality (e.g., reduce sediment-laden water from exiting the site) and existing hydrology (i.e., reduce alteration to existing/natural overland drainage). In addition, it may be necessary to obtain a construction stormwater National Pollutant Discharge Elimination System (NPDES) permit for discharges of stormwater associated with construction activities. As part of the NPDES permit, the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) would be required to help minimize any pollution that might leave the site by stormwater. The SWPPP would contain a detailed site plan and schematics for the installation of temporary and permanent stormwater and erosion control devices to effectively manage the site during construction and facility operation. For the new RCRA-permitted disposal cell at the Area 5 RWMC, a leachate collection system and groundwater monitoring well would be installed to protect and verify groundwater quality.

Surface Water. From 2023 through 2028, NNSA would continue to monitor waste water systems in accordance with applicable permits. The sewage lagoon systems at Area 6 Yucca Lake, Area 6 DAF, and Area 23 Mercury, would operate in compliance with Water Pollution Control General Permit GNEV93001, which requires bi-weekly inspections of active systems and quarterly influent monitoring. The NNSS Area 12 ETDS would be monitored in accordance with the NDEP-BFF water pollution control permit NEV96021.

Groundwater. Groundwater monitoring for contamination from historical nuclear underground tests (UGTs) would continue in accordance with NNSA/NFO and EM Nevada requirements, and no changes in groundwater monitoring are proposed. DOE/NNSA would continue to monitor groundwater quality and groundwater levels and flow patterns across the NNSS. The NNSS PWS would continue to comply with requirements of the SDWA. In addition, monitoring wells associated with the Area 5 Mixed Waste Disposal Unit (Cells 18 and 25), would be monitored in accordance with the RCRA permit to verify performance. Water demand could increase as a result of construction activities and increased operations, but would not be expected to exceed projections in the 2013 SWEIS (Table 3.1.6-1).

The SPE Phase III/RVDC Project is not expected to impact surface water or groundwater. The project would be located within the southern portion of the Rock Valley fault system, about 3.1

miles from the southern boundary of the NNSS. Although subsurface drilling would be required, contamination from drilling equipment is not expected; as the drilling fluids are non-hazardous and drilling would be conducted in accordance with NDEP drilling regulations (NAC 534). During testing, all high explosives would be consumed, so no contamination is expected. Local surface drainage patterns cross the southern boundary approximately 5 miles from the location of the SPE Phase III/RVDC Project. Therefore, the potential to contaminate downgradient receptors is low. Testing at Rock Valley would result in surface and subsurface disturbance but there would be no adverse impacts to water resources.

Three UGTA CAUs (one in Frenchman Flat, one in Rainier Mesa/Shoshone Mountain, and one in Yucca Flat/Climax Mine) have reached the closure stage. The Frenchman Flat CAU, which is the first of the UGTA CAUs to reach the closure stage, is located approximately 6.2 miles northeast of the SPE Phase III/RVDC Project location. Because of this relatively close proximity, this SA includes an analysis of potential impacts from the SPE Phase III/RVDC Project on the Frenchman Flat CAU. The Frenchman Flat CAU regulatory boundary objective is to protect receptors downgradient of the Rock Valley fault system from radionuclide contamination. Modeling of radionuclide transport originating from the Frenchman Flat CAU shows that limited quantities of contaminants reach the regional Lower Carbonate Aquifer in 1,000 years and that contamination is dominated by tritium, which will decay to levels well below the SDWA standard within 200 years (NNSA 2016). Regional groundwater flow (within the Lower Carbonate Aquifer) flows southwest to the Rock Valley fault system, which is located downgradient of the Frenchman Flat basin, and is the expected groundwater migration pathway for any potential groundwater contamination from the Frenchman Flat CAU.

The Frenchman Flat CAU regulatory boundary is established at the interface of the shallow Alluvial/Volcanic aquifer and the Rock Valley fault system. Between 2016-2020, all monitoring results indicate that the regulatory boundary objective has been met, as tritium has not been detected in early-detection groundwater monitoring wells near the Frenchman Flat CAU (NNSA 2022a). Due to the project's downgradient location, slow contaminant migration rate, and distance from the Frenchman Flat CAU, the SPE Phase III/RVDC Project is not expected to increase the potential for contaminant migration from Frenchman Flat CAU.

3.1.6.4 Conclusion

The new and continuing projects and site operations would not significantly change impacts to water resources at NNSS and are consistent with the impacts analyzed in the 2013 SWEIS. Additional impacts to water resources or noncompliance with U.S. Environmental Protection Agency (USEPA) and State water quality requirements are not expected. NNSA would continue to comply with all applicable regulations and permit requirements for surface and groundwater. Therefore, further supplementation of the 2013 SWEIS for water resources is not needed.

3.1.7 Biological Resources

This section summarizes the 2013 SWEIS biological resources impacts (Section 3.1.7.1), discusses changes in biological resources since the 2013 SWEIS (Section 3.1.7.2), analyzes the potential changes in biological resources that could result from the actions evaluated in this SA (Section 3.1.7.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.7.4).

Biological Resources – American Indian Perspectives

Culturally affiliated tribes know the NNSS contains ancient playas, surrounded by mountain ranges. The run-off from these ranges serves to maintain a healthy desert floor and environment. Animals frequent the area, creating many distinctive trails by naturally tilling the soil. The trails, along with the animals, leave their marks on the land, which are central to our stories, songs, and lifeways. American Indian people rely on the plants, animals, water, and insects for food, as well as medicines and indicators that are traditionally managed to keep the world in balance. The tribes know that culturally appropriate interactions with the land and the resources are vital to sustaining harmony. The tribes believe that integrating TEK is required to responsibly monitoring and managing the land at the NNSS.

3.1.7.1 2013 SWEIS Analysis

The 2013 SWEIS analysis on biological resources addresses impacts to vegetation, wildlife, and sensitive and protected species at NNSS and offsite biota. The criteria used to determine potential impacts on biological resources resulting from DOE/NNSA activities include the area of disturbance (i.e. habitat loss) and the potential of proposed activities to cause damage to any species protected by applicable statutes, including exceeding the terms and conditions in the *Final Programmatic Biological Opinion for Implementation of Actions Proposed on the Nevada Test Site, Nye County, Nevada* (2009 Biological Opinion) (NNSA 2013). The 2009 Biological Opinion authorized the incidental "take" (accidental killing, injury, harassment, etc.) of desert tortoises (*Gopherus agassizii*) that may occur during NNSS activities.

Flora. In the 2013 SWEIS, potential land disturbed at NNSS under all alternatives ranges from 2,740 to 25,877 acres or 0.35 to 3.27 percent of undisturbed area on NNSS (NNSA 2013). Four habitat types on the NNSS were identified as “important habitats,” and include pristine, unique, sensitive, and diverse habitats. The source of potential impacts includes construction activities, detonations of explosives, remediation of contaminated soils sites, building modifications, and decontamination or demolition of buildings. Impacts to vegetation include the disturbance of previously undisturbed land and removal of vegetation to clear areas. The disturbance of native vegetation could also promote the proliferation of nonnative invasive weeds and the unintentional introduction of new weed species from contaminated equipment brought in from other regions.

Fauna. Most impacts on wildlife from DOE/NNSA activities would be temporary. Many of these temporary disturbances, such as off-road vehicular traffic, would occur in areas adjacent to previously disturbed areas that may possess marginal value as wildlife habitat. Noise associated with DOE/NNSA activities would impact wildlife in various ways, depending on the nature and location of the noise source and the particular species of wildlife (NNSA 2013).

Threatened and Endangered Species. In the 2013 SWEIS, the Mojave population of the desert tortoise (*Gopherus agassizii*) was the only federally listed species known to occur on the NNSS. Approximately 7,350 acres, or 2 percent of NNSS land within desert tortoise range, had been disturbed in the past by construction of facilities and infrastructure and other activities. At the time of the 2013 SWEIS, the population density of the desert tortoises on the NNSS was unknown but was considered to be very low. The 1996 Biological Opinion and 2009 Biological Opinion concluded that activities anticipated to occur on the NNSS would not jeopardize the continued existence of the Mojave population of desert tortoises and that no critical habitat would be destroyed or adversely modified. The 2013 SWEIS concluded that the potential for DOE/NNSA activities at the NNSS to impact plants and animals in areas outside of the NNSS is negligible (NNSA 2013).

The DOE/NNSA NFO Desert Tortoise Compliance Program was developed in 1992 and served to implement the terms and conditions of the 2009 Biological Opinion for the NNSS. Of the 125 tortoises that could be "taken," only 1 to 2 tortoises were expected to be taken by injury or mortality each year; the remainder would be taken by harassment by being moved by qualified biologists or employees off of roadways or by qualified biologists from areas of proposed land disturbance to prevent their injury or death. The estimated number of desert tortoises affected ranged from 0 to 178 under the alternatives in the 2013 SWEIS (NNSA 2013).

Other Species of Concern. NNSS is home to 88 sensitive and protected/regulated species. Sensitive and protected/regulated species include 1 moss, 22 flowering plants plus 18 species of cacti, 1 mollusk, 2 reptiles, 15 birds, and 27 mammals. Sensitive reptiles include the desert tortoise and the western red-tailed skink (*Eumeces gilberti rubricaudatus*). Sensitive mammals include seven regulated game species and at least 13 sensitive species of bats are known to occur at the NNSS or in adjacent areas. Two sensitive species of plants occur in the valleys and would be more susceptible to being impacted: *Camissonia megalantha, Cymopterus ripleyi* var. *saniculoides.* Others like *Eriogonum concinnum* are growing on disturbed areas, such as road cuts and cut slopes for well pads (NNSA 2013).

3.1.7.2 Changes since the 2013 SWEIS Analysis (2013 through 2022)

Flora and Fauna. From 2013 to 2021, approximately 204 biological surveys were conducted covering nearly 5,000 acres. Several projects had multiple survey locations and post-activity surveys were conducted for projects completed before and during 2021. A summary of the biological surveys conducted between 2013 to 2021 is presented in Table 3.1.7-1.

Table 3.1.7-1. Summary of Biological Surveys at NNSS from 2013–2021

Survey Year	Number of Projects Requiring Biological Surveys	Acres Surveyed	Projects Requiring Biological Surveys within the Range of the Desert Tortoise	Desert Tortoise Detected Injury or Mortality	Desert Tortoise Habitat Disturbed (acres)
2021	29	254	14	0	55.0
2020	34	364	17	0	24.0
2019	33	349	21	0	0.0
2018	29	769	33	0	15.0

Survey Year	Number of Projects Requiring Biological Surveys	Acres Surveyed	Projects Requiring Biological Surveys within the Range of the Desert Tortoise	Desert Tortoise Detected Injury or Mortality	Desert Tortoise Habitat Disturbed (acres)
2017	19	504	10	0	1.0
2016	16	388	8	0	0.3
2015	13	646	5	0	0.0
2014	18	492	15	0	5.4
2013	13	1,197	10	0	12.0

Source: NNSS 2014b, NNSA 2015b, NNSS 2016b, NNSS 2017b, NNSS 2018b, NNSS 2019b, NNSS 2020b, NNSS 2021b, NNSS 2022b.

Threatened and Endangered Species. The desert tortoise remained the only federally listed species on the NNSS. The 2009 Biological Opinion expired on August 26, 2019. On February 27, 2019, NNSA/NFO provided USFWS with a Biological Assessment of anticipated activities on the NNSS from 2019 through 2029 and entered into a formal consultation with USFWS to obtain an updated Biological Opinion. The USFWS issued a new Biological Opinion to cover the term of August 27, 2019 through 2029. The Biological Opinion is effectively a permit to conduct activities in tortoise habitat in a specific manner and authorizes the incidental take of tortoises that may occur during the activities. The new Biological Opinion states that the proposed NNSS activities are not likely to jeopardize the continued existence of the Mojave population and sets limits for the acres of tortoise habitat that can be disturbed; the number of accidentally injured and killed tortoises; and the number of captured, displaced, and relocated tortoises. The new parameters also require only large tortoises (>180 millimeters [mm] midline carapace length) be reported under the incidental take limits (NNSS 2022b). Table 3.1.7-2 presents the cumulative totals and permit limits for tortoise habitat disturbance and take of large tortoises from August 2019 through 2021.

Table 3.1.7-2. Cumulative Totals and Permit Limits for Tortoise Habitat Disturbance and Take of Large Tortoises (>180 mm)

Program	Actual Number of Acres Impacted (Limit Allowed)	Number of Tortoises Incidentally Taken (Maximum Allowed)	
		Non-injury or Non-mortality[a]	Detected Injury or Mortality[b]
Continued Use of Existing Roads	NA	55 (350)[c]	0 (15)[d]
Defense	0.7 (500)	0 (10)	0 (2)
Waste Management	52.6 (250)	0 (10)	0 (2)
Environmental Restoration	0.0 (250)	0 (10)	0 (2)
Nondefense Research and Development	2.9 (1,000)	0 (20)	0 (4)
Strategic Partnership Projects	0.0 (500)	0 (20)	0 (2)
Infrastructure	22.8 (500)	0 (20)	0 (4)[e]
Totals (August 27, 2019 - 2021)	**79 (3,000)**	**55 (440)**	**0 (31)**
Totals for 2021	**54.6**	**25**	**0**

a. All tortoises observed in harm's way may be moved to a safe location as outlined in the Opinion.
b. The numbers in parentheses in this column represent triggers that if exceeded require reinitiation of the Opinion.

c. No more than 35 non-injury/non-mortality tortoises in a given year. Going over this limit would require concurrence with the USFWS.
d. No more than 4 tortoises killed in a given year and no more than 15 killed during the term of the Biological Opinion.
e. No more than 2 tortoises killed in a given year and no more than 4 killed during the term of the Biological Opinion.
Source: NNSS 2022b.

Other Species of Concern. In 2021, important species known to occur on the NNSS included one mollusk, two reptiles, 241 birds, 23 mammals, 20 sensitive plants, and 23 plants protected from unauthorized collection. These species are classified as important due to their sensitive, protected, and/or regulatory status with state or federal agencies, and are evaluated for inclusion in long-term monitoring activities on the NNSS. Although none of the known plant species on the NNSS are listed as threatened or endangered under the ESA, numerous plants on the NNSS are considered sensitive by the Nevada Division of Natural Heritage (NDNH) and are included in the NDNH At-Risk Plant and Animal Tracking List (NNSS 2022b).

Habitat Restoration Program. Habitat restoration activities conducted in 2021 included visually assessing the vegetation at the U-3ax/bl closure cover (CAU 110) (Area 3 RWMS) and the "92-Acre Area" (CAU 111) (Area 5 RWMC); revegetating CAU 577 East and West Cover Caps (Area 5 RWMC); transplanting creosote bush and white bursage and evaluating revegetation success from fall 2020 seeding on Cell 18 (Area 5 RWMC); and implementing a research study to evaluate the effectiveness of different herbicide and seeding treatments to control cheatgrass (*Bromus tectorum*) after the Cherrywood Wildland Fire (NNSS 2022b).

Cheatgrass is the most common invasive plant found but was only detected on 24 percent of the 104 study sites on NNSS due to drought conditions. The colonization by invasive species such as cheatgrass increases the likelihood of future wildland fires because they provide abundant fine fuels which allows fire to spread from one shrub to another (NNSS 2022b).

3.1.7.3 Analysis of the Projected Changes (2023 through 2028)

Within the next five years, NNSA estimates that construction of new and replacement utilities and facilities would disturb approximately 150 acres of previously undisturbed land (30 acres annually). DD&D of aging facilities would restore approximately 5 acres (1 acre per year). Net, new land disturbance from facility development and utility upgrades would be approximately 145 acres, or 29 acres annually. One-hundred and forty-five (145) acres of new net land disturbance represents a negligible amount (0.017 percent) of NNSS's total land area. In addition to these new land disturbances, the NSPG is expected to remove vegetation from approximately 600 acres of land (approximately 0.07 percent of NNSS's total land area) at three different remote locations (Areas 7, 18, 20) and maintain the areas free of vegetation for off-road use. Development of solar power generation infrastructure in Areas 2, 3, 5, 6 and 23 would disturb approximately 200 acres, or 0.02 percent, of NNSS's total land area. Overall, because the NNSS site is vast in size, with development concentrated in clusters, impacts over the next five years would not result in perceivable changes to biological resources.

Additional construction projects would result in increased traffic, which in turn can increase roadkill numbers. Although traffic has increased and there has also been an increase in tortoise observations since 2013, the NNSS has not observed an increase in tortoise roadkill numbers. This

is attributed to educational outreach program which trains employees on avoiding complacency when driving and what do to if a tortoise is encountered on a road.

State-managed and state-protected species are monitored under the Ecological Monitoring and Compliance Program (EMAC). Under this program, projects and activities involving land-disturbing activities on NNSS are reviewed by biologists to determine if: (1) sensitive and protected/regulated species occur within the project area; (2) a biological survey is required to identify sensitive and protected/regulated species within the project area, and/or; (3) mitigation measures need to be developed to protect impacted species. The goal of the surveys is to minimize adverse effects of land disturbance on sensitive and protected/regulated plant and animal species, their associated habitat, and other important biological resources. Important biological resources include cover sites, nest or burrow sites, roost sites, or water sources important to sensitive species. Survey reports document species and resources found and provide mitigation recommendations.

Projects occurring in desert tortoise habitat on the NNSS must also comply with the terms and conditions of the Biological Opinion issued on August 27, 2019. The EMAC implements the protective measures of the Biological Opinion, documents compliance actions taken by NNSA/NFO, and assists NNSA/NFO in USFWS consultations. Protective measures listed in the Biological Opinion include (a) conducting 100 percent coverage tortoise clearance surveys at project sites within 24 hours from the start of project construction, (b) ensuring projects have a desert tortoise monitor on site during site clearing and heavy equipment operation, (c) developing effects analysis for proposed disturbances to append to the Biological Opinion, and (d) preparing an annual compliance report for NNSA/NFO submittal to USFWS

DOE/NNSA is subject to, and complies with, existing laws, regulations, and policies regarding protection of sensitive and otherwise regulated plant and animal species and has established practices to minimize or avoid potential adverse effects on biological resources.

3.1.7.4 Conclusion

Potential impacts to ecological resources at NNSS will be minimized through implementation of protective measures and continued biological monitoring. Existing disturbances will be used to the greatest extent possible for new projects and activities. NNSA/NFO will continue to complete necessary biological assessments and obtain concurrence from USFWS on any identified impacts. The new, modified, and continuing projects and modifications in site operations through 2028 would not significantly affect biological resources and are consistent with the impacts analyzed in the 2013 SWEIS.

Flora. NNSA/NFO proposed activities at the NNSS would impact native vegetation directly by clearing areas or by crushing or breaking due to vehicular or pedestrian traffic. NNSA/NFO would avoid siting new facilities or activities in sensitive habitat to the extent reasonably possible. Disturbance of native vegetation either by direct removal or by mechanical damage from off-road vehicular or pedestrian traffic could promote the proliferation of nonnative invasive weeds such as cheatgrass. The best way to control cheatgrass in the long term is to establish a perennial vegetative community that will outcompete cheatgrass. For short term control, herbicides would be applied. Research studies would continue to evaluate the effectiveness of different herbicide and seeding treatments to control cheatgrass

Fauna. Most impacts on wildlife from NNSA/NFO activities would be temporary. Many of those temporary disturbances, such as off-road vehicular traffic, would occur in areas adjacent to previously disturbed areas that may possess marginal value as wildlife habitat. In addition to these direct effects, disturbance of vegetation, particularly in large blocks, could adversely impact wildlife populations through loss and fragmentation of cover, breeding, traveling, and foraging habitat. Noise associated with NNSA/NFO activities would impact wildlife in several ways, depending on the nature and location of the noise source and the particular species of wildlife. For some species, such as coyotes, human occupation of an area may increase foraging opportunities. Other species are less adaptable to human presence. Sudden loud noises such as explosives detonations could startle wildlife, resulting in impacts on certain species.

Threatened and Endangered Species. Projects occurring in desert tortoise habitat on the NNSS must comply with the terms and conditions of the Biological Opinion issued on August 27, 2019 which covers anticipated activities on the NNSS from 2019 through 2029. The new Biological Opinion states that the proposed NNSS activities are not likely to jeopardize the continued existence of the Mojave population. If the level of incidental take is reached and anticipated to be exceeded during the course of actions, such an incidental take would represent new information requiring consultation with USFWS and review of the reasonable and prudent measures in the Biological Opinion.

Other Species of Concern. Compared to most other special status animal species on the NNSS, the western burrowing owl *(Athene cunicularia hypugaea,)* requires greater management attention because it occupies the flat, open valley bottoms in each of the three ecoregions found on the NNSS; primarily Yucca Flat (Transition Ecoregion), Frenchman Flat and Jackass Flats (Mojave Desert Ecoregion), and near Buckboard Mesa (Great Basin Desert Ecoregion). Other sensitive and protected bird species would be primarily impacted by disturbance during the nesting season. If active nests of sensitive and otherwise protected bird species were located during pre-project biological surveys, NNSA/NFO would avoid impacting the nests until the young birds fledge. In compliance with the *Migratory Bird Treaty Act* (MBTA), if it were imperative to disturb an active nest of any bird species protected under the MBTA, NNSA/NFO would consult with USFWS prior to taking any action that would affect the nest or nesting birds.

3.1.8 Air Quality, Climate, and Noise

This section summarizes the 2013 SWEIS climate, air quality, and noise impacts (Section 3.1.8.1), discusses changes in these impacts since the 2013 SWEIS (Section 3.1.8.2), analyzes the potential changes in the air quality, climate, and noise that could result from the actions evaluated in this SA (Section 3.1.8.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.8.4).

3.1.8.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of climate, air quality, and noise impacts at NNSS in Sections 4.1.8 and 4.4.12.7 (affected environment) and Section 5.1.8 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

Climate and Greenhouse Gas (GHG) Emissions. NNSS covers an area of approximately 1,360 square miles of mountain and desert terrain. The site sits in the southwestern corner of the Great Basin Desert, with the southern third of NNSS located in the Mojave Desert. The NNSS site generally slopes downward from north to south (from about 7,700 to 2,700 feet). Significant climate differences within NNSS stem largely from these differences in elevation. Higher elevations generally experience cooler temperatures and more precipitation, while generally warmer temperatures and less precipitation occur in the desert basins. The 2013 SWEIS observed that the average annual temperature in the southwest U.S. has increased by 1.4 °F over the 1960 to 1978 baseline. Elevated temperatures result in increased rates of evaporation and plant transpiration, leading to an increase in atmospheric water vapor available for precipitation events. The impact on precipitation is dependent on atmospheric conditions, with some areas experiencing more precipitation events due to increased evaporation while others become more susceptible to droughts.

GHG emissions from activities at the NNSS are generated by various mobile and stationary source types. Per the 2013 SWEIS, these activities created about 65,632 carbon-dioxide-equivalent (CO_2e) metric tons of GHG emissions in 2008. Power generation (electrical energy generation) is by far the largest single source of GHG emissions related to these activities. The 2013 SWEIS estimated that future GHG emissions from activities at the NNSS would decrease relative to the 2008 baseline level. These reductions were expected due to the introduction of newer NNSA/NFO fleet and worker vehicles with improved fuel economy, and improved combustion and emissions treatment efficiencies of electric power generating sources on NNSS (NNSA 2013). In the ROD for the 2013 SWEIS, NNSA estimated that it would reduce GHG emissions by 28 percent by 2020.

Ambient Air Quality. The NNSS is within Nevada Intrastate Air Quality Region 147. Nye County contains all of the NNSS, but has insufficient available data to determine the attainment status. Thus, it is designated as unclassified/attainment because USEPA treats an unclassified area as if it is in attainment for regulatory purposes. The nearest nonattainment region to NNSS was Inyo County, California, situated approximately 65 miles from the western boundary of NNSS. Inyo County was deemed in serious nonattainment for PM_{10}.

Radiological Air Quality. The sources of radioactive air emissions on the NNSS include the following: (1) tritium (3H) in water (tritiated water) evaporated from containment ponds; (2) tritiated water vapor diffusing from soil at the Area 3 RWMS, the Area 5 RWMS, and historical surface or near-surface nuclear device test locations (particularly Sedan and Schooner craters); (3) resuspension of contaminated soil at historical surface or near-surface nuclear device test locations; and (4) radionuclides from current operations (NNSS 2022a). National Emission Standards for Hazardous Air Pollutants (NESHAPs) are established under Title I of the *Clean Air Act* (CAA) to limit ambient levels of hazardous air pollutants. The radionuclide inhalation NESHAP for Federal facilities is set at the emissions total (cumulative across all radionuclides) that would cause a member of the public to receive an effective dose equivalent of 10 millirem in a year. NNSS features 17 DOE/NNSA-established ambient-air sampling sites. Six of the 17 are considered “critical receptors.” These "critical receptors" monitoring locations demonstrate NESHAPs compliance for various radionuclides. Most of these 17 ambient monitors are placed at or near locations of historical nuclear testing or current radiological operations.

The 2013 SWEIS found that NNSS has complied with the NESHAPs since the 1996 NTS EIS publication. The highest annual average radiation levels detected at critical receptor locations were from tritium, with a measured concentration of 434 x 10^{-12} microcuries per milliliter, which amounts to only 29 percent of the NESHAPs concentration level. Radiological monitoring across the NNSS indicates that levels of americium-241, plutonium-238, -239, and -240, cesium-137, and tritium have all remained well below the NESHAPs concentration levels (NNSA 2013).

Noise. The acoustic environment surrounding NNSS is characteristic of uninhabited desert areas and small rural communities where natural phenomena, such as wind and rain, account for most of the background noise. Sources of manmade noise include vehicle travel along public highways and occasional aircraft noise from the Creech Air Force Base and Desert Rock Airstrip located near the southern border of NNSS. The closest sensitive receptors to the site boundary are residences located approximately 1 mile to the south, in Amargosa Valley. Except for the prohibition of nuisance noise, neither the State of Nevada nor local governments have established specific environmental noise standards.

Sources of noise on-site include equipment and machines, blasting and explosives experiments, aircraft operations, and vehicles. Due to NNSS's remote location, large size, access restrictions, and lack of a nearby population, the general public has little to no exposure to noise generated within NNSS. The location of most facilities towards the site's interior allows sound waves to dissipate by the time they reach the NNSS boundary. From off-site, noise from most sources within the NNSS is barely distinguishable above background noise levels.

Air Quality, Climate, and Noise – American Indian Perspectives

Culturally affiliated tribes know air can be destroyed causing pockets of dead air. There is only so much alive air that surrounds the world. Dead air lacks the spirituality and life necessary to support other life forms. Airplanes crash when they hit dead air. American Indian people know that ceremonies have helped manage the climate in the NNSS region. Unfortunately, tribes have not been able to perform these ceremonies on the lands of the NNSS since its time as a nuclear testing facility. Our traditional homelands continue to suffer without ceremonial intervention. To facilitate the healing and restoring the balance of the land, the tribes believe NNSA/NFO must make provisions for culturally affiliated tribes to access to the lands in order to perform these rituals.

3.1.8.2 Changes since the 2013 SWEIS (2013 through 2022)

Climate and GHG Emissions. The majority of NNSS GHG emissions are generated from purchased electricity, with fleet emissions next highest. In 2021, Scope 1 (direct) and Scope 2 (indirect) emissions were 30,551 metric tons of CO_2e. This represents a 53.5 percent decrease in GHG emissions from the 2008 baseline of 65,632 metric tons CO_2e (NNSS 2022a).

Ambient Air Quality. In general, emissions-generating activity within NNSS continued to be widely dispersed over the vast site. At the boundaries of NNSS, ambient concentrations of criteria pollutants remained below ambient air quality standards, with no impacts to Nye County's attainment designation for all criteria pollutants. In Clark County, site emissions have not caused or contributed to any new air quality violations or increase in the frequency of severity of any existing violation of any air quality standard.

Radiological Air Quality. There have been no changes in the sources of radioactive air emissions on the NNSS since the 2013 SWEIS. The annual NNSS Environmental Reports (NNSSER) for the last five years (2017-2021) show the results of radiological air sampling across all environmental locations at NNSS. Overall, the mean concentrations are within the range of values outlined in the SWEIS and comparable with past monitoring results, and well below the USEPA NESHAP limits (NNSS 2018a, NNSS 2019a, NNSS 2020a, NNSS 2021a, NNSS 2022a).

Noise. The acoustical environment at and surrounding NNSS has not changed in a measurable way since the 2013 SWEIS. The boundaries of the site remain unchanged, and the level of noise-producing activities is consistent with past actions. There has been no discernible increase or decrease in the amount of noise generated by the site, nor any other factors that affected the acoustical environment in the area.

3.1.8.3 Analysis of Projected Changes (2023 through 2028)

Climate. GHGs are components of the atmosphere that trap heat relatively near the surface of the earth, and, therefore, contribute to the greenhouse effect and climate change. Most GHGs occur naturally in the atmosphere; increases in their concentration result from human activities such as the burning of fossil fuels. Global temperatures are expected to continue to rise as human activities continue to add carbon dioxide, methane, nitrous oxide, and other GHGs to the atmosphere (USEPA 2023a).

As stated in Section 3.1.8.2, the majority of NNSS GHG emissions are generated from purchased electricity and fleet emissions. Approximately 20-megawatts of solar PV electricity generation and associated battery energy storage systems are planned during this five-year period. Every megawatt of solar PV electricity generation would reduce GHG emissions from conventional grid-supplied electricity generation by approximately 1,500 metric tons of CO_2e per year (NREL 2023). Consequently, 20-megawatts of solar PV electricity generation at NNSS would reduce CO_2e emissions by approximately 30,000 metric tons per year. NNSA also plans to convert their vehicle fleet to 50 percent zero-emissions by 2028, and procure 100 percent EVs by 2035. This is an ongoing mission and as petroleum vehicles are replaced, site emissions would decrease. A 50 percent reduction in the conventionally powered fleet would reduce GHG emissions by approximately 862 metric tons of $C0_2e$ by 2028. Reducing GHG emissions would have a positive impact on global warming/climate change, although this impact cannot be quantitated.

Ambient Air Quality. Land disturbance associated with construction and DD&D would generate particulate matter and fugitive dust. In addition, on- and off-road diesel equipment and vehicles, worker trips, and paving off-gasses would generate emissions. Exhaust emissions from these latter sources would result in releases of sulfur dioxide, nitrogen oxide, particulate matter, total suspended particulates, volatile organic compounds, and carbon monoxide. However, due to the distance from nearby population centers there would be no reduction in air quality to the surrounding communities. The periodic operation of portable generators in support of the NSPG would not have any notable impact on air quality. All new stationary sources of air emissions (e.g., boilers and generators) would be reviewed for compliance with all federal, state, and local permitting requirements. All required permits would be obtained prior to construction or operation. NNSA would continue to comply with all regulations and programs.

Radiological Air Quality. There would be no radiological emissions during construction activities. There is a potential for short-term radiological air emissions from DD&D actions. Prior to the initiation of DD&D activities, NNSA would prepare a detailed DD&D plan. The DD&D plan would contain a detailed description of the project-specific DD&D activities to be performed and would be sufficient to allow an independent reviewer to assess the appropriateness of the decommissioning activities; the potential impacts on the health and safety of workers, the public, and the environment; and the adequacy of the actions to protect health and safety and the environment.

During operations, there would be no changes in the sources of radioactive air emissions on the NNSS from the actions evaluated in this SA. Ongoing operations would continue to release radioactivity to the environment through stacks and from diffuse sources. Radiological emissions are not projected to change through 2028 over the 2013 SWEIS baseline. Potential radiological impacts to the public would be the same as described in the 2013 SWEIS and would be less than 10 millirem per year limit from airborne emissions of radionuclides, per DOE Order 458.1 (*see* Section 3.1.12 for details regarding the dose to the public from continued operations at NNSS). NNSS activities would continue to comply with NESHAP limits.

Noise. No substantial effects to the acoustical environment at and surrounding NNSS are expected through 2028. Ongoing construction and operations would produce noise levels similar to past activities. Table 3.1.8-1 shows the attenuation of construction noise over relatively short distances. As most actions during this period would be within the site's interior, construction noise levels would dissipate to less than the Day-Night Average Sound Level (DNL) 65 dBA beyond the site boundary. Projects occurring at or near the site's boundary would not result in offsite noise impacts because there are no residences or noise receptors within the vicinity of the project sites. There are no changes in site operations during this period that would result in discernable changes to the acoustical environment at NNSS.

Table 3.1.8-1. Peak Noise Levels Expected from Construction Equipment

Source	Noise level (dBA)					
	Peak	Distance from source (feet)				
		50	100	200	400	800
Heavy trucks	95	84–89	78–83	72–77	66–71	60-65
Dump trucks	108	88	82	76	70	64
Concrete mixer	105	85	79	73	67	61
Jackhammer	108	88	82	76	70	64
Scraper	93	80–89	74–82	68–77	60–71	54-65
Dozer	107	87–102	81–96	75–90	69–84	63-78
Generator	96	76	70	64	58	52
Crane	104	75–88	69–82	63–76	55–70	49-64
Loader	104	73–86	67–80	61–74	55–68	49-62
Grader	108	88–91	82–85	76–79	70–73	64-67
Dragline	105	85	79	73	67	61
Pile driver	105	95	89	83	77	71
Fork lift	100	95	89	83	77	71

Source: Golden et al. 1980.

3.1.8.4 Conclusion

Site operations are anticipated to be consistent with past levels. No notable changes are anticipated to climate, air quality, and noise during the five-year period ending in 2028 if the site continues to focus on climate, renewable and energy targets identified in current Executive Orders. Global climate change trends will continue to impact climate and weather patterns at NNSS as outlined in Section 3.1.8.1. Current NNSS modernizations efforts would result in replacing obsolete facilities with new HPSB certified facilities, and on-site renewable electrical installations replacing grid-supplied fossil fuel generated sources, and supplying EV charging stations for zero-emission vehicles (ZEVs) replacing their petroleum-based counterparts. This ongoing transition would allow NNSS to continue to grow and serve its mission while lowering its overall carbon footprint. Air quality and noise levels over this period are expected to be in-line with past performance with no adverse effects to the public.

3.1.9 Visual Resources

Visual resources are natural and man-made features that give a particular landscape (all the visible features of an area of land) or viewshed (view of an area from a particular vantage point) its character and aesthetic quality. NEPA requires that federal agencies consider visual impacts of proposed projects, including potential effects on historic properties, scenic resources, and the scenic experiences of people who view the landscape. The degree to which development affects the aesthetic quality of a landscape depends on the contrast created between the project elements and the existing landscape and the visibility of the developments to viewers both on- and offsite. Visual exposure and sensitivity is also considered with analyzing the visual effects of an action. The measure of the quality of a view must be tempered by the overall sensitivity of the viewer. Given NNSS's remote location and neighboring restricted areas that limit views from off site, no visually sensitive locations and viewpoints from visually sensitive locations were identified in the analysis of NNSS.

This section summarizes the 2013 SWEIS visual resources impacts (Section 3.1.9.1), discusses changes in visual resources impacts since the 2013 SWEIS (Section 3.1.9.2), analyzes the potential changes in the visual environment that could result from the actions evaluated in this SA (Section 3.1.9.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.9.4).

Visual Resources – American Indian Perspectives

The culturally affiliated tribes rely on visual resources, including important features on the land that are integrated into our religious and ceremonial rituals. Culturally sensitive activities incorporate songscapes or storyscapes that define our cultural landscape.

Central to the cultural experience is isolation and serenity within an uncompromised landscape. If construction and operation of the proposed or the continuation of activities proceed in a culturally-inappropriate manner, then visual resources on the NNSS will be adversely impacted, creating an unbalanced environment.

To restore balance to the environment and its visual resources, the tribes believe NNSA/NFO must provide access for culturally affiliated tribes to conduct religious and ceremonial activities to fulfill our traditional obligations. In this manner, we can restore and preserve our spiritual harmony as a whole.

3.1.9.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of visual resources at NNSS in Sections 4.1.9 (affected environment) and Section 5.1.9 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

The NNSS is typical of the Basin and Range Physiographic Province. Key visual features include the Mercury Valley gently sloping upward toward the hills, mesas, and mountains enclosing the valley. The course, angular terrain of these topographical features provides visual interest as the lighting changes throughout the day.

The 2013 SWEIS found that the only areas offering public vantage points to NNSS exist along the site's southern boundary from public roadways, mostly highways. While development in the areas of public purview is generally limited and small in scale, the use of light-colored building materials make them visible from a distance. Only NNSS Areas 22, 23, and 25 are visible to the public from U.S. Route 95 and the Amargosa Valley. Highways pass by the NNSS in areas that are largely undeveloped, and views of the sites are fleeting at standard highway speeds. All other public visual access to the interior of the NNSS is limited by terrain.

The 2013 SWEIS found that the visual effects from the construction of new facilities and infrastructure improvements in Areas 22, 23, and 25 would be short-term and common for the site. Further, once built, new facilities and infrastructure would blend with the existing built environment and retain the same visual character. Construction and operations of a 1,000-megawatt capacity solar power generation facility in Area 25 would have permanent adverse visual effects. The infrastructure would introduce a new man-made visual feature over approximately 10,000 acres of land visible from U.S. Route 95.

Under the 2013 SWEIS analysis, environmental restoration efforts and demolition of existing facilities outside of Areas 22, 23, and 25 would generally improve the overall visual quality and restore the landscape to a natural-looking appearance. However, the visual effects were not analyzed as these areas are outside of the public viewshed.

3.1.9.2 Changes since the 2013 SWEIS (2013 through 2022)

The visual environment at NNSS has not changed in an appreciable or measurable way since the publication of the 2013 SWEIS. The large solar facility slated for Operational Area 25 was not built during this period, thus the adverse visual effects outlined in the SWEIS were not realized by the public. While the overall modernization of NNSS facilities enhance the site's appearance, most of the beneficial visual effects are diminished due to the distance of the projects from public vantage points.

3.1.9.3 Analysis of Projected Changes (2023 through 2028)

NNSS is largely shielded from public view by NTTR and other restricted-access federal lands. The visual character of NNSS would remain largely unchanged during this five-year period. As facility development and infrastructure projects would be primarily driven by function, the appearance of these projects is expected to be consistent with the existing industrial and utilitarian facilities. While construction activities may cause short-term visual impacts, such as the presence of heavy equipment, buildings in various stages of construction, and increased dust, these actions are consistent with the existing character of the site.

The most notable visual alterations would be the replacement of the main gate and the solar installations. These actions may cause moderate visual effects solely due to their proximity to public viewpoints along the southern boundary of NNSS. However, since these actions either replace or represent an existing built element on NNSS, they would not introduce any unique visual features.

3.1.9.4 Conclusion

Views of NNSS from public vantage points are extremely limited due to distance, intervening topography, and generally hazy atmospheric conditions. Because most actions would be located in the interior of the site, construction-related activities would not be noticeable at or beyond the installation’s boundary. Site visitors and employees observing construction would find these activities similar to past development activities at NNSS. Site operations would continue along their established trajectory with no marked change to the aesthetic environment.

3.1.10 Cultural Resources

This section summarizes the 2013 SWEIS cultural resources impacts (Section 3.1.10.1), discusses changes in cultural resources since the 2013 SWEIS (Section 3.1.10.2), analyzes the potential changes in cultural resources that could result from the actions evaluated in this SA (Section 3.1.10.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.10.4).

3.1.10.1 2013 SWEIS Analysis

The 2013 SWEIS discusses the known prehistoric, ethnographic, and historic cultural resources within the boundaries of the NNSS. The area of influence for the NNSS was defined as all ground areas that would be disturbed by construction, maintenance, or operations of program facilities and

activities occurring on site. The 2013 SWEIS determined that cultural resources impacts could potentially occur as a result of activities that involve modification of buildings and ground disturbance in previously undisturbed locations. These impacts could occur through drilling; grading; excavation; fencing; training and exercises in remote areas; cleanup activities; construction of buildings, roads, firebreaks, and utilities; and building modification, decontamination, or demolition. Vehicular and pedestrian access to areas containing cultural resources could increase the potential for vandalism or unauthorized artifact collection to occur that could affect archaeological sites and archaeologically sensitive areas (NNSA 2013).

Recorded Cultural Resources. The 2013 SWEIS information on cultural resources on the NNSS resulted from numerous cultural resources studies completed over 30 years. At the time of the 2013 SWEIS over 600 cultural resources studies had been conducted on the NNSS and almost 2,000 cultural resources sites had been recorded (NNSA 2013).

While all areas of the NNSS have the potential to possess cultural resources, areas with the highest number of recorded cultural resources are Rainier and Pahute Mesas in the northwest (largely within the Fortymile Canyon-Buckboard Mesa Hydrographic Basin), followed by Jackass Flats in the southwest (within the Fortymile Canyon-Jackass Flats Hydrographic Basin) and Yucca Flat in the east (within the Yucca Flat Hydrographic Basin). The types of cultural resources found on the NNSS include prehistoric and historic sites, buildings, structures, objects, districts, features, and artifacts (NNSA 2013). Table 3.1.10-1 presents a summary of the cultural resources recorded at NNSS in the 2013 SWEIS.

Table 3.1.10-1. 2013 NNSS Cultural Resources Sites by Site type and Hydrographic Basin

	Prehistoric Site Types							Historic Site Types		Untyped Sites	Total Sites	NRHP-Eligible
Hydrographic Basin	**RB**	**TC**	**EL**	**PL**	**LO**	**CA**	**STA**	**HI**	**NT**	**UT**		
Mercury Valley	0	0	0	0	3	0	0	1	2	0	**6**	**2**
Rock Valley	0	1	1	1	15	0	0	0	1	0	**19**	**4**
Fortymile Canyon–Jackass Flats	1	36	17	62	243	7	1	8	8	9	**392**	**120**
Fortymile Canyon–Buckboard Mesa	0	111	7	109	211	6	1	3	0	54	**502**	**346**
Oasis Valley	0	14	1	20	90	0	0	1	0	2	**128**	**49**
Gold Flat	0	25	1	97	131	10	0	2	1	1	**268**	**169**
Kawich Valley	0	9	1	25	37	0	0	2	0	8	**82**	**58**
Emigrant Valley/Groom Lake Valley	0	0	0	0	5	0	0	0	0	0	**5**	**0**
Yucca Flat	4	68	10	37	132	57	1	44	25	17	**395**	**176**
Frenchman Flat	1	3	2	43	60	0	0	11	34	0	**154**	**58**
Total Sites	6	267	40	394	927	80	3	72	71	91	**1,951**	**982**

CA = cache; EL = extractive locality; HI = historic site; LO = locality; NRHP = National Register of Historic Places; NT = nuclear testing; PL = processing locality; RB = residential base; STA = station; TC = temporary camp; UT = untyped.
Note: This table does not include isolated artifacts or features. This table does include sites recorded within environmental restoration sites in the Nevada Test and Training Range adjacent to the NNSS.
Source: NNSA 2013.

In the 2013 SWEIS analysis on cultural resources were assessed based on the estimated number of sites that may be affected by land-disturbing activities associated with ongoing and proposed projects at the NNSS. Estimates were based on the site densities of known cultural resources in each hydrographic basin; density values were extrapolated to estimate the number of sites that may exist in each hydrographic basin where program facilities and activities may be located.

Under the No Action Alternative, 4,460 acres of land would be disturbed, with impacts on an estimated 1,855 cultural resources sites, 575 of which would be eligible for inclusion in the National Register of Historic Places (NRHP). Under the Expanded Operations Alternative, DOE/NNSA activities at the NNSS and environmental restoration sites on the NTTR would disturb up to 25,877 acres of previously undisturbed land, including about 10,300 acres for one or more commercial solar power generation facilities and associated transmission lines. This would affect an estimated 7,688 cultural resources sites, 2,447 of which would be eligible for inclusion in the NRHP. Under this alternative, DOE/NNSA activities alone would potentially affect 682 cultural resources sites, 283 of which would be eligible for inclusion in the NRHP. Under the Reduced Operations Alternative, 2,170 acres of previously undisturbed land would be disturbed, including about 1,200 acres of disturbance for construction of a commercial solar power generation facility. The total estimated number of cultural resources sites potentially affected is 861, 266 of which are eligible for inclusion in the NRHP (NNSA 2013).

Sites of American Indian Significance. In compliance with Federal laws and DOE policy, the NNSA/NFO conducts an ongoing American Indian consultation program to address American Indian concerns about archaeological sites, plant and animal resources, traditional cultural properties, and sacred sites on the NNSS that hold great cultural value. This program has been in place since 1987 and recognizes the government-to-government relationship between the NNSA/NFO and American Indians. At the time of the 2013 SWEIS, NNSA/NFO consulted with representatives of 16 tribal groups and one American Indian organization representing three ethnic groups (Western Shoshone, Southern Paiute, and Owens Valley Paiute and Shoshone) who have cultural and historic ties to the NNSS area. These American Indian groups were collectively described in the 2013 SWEIS as the Consolidated Group of Tribes and Organizations (CGTO)[11]. Ongoing consultation with the tribes, consisting of meetings, interviews, and site visits, has resulted in several studies that identify sites and locations throughout the NNSS that possess cultural significance for contemporary American Indians. These sites and locations consist of numerous ethnoarchaeological, ethnobotanical, and ethnozoological sites; rock writings (petroglyphs/pictographs) sites; and sites of spiritual significance (NNSA 2013).

American Indian Cultural Resources. As a part of consultation efforts conducted for the 2013 SWEIS, the American Indian Writers Subgroup documented perspectives on cultural resources on the NNSS, in relation to the proposed activities in the 2013 SWEIS. The tribes confirmed that American Indians used traditional sites in the NNSS area to make tools, tone artifacts, and ceremonial objects; many sites are also associated with traditional healing ceremonies and power places (NNSA 2013).

[11] The NNSA/NFO no longer refers to the tribes affiliated with the NNSS as the CGTO. Tribal consultation is conducted on a government-to-government basis between NNSA/NFO and each individual tribe

Cultural Resources – American Indian Perspectives

Many tribal views that were presented in Appendix C of the 2013 SWEIS remain valid and are identified or implied by the AIWS tribal perspectives provided in the 2023 SA. Following the ROD and up to 2023, NNSA/NFO interacted with the TPC in quarterly meetings and semi-annual field visits. Annual Tribal Update Meetings have been sustained using ongoing project updates and opportunities for robust discussions. Since the 2013 SWEIS, tribal representatives have expressed the importance of expanding funding to support increased tribal involvement and integrating collaborative co-management activities to further enhance NNSA/NFO land management responsibilities. The tribes have identified the need to increase tribal monitoring during archaeological surveys and have requested informational briefings on a variety of NNSS, TTR and RSL-Nellis activities during regularly scheduled meetings.

Culturally affiliated tribes continue to express the importance of including tribal monitors in archaeological surveys and visiting the land to broaden the cultural interpretation of recorded sites that were identified in nearly 2,000 cultural resources sites referenced in the 2013 SWEIS.

Many culturally affiliated tribes have designated Tribal Historic Preservation Officers (THPO) that serve in a similar capacity as a SHPO. Tribes may elect to participate and assist in preservation efforts of tribal historic properties and cultural traditions in accordance with established regulations. However, most THPOs do not have dedicated or adequate funding to interact regularly with NNSA/NFO, although NNSA/NFO makes efforts to share similar Section 106 updates tied to NNSS activities with THPOs and Tribal governments.

3.1.10.2 Changes since the 2013 SWEIS Analysis (2013 through 2022)

Cultural resources inventories conducted from 2013 through 2021 are summarized in Table 3.1.10-2. These inventories were generally completed for compliance with either Section 106 of the *National Historic Preservation Act* (NHPA) or Section 110 of the NHPA.

Table 3.1.10-2. Cultural Resources Activity 2013-2021

Year	Activity
2021	• Cultural resources inventories and architectural surveys for six projects in nine areas. • 139 cultural resources were identified and recorded. Of these resources, 84 resources were determined eligible for the NRHP. • A total of 723.8 acres were inventoried.
2020	• Cultural resources inventories and architectural surveys for nine projects in seven areas. • 27 cultural resources were identified and recorded. Of these resources, 25 resources were determined eligible for the NRHP. • A total of 266.5 acres were inventoried.
2019	• Cultural resources inventories and architectural surveys for 15 projects in seven areas. • 120 cultural resources were identified and recorded. Of these resources, 55 were determined eligible for the NRHP. • A total of 1,408.78 acres were inventoried. • NNSA/NFO determined that the Mercury Modernization undertaking will have adverse effects on historic properties eligible for the NRHP and executed a programmatic agreement (PA) with the State Historic Preservation Office (SHPO) that specifies the approach NNSA/NFO will

Year	Activity
	take to streamline the NHPA Section 106 compliance process for modernization activities in Mercury.
2018	• Cultural resources inventories and architectural surveys for eight projects in 18 areas. • 46 cultural resources were identified and recorded. Of these resources, 16 were recommended as eligible to the NRHP. • A total of 986.04 acres were inventoried.
2017	• Cultural resources inventories and historical evaluations for 18 projects in 14 areas. • 118 cultural resources identified and recorded, and, of these, 103 were recommended eligible to the NRHP. • A total of 252.7 acres was inventoried.
2016	• Cultural resources inventories and historical evaluations for 13 projects in 9 areas. • 66 cultural resources identified and recorded, and, of these, 20 were determined eligible to the NRHP. • A total of 900 acres were inventoried.
2015	• Archival research was conducted for 29 proposed projects. This led to 11 field inventories, which resulted in the identification of 10 sites and 20 historic structures and buildings. • A total of 785 acres were examined during the inventories. • There were no reported occurrences of damage to archaeological sites.
2014	• Archival research was conducted for 39 proposed projects. This led to nine field inventories. The inventories resulted in the identification of 18 historic sites and one multicomponent site. • A total of 556 acres were examined during the inventories. • A wooden structure associated with nuclear testing was assessed for damage.
2013	• Archival research was conducted for 40 proposed projects. This led to six field inventories and two historical evaluations. One historic site was identified during the report phase and ten historic sites and three Historic Districts were identified during the field work phase. • A total of 1,061.4 acres were examined during the inventories. • No damage to archaeological sites was reported.

Source: NNSS 2014a, NNSS 2015a, NNSS 2016a, NNSS 2018a, NNSS 2019a, NNSS 2020a, NNSS 2021a, NNSS 2022a.

Programmatic Agreement for the Modernization of the Town of Mercury (Mercury PA). In 2018, NNSA/NFO determined that the Mercury Modernization undertaking would have adverse effects on historic properties eligible for the NRHP and executed a Mercury PA with the SHPO. The Mercury PA has a term of 20 years and affects NNSA/NFO's NHPA compliance procedures for projects in the Mercury Historic District (MHD). NNSA/NFO determined that the MHD is eligible for listing in the NRHP in consultation with the SHPO as part of the implementation of the Mercury PA. In addition to requiring the historic district evaluation, the Mercury PA specifies the streamlined approach that NNSA/NFO will take to complete the NHPA Section 106 compliance process for modernization activities in Mercury. It stipulates the level of mitigation required for proposed activities and how to determine when mitigation efforts are sufficient for future activities (NNSS 2022a). NNSA/NFO has utilized the Mercury PA to complete NHPA

Section 106 compliance and associated SHPO consultation for approximately 12 undertakings from 2018 through 2022.

Other Agreement Documents. Between 2013 and 2022, NNSA/NFO consulted with the SHPO on approximately 50 undertakings on the NNSS for compliance with NHPA Section 106 of the NHPA. Of these, eight resulted in Memoranda of Agreement (MOAs) between NNSA/NFO and the SHPO to resolve adverse effects to historic properties. Implementing the MOAs resulted in the identification of three historic districts on the NNSS: Area 12 Camp, Area 6 Control Point, and Area 1 Subdock. It also resulted in the publication of approximately 28 reports and report series to https://www.osti.gov/, making information about historic properties on the NNSS available to the public.

American Indian Consultation Program (AICP). The NNSA/NFO AICP was developed in 1991 and involves sixteen Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone tribes with cultural and historic ties to the NNSS. A Tribal Update Meeting (TUM) is held annually to bring together culturally affiliated tribes and managers from NNSA/NFO and EM NV to discuss NNSS activities. The meeting supports government-to-government interactions and provides an opportunity for NNSA/NFO to share program updates while responding to questions presented by attendees (NNSS 2022a). In even-numbered years, the TUM includes a field visit to NNSS to tour cultural resource sites. The sites are selected in consultation with the tribes.

Another element of the AICP is the Tribal Planning Committee (TPC), which was established in 2017. The TPC consists of two tribal representatives from each of the three ethnic groups affiliated with the NNSS (Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone). The six members of the TPC are selected by the tribes. The TPC meets with NNSA/NFO quarterly and participates in two field visits a year at NNSS locations of interest to the tribes. The TPC site visits afford tribal members more frequent and varied access to cultural sites on the NNSS where they can examine site integrity, evaluate resources, and share their tribal perspectives. These site visits, and the quarterly meetings, are an efficient way for the tribes and NNSA/NFO to engage and share information between the annual meetings and biennial site visits.

3.1.10.3 Analysis of the Projected Changes (2023 through 2028)

Within the next five years, NNSA estimates that construction of new and replacement utilities and facilities would disturb approximately 150 acres of previously undisturbed land (30 acres annually). DD&D of aging facilities would restore approximately 5 acres (1 acre per year). Net, new land disturbance from facility development and utility upgrades would be approximately 145 acres, or 29 acres annually. One-hundred and forty-five (145) acres of new net land disturbance represents a negligible amount (0.017 percent) of NNSS's total land area. In addition to these new land disturbances, the NSPG is expected to remove vegetation from approximately 600 acres of land (approximately 0.07 percent of NNSS's total land area) at three different remote locations (Areas 7, 18, 20) and maintain the areas free of vegetation for off-road use. Development of solar power generation infrastructure in Areas 2, 3, 5, 6 and 23 would disturb approximately 200 acres, or 0.02 percent, of NNSS's total land area. Any land disturbances would have the potential to impact cultural resources.

NNSA/NFO is subject to, and complies with, existing laws, regulations, and policies regarding protection of prehistoric and historic sites, buildings, and structures and has established practices to minimize or avoid potential adverse effects on cultural resources. The CRMP was established to protect the cultural resources at the NNSS and ensure NNSA/NFO compliance with all applicable requirements. The CRMP contains the following major components: (1) NNSS project reviews for cultural resource compliance; (2) archival research, field inventories, built-environment surveys, and evaluations of NRHP eligibility; (3) the curation of artifact collections and program records; and (4) the AICP. Guidance for CRMP work is provided in the NNSS Cultural Resources Management Plan (NNSS 2022a).

If a project causes an adverse effect to cultural resources, the NNSA/NFO will continue to consult with the SHPO, Tribes, and other stakeholders to develop and evaluate alternatives or modifications to the undertaking that could avoid, minimize, or mitigate the adverse effect on the historic property. Once the NNSA/NFO and the SHPO agree on how the adverse effect will be resolved, a MOA is executed. When NNSA/NFO implements the MOA in accordance with its stipulations, then the adverse effect of the federal agency's undertaking on the historic property is resolved, and the agency's NHPA Section 106 responsibilities have been satisfied.

NNSA/NFO and the SHPO are currently negotiating a site-wide NNSS Programmatic Agreement (NNSS PA) under the NHPA. This PA will streamline the Section 106 consultation process similar to the Mercury PA, but will apply to all areas on the NNSS not governed by the Mercury PA. Full execution of the NNSS PA is anticipated by the end of 2023.

3.1.10.4 Conclusion

Cultural resources impacts would potentially occur as a result of activities that involve modification of buildings and ground disturbance in previously undisturbed locations. These impacts would occur through drilling; grading; excavation; fencing; training and exercises in remote areas; cleanup activities; construction of buildings, roads, firebreaks, and utilities; and building modification, decontamination, or demolition. Vehicular and pedestrian access to areas containing cultural resources would increase the potential for vandalism or unauthorized artifact collection to occur that could affect archaeological sites and archaeologically sensitive areas.

Built environment resources designated for modification, decommissioning, or demolition will be evaluated as potential historic properties, and adverse effects to historic properties will be mitigated. For archaeological resources, cultural resource inventories will be completed prior to ground-disturbing activities in previously unsurveyed areas and impacts on sites eligible for listing in the NRHP will be avoided or mitigated. All evaluations, effects analyses, and mitigation will be completed in consultation with the SHPO per Section 106, Section 110, the Mercury PA, or the NNSS PA, as applicable. The new, modified and continuing project and modifications are consistent with the impacts analyzed in the 2013 SWEIS. Impacts to cultural resources will remain within the 2013 SWEIS projections.

3.1.11 Waste Management

Radioactive and nonradioactive wastes are generated and managed at the NNSS as part of ongoing operations; DD&D of unneeded structures and facilities; and environmental restoration activities,

including remediation of soil sites and industrial facilities. Radioactive wastes generated and/or managed at the NNSS include LLW and MLLW, and TRU waste. In addition, the NNSS accepts classified waste (with or without hazardous constituents). The Waste Management Program also manages nonradioactive hazardous waste regulated under the RCRA (42 U.S.C. 6901 et seq.); wastes containing asbestos or polychlorinated biphenyls (PCBs) regulated under the *Toxic Substances Control Act* (TSCA) (15 U.S.C. 2601 et seq.); explosive wastes; and nonhazardous wastes, including sanitary solid waste, construction and demolition debris, and hydrocarbon-contaminated soil and debris.

This section summarizes the 2013 SWEIS waste management impacts (Section 3.1.11.1), discusses changes in waste management impacts since the 2013 SWEIS (Section 3.1.11.2), analyzes the potential changes in waste management that could result from the actions evaluated in this SA (Section 3.1.11.3), and presents a conclusion regarding the potential future waste management changes compared to the 2013 SWEIS analysis (Section 3.1.11.4).

Waste Management – American Indian Perspectives

Culturally affiliated tribes strongly oppose the transportation, storage, and disposal of LLW and MLLW at the NNSS. The tribes are concerned that transporting radioactive waste and materials throughout our homelands can adversely impact the health and safety of tribal resources and communities. Tribal lands within the tribal region of influence may be located in remote areas, often with substandard roads. Should an emergency situation related to NNSS shipments occur, it could result in closure of roads or limit access to tribal communities and resources.

American Indian people have used the area and resources within present day NNSS and TTR administrative boundaries since the beginning of time. The tribes know how to sustain cultural and ecological balance of the land and its resources using traditional ecological knowledge that is central to cultural and religious ceremonies.

In 2017, EMNV experienced challenges with developing a vegetative cover at the CAU 111 92-acre site at the RWMC in Area 5 of the NNSS. Upon the recommendation of the Nevada Site Specific Advisory Board (NSSAB), EMNV supported a 3-year Tribal Revegetation Project (2017 to 2020) at CAU 111. The project blended with cultural and scientific methods for restoring the vegetative cover. During the project, the Tribal Revegetation Committee (TRC) involved tribal spiritual leaders, and plant experts to identify planting techniques in thirty 10 x 10-meter and eight 10 x 100-meter test plots to find potential solutions.

At the conclusion of the project, the TRC identified alternative planting seasons and other treatments that could be replicated from elements of TEK. The project yielded positive results with a 70% success rate for selecting suitable soil amendments, identifying compatible plants, using alternate planting seasons, and integrating appropriate cultural methods for developing a vegetative cover.

Culturally affiliated tribes strongly encourage EMNV and NNSA/NFO support similar TRC initiatives for the RWMC, NNSS and off-site locations to restore the ecological balance of the lands and resources within our homelands.

3.1.11.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of the waste management practices at NNSS in Section 4.1.11 (affected environment) and Section 5.1.11 (environmental consequences). Relevant information from the 2013 SWEIS is summarized below.

Waste management impacts were assessed by comparing the projected waste volumes generated or disposed under each SWEIS alternative to current waste management practices and the availability of onsite or offsite waste management capacity. Adverse impacts on waste management would occur if any of the different types of wastes lacked appropriate management capacity. Tables 3.1.11-1 and 3.1.11-2, respectively, summarize the projected types and volumes of radioactive and nonradioactive wastes generated and disposed at the NNSS under the three SWEIS alternatives, projected as 10-year volumes.

Table 3.1.11-1. Projected 10-Year Volumes of Radioactive Wastes Generated and Disposed at the NNSS

Waste Stream	Alternatives		
	No Action (cubic feet)	Expanded Operations (cubic feet)	Reduced Operations (cubic feet)
Waste Volumes Generated at the NNSS			
Low-level radioactive waste	1,000,000	1,300,000	1,000,000
Mixed low-level radioactive waste	520,000	520,000	520,000
Transuranic waste	9,600	19,000	7,100
Waste Volumes Disposed at the NNSS			
Low-level radioactive waste	15,000,000	48,000,000	15,000,000
Mixed low-level radioactive waste	900,000	4,000,000	900,000

Table 3.1.11-2. Projected 10-Year Volumes of Nonradioactive Wastes Generated and Disposed at the NNSS

Waste Stream	Alternatives		
	No Action (cubic feet)	Expanded Operations (cubic feet)	Reduced Operations (cubic feet)
Waste Volumes Generated at the NNSS			
Total hazardous waste	210,000	340,000	190,000
Total solid waste	3,800,000	10,000,000	3,700,000
Waste Volumes Disposed at the NNSS			
Total solid waste	3,500,000	9,200,000	3,400,000

The 2013 SWEIS concluded that sufficient disposal capacity was available for waste generated under the three SWEIS alternatives. The analysis for the Expanded Operations Alternative, projected to generate the largest quantities of waste, is summarized below.

LLW and MLLW. The 2013 SWEIS projected that adequate disposal capacity was available at the NNSS for the volumes of LLW and MLLW under the Expanded Operations Alternative (52 million cubic feet), provided the Area 3 RWMS is reopened for in-state-generated waste. Additionally, adequate disposal capacity exists if the Area 5 RWMC is expanded or operational disposal practices at the Area 5 RWMC were modified to allow more-efficient use of available disposal space (e.g., construction of larger and/or deeper disposal units).

Transuranic Waste. The 2013 SWEIS projected volume of TRU waste under the Expanded Operations (19,000 cubic feet) would account for only about 0.3 percent of the 6.3 million cubic feet of waste authorized for disposal at the WIPP under the *WIPP Land Withdrawal Act*. The WIPP disposal capacity would be sufficient for disposal of all TRU waste generated under this alternative.

Hazardous waste. The 2013 SWEIS projected approximately 170,000 cubic feet of hazardous waste would be generated by NNSS generators. Additionally, about 170,000 cubic feet could be generated from construction and operation of one or more commercial solar power generation facilities. Most of this waste would be dispositioned by offsite recycling or reuse rather than offsite disposal. Because numerous permitted hazardous waste-recycle or treatment, storage, and disposal (TSD) facilities are in operation in Nevada or neighboring states, adequate offsite waste management capacity was expected for the hazardous waste projected under this alternative.

Nonhazardous waste. About 8.5 million cubic feet of sanitary solid waste and construction and demolition debris was projected for disposal from all DOE/NNSA Nevada generators over the next 10 years. The projected volume of solid waste would not exceed the available disposal capacity at the NNSS. Adequate waste disposal capacity would also be available if solid waste from one or more commercial solar power generation facilities was disposed at permitted NNSS landfills.

3.1.11.2 Changes since the 2013 SWEIS (2013 through 2021)

While annual waste generation quantities have fluctuated since the 2013 SWEIS was finalized, overall waste generation in 2013-2021 has remained below the 2013 SWEIS projections. Projected and Actual Waste Generation quantities are compared in Table 3.1.11-3.

Table 3.1.11-3. 2013 SWEIS Projected and Actual Waste Generation and Disposal (2013-2021) at NNSS (volume in cubic feet)

Waste Stream	2013 SWEIS [a] (10-year projection)	2013 actual	2014 actual	2015 actual	2016 actual	2017 actual	2018 actual	2019 actual	2020 actual	2021 actual	Total actual 2013-2021
Low-level radioactive waste [b]	48,000,000	1,025,379	1,183,966	1,238,210	895,695	1,035,845	844,344	717,807	327,964	559,657	7,828,867
Mixed low-level radioactive waste [b]	4,000,000	99,144	88,934	95,975	61,800	108,961	131,294	101,676	54,244	90,415	832,443
Total hazardous waste [c,e]	340,000	310	1,460	642	55	328	401	121	198	67	3,582
Total solid waste [d,e]	9,200,000	121,692	98,642	83,842	136,744	68,640	248,358	1,013,180	543,500	181,150	2,495,748

a. Projected 10-Year Volumes of Radioactive Wastes Generated and Disposed at the Nevada National Security Site for the Expanded Operations Alternative
b. LLW and MLLW received and disposed at the Area 5 RWMC; LLW received and disposed at the Area 3 RWMS in 2018 and 2019. LLW and MLLW volumes include classified waste.
c. Volume of HW shipped offsite to an approved disposal facility. HW is not disposed of at NNSS.
d. Solid waste disposed at Area 6 Hydrocarbon Landfill, Area 9 U10c Solid Waste Landfill, and Area 23 Solid Waste Landfill
e. Actual quantities of hazardous waste and solid waste are reported in tons (NNSS Site Environmental Reports); weight converted using an estimate of 68.13 cubic feet/ton.

Source: NNSS 2014a, NNSS 2015a, NNSS 2016a, NNSS 2017a, NNSS 2018a, NNSS 2019a, NNSS 2020a, NNSS 2021a, and NNSS 2022a.

Several waste management updates have occurred since the 2013 SWEIS as described below.

On October 26, 2017, NDEP issued a Finding of Alleged Violation (FOAV) and Order to NNSA/NFO for potential violation of RCRA and State of Nevada regulations on 93 containers of low-level waste which were determined to be mixed waste (due to the presence of chromium) which had been received from Nuclear Fuel Services (NFS) in Tennessee for disposal at the Area 5 RWMC from 2009 to 2015. The FOAV required NNSA/NFO to address the allegations in a show-cause meeting followed by a formal written response and submission of a Corrective Action Plan to prevent recurrence. The containers were disposed in LLW Cells 12, 15, 17, 20, and 21, but should have been disposed in a separate mixed-waste disposal cell, which has a double geo-synthetic liner to further isolate waste. The 93 containers are not readily retrievable. Following identification of this issue in June 2016, NNSA/NFO suspended all NFS waste shipments and examined options to address these 93 containers. Based on environmental, safety and security requirements, the approach was to leave the 93 containers in place. The FOAV identifies potential noncompliance with RCRA section 40 CFR 264.13(a)(1) which requires a waste disposal facility operator to obtain sufficient chemical or physical analysis from an offsite waste generator to ensure it matches the identity of the waste being received. A formal written response was submitted to the State of Nevada in January 2018, and a draft Corrective Action Plan that addresses actions to prevent recurrence was submitted in March. A Settlement Agreement was signed by NDEP on May 8, 2019 (NNSS 2018a, NNSS 2019a). The actions identified in the Settlement Agreement will be completed, and the Settlement Agreement will be formally closed.

On July 3, 2019, the DOE EM Nevada Program and NNSA/NFO notified NDEP that a classified waste stream had been transported from the Y-12 National Security Complex (Y-12) in Oak Ridge, Tennessee, and disposed at the Area 5 RWMC. Subsequent communications determined that between January 2013 to December 2018, there were 10 shipments of NNSS Waste Acceptance Criteria non-compliant shipments involving 33 waste containers that had been shipped from Y-12 to the NNSS and had been disposed at the Area 5 RWMC. On June 15, 2020, NDEP issued to NNSA/NFO an FOAV and Order citing the 33 waste containers received from Y-12. Additionally, on April 13, 2020, the NNSA/NFO received a Notice of Violation and report from USEPA Region 9 that provided the results of a RCRA Compliance Evaluation Inspection (CEI) conducted in August 2019. The report detailed three items as areas of potential violations and one item as an area of concern. The potential violations addressed in the CEI were 1) lack of confirmatory data regarding the status of the waste associated with an LLW profile, 2) adequacy of groundwater monitoring data in past submittals of groundwater reports, and 3) the hazardous waste compliance status of the Y-12 waste containers. The area of concern addressed in the CEI was the location of groundwater monitoring wells and the constituents tested in the groundwater monitoring program. Following a series of collaborative conversations, the DOE and the State of Nevada reached a mutually beneficial resolution to all regulatory actions resulting from the July 2019 waste issue (NNSS 2021a). All NDEP and USEPA concerns were addressed in a Settlement Agreement which was finalized and signed on June 22, 2021. As part of the Settlement Agreement, a minimum of 24 sessions of Real-Time Radiography (RTR) was performed on selected shipments for fiscal years 2022 and 2023. At present, most of the commitments from the Settlement Agreement have been completed and it is anticipated the remaining items will be completed in 2024.

On June 24, 2015, a release of a D001 oxidizer waste into the air occurred at the 90-day accumulation area at the Nonproliferation Test and Evaluation Complex on the NNSS. This release was reported to NDEP on June 25, 2015. Further investigation into this release resulted in a FOAV issued by NDEP on August 27, 2015. The FOAV relates to alleged failure of DOE/NNSA/NFO to comply with applicable State and Federal hazardous waste management statutes and regulations. A final settlement was reached in March 2016 with a cash payment of $20,000 and a requirement for DOE/NNSA/NFO to implement a Supplemental Environmental Project.

Area 5 Radioactive Waste Management Complex. The Area 5 RWMC is a DOE-owned radioactive waste disposal facility that accepts radioactive waste received from NNSS projects as well as offsite waste generator facilities. Waste verification is conducted at the Area 5 RWMC. Waste verification is an inspection process that confirms the waste stream data supplied by approved waste generators before MLLW or non-radioactive classified hazardous waste is accepted for disposal at the NNSS. Verification may involve visual inspection, RTR, and/or chemical screening on a designated percentage of MLLW or non-radioactive classified hazardous matter. The operational units of the Area 5 RWMC include a RTR Building and active, inactive, and closed LLW and MLLW cells.

Ten cells have been receiving wastes since 2013. They include LLW cells (Cells 14, 15, 19, 20, 21, 22, 23, 24, 27, and 28) and two MLLW cells (Cells 18 and 25). All active Area 5 RWMC cells can accept radioactive waste contaminated with non-regulated polychlorinated biphenyl (PCB) bulk product waste, but only Cell 25 can accept waste contaminated with regulated PCB remediation waste and asbestos-contaminated MLLW. Additionally, Cells 19, 22, 27, and 28 can accept regulated asbestos low-level waste (ALLW) and are permitted under Permit SW 532. In addition, U.S. Department of Agriculture (USDA) Compliance Agreement (NV-101-NNSS-21) authorizes NNSS to receive untreated regulated domestic soil for decontamination by landfill disposal via deep burial in cells at the Area 5 RWMC. That USDA Compliance Agreement includes transportation and handling requirements to safeguard against the potential spread of invasive species, such as fire ants. DOE/NNSA would comply with that agreement.

Cell 18 waste accumulation began on January 26, 2011, and the final waste packages were disposed on August 29, 2019. Closure activities for Cell 18 were completed in 2020 and the NDEP concurred on beginning post-closure monitoring in the fall of 2021. Cells 12, 15, 17, 20, and 21 (all now closed) are part of Chromium Containing Waste Disposal Cells (CAU 577). CAU 577 was established in the FFACO under a Settlement Agreement with NDEP dated May 8, 2019. The Closure Report for CAU 577 addressed Cells 12, 15, and 17 and was approved by NDEP in 2021. Corrective actions for Cell 20 was addressed in an addendum to the Closure Report and approved by NDEP in 2022. Cell 21 corrective actions will be addressed in a second addendum. All corrective actions for Cells 12, 15, 17, and 20 have been completed while Cell 21 closure is ongoing. Corrective actions included construction of RCRA-compliant closure covers over the waste disposal cells and revegetation of the closure covers. Since 2013, the operational footprint of the Area 5 RWMC has expanded and operational disposal practices have been adjusted to make more efficient use of space. The Area 5 RWMC disposal services are expected to continue until the remaining needs of the DOE complex are met, and capacity issues are not expected. In 2021, the Area 5 RWMC received 650,072 cubic feet of radioactive waste for disposal, the majority of which was received from offsite generators (NNSS 2022a).

The TRU Pad Cover Building (TPCB) within the Area 5 RWMC stores TRU/mixed TRU waste until it is characterized for disposal at WIPP. In 2021, the TRU waste remaining in storage at the TPCB consisted of two experimental spheres (containing a total of approximately 192 cubic feet of TRU waste) from LLNL and 39 standard waste boxes (containing a total of approximately 2,457 cubic feet of TRU waste) from the JASPER facility (NNSS 2022a). The total volume of TRU waste currently in storage at the TPCB is approximately 2,649 cubic feet, which is well below the 19,000 cubic feet of TRU waste that was projected under the Expanded Operations in the 2013 SWEIS.[12]

Area 3 Radioactive Waste Management Site. Disposal operations at the Area 3 RWMS began in the late 1960s. Until 2006, the site was used for disposal of bulk LLW, such as soils or debris, and waste in large cargo containers. In 2018 and 2019, the Area 3 RWMS was re-opened for disposal of bulk LLW in the U-3ah/at cell, which was generated by environmental corrective actions conducted at the Clean Slate III site on the Tonopah Test Range, located just north of the NNSS. The final shipment of waste from this campaign was disposed at the Area 3 RWMS on August 28, 2019. Currently, only DOE waste generated within the State of Nevada may be disposed at the Area 3 RWMS (NNSS 2022a).

Solid Waste Landfills. From 2013 thru 2022, operations continued at three landfills for solid waste disposal at the NNSS. The landfills are regulated and permitted by NDEP-BFF. The SW 532 Permit allows for asbestos waste disposal and is permitted by NDEP-BFF. No liquids, HW, or radioactive waste are accepted in these landfills (NNSS 2022a). These are:

- Area 6 Solid Waste Disposal Site – accepts hydrocarbon-contaminated wastes, such as soil and absorbents, permitted under Solid Waste Permit 13 097 02.
- Area 9 U10c Solid Waste Disposal Site – designated for industrial waste such as construction and demolition debris and asbestos waste under certain circumstances, permitted under Solid Waste Permit 13 097 03. Disposal of regulated asbestos-containing material is permitted under Solid Waste Permit 532.
- Area 23 Solid Waste Disposal Site – accepts municipal-type wastes such as food waste and office waste. Regulated asbestos-containing material is also permitted in a special section. The permit allows disposal of no more than an average of 20 tons/day at this site, permitted under Solid Waste Permit 13 097 04. Disposal of regulated asbestos-containing material is permitted under Solid Waste Permit 532.

NDEP visually inspects the landfills annually for compliance. In 2018, the vadose zone monitoring (VZM) schedule for the Area 6 hydrocarbon landfill and the Area 9 U10c solid waste landfill was amended by NDEP from annual to biennial events. Results from VZM indicate that no soil moisture migration and, therefore, no waste leachate migration to the water table has occurred.

[12] The total volume of TRU waste in storage at the TPCB has fluctuated from a low of approximately 2,500 cubic feet in 2013 to a current high of approximately 3,640 cubic feet (MSTS 2023b).

3.1.11.3 Analysis of Projected Changes (2023 through 2028)

None of the actions evaluated in this SA would notably change the facilities, operations, or activities at NNSS. The same types of operations are expected to occur in the same or similar facilities analyzed in the 2013 SWEIS. Accordingly, potential impacts on waste management would be similar to those analyzed in the 2013 SWEIS.

Actions and operations (Table 2-2) considered for the waste management analysis include:

- Installation of new gloveboxes in a building at the DAF to provide for an expansion of special nuclear material process capability to meet mission needs, which would increase TRU waste generation.
- A new RCRA-permitted disposal cell to be constructed at the RWMC in Area 5. This would be the third such cell built and would be designed to hold over 1.5 million cubic feet of MLLW.
- Installation and operation of portal radiography unit (real-time radiography) at Area 5 RWMC in 2023-2024, would be for radiography operations (screening) for incoming waste trucks/packages.
- LLW and MLLW disposal volumes at the NNSS from continued operations are projected to average about 750,000 cubic feet (LLW) and 90,000 cubic feet (MLLW) per year through 2028.
- Potential disposal of three special LLW volumes include: (1) approximately 3-4 million cubic feet of soils from the Santa Susana Field Laboratory, California; (2) approximately 2.5 million cubic feet of soils from Palomares, Spain; and (3) approximately 2.0 million cubic feet from the Industrial Sites environmental restoration activities. Note, the NNSA would potentially pursue removal of the limitation for Nevada-only waste in the Area 3 RWMS if a large project such as Palomares and/or Santa Susanna were to go forward. Removal of this limitation would require concurrence from the State of Nevada.
- Approximately 194,000 square feet of facilities would undergo DD&D.

The 2013 SWEIS analyzed the disposal of up to 48 million cubic feet of LLW and 4 million cubic feet of MLLW at the Area 5 RWMC and the Area 3 RWMS. From 2013 through 2021, approximately 7.8 million cubic feet of LLW and 0.8 million cubic feet of MLLW have been disposed of in those disposal areas. Therefore, remaining available disposal capacities are approximately 40 million cubic feet for LLW and 3.2 million cubic feet for MLLW. The projected total volume of LLW from 2023 through 2028 (for routine operations and special projects combined) is approximately 13.0 million cubic feet, and for MLLW approximately 0.6 million cubic feet. Therefore, sufficient available capacity exists to accommodate disposal of LLW and MLLW during the timeframe for this SA.

TRU waste generation could increase as a result of the expansion of special nuclear material process capability at the DAF. NNSA estimates that approximately 10 additional drums of TRU waste could be generated annually (MSTS 2023b). This would increase TRU waste volumes by approximately 70.6 cubic feet per year, which would represent a 3.7 percent increase in TRU waste compared to the 1,900 cubic feet per year of TRU waste that was estimated in the 2013 SWEIS for the Expanded Operations Alternative. NNSA would stage TRU waste in the Area 5 RWMC

until shipment and disposal at the WIPP. Approximately 3 additional shipments to WIPP from NNSS would be expected every ten years as a result of this increased work in the DAF (see Section 3.1.3.3 for a discussion of the potential impacts associated with this increased TRU waste transportation). The additional 706 cubic feet of TRU waste that would be generated over 10 years would account for only about 0.01 percent of the 6.3 million cubic feet of waste authorized for disposal at the WIPP under the *WIPP Land Withdrawal Act*.

For DD&D, the USEPA estimates that approximately 158 pounds of waste is generated per square foot of demolition (USEPA 2003). Approximately 194,000 square feet of facilities would undergo DD&D between 2023 and 2028 at NNSS, resulting in approximately 15,326 tons of waste, which would not exceed estimates in the 2013 SWEIS. Nonhazardous DD&D wastes would primarily be disposed of in permitted NNSS landfills, which have adequate capacity (NNSA 2013). Any hazardous or PCB wastes would be accumulated and shipped off-site for disposal at permitted disposal facilities.

3.1.11.4 Conclusion

The new and continuing projects and site operations would not significantly change impacts to waste management at NNSS and are consistent with the impacts analyzed in the 2013 SWEIS. Sufficient available capacity exists to accommodate projected waste volumes at NNSS, particularly LLW and MLLW. Therefore, further supplementation of the 2013 SWEIS for potential impacts to waste management is not needed.

3.1.12 Human Health and Safety

In accordance with DOE Order 450.2 and DOE Order 440.1B NNSA and NNSS are required to operate in a manner that protects the health and safety of workers and the public, preserves the quality of the environment, and prevents property damage. ES&H is a priority consideration in the planning and execution of all work activities at NNSS. DOE Order 452.3 requires NNSS to comply with applicable ES&H laws, regulations, and requirements and with directives promulgated by DOE/NNSA regarding occupational safety and health.

Current activities associated with routine operations at NNSS have the potential to affect worker safety and public health. Workers are exposed to occupational hazards similar to those experienced at most industrial work sites. Monitoring of materials released from NNSS and environmental monitoring and surveillance on and around the site are discussed in the NNSSERs. Table 3.1.12-1 provides the various exposure limits set for exposure pathways by DOE and the USEPA for radiation workers and members of the public.

Table 3.1.12-1. Exposure Limits for Members of the Public and Radiation Workers

Guidance Criteria (organization)	Public Exposure Limit at the Site Boundary	Worker Exposure Limit
10 CFR Part 835 (DOE)	--	5,000 millirem per year [a,b]
DOE Order 458.1 (DOE) [c]	10 millirem per year (air pathways) 4 millirem per year (drinking water pathways) 100 millirem per year (all pathways)	--
40 CFR Part 61 (USEPA)	10 millirem per year (all air pathways)	--

Guidance Criteria (organization)	Public Exposure Limit at the Site Boundary	Worker Exposure Limit
40 CFR Part 141 (USEPA)	4 millirem per year (drinking water pathways)	--

DOE = U.S. Department of Energy; USEPA = U.S. Environmental Protection Agency; N/A = not applicable.
a. Although this is a limit (or level) that is enforced by DOE, worker doses must be managed in accordance with ALARA principles. Refer to footnote b.
b. The regulatory dose limit for an individual worker is 5,000 millirem/year (10 CFR Part 835). At NNSS, the administrative control level is 500 millirem/year (NNSA 2013).
c. Derived from 40 CFR Part 61, 40 CFR Part 141, and 10 CFR Part 20.

This section summarizes the 2013 SWEIS human health impacts (Section 3.1.12.1), discusses changes in human health impacts since the 2013 SWEIS (Section 3.1.12.2), analyzes the potential changes in human health that could result from the actions evaluated in this SA (Section 3.1.12.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.12.4).

Human Health and Safety – American Indian Perspectives

Culturally affiliated tribes are aware that risk assessment models have been used for calculating potential risks to human health and safety. Although these models project the potential impacts based on calculated risks, the models do not consider perceived risks considered meaningful to American Indian people. The lack of knowledge or cultural logic of an unfamiliar concept can lead to feelings of perceived or impending danger by American Indian people. The tribes believe everything is interrelated resulting in cause-and-effect methodology. The approach is contrary to scientific models that tend to compartmentalize factors using mathematical equations for identifying risks to health and safety.

Culturally, many American Indian people believe that planning for an emergency increases the likelihood of an emergency occurring and creating the potential of harm to the land, environment, or to their communities. Equally, some Indian reservations are within close proximity to the NNSS or TTR. Tribal communities may be adversely impacted if an emergency occurs associated with DOE activities. Should an emergency situation occur related to the transportation of hazardous and radioactive waste or materials, the closure of roadways or access to hospitals and medical facilities could occur. NNSA/NFO must work closely with culturally affiliated tribes to build capacity through expanded educational opportunities and funding for the development of emergency management programs and response capabilities.

3.1.12.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of public human health, worker health, and worker safety at NNSS in Sections 4.1.12 (affected environment) and Section 5.1.12 (impacts of the alternatives). Relevant information from the 2013 SWEIS is summarized below.

Public Health. Under the 2013 SWEIS analysis, the dose to the off-site maximally exposed individual (MEI) was expected to remain within the 10 millirem/year standard required by 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities." For the preferred alternative, the annual dose to the MEI from radiological emissions was calculated to be a maximum of 4.8 millirem/year, which corresponds to a latent cancer fatality risk of $3x10^{-6}$. The collective dose to the population within 50-miles of NNSS from radiological emissions was calculated to be 0.89 person-rem, which

corresponds to a latent cancer fatality (LCF) risk of $5x10^{-4}$ (NNSA 2013). The total dose to the MEI was calculated to be 15 millirem/year, which is 15 percent of the DOE limit of 100 millirem/year.[13]

Worker Health. The 2013 SWEIS identified the projected radiation exposure for the average individual worker to be 70 millirem/year and 5.2 person-rem/year for the worker population. None of the alternatives in the SWEIS were determined to notably increase worker doses or LCF risks (NNSA 2013).

Worker Safety. The 2013 SWEIS analyzed available data for occupational injury and illness rates at NNSS. The occupational health and safety performance is measured by injury and illness rates (Total Recordable Case and Days Away with Restricted Time [DART]) pursuant to DOE orders that use OSHA criteria. Per the DOE Computerized Accident/Incident Reporting System (CAIRS), the Total Recordable Case rate at NNSS in 2013 was 2.1, meaning that for every 100 workers, approximately 2.1 recordable incidents[14] would be expected annually. The DART rate at NNSS was determined to be 1.2, meaning that for every 100 workers, approximately 1.2 work-related severe injuries or illness that result in days away from work or days of job restriction would be expected annually (DOE 2023a).

3.1.12.2 Changes since the 2013 SWEIS (2013 through 2022)

Public Health. Table 3.1.12-2 presents information on MEI and population doses at NNSS over the period 2013-2021. As shown on that table, the dose to the MEI from radiological emissions varied between 0.02 - 0.7 millirem/year, which is well below the MEI dose estimated in the 2013 SWEIS. Table 3.1.12-2 also shows that the modeled doses from air emissions to the population within 50 miles of NNSS has resulted in a collective dose of between a low of 0.24 person-rem/year to less than 1.0 person-rem/year, which is well below the estimate in the 2013 SWEIS. Over the past nine years, the total dose to the MEI varied between 0.49 – 12.9 millirem/year, all of which are below the estimates in the 2013 SWEIS and well below the DOE limit of 100 millirem/year.

Worker Health. As shown in Table 3.1.12-3, between the years 2013-2021, the measured radiation exposure for the average individual worker was approximately 43 millirem/year and the total worker dose averaged 3.4 person-rem/year (DOE 2023b). These worker doses are below the estimates in the 2013 SWEIS.

Worker Safety. Over the past 10 years, the Total Recordable Case rate at NNSS has varied between a low of 0.8 in 2020 and a high of 3.1 in 2016. Similarly, the DART Rate has varied between a low of 0.8 in 2020 and a high of 1.6 in 2016. The low rates in 2020 are most likely due to reduced operational activities at the site as a result of COVID-19. Over the past 10 years, the average Total Recordable Case rate has been approximately 1.8 and the average DART rate has been approximately 1.0 (DOE 2023a). These rates are similar to the rates presented in the 2013 SWEIS.

[13] Total dose includes doses from air emissions and any doses from drinking water, ingestion of contaminated wildlife, and direct radiation.

[14] Recordable incidents include all work related deaths, illnesses, and injuries which result in a loss of consciousness, restriction of work or motion, permanent transfer to another job within the company, or that require some type of medical treatment or first-aid.

Table 3.1.12-2. Annual Radiation Exposures to Public from NNSS Operations (2013–2021)

Receptor/Dose/Risk	2013 SWEIS (10-year projection)	2013	2014	2015	2016	2017	2018	2019	2020	2021	Average (2017-2021)
Offsite MEI[a]											
Dose (from air emissions)	4.8	0.02	0.02	0.04	0.034	0.07	0.07	0.06	0.063	0.056	0.05
Total Dose (millirem)	15	0.55	3.25	2.91	1.53	0.81	12.9	0.49	0.55	0.75	2.63
Population within 50-miles of NNSS[b]											
Dose (person-rem)	0.89	<1[c]	<1[c]	<1[c]	<1[c]	0.25	0.74	0.29	0.29	0.24	<1

a The MEI is a hypothetical individual located offsite who could potentially receive the maximum dose of radiation.

b. Based on approximately 493,700 - 523,300 people living within 50 miles of NNSS in year of estimate.

c. The collective population dose to people within 50 miles of the NNSS emission sources was not estimated in 2013-2016. DOE approved the discontinuance of reporting collective population dose from NNSS operations after 2004 because it is so low for the NNSS. It has been below 0.6 person-rem/yr for the period from 1992, when it was first calculated and reported to DOE, through 2004.

Source: NNSA 2013a, NNSS 2014a, NNSS 2015a, NNSS 2016a, NNSS 2017a, NNSS 2018a, NNSS 2019a, NNSS 2020a, NNSS 2021a, NNSS 2022a.

Table 3.1.12-3. Radiation Doses to NNSS Workers from Operations (2013–2021)

Occupational Personnel	2013 SWEIS (average annual projection)	From Outside Releases and Direct Radiation by Year									Average (2017-2021)
		2013	2014	2015	2016	2017	2018	2019	2020	2021	
Number of workers receiving a measurable dose	70	89	116	98	84	94	74	50	72	38	79
Total (collective) worker dose (person-rem)	5.2	3.2	5.6	5.0	3.3	3.8	3.9	1.9	1.8	1.8	3.4
Average radiation worker dose (millirem)[a]	74	36	48	51	40	41	53	39	25	48	43

a. No standard is specified for an "average radiation worker;" however, the maximum dose to a worker is limited as follows: the radiological limit for an individual worker is 5,000 millirem per year (10 CFR Part 835). However, DOE's goal is to maintain radiological exposure as low as reasonably achievable. At NNSS, the administrative control level is 500 millirem/year (NNSA 2013).

Source: DOE 2023b.

3.1.12.3 Analysis of Projected Changes (2023 through 2028)

Public Health. The actions evaluated in this SA would not change radiological emissions from NNSS or the annual dose to the MEI.

Worker Health. The installation and operation of the LLNL gloveboxes and the implementation of the Enhanced Staging Program (ESP) could each change worker doses at the DAF. Based on the assumptions that no more than 10 workers would be required for either project, and that workers doses would not exceed the average doses received for other similar work, a maximum of 0.82 person-rem per year would be received by the workers involved in these projects.[15] As shown in Table 3.1.12-3, the total (collective) annual worker dose has averaged 3.4 person-rem over the past nine years compared to the 2013 SWEIS estimate of 5.2 person-rem. Consequently, the addition of 0.82 person-rem would still result in a total (collective) annual worker dose below the 2013 SWEIS estimate.

Worker Safety. Construction and DD&D activities associated with the actions evaluated in this SA could cause increases in occupational injuries. Based on a peak workforce of 200 workers, approximately 5.4 total recordable incidents would be expected annually. In addition, approximately 3.0 work-related severe injuries or illness that result in days away from work or days of job restriction would be expected annually (DOE 2023a).

3.1.12.4 Conclusion

The actions evaluated in this SA would not change public health impacts. With regard to NNSS workers, worker health and safety would be bounded by the 2013 SWEIS analysis.

3.1.13 Environmental Justice

This section summarizes the 2013 SWEIS environmental justice impacts (Section 3.1.13.1), discusses changes in environmental justice since the 2013 SWEIS (Section 3.1.13.2), analyzes the potential changes in environmental justice that could result from the actions evaluated in this SA (Section 3.1.13.3), and presents a conclusion regarding the potential future changes compared to the 2013 SWEIS analysis (Section 3.1.13.4).

[15] Based on 20 workers receiving 41.2 millirem/year (which is the 5-year average worker dose [see Table 3.1.12-3]). For the ESP, the dose would be a one-time occurrence to establish the new rack system.

Environmental Justice – American Indian Perspectives

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* requires federal agencies to identify and/or mitigate potentially disproportionate impacts to minority and low-income communities. Culturally affiliated tribes maintain environmental justice disparities continue to exist. Ongoing tribal interactions during quarterly TPC meetings and at annual update meetings remain a priority; however, expanded tribal involvement to identify or address disparities is a recurring theme that has been expressed by tribal representatives.

Culturally affiliated tribes continue to identify activities effecting the integrity of our Holyland, cultural survival-access, and disproportionately high and adverse human health and environmental impacts to American Indian communities and resources that must be remedied. These Environmental Justice concerns were identified in the 2013 SWEIS and continue in 2023, requiring ongoing consideration and appropriate mitigation measures until resolved through increased funding to expanded tribal interactions.

3.1.13.1 2013 SWEIS Analysis

The 2013 SWEIS presents a summary of the demographic analysis prepared to analyze the potential impacts on low-income and minority populations affected by the programs discussed in the SWEIS. The ROI for analyzing environmental justice in the SWEIS comprises Nye and Clark Counties, Nevada.

The 2013 SWEIS identified low-income populations when the percentage of low-income people in the area of interest is meaningfully greater than the corresponding percentage in the general populations. DOE/NNSA used the state-wide average of 11.2 percent to define the percentage of low-income people in the general population. To identify minority populations, DOE/NNSA identified census block groups where the percentage of minority individuals was greater than 50 percent (NNSA 2013).

Numerous census block groups with low-income populations are distributed throughout the ROI, including large (but sparsely populated) block groups adjacent to the NNSS. No block groups in Nye County (the county the NNSS is located within) had minority populations greater than 50 percent. One census block group in Clark County, approximately 2 miles east of the southeastern corner of the NNSS, had a minority population greater than 50. Additional block groups with minority populations greater than 50 percent are found further to the east in the Las Vegas metropolitan area, closer to the RSL-Nellis and NLVF facilities (NNSA 2013).

The 2013 SWEIS concluded that both human health and environmental impacts on low-income and minority populations would be the same as those on the general population within the ROI. Therefore, disproportionately high and adverse impacts on minority and low-income populations were not expected. The 2013 SWEIS estimated that an increase in jobs due to the construction of the solar power generation facility could provide needed jobs to unemployed individuals in the area, which would have a beneficial impact on low-income individuals in the ROI (NNSA 2013).

3.1.13.2 Changes since the 2013 SWEIS Analysis (2013 through 2022)

In January 2021, President Biden issued Executive Order 14008, *Tackling the Climate Crisis at Home and Abroad*. The order formalizes President Biden's commitment to make environmental justice a part of the mission of federal agencies to develop programs, policies, and activities to address the disproportionate health, environmental, economic, and climate impacts on disadvantaged communities and required federal agencies to "make achieving environmental justice part of their missions." Low-income populations refer to individuals with incomes below the federal poverty thresholds. On April 21, 2023, President Biden signed Executive Order 14096, *Revitalizing Our Nation's Commitment to Environmental Justice for All*. The order amends Executive Order 12898 and "supplements the foundational efforts of Executive Order 12898 to address environmental justice." The new order identifies three steps that federal agencies shall take in their NEPA reviews:

1. Analyze direct, indirect, and cumulative effects of federal actions on communities with environmental justice concerns;
2. Consider best available science and information on any disparate health effects (including risks) arising from exposure to pollution and other environmental hazards, such as information related to the race, national origin, socioeconomic status, age, disability, and sex of the individuals exposed; and
3. Provide opportunities for early and meaningful involvement in the environmental review process by communities with environmental justice concerns potentially affected by a proposed action, including when establishing or revising agency procedures under NEPA.

For this SA, estimates from the 2020 Decennial Census and the U.S. Census Bureau's American Community Survey for census block groups were used. If a census block group meets either of the significance thresholds listed below, that census block group is considered a minority or low-income population block group.

- The minority population that resides in the census block group exceeds 50 percent of the total population for that census block group;
- the minority population in the block group is 10 percent higher than the minority population percent in the county; or
- the low-income population is equal to or greater than that of the county low-income population.

Analysis of the data indicates that there were no block groups with low-income populations that are 20 percentage points higher than the low-income populations of Clark County (13.4 percent) and Nye County (14.5 percent). Block groups with larger percentages of low-income populations are found further to the east in the Las Vegas metropolitan area (USCB 2021c).

There is one census block group in Nye County (the county where the NNSS is located) that exceeds the 50 percent threshold of minority populations of the county. There were no additional block groups with minority populations that are 20 percentage points higher than the minority population of Nye County (27.7 percent). In Clark County the closest block group to the NNSS with a minority population greater than 50 percent is approximately 2 miles east of the southeastern

corner of the NNSS. Additional block groups with minority populations greater than 50 percent are found further to the east in the Las Vegas metropolitan area, closer to the RSL-Nellis and NLVF facilities (USCB 2021d).

Since the 2013 SWEIS, NNSA/NFO has continued consultation and formal and informal meetings with 16 Southern Paiute, Western Shoshone, and Owens Valley Paiute and Shoshone Tribal nations and organizations with cultural and historical ties to the NNSS and the annual TUM, which brings together culturally affiliated tribes and managers from DOE to discuss NNSS activities (NNSS 2022a).

3.1.13.3 Analysis of the Projected Changes (2023 through 2028)

NNSS projects and operations that may be implemented between 2023 and 2028 are likely to have effects equivalent to those analyzed in the 2013 SWEIS. Both human health and environmental impacts on low-income and minority populations would be the same as those on the general population within the ROI. Therefore, no disproportionate and adverse impacts on minority and low-income populations are expected. An increase in jobs from construction activities at the NNSS could provide needed jobs to unemployed individuals in the area, which would have a temporary beneficial impact on low-income individuals in the ROI. None of the proposed projects described in Chapter 2 of this SA are likely to negatively affect environmental justice populations.

3.1.13.4 Conclusion

NNSS has an ongoing commitment to environmental justice. The new, modified, and continuing projects and modifications are not expected to significantly impact environmental justice populations and are consistent with impacts analyzed in the 2013 SWEIS.

3.1.14 Accidents and Intentional Destructive Acts

NEPA requires that an agency evaluate reasonably foreseeable adverse effects on the human environment in an EIS. This SA informs the decisionmaker and the public about the chances that reasonably foreseeable accidents could occur, as well as the potential adverse consequences. An accident is considered bounding if no reasonably foreseeable accident can be found with greater consequences. An accident is reasonably foreseeable if the analysis of occurrence is supported by credible scientific evidence, is not based on pure conjecture, and is within the rule of reason (40 CFR 1502.21[d]; DOE Order 458.1; DOE-STD-1020-2016).

An accident is a sequence of one or more unplanned events with potential outcomes that endanger the health and safety of workers and the public. An accident can involve a combined release of energy and hazardous materials (radiological or chemical) that might cause prompt or latent health effects. The sequence usually begins with an initiating event, such as human error, equipment failure, or earthquake, followed by a succession of other events that could be dependent or independent of the initial event, which dictate the accident's progression and the extent of materials released.

If an accident were to occur involving the release of radioactive or chemical materials, workers, members of the public, and the environment would be at risk. Workers in the facility where the

accident occurs would be particularly vulnerable to the effects of the accident because of their location. The offsite public and noninvolved workers would also be at risk of exposure to the extent that meteorological conditions exist for the atmospheric dispersion of released hazardous materials.

For the public, the MEI, and a noninvolved worker, there are no established standards for doses associated with an accident; however, DOE uses an offsite individual dose of 25 rem in its safety analysis as an evaluation guideline as to whether safety class or safety significant controls are required. This section summarizes the 2013 SWEIS accident impacts (Section 3.2.14.1), discusses changes in accident impacts since the 2013 SWEIS (Section 3.2.14.2), analyzes the potential changes in accidents that could result from the actions evaluated in this SA (Section 3.2.14.3), and presents a conclusion regarding the potential future accident changes compared to the 2013 SWEIS analysis (Section 3.2.14.4).

3.1.14.1 2013 SWEIS Analysis

The 2013 SWEIS includes a discussion of the accident history at NNSS in Section 4.1.12 and an analysis of accident impacts for the alternatives at NNSS in Section 5.1.12. Relevant information from the 2013 SWEIS is summarized below. The accident analysis in the 2013 SWEIS considered a range of accidents associated with the activities performed in support of the National Security/Defense, Environmental Management, and Nondefense Missions.

Radiological Accidents. The accidents for which detailed analyses were performed were those with the highest potential for offsite impacts. For each accident, the offsite population includes residents living within 50 miles of the accident location; the MEI, a hypothetical individual living along the site boundary in the direction of largest impact; and the noninvolved worker, a hypothetical individual assumed to be 110 yards from the accident location. Using the site boundary of the NNSS as the location of the MEI results in a conservative estimate of impacts because, for most of the site boundary, the NTTR provides a buffer area between the NNSS and areas accessible to the general public. As many accidents result in ground-level releases, a nominal distance of 110 yards was selected to provide a conservative indication of the dose a potential noninvolved worker might receive. Operational safety practices, including emergency preparedness and training, would make it very unlikely that any worker would receive the high doses often associated with this nearby receptor location.

The 2013 SWEIS considered the following accidents:

- DAF explosion involving 55 pounds of high explosives and 1 kilogram of plutonium;
- DAF design-basis earthquake;
- National Criticality Experiments Research Center (NCERC) Godiva – burst reactivity induced accident;
- NCERC beyond-design-basis vault fire – unmitigated;
- NCERC beyond-design-basis Godiva excess reactivity insertion;
- Joint Actinide Shock Physics Experimental Research (JASPER) ultrafast closure valve system failure;
- JASPER Target Building fire;

- Area 5 RWMC – transuranic waste container – vehicle impact and fire;
- Area 5 RWMC design-basis earthquake;
- Area 5 RWMC Transuranic Package Transporter (TRUPACT) Type A container drop, breach, and fire;
- One-container spill;
- Three-container fire; and
- Aircraft crash and fire (NNSA 2013).

Because the same types of activities would occur at the facilities under all of the alternatives, the accident scenarios and consequences would be the same across the alternatives analyzed in the 2013 SWEIS. Differences in accident frequencies due to the level of operations would fall within the frequency ranges of the accident events.

The accidents with the highest potential consequences and highest radiological risks are those associated with accidents at DAF. At DAF, there are both large quantities of radioactive materials and explosives in close proximity, so there is a potential mechanism to disperse the radioactive material and release it to the atmosphere. Because DAF is designed for these activities, all of the accidents that would result in release of radioactive material to the environment would require extremely unlikely failure of multiple safety systems. The maximum reasonably foreseeable accidents at DAF could result in the explosive dispersal of 1 to 5 kilograms of plutonium and have estimated probabilities in the range of 8×10^{-4} to 1×10^{-6} per year of operation. The highest consequence accident would be an earthquake-initiated accident. If the accident were to occur:

- The MEI would receive a dose of 0.86 rem, corresponding to an LCF risk of 0.0005 (1 chance in 2,000);
- The offsite population of about 42,100 within 50 miles of DAF would receive a dose of 113 person-rem; the calculated number of LCFs associated with this dose is 0.07, implying that the most likely outcome would be no additional LCFs in the exposed population;
- An involved worker within DAF could be fatally injured in the seismically induced explosion. A noninvolved worker outside of DAF could receive a dose of 2,800 rem, resulting in an acute fatality due to receipt of a lethal dose.
- When the annual probability of the accident occurring is taken into account, the increased risk of an LCF to the MEI would be 5×10^{-10} (1 chance in 2 billion); the increased risk of a single LCF in the exposed population would be 7×10^{-8} (1 chance in 14 million); and the increased risk of an LCF to a noninvolved worker would be 1×10^{-6} (1 chance in 1 million) (NNSA 2013).

Chemical Accidents. The 2013 SWEIS concluded that the potential for hazardous chemical accidents to affect workers or the public is quite limited. Inventories of hazardous chemicals are maintained and reported annually to the State of Nevada. Only small quantities of most types of hazardous chemicals are used at the NNSS and that these chemicals present accident risks primarily to workers directly handling the chemicals. DOE safety programs are in place to minimize the risks to workers from both routine operations and accidents involving these materials. The larger quantities of hazardous materials that would be unique to NNSS-type activities include large quantities of lead metal typically used for shielding, but these materials do not present an accident risk (NNSA 2013).

Intentional Destructive Acts. DOE's *Recommendations for Analyzing Accidents under the National Environmental Policy Act* (DOE 2002) requires that EIS's include a range of accident scenarios analyzed for intentional destructive acts (IDAs). Although these IDAs (i.e., malevolent acts of sabotage or terrorism) are not accidents, their physical acts – whether caused by a fire, explosion, missile, or other impact force – may be compared to the effects of postulated accidents. Consequences of acts of sabotage or terrorism involving radioactive and hazardous materials with environmental and/or health risks can be compared to the accident analyses documented in the 2013 SWEIS.

Details of terrorist attack scenarios and security countermeasures are not released to the public because disclosure of this information could be exploited by terrorists to plan attacks. The 2013 SWEIS included an IDA assessment in a classified appendix. Depending on the nature of malevolent, terrorist, or intentional destructive acts, impacts may be similar or could exceed the impacts of accidents analyzed in the 2013 SWEIS.

3.1.14.2 Changes since the 2013 SWEIS (2013 through 2022)

Since 2013, there have been no notable changes in any facilities, operations, or accident parameters at NNSS that could significantly change the potential impacts of accidents that were analyzed in the 2013 SWEIS. The same types of operations, with similar types and quantities of radiological and hazardous materials, are occurring in the same facilities analyzed in the 2013 SWEIS. In addition, there have been no notable changes in the population, locations of potentially exposed member of the public or workers, or meteorological conditions that would significantly change the modelling results.

3.1.14.3 Analysis of Projected Changes (2023 through 2028)

None of the actions evaluated in this SA would notably change the facilities, operations, or accident parameters at NNSS that could significantly change the potential impacts of accidents that were analyzed in the 2013 SWEIS. The same types of operations, with similar types and quantities of radiological and hazardous materials, are expected to occur in the same or similar facilities analyzed in the 2013 SWEIS (MSTS 2023). In addition, there have been no notable changes in the population, locations of potentially exposed member of the public or workers, or meteorological conditions that would significantly change the modelling results.

3.1.14.4 Conclusion

The impacts presented in the 2013 SWEIS are still considered applicable and bounding for any accident impacts for the actions evaluated in this SA.

3.2 Tonopah Test Range (TTR)

Because the actions in this SA only include minor projects at TTR (e.g., upgrades/modification of utilities and existing facilities, and demolition of excess facilities), the TTR analysis is less detailed than the NNSS and NWLV Campus analyses. Such an approach is consistent with the "sliding scale" method of analysis, in which potential impacts are discussed in proportion to their significance.

Tonopah Test Range – American Indian Perspectives

The TTR falls within the indigenous homelands of the culturally affiliated tribes. Culturally affiliated tribes have a limited understanding of the TTR as they do not participate in TTR planning or operational activities. However, the tribes are knowledgeable about the resources within our traditional homelands which surround TTR and should be afforded the opportunity to become more actively involved.

The DOE should examine methods to support increased tribal participation at the TTR. Tribal representatives should be given regular briefings about the TTR. The tribes believe DOE must support TPC field visits to the TTR so tribal representatives can increase familiarity and evaluate TTR activities that impact the surrounding area.

Land Use. Site improvements such as fiber optic cables, building utility lines, and concrete pads to support test activities would be expected to disturb less than 25 acres of land annually. These site improvements would typically occur on lands previously disturbed by trenching, excavation, and past land disturbing operations. Because there are approximately 179,200 acres on the TTR, disturbance of less than 25 acres of land annually would not be significant. DD&D activities could restore some previous disturbed land to their previous conditions. Operations would be consistent with current land use designations and historic uses of the TTR.

Infrastructure. Minor construction, DD&D, and operational activity increases at the TTR would not change infrastructure demands. The existing infrastructure is adequate to support demands.

Transportation and Traffic. TTR is located in an isolated, rural area, and traffic volumes on public area roads are low (NNSA 2013). Minor construction, DD&D, and operational activity increases at the TTR would not notably change the workforce or impact traffic/transportation in the area.

Socioeconomics. There are approximately 100 employees at the TTR. Minor construction and DD&D activities at the TTR would be expected to increase the workforce. The increase, which is expected to be less than approximately 30 persons, would have negligible effects on the socioeconomic conditions within the ROI (i.e., Nye County).

Geology and Soils. Effective September 30, 2020, DOE-LM assumed long-term stewardship responsibility for 70 FFACO corrective action sites located on the TTR and surrounding NTTR. Prior to the transfer, DOE-EM completed the required environmental corrective actions (including transporting contaminated soil and debris to the NNSS for permanent disposal) and obtained regulator approval to close these sites. DOE-LM long-term stewardship responsibilities for these 70 sites includes fulfilling FFACO post-closure requirements (i.e., surveillance and maintenance activities) and any required NEPA documentation. Though these 70 sites were addressed in the 2013 SWEIS, the sites are not included in this SA due to the transfer of long-term stewardship responsibilities to DOE-LM. The completion of soil remediation activities on and around TTR was accomplished in accordance with the FFACO, which outlines a schedule of commitments to address sites contaminated by historic nuclear testing activities conducted by DOE and DoD in Nevada. This legally binding agreement between the State of Nevada, DOE, and DoD ensures the entities work together to authorize cost-effective corrective actions in the state. It also establishes

a framework for identifying, prioritizing, investigating, remediating, and monitoring contaminated sites. Compliance with the FFACO enables DOE to demonstrate its commitment to responsibly remediate and manage sites like TTR through investigations, corrective actions, and post-closure monitoring that is protective of public health and the environment.

Site improvements such as fiber optic cables, building utility lines, and concrete pads to support test activities would be expected to disturb less than 25 acres of soils annually. DD&D activities could restore some previous disturbed land to their previous conditions. Given the size of the TTR, these impacts would be negligible.

Hydrology. Minor construction, DD&D, and operational activity increases would not change the hydrology conditions at the TTR.

Biological Resources. Animal species on the TTR include all species found in the Great Basin Desert on the NNSS. The Nevada Wild Horse Range and other wild horse land use areas constitute a significant portion of the Nevada Test and Training Range, including the TTR. Hundreds of wild horses graze freely throughout the TTR, and activities on site have had little effect on the horse population or their grazing habits. No current federally listed threatened, endangered, or candidate plant or animal species are known to occur on the TTR (NNSA 2013). Minor construction, DD&D, and operational activity increases at the TTR would not change impacts to biological resources.

Air Quality, Climate, and Noise. All of the TTR is within Nye County, for which there are insufficient data to determine attainment status, so the TTR is designated as an unclassified area. However, USEPA treats unclassified areas as if they are in attainment for regulatory purposes. No ambient air quality data have been measured on the TTR; however, the ambient air quality characteristics are anticipated to be better than or similar to those of the NNSS, given the lower vehicle and stationary source activity levels (NNSA 2013). Minor construction, DD&D, and operational activity increases at the TTR would not change impacts to air quality, climate, and noise.

Visual Resources. The TTR is visually similar to areas of the NNSS with higher elevations and is only visible from an access road off U.S. Route 6. No changes to visual resources are expected from the actions evaluated in this SA.

Cultural Resources. Less than 4 percent of the TTR has been surveyed for archaeological resources. In 2005, a survey and assessment of the built environment at the TTR resulted in DOE's determination that 60 properties were contributing elements to the SNL Tonopah Test Range Historic District. The Nevada State Historic Preservation Officer concurred with the findings in 2011 (SNL 2022).

In 2022, Sandia and DOE personnel hosted representatives from the Nevada State Historic Preservation Office at SNL/TTR. In addition to touring the site, staff discussed several cultural resources issues, including updating the survey and assessment of the built environment at the site to include both the historic district and those properties not previously included in it. Ultimately, this would allow for the development of a Programmatic Agreement to manage all DOE-owned buildings and structures at the site, whether contributing to the historic district or not. DOE and

Sandia will proceed with conducting a new survey and preparing for consultation with the State in 2023.

In the period since DOE and the State Historic Preservation Office agreed on the historic district, two contributing elements have been renovated and two underwent DD&D, leaving 56 elements within the district. All work was done after consultation between DOE and the State Historic Preservation Office.

Because there are approximately 179,200 acres on the TTR, disturbance of less than 25 acres of land annually would not be expected to notably impact cultural resources. Prior to any DD&D or land disturbance, DOE/NNSA would conduct cultural resource surveys and Section 106 consultations, as necessary, to ensure compliance with the NRHP. DOE/NNSA would also continue to consult with culturally affiliated tribes, along with TTR personnel, to better understand the cultural significance of any sites and locations on the TTR and create transparency to build a stronger relationship with the tribes.

Waste Management. DD&D activities could result in the generation of additional wastes above annual operational wastes currently generated. For DD&D, the USEPA estimates that approximately 158 pounds of waste is generated per square foot of demolition (USEPA 2003). Over approximately the next five years, approximately 10,000 square feet of facilities would undergo DD&D at TTR, resulting in approximately 790 tons of waste. Most DD&D wastes are expected to be nonhazardous and would be disposed of at the USAF-operated landfill at the TTR. That landfill, which was expanded around 2010, is authorized to receive no more than 20 tons of municipal solid waste per day and is projected to have a total license expectancy of 30 years (NNSA 2013). The additional wastes from DD&D would amount to 40 days of wastes disposed of at the landfill. Any hazardous wastes and asbestos wastes would be accumulated and shipped off site for disposal at permitted disposal facilities.

Human Health and Safety. Minor construction and DD&D activities at the TTR could cause increases in occupational injuries. Based on DOE's CAIRS data, approximately 0.6 deaths, days away from work, or days of restricted work activity or job transfer would be expected annually. In addition, approximately 0.4 work-related severe injuries or illness that result in days away from work or days of job restriction or transfer would be expected annually (DOE 2023a).

Environmental Justice. No high and adverse impacts from construction and operation activities at TTR are expected. Consequently, there would be no disproportionate and adverse impacts to minority or low-income populations.

Accidents and Intentional Destructive Acts. None of the actions evaluated in this SA would notably change the facilities, operations, or accident parameters at TTR that could significantly change the potential impacts of accidents that were analyzed in the 2013 SWEIS.

3.3 North Las Vegas Facility (NLVF)/Northwest Las Vegas (NWLV) Campus

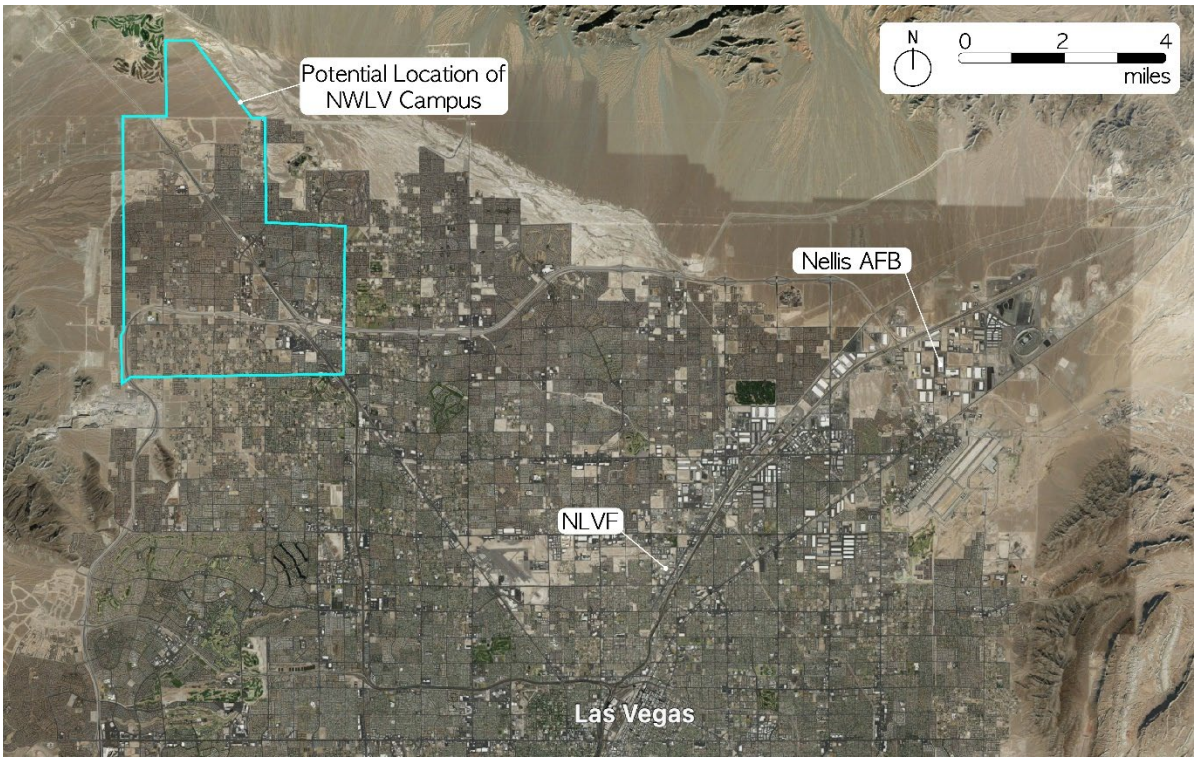
3.3.1 Land Use

The NWLV Campus would be located within a parcel of land that is approximately 12 to 15 miles northwest of the existing NLVF Campus (see Figure 3.3.1-1), which includes private and public lands (see Figure 3.3.1-2). As shown in Figure 3.3.1-2, most of the undeveloped land that could potentially be developed for the NWLV Campus is located east of the US 95, north of Moccasin Road and is bounded by Durango Drive and Floyd Lamb Park to the east and North Schaumber Road to the west. For the purposes of this SA, the NNSA evaluated the potential environmental impacts associated with locating the new NWLV Campus within the undeveloped portion of the parcel shown on Figure 3.3.1-2.[16]

Furthermore, the proposed campus area is part of the 7,000 acres of undeveloped public lands within the Las Vegas Valley, which was the subject of the BLM-prepared 2017 Environmental Assessment (EA) for the Las Vegas In-Valley Area Multi-Action Analysis (DOI-BLM-NV-S010-2016-0054-EA; BLM 2017). In that EA, the BLM analyzed the Proposed Action to dispose/transfer/use[17] approximately 7,000 acres through the Southern Nevada Public Land Management Act, Public Law 105-263 (SNPLMA). The purpose of the EA was to determine if the Proposed Action would result in any significant environmental impacts. As a result of that EA, the BLM issued a Finding of No Significant Impact (FONSI), which stated that "the Proposed Action is not a major Federal action and will result in no significant impacts to the environment, individually or cumulatively with other actions in the general area" (BLM 2017). Therefore, the land on which the NWLV Campus would potentially be constructed has been deemed to be available for transfer and use for NNSA's purposes. Approximately 940 of the 7,000 acres of undeveloped public lands analyzed in the 2017 EA are expected to be transferred to the City of Las Vegas, which intends to develop the land. The NWLV Campus could be located within that 940 acre parcel.

[16] Analyzing an undeveloped portion of the parcel results in a conservative estimate of the potential environmental impacts. Upon identification of the specific location for the NWLV Campus, NNSA will review this SA to verify the project location and scope remains within the parameters analyzed herein.

[17] The disposal was a noncompetitive direct sale.



Note: See Figure 3.3.1-2 on next page for a more detailed location of the NWLV Campus parcel under consideration.

Figure 3.3.1-1. Potential Location of the New NWLV Campus Relative to Existing NLVF

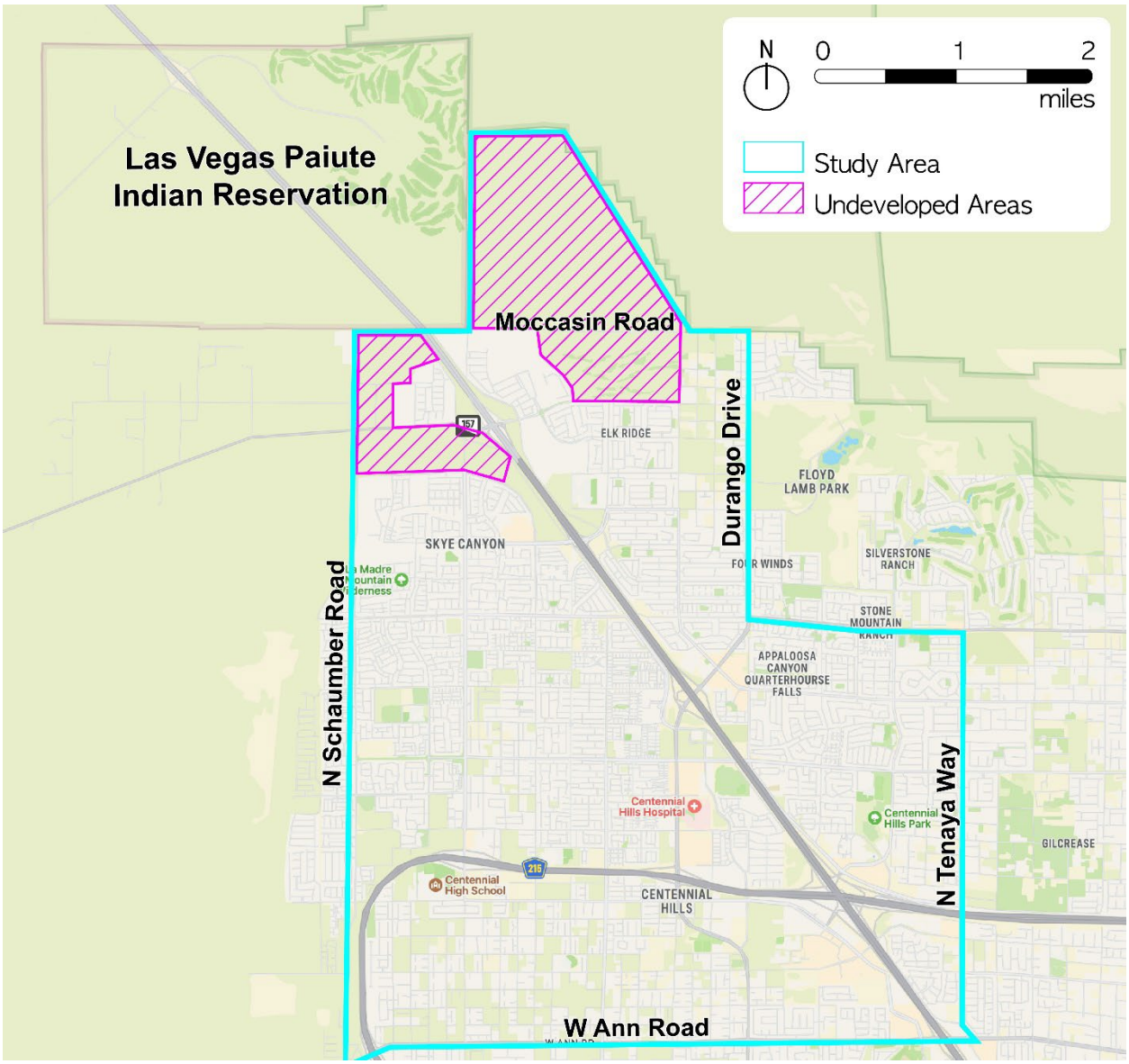


Figure 3.3.1-2. Potential Location of the New NWLV Campus

The proposed NWLV Campus would be developed to be compatible with surrounding existing and planned land uses and in compliance with applicable zoning regulations. The NWLV Campus could include multiple 3- to 4-story buildings that will be used for office, maintenance, and light laboratory purposes. The total proposed building floor area is estimated to range between 300,000 to 800,000 square feet. Onsite parking for the campus will be developed as surface parking and/or parking structures. Onsite bus loading areas will also be developed. The NNSA estimates that up to 40 acres of land could be disturbed for the construction of the new NWLV Campus.

3.3.2 Infrastructure

With the exception of electrical transmission lines, there are no existing utilities present within the undeveloped areas of the parcel. Consequently, NNSA would need to develop utilities

infrastructure, including water, gas and sewer lines, to support the proposed NWLV Campus.[18] Annual utility usage estimates for the NWLV Campus are shown below in Table 3.3.2-1. The utility needs of the NWLV Campus are expected to be similar to or less than the current NLVF Campus demands because of its proposed smaller campus facilities and efficiency initiatives.

Table 3.3.2-1. Operational and Utility Requirements for the New NWLV Campus

Requirements	Consumption/Use	
	New NWLV Campus	Existing NLVF
Operational Workers (number of workers)	1,500	1,800
Annual Electricity Use (kilowatt-hours)	6,750,000 [a]	15,447,000
Potable Water Use (gallons/year)[b]	52,500	63,000
Natural gas use (cubic feet/year)[c]	7,200,000	15,983,952
Sanitary Wastewater (gallons/day)[d]	37,500	45,000

a. Based on 22.5 kilowatt-hours/square foot/year. The new NWLV Campus analyzed in this SA would be a maximum of 300,000 square feet. The existing NLVF is 665,998 square feet.
b. Based on potable water use of 35 gallons/day/person.
c. Based on 24 cubic feet/square foot/year.
d. Based on wastewater generation of 25 gallons/person/day.

3.3.3 Transportation and Traffic

As part of the development of the new NWLV Campus, NNSA might also need to develop the local transportation infrastructure. If the new NWLV Campus were constructed in the undeveloped portion of the area shown on Figure 3.3.1-2, establishment of local arterial roads could be required.[19] Due to the proximity of the proposed NWLV Campus to the existing NLVF campus, the transportation impacts of commuting workers would be similar to existing transportation impacts.

3.3.4 Socioeconomics

The new NWLV Campus would be located within the same socioeconomic ROI (i.e., Clark County) as the existing NLVF. Consequently, once operational, the relocation of employees to the new NWLV Campus is not expected to change any socioeconomic impacts within the ROI. During construction, there would be short-term beneficial socioeconomic impacts. For example, NNSA expects that the construction contractor would purchase a portion of construction materials locally. Additionally, construction payroll and materials expenditures would have a positive impact on the local economies from where workers and materials are sourced. Estimated direct construction jobs may also result in additional indirect jobs that would provide increased local revenue. NNSA expects that the temporary construction workers would most likely be drawn from the local community and would thus not result in a permanent increase. Consequently, housing

[18] As discussed in Chapter 4 of this SA, a master planned community is planned within the undeveloped parcel analyzed in this SA where the new NWLV Campus could be located. This community could consist of residential housing, office space, parks, two schools (an elementary school and a K-8 charter school), and open space. The development is intended to support the mission and operation of Creech and Nellis Air Force Bases (BLM 2021). Although the development of the utility infrastructure for the master planned community would occur independently of the NWLV Campus, it could also support the NWLV Campus, depending on the timing of construction activities.

[19] Development of the transportation infrastructure to the master community would occur independently of the NWLV Campus, but could also support the NWLV Campus, depending on the timing of construction activities.

and community services would not be impacted. Because the peak construction workforce (400 persons) would be negligible compared to the projected population in the ROI, socioeconomic impacts during construction, although beneficial, are not expected to be significant. The increase in economic activity would be temporary and would subside when construction is completed after approximately three years.

3.3.5 Geology and Soils

Soils in the Las Vegas area around the new NWLV Campus are generally composed of gravel, windblown sand, fine-grained silts, and clays. The degree of soil development in the Las Vegas valley area ranges from thin, poorly developed soils overlying competent bedrock to stratified soils with well-developed subsoils and caliche horizons. Soils on alluvial fans along the valley margins are typically deep, gravelly fine sandy soils. Fine sandy soil horizons are typically present in broad, flat areas along the flanks of alluvial fans known as sand sheets. Desert pavement consists of closely spaced pebbles and rock fragments and covers large area of the valley, especially in upland portions of alluvial fans and along ephemeral washes. Construction activities could result in the loss of desert pavement, desert soils, biocrust, and soil stability (BLM 2017). Due to the construction and operation of the proposed NWLV campus, up to 40 acres of soil area could be disturbed, but no geological impacts are expected.

3.3.6 Hydrology

The hydrology of the Las Vegas valley area has been extensively modified to provide drainage and flood control for urban development in the Las Vegas metropolitan area. Drainage improvements have included construction of flow channels, culverts, and detention basins. Flow channels and culverts divert channel flow and flood waters from developed areas and roadways. Detention basins provide temporary storage capacity for peak flow from storm events and control the release of flows to protect downstream infrastructure from flooding. The basins promote infiltration of impounded water into the shallow groundwater, contributing to the groundwater system and allowing gradual discharge back into the drainage system (BLM 2017).

Available analysis of recharge in the Las Vegas valley area indicates that most of the recharge occurs at elevations greater than 5,000 feet in the mountains adjacent to the valley where rainfall and snowmelt directly infiltrate into rock outcrops or mountain runoff infiltrates into alluvial fan deposits. However, as the climate continues to change, more of the precipitation in Southern Nevada would occur during extreme summer storm events in lower elevation and less during the winter precipitation events in higher elevation, as it has in the past. In the 1980s, only a small amount of runoff infiltrated through ephemeral washes and precipitation on the valley floor and resulted in net infiltration, with less than 15 percent of rainfall contributing to recharge in areas below 5,000 feet (BLM 2017).

Ephemeral washes are located throughout the Las Vegas valley area. Washes that naturally convey storm flows to the Las Vegas Wash and Lake Mead may be considered waters of the United States as defined by 33 CFR Part 328 (BLM 2017). Wetland and riparian communities are considered valuable natural resources that provide habitat for a variety of common and special status plant and wildlife species. Riparian communities are vegetative zones associated with rivers and streams, especially in arid or semi-arid habitats where vegetation and wildlife reach far greater

levels of diversity and abundance than in nearby habitats. The riparian community is uncommon in the Las Vegas valley because it is restricted to areas of perennial and ephemeral streams, stormwater run-off channels, and emergent shallow groundwater (BLM 2017). No wetland and riparian communities are expected to occur within the 40-acre parcel where the new NWLV Campus would be constructed. Prior to construction, the construction area would be surveyed to ensure no impacts to riparian communities would occur.

Water for construction and operation would be provided by the Las Vegas Valley Water District. No impacts to groundwater or surface water are anticipated from construction activities or operation of the new NWLV Campus. There is the potential for accidental spills during construction activities which could cause contaminants to travel offsite during storm events if response measures are not implemented. The potential sources are associated with leakages and spill of fuels and lubricants from vehicles and other construction machinery. In addition to accidental spills, disturbance of surface soils could increase the potential for erosion and transport of soil (sediment) during rainfall events. This could create adverse impacts to water quality.

The proposed development of up to 40 acres would change the existing hydrologic condition by increasing impervious surfaces and landscaped areas. The change in hydrologic conditions would increase surface water runoff and reduce groundwater infiltration in the developed areas as compared to predevelopment conditions. As precipitation patterns continue to change from snowfall in higher elevation during the winter months to monsoonal rainfall in the lower elevations during the summer months, the increase in impervious surfaces and flood control infrastructure may lead to increased evaporation. Increased evaporation, in turn, would lead to an overall lower recharge rate to groundwater. During operations, impacts to groundwater or surface water quality are not expected because there would be no facility discharges.

3.3.7 Biological Resources

The area where the new NWLV Campus would be constructed supports, and is adjacent to lands that support wildlife characteristics of the Mojave Desert. Biological diversity varies according to topography, plant community, and proximity to water, soil type, and season (BLM 2017). Surface-disturbing actions associated with construction of the new NWLV Campus could result in killing or maiming of ground-dwelling animals, displacement of individuals, permanent loss and fragmentation of habitat, and increased potential for harassment of wildlife. Indirect impacts could include increased noise, introduction and spread of weeds, increased erosion potential, and increased human or predator activity (predation, harassment, collection, vehicle traffic/collisions). These impacts may lead to an increase in wildlife mortalities or cause wildlife to abandon intact habitats that are immediately adjacent to construction sites or disturbed sites. However, wildlife species in the general area are common and widely distributed. Therefore, the loss of wildlife and/or their habitat in the proposed project area is expected to have a negligible impact on populations of the species throughout the region (BLM 2017). In the 2017 EA, the BLM concluded that impacts to BLM sensitive species (listed below) are not anticipated to lead to population-level decline throughout the species range (BLM 2017).

Chuckwalla, Gila monster, and desert sidewinder. Potential impacts to these species from the actions evaluated in this SA would be similar to those discussed above for general wildlife.

Desert bighorn sheep. In addition to the potential of direct loss of foraging habitat, desert bighorn sheep may be disturbed by noise generated by projects in or adjacent to their habitat. Animals may seek cover on steep slopes and ridges to avoid project activities and associated noise pollution. Increased impacts may occur if activities occur during lambing season. Solitude-dependent species, such as the desert bighorn sheep, may abandon the areas where human activities have reduced the quality of their habitat.

Bats. Loss of habitat due to urban development removes natural foraging and roosting habitat for bat species. In addition, artificial water sources can injure or kill bats if not properly designed and maintained. However, bridges, buildings, and other structures may provide analog roosting habitats for bats within urban areas (BLM 2017).

Threatened and Endangered Species. The only federally protected threatened or endangered species known to occur in the vicinity of the project area is the threatened Mojave desert tortoise. The undeveloped area within the parcel where the NWLV Campus could be located is not within desert tortoise designated critical habitat however, it is possible that desert tortoise could be present in the undeveloped area. Potential impacts to desert tortoise from implementing surface-disturbing actions covered under this analysis would be similar to those described above for general wildlife. Desert tortoises could be either injured or killed (by crushing) or harassed (by being moved out of harm's way) if not noticed and avoided during installation of utilities and construction of the NWLV Campus. Additional impacts may include increased noise disturbance, increased predators, increased human presence leading to death or harm to individuals or collection, increased weeds, and increased access by the general public.

Upon identification of the specific location for the NWLV Campus, NNSA would ensure appropriate consultation and coordination is completed with the USFWS regarding potential impacts on federally listed species protected under the *Endangered Species Act*.

Biological Resources – American Indian Perspectives

Culturally affiliated tribes have the ability to assess and protect resources using traditional ceremonies that keep the land in balance. Prior to ground disturbing activities, culturally affiliated tribes should be provided opportunities to evaluate adverse impacts to resources and the ability to examine the land and flora that may be destroyed. In the event culturally sensitive habitats are impacted, NNSA/NFO should make provisions for tribal representatives to conduct traditional blessings or engage in other culturally compatible activities before disturbance or removal occurs.

3.3.8 Air Quality, Climate, and Noise

The existing NLVF and location for the new NWLV Campus are both within Hydrographic Area 212, which is in Clark County, Nevada. Hydrographic Area 212 is in attainment for all national ambient air quality standards (NAAQS) except ozone.[20] Hydrographic Area 212 is classified as a marginal nonattainment area for ozone.

[20] Hydrographic Area 212 is an attainment area subject to a maintenance plan for carbon monoxide (CO) and particulate matter less than or equal to 10 microns in diameter (PM_{10}).

For the new NWLV Campus, there would be short- and long-term minor adverse effects to air quality. Air quality effects would be minor unless the emissions exceed the general conformity rule *de minimis* (of minimal importance) threshold values, or contribute to a violation of any federal, state, or local air regulation. Short-term effects would be due to generating airborne dust and other pollutants during construction, as well as emissions from construction worker commutes. Construction emissions were estimated for fugitive dust, on- and off-road diesel equipment and vehicles, and worker trips for the peak year of construction (see Table 3.3.8-1).

Table 3.3.8-1. Annual Air Emissions (tons/year) Compared to *De Minimis* Thresholds

Activity/Source	CO	NO_x	VOC	SO_x	PM_{10}	$PM_{2.5}$	*De Minimis* Threshold	Exceeds *De Minimis* Thresholds? [Yes/No]
Construction Emissions (tons/year [tpy])	4.2	4.2	2.7	<0.1	19.0	0.2	100	No

CO = carbon monoxide; NOx = nitrogen oxides; SOx = sulphur oxides; PM_{10} = particulate matter less than or equal to 10 microns in diameter; $PM_{2.5}$ = particulate matter less than or equal to 2.5 microns in diameter.
Source: derived from NNSA 2020.

NNSA would take reasonable precautions to prevent fugitive dust from becoming airborne during construction. Reasonable precautions might include using water to control dust from land clearing and construction activities. Additionally, all construction equipment employed onsite would be maintained and equipped with the appropriate emission control equipment in accordance with applicable contract requirements. Consequently, there would be minimal emissions associated with fugitive dust and earthmoving equipment.

Climate change presents a global problem caused by increasing concentrations of GHG emissions. The state of Nevada has warmed about two degrees Fahrenheit since the beginning of the 20th century. Throughout the southwestern United States, heat waves are becoming more common, and snow is melting earlier in spring. Soils are likely to be drier, and periods without rain are likely to become longer, making droughts more severe. Higher temperatures and drought would increase the severity, frequency, and extent of wildfires in Nevada, which could harm property, livelihoods, and human health (USEPA 2016). Higher temperatures and drought would also decrease the availability of water in the future. Lake Mead has already reached its first critical marker and is projected to reach its second marker by 2026 (Reclamation 2021). Rising temperatures also increase the formation of ground-level ozone, which can exacerbate challenges attaining the ozone NAAQS standard for areas that are currently classified as maintenance or nonattainment.

In 2019, Clark County residents, businesses, and visitors generated more than 29 million metric tons of CO_2e (SNRPC 2021). Annual GHG emissions associated with the NWLV Campus would increase during operations as a result of increased electricity consumption. GHG emissions were calculated to increase by approximately 2,920 metric tons/year of CO_2e (USEPA 2023b).[21] While climate change results from the incremental addition of GHG emissions from millions of individual sources, the significance of an individual source alone is impossible to assess on a global

[21] GHG increases are based on generating 6,750,000 kW-hr of electricity for the new NWLV Campus. No credit is taken for any electricity reductions that might occur at the existing NLVF if relocation occurs. In addition, there could be approximately 2,666 metric tons/year of CO_2e associated with worker commuting, which is not expected to be significantly different than current emissions from workers commuting to the existing NLVF.

scale beyond the overall need for global GHG emissions reductions to avoid adverse global outcomes. Therefore, the analysis in this SA is to determine the potential increase of CO_2e emissions for the actions evaluated in this SA. The 2,920 metric tons of CO_2e would represent a 0.01 percent increase compared to existing GHG emissions in Clark County.

Noise impacts would be temporary during construction. At 400 feet from the construction site, construction noises would range from approximately 55 to 85 decibels. Noise levels higher than 80 to 85 decibels are sufficient to startle or frighten birds and small mammals (Golden et al. 1980). Thus, there would be little potential for disturbing wildlife outside a 400-foot radius of the construction site. Construction workers could be exposed to noise levels higher than the permissible exposure limit of 90 A-weighted decibels specified by the Occupational Safety and Health Administration (OSHA) (29 CFR 1926.52). However, NNSA would implement appropriate hearing protection programs to minimize noise impacts to workers. These include the use of administrative controls, engineering controls, and personal hearing protection equipment.

3.3.9 Visual Resources

The new NWLV Campus would be located on land in which vegetation is typical of the lower elevations of the Mojave Desert and includes Mojave creosote bush scrub. Common plants in the Mojave creosote bush scrub community include creosote bush, white bursage, and cactus and yucca species. Generally, the vegetation is continuous across the parcel, widely spaced, and 2 to 8 feet tall (BLM 2017).

In the short-term, during construction of the new NWLV Campus, visual impacts would occur from an increase in dust, vegetation removal, grading, on-site traffic, and construction workers present at the site. This landscape alteration would be noticeable but visually subordinate to the surrounding landscape features. Construction would result in minor visual impacts that are temporary in nature.

From a visual impacts perspective, the most sensitive area of the parcel where the new NWLV Campus could be located is on lands between the Las Vegas Paiute golf resort and the Tule Springs Fossil Beds National Monument (Monument) and is within the Great Basin region of the Basin and Range Physiographic Province. The Las Vegas and Sheep ranges are visible to the north and east of the parcel. The parcel is generally flat, gently sloping to the southeast. Much of the area to the south has been modified by the growth and development of the Las Vegas metropolitan area. In the background, views of the Monument and the resort enhance the sense of a large, natural, undeveloped landscape for visitors looking north and east from the Las Vegas Paiute golf resort across the area where the NWLV Campus could be located (BLM 2021).

If located near the Las Vegas Paiute golf resort and the Monument, the new NWLV Campus could be viewed from the golf resort. Those views would have moderate visual impacts from the contrasting form, lines, colors, and textures of the area. If sited in that area, visible contrasts could be reduced by a buffer immediately adjacent to the golf resort. A buffer immediately adjacent to the Tribal lands could also be implemented for the purpose of protecting the viewshed of the mountain range to the east (BLM 2021).

Visual Resources – American Indian Perspectives

The AIWS knows that the proposed NWLV Campus may create adverse visual effects to the Las Vegas Paiute Tribe, Tule Springs Fossil Beds National Monument, and other culturally sensitive locations within the Basin and Range Physiographic Province and the Las Vegas and Sheep Ranges. These locations fall within the traditional homelands of the culturally affiliated tribes. Prior to evaluating potential impacts to Las Vegas Paiute Tribal enterprises, DOE should first consult with the Las Vegas Paiute Tribe on a government-to-government basis to discuss tribal interests and concerns.

3.3.10 Cultural Resources

Much of the parcel where the new NWLV Campus could be located has been inventoried for cultural resources. A Class III cultural resource inventory was completed in 2017 for a portion of the parcel. That Class III survey documented 24 cultural resource sites. Other surveys that have been completed since 2017 have revealed no new historic properties in this area. Based on these surveys, BLM determined that there is a limited amount of undisturbed land remaining on the valley floor under the administration of the BLM that has not been surveyed for archaeological sites (BLM 2017).

Impacts to cultural resources are expected to be negligible because the majority of the area has been surveyed and impacts to cultural resources have already been mitigated. Upon identification of the specific location for the NWLV Campus, NNSA would ensure compliance with applicable cultural resource requirements. Undisturbed areas where there are insufficient archaeological surveys would require field surveys on a case-by-case basis. Where direct impacts and indirect effects to NRHP-eligible sites are discovered or known, impacts would be mitigated, as required.

Development could directly affect resources through ground-disturbing activities and indirect effects could include audible and visual intrusions. However, construction of the new NWLV Campus would not be expected to adversely impact Native American resources. The Southern Paiute village and farm sites, the exact locations of which are unknown, are unlikely to be found within the area (BLM 2017). NNSA would conduct government-to-government consultation with any potentially affected tribes as required.

Cultural Resources – American Indian Perspectives

Prior to archaeological surveys or ground disturbing activities tied to the NWLV Campus, NNSA/NFO should provide opportunities for the TPC to first examine the proposed location and evaluate the potential presence of culturally sensitive resources. Informational briefings should be provided when updates are available, particularly during quarterly TPC briefings and at the annual NNSA/NFO Tribal Update Meeting.

3.3.11 Waste Management

The undeveloped land within the parcel where the new NWLV Campus could be located is a greenfield site which has never had any hazardous substance stored on it for one year or more, has not been known to have any hazardous substance released/spilled on it, or been used to dispose of any hazardous substance (BLM 2021). No wastes are currently generated on those lands. During operations, municipal solid waste would be generated. No adverse impacts are expected as sufficient landfill capacity exists to accommodate the nonhazardous solid waste generated from construction and operational and activities of the new NWLV Campus. NNSA would use best management practices to recycle the anticipated routinely generated paper, clean consumer plastics, corrugated cardboard, and toner cartridges as well as the occasionally generated materials such as batteries, broken furniture, circuit boards/electronic equipment, glass, lamps, scrap metal, and wood/pallets. Small volumes of hazardous waste (e.g., non-empty aerosol cans, oily rags), may be generated intermittently during operations. Hazardous wastes would be temporarily accumulated onsite pending disposal at an off-site permitted facility. All hazardous waste would be managed and disposed in accordance with applicable state and federal requirements.

3.3.12 Human Health and Safety

Because operations of the NWLV Campus at the new site would generally be administrative in nature, no notable human health impacts are expected once the relocation is completed. However, there could be occupational impacts to workers who construct the new NWLV Campus. Those potential impacts are presented in Table 3.3.12-1. As shown in the table, approximately 16 lost days of work would be expected annually as a result of occupational injuries and approximately 0.05 deaths would be expected annually (statistically, this would equate to one construction fatality every 20 years for the construction workforce of 400 persons).[22]

Table 3.3.12-1. Annual Occupational Injuries for Constructing the New NWLV Campus

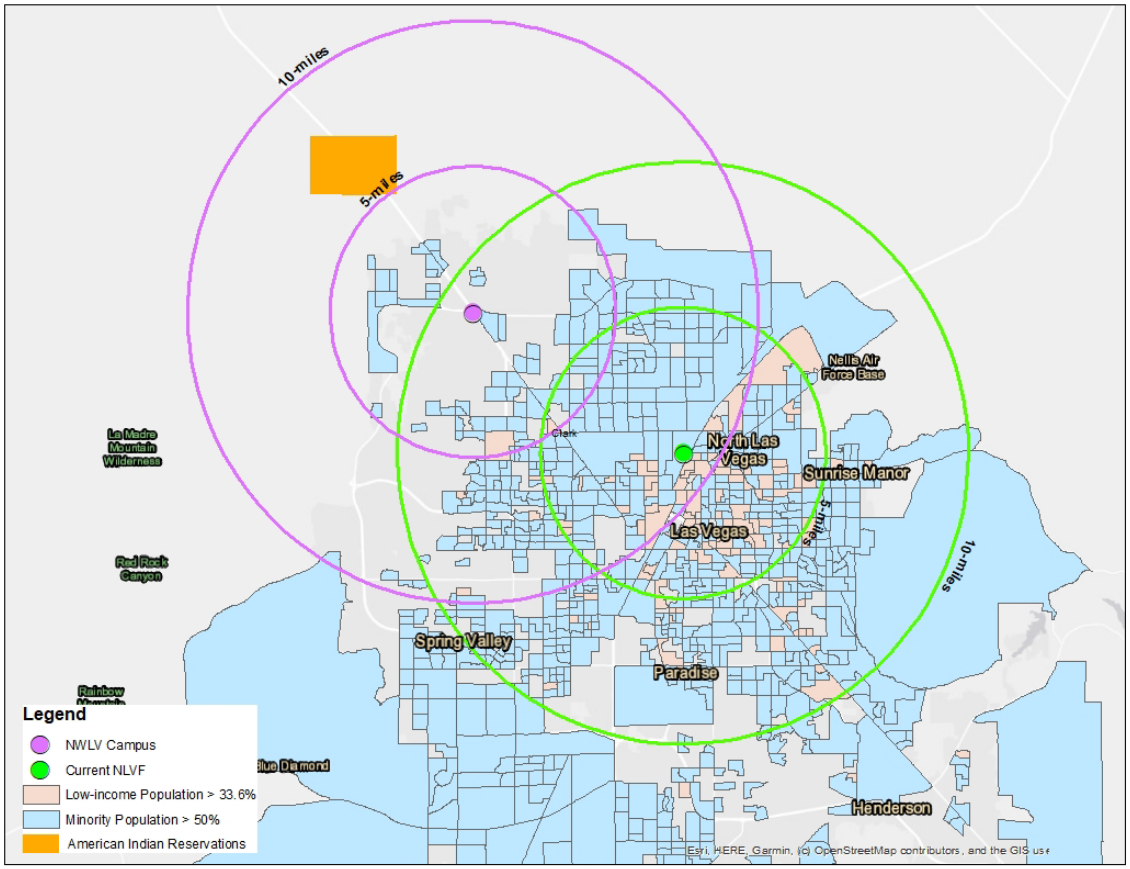
Injury, Illness, and Fatality Categories	Construction[c]
Annual lost days due to injury/illness[a]	16
Annual number of fatalities[b]	0.05

a. Based on 4 injuries in Nevada per 100 workers for construction.
b. Based on 11.8 fatalities in Nevada per 100,000 workers for construction.
c. Based on peak construction workforce of 400.
Source: BLS 2021.

[22] Because the construction duration of the new NWLV Campus will be far less than 20 years, no construction fatalities are expected.

3.3.13 Environmental Justice

In the 2013 SWEIS, the ROI for environmental justice for the NLVF was defined as Clark County. For the analysis of the new NWLV Campus in this SA, NNSA conducted a more detailed examination of environmental justice impacts by defining smaller, more specific ROIs around both the existing NLVF and the new NWLV Campus. Through this process, NNSA could better determine whether there would be any significant environmental justice impacts from relocating operations to the new NWLV Campus. Figure 3.3.1-3 depicts the ROIs for the environmental justice analysis for the NWLV Campus and Table 3.3.13-1 provides the environmental justice data for these ROIs. As shown in that table, there are fewer census block groups surrounding the new NWLV Campus that exceed thresholds for minority and/or low-income populations compared to the existing NLVF.[23]



Source: USCB 2021c, USCB 2021d.

Figure 3.3.1-3. ROIs for the NWLV Campus Environmental Justice Analysis

[23] Census block groups are a smaller subdivision of a census tract and are statistical divisions used by the U.S. Census Bureau for the purpose of collecting and presenting statistical data from the decennial census and various surveys. The census block group is the smallest geographic unit the U.S. Census Bureau uses to report sample data (i.e., data which is only collected from a fraction of all households) and is made up of a combination of census blocks.

Table 3.3.13-1. Environmental Justice Data for the NWLV Campus Analysis

	Census Block Groups		Census Block Groups - Minority Populations		Census Block Groups – Low-income Populations	
	5-miles	10-miles	5-miles	10-miles	5-miles	10-miles
Existing NLVF	371	889	334	655	74	100
NWLV Campus	175	498	72	294	2	36

Source: USCB 2021c, USCB 2021d.

The construction and operation of the new NWLV Campus would not have a disproportionate and adverse effect on the citizens of Clark County and nearby cities because the proposed operations would be similar to operations at the existing NLVF which currently do not have disproportionate and adverse impacts on the general population or minority and/or low-income populations. Additionally, because there are fewer block groups surrounding the new NWLV Campus that exceed thresholds for minority and/or low-income populations, NNSA expects adverse impacts associated with the new NWLV Campus to be smaller than existing impacts at the NLVF. The construction of the new NWLV Campus and the relocation of employees may provide a social and economic benefit to the individuals within the new NWLV Campus ROI through the creation of jobs and access to resources in the form of goods and services retailers. Because of the close proximity of the NLVF and the new NWLV Campus, NNSA does not expect any displacement of any residents or businesses in the area surrounding the NLVF. Any impacts are not expected to be appreciably more severe in magnitude or area predominately borne by any segment of the population, such as household population with low-income or a minority population. Because no notable health impacts are expected, there would be no disproportionate and adverse health impacts on minority and low-income populations.

Environmental Justice – American Indian Perspectives

Culturally affiliated tribes are concerned that tribal access to land or resources within secure areas associated with the NWLV Campus may be limited. Additional informational briefings about the development of the NWLV Campus must be provided during quarterly TPC meetings and at the annual NNSA/NFO Tribal Update Meeting.

3.3.14 Accidents

Because operations of the NWLV Campus would be mostly administrative in nature, the potential for accidents is expected to be minimal once the relocation is completed.

4.0 CUMULATIVE IMPACTS

The Council of Environmental Quality regulations (40 CFR § 1508.7) define cumulative impacts as "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time." The ROI that DOE/NNSA used for identifying potential projects for the cumulative impacts analysis includes the area within 50 miles of the boundaries of the NNSS and the TTR and within 10 miles of the boundaries of the new NWLV Campus. Most of the land within the cumulative impacts ROI for this SA is managed by Federal agencies. In addition to DOE/NNSA, other Federal agencies that manage lands within the ROI include BLM, DOE, the USAF, the USFWS, the USFS, and the National Park Service (NPS). In addition, there are lands and facilities under the jurisdiction of agencies of the State of Nevada and Nye, Clark, Esmeralda, and Lincoln Counties.

DOE/NNSA identified reasonably foreseeable future actions of others by conducting a review of publicly available documents prepared by Federal, state, tribal, and local government agencies and organizations. The following projects were identified and are included in the cumulative analysis in this SA:

- As part of the current administration's goal to permit 25 gigawatts of renewable energy on public lands by 2025 and achieve a carbon pollution-free power sector by 2035, the BLM is auctioning four parcels totaling 23,675 acres for utility-scale solar energy development in the Amargosa Desert in Nye County, Nevada (BLM 2023).

- In 2016, the USAF filed an application with the Department of the Interior to extend the current withdrawal of public lands from all forms of appropriation under the public land laws, for military use of the NTTR. The USAF also requested the withdrawal of approximately 301,507 additional acres of public lands from all forms of appropriation under the public land laws. The purpose of the requested extension and expansion of the withdrawals at NTTR is to withdraw and reserve the lands for use by the USAF for training (81 FR 60727).

- Within the parcel where the new NWLV Campus could be located, the City of Las Vegas has requested to purchase approximately 940 acres and intends to enter into an agreement with the Olympia Companies, LLC (Olympia) to be the developer for the parcel. A master community is planned on the 940 acres, consisting of residential housing, office space, parks, two schools (an elementary school and a K-8 charter school), and open space. That development is intended to support the mission and operation of Creech and Nellis Air Force Bases. The parcel is centered between Creech and Nellis Air Force Bases which would provide a short commute time to Creech Air Force Base and excellent access to community services (BLM 2021).

- General Area-Wide Growth in the ROI: The Las Vegas area population has grown by approximately 14 percent over the past 10 years and is expected to continue to grow. Clark County is home to roughly 2.3 million people, but forecasts predict the population could

go beyond 4 million by 2055. Such growth is expected to strain community services, utility demands, and stress the environment. In February 2021, Clark County adopted its first ever Sustainability and Climate Action Plan (Clark 2021).

- The potential disposal of approximately 5,050,000 cubic feet of waste and excess material that will be generated from deactivation and cleanup activities at the Paducah Gaseous Diffusion Plant, as analyzed in the *Paducah Gaseous Diffusion Plant Final Environmental Assessment for Disposition of Waste and Materials* (DOE/EA-2116) (DOE 2020).

4.1 Potential Cumulative Impacts

Land Use. Due to remoteness and land availability, actions at NNSS, TTR, and RSL-Nellis would not result in notable cumulative land use impacts in the ROI. In Las Vegas, land use associated with the NWLV Campus would disturb approximately 40 acres of the 940 acres in the planned master community. The NWLV Campus would be consistent with the City of Las Vegas' development interests for that parcel.

Infrastructure. As detailed in Chapter 3, NNSS has notably reduced energy intensity and potable water use since 2013. Nonetheless, energy and water use will continue to be important issues for the region. Clark County has achieved an 8 percent improvement in energy performance between 2013 and 2019 and expects to continue this trend through continued efficiency investments (Clark 2021). In terms of capacity and generation, most of Nevada's largest power plants are natural gas-fired. In 2022, natural gas fueled 56 percent of Nevada's total in-state electricity generation, its smallest share in the past 17 years. In 2022, Nevada ranked sixth in the nation in total electricity generation from utility- and small-scale solar resources combined. Solar energy provided 23 percent of Nevada's total generation, and renewable energy from all sources supplied 37 percent of the state's total generation. In 2022, Nevada accounted for about one-fourth of the nation's geothermally-sourced electricity generation (EIA 2023). NNSS operations account for much less than one percent of electricity consumption in the state.

Total and per-capita water use in Southern Nevada has declined over the last decade, even as the region's population has increased by 14 percent. Total water consumption has gone down from 261,000 acre-feet in 2008 to 243,000 acre-feet in 2018. Annual water use per capita has also dropped from 144 gallons to 124 gallons per day between 2008 and 2018 (LV Sun 2019). NNSS operations account for much less than one percent of water consumption in the state.

Transportation and Traffic. Due to remoteness, actions at NNSS, TTR, and RSL-Nellis would not result in notable cumulative transportation/traffic impacts in the ROI. In Las Vegas, worker commuting associated with the NWLV Campus would not be expected to notably change because of the proximity of the proposed NWLV Campus to the existing NWLV.

Socioeconomics. No notable changes in workforce at NNSS are expected. Although socioeconomic impacts from NNSS operations are beneficial (i.e., the NNSS provides nearly $1 billion in economic impact in the state of Nevada), they are a minor contribution to the socioeconomic conditions within the ROI.

Geology and Soils. There would be no notable cumulative impacts to geology and soils for the actions evaluated in this SA.

Hydrology. There would be no notable cumulative impacts to hydrology for the actions evaluated in this SA.

Biological Resources. Approximately 7,350 acres, or 2 percent of NNSS land within desert tortoise range, has been disturbed in the past by construction of facilities and infrastructure and other activities. Activities anticipated to occur on the NNSS would not jeopardize the continued existence of the Mojave population of desert tortoises and no critical habitat would be destroyed or adversely modified. The potential for DOE/NNSA activities at the NNSS to impact plants and animals in areas outside of the NNSS is negligible.

Air Quality, Climate, and Noise. NNSS operations occur within air quality areas that are either in attainment for all NAAQS (except ozone) or are designated as an unclassified area. Operations at NNSS do not notably impact air quality in the region. The State of Nevada has set GHG reduction goals of 28 percent below 2005 levels by 2025, 45 percent below 2005 levels by 2030, and zero or near-zero by 2050 (NDEP 2021). NNSS actions evaluated in this SA will contribute to GHG emission reductions through increased PV electricity generation and conversion to zero-emission vehicles.

Visual Resources. There would be no notable cumulative impacts to visual resources for the actions evaluated in this SA.

Cultural Resources. Prior to any DD&D or land disturbance, DOE/NNSA would conduct cultural resource surveys and Section 106 consultations, as necessary, to ensure compliance with the NHPA. DOE/NNSA would also continue to consult with the potentially affected tribes to better understand the cultural significance of any sites and locations that may be affected by future actions. No notable cumulative impacts are expected.

Waste Management. DD&D activities could result in the generation of additional wastes above annual operational wastes currently generated. On-site and off-site landfills have adequate capacity to dispose of any DD&D wastes. With respect to the potential disposal of approximately 5,050,000 cubic feet of waste and excess material that will be generated from deactivation and cleanup activities at the Paducah Gaseous Diffusion Plant, NNSS is a potential disposal location for approximately 4,838,000 cubic feet of LLW and 179,000 cubic feet of MLLW. Such disposal would be consistent with prior DOE decisions related to waste management (DOE 2020). DOE has not generated or sent any waste or excess material to NNSS that is included in the 5,050,000 cubic feet of waste that is the subject of the Proposed Action in DOE/EA-2116 (DOE 2020). As of the date of this SA, DOE has not made any final decision whether any LLW and/or MLLW would be disposed of at NNSS. If NNSS is selected, prior to shipping any wastes off-site, DOE will follow all required waste acceptance processes for each treatment and/or disposal facility to confirm acceptability that each waste shipment meets waste acceptance criteria and other applicable license and permit requirements. The large gaseous diffusion components are similar to the large diffusion components previously accepted at the NNSS for disposal as LLW. The Paducah site has an approved, active profile, PDGP-PAD000005, Special Waste Debris, which

has been used for disposal of intact components and containerized disassembled components. Future components could be assessed to ensure compliance with the upper limits of activity and overall identified volumes.

As discussed in Section 3.1.11.3, the 2013 SWEIS analyzed the disposal of up to 48 million cubic feet of LLW and 4 million cubic feet of MLLW at the Area 5 RWMC and the Area 3 RWMS. From 2013 through 2021, approximately 7.8 million cubic feet of LLW and 0.8 million cubic feet of MLLW have been disposed of in those disposal areas. Therefore, remaining available disposal capacities are approximately 40 million cubic feet for LLW and 3.2 million cubic feet for MLLW. Under the Proposed Action in this SA, the projected total volume of LLW from 2023 through 2028 (for routine operations and special projects combined) is approximately 13.0 million cubic feet, and for MLLW approximately 0.6 million cubic feet. If the 4,838,000 cubic feet of LLW and 179,000 cubic feet of MLLW from deactivation and cleanup activities at the Paducah Gaseous Diffusion Plant were disposed of at NNSS, LLW and MLLW volumes would remain well below projections in the 2013 SWEIS and sufficient available capacity exists to accommodate disposal of this LLW and MLLW.

With regard to TRU waste associated with the Proposed Action in this SA, the additional 706 cubic feet of TRU waste that would be generated over 10 years would account for only about 0.01 percent of the 6.3 million cubic feet of waste authorized for disposal at the WIPP under the *WIPP Land Withdrawal Act.*

Human Health and Safety. There would be no notable cumulative impacts to human health and safety for the actions evaluated in this SA.

Environmental Justice. No high and adverse impacts from construction and operation activities at NNSS are expected. Consequently, there would be no notable contribution to disproportionate and adverse cumulative impacts to minority or low-income populations.

Accidents and Intentional Destructive Acts. None of the actions evaluated in this SA would notably change the facilities or operations at NNSS. No cumulative impacts are expected.

Potential Cumulative Impacts – American Indian Perspectives

Culturally affiliated tribes have worked in tandem with NNSA/NFO for three decades expanding tribal engagement through government-to-government interactions on tribal topics of interest. The January 26, 2021 *Presidential Memorandum on Tribal Consultation and Strengthening Nation-to-Nation Relations* and DOE Order 144.1 *American Indian Tribal Government Interactions and Policy* remain the cornerstone for the NNSA/NFO AICP. The AIWS continues to support the intent of these federal directives that promote meaningful tribal involvement to protect the traditional homelands of culturally affiliated tribes.

5.0 CONCLUSION AND DETERMINATION

DOE/NNSA/NFO has prepared this SA to assess the potential environmental impacts of continued operations at NNSS, with a focus on the projects/changes that have occurred at NNSS since publication of the 2013 SWEIS and ROD or are expected to occur within approximately the next five years. This SA evaluates the impacts of these projects/changes against the impacts presented in the 2013 SWEIS.

This SA was prepared in accordance with the DOE procedures implementing NEPA (10 CFR 1021) that require that "[when] it is unclear whether or not an Environmental Impact Statement (EIS) supplement is required, DOE shall prepare a Supplement Analysis [that] shall discuss the circumstances that are pertinent to deciding whether to prepare a supplemental EIS pursuant to 40 CFR 1502.9(c)" (10 CFR 1021.314). An SA may also be prepared at any time, as appropriate, to further the purposes of NEPA.

As shown in Section 3.0, the potential impacts associated with the actions evaluated in this SA would not be significantly different than impacts presented in the 2013 NNSS SWEIS. Based on the results of this Final SA, DOE/NNSA/NFO has determined that: (1) the actions evaluated in this SA would not constitute a substantial change; (2) there are no significant new circumstances or information relevant to environmental concerns; and (3) no additional NEPA documentation is required at this time.

Based on my review of the information in this SA and pursuant to NNSA's Administrative Procedure and DOE's NEPA implementing procedures (10 CFR 1021.314(c)), the NNSA/NFO has determined, with the concurrence of the NFO Legal Counsel, that no further NEPA documentation is required at this time.

Concurrence by: BRIAN WEDL Digitally signed by BRIAN WEDL Date: 2024.01.17 09:44:32 -08'00'

Brian C. Wedl — Date
Legal Counsel, NNSA/NFO

Concurrence by: Patricia L. Gallo Digitally signed by Patricia L. Gallo Date: 2024.01.17 10:10:27 -07'00'

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Approved by: DAVID BOWMAN Digitally signed by DAVID BOWMAN Date: 2024.01.17 12:11:00 -08'00'

David R. Bowman, PhD — Date
Manager, NNSA/NFO

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APPENDIX A
Categorical Exclusions

A INTRODUCTION

Tables A-1 and A-2 provide a list and description of the categorical exclusions that were issued for actions that have occurred over the period 2013-2022 for NNSS, TTR, NLVS, and the Remote Sensing Laboratory at Nellis AFB.

Table A-1. Categorical Exclusions for NNSS, NLVF, and the RSL (2014 – 2022)

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
2022			
NV-2022-022	Military Data Collection Training	Training exercises would take place at the Nevada National Security Site (NNSS) in Area 25 at the U25xTunnel facility and Area 26 at the Upper Phoenix Facility. The proposed training would be to conduct data collection exercises.	B1.2 Training exercises and simulations
NV-2022-021	Engagement Simulation System (ESS) Training	Various Force-on-Force and Engagement Simulation System (ESSA) training exercises for Nevada Field Office (NFO) security personnel would take place at the NNSS. NFO security personnel would patrol designated areas to protect simulated Special Nuclear Material (SNM).	B1.2 Training exercises and simulations
NV-2022-017	Area 2 Office Trailer Disposal	The proposed activities would include demolition and disposal of two structures and scrap material in Area 2. These structures were used to support SNL activities in Area 2 of the NNSS and have been abandoned for several years. Structures would be prepared for demolition by removing any equipment, utilities, and loose debris from in and around the facilities. Demolition waste would be disposed in the Area 9 U10c landfill, and metal debris would be segregated for salvage where possible.	B1.23 Demolition and disposal of buildings
NV-2022-016	Construction of Indoor Firing Range	This project would provide the NNSS Protective Force Contractor, with a fully operational, climate-controlled indoor firing range. The firing range would be in Area 23, south of Building 23-1101 and west of Building 23-1103. Six modular, prefabricated units would comprise the 12lane indoor firing range.	B1.15 Support buildings
NV-2022-015	Area 6 Device Assembly Facility (DAF) Geotechnical Investigation	A geotechnical investigation would be conducted in the vicinity of the Area 6 Device Assembly Facility (DAF) Operations Complex at the NNSS. Information obtained from the geotechnical investigation would be used for siting, designing, and constructing new facilities. Geotechnical soil testing would be conducted at fifteen locations in the vicinity of the DAF.	B3.1 Site characterization and environmental monitoring
NV-2022-014	Weather Support for the NNSS	The Air Resources Laboratory (ARL) Special Operations Research Division (SORD) provides a comprehensive meteorology program for NNSA/NFO on the NNSS. This program includes the measurement of meteorological parameters near the surface (1 to 10 meters) and aloft (10 to 35,000 meters).	B1-19 Microwave, meteorological, and radio towers
NV-2022-011	Building 23-118 Certified Packaging Center (CPC)	The CPC can be used during project planning to design, develop, and train operations personnel in an environment that closely simulates actual work locations. The simulated environment is used to identify and mitigate hazards and assists operations personnel in development of processes and procedures to safely perform operations.	B1.2 Training Exercises and Simulations
NV-2022-010 REV 1	Demolition, Removal, and Disposal of	The purpose of this project is to demolish and dispose of abandoned structures in Area 12 on the NNSS that have no further use and are	B1.23 Demolition and disposal of buildings

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
	Structures in Area 12 Camp	considered a safety hazard due to their deteriorated condition. Structures are to be hauled off to the Area 9 U10c Landfill after they have been prepped, and any equipment, utilities, and loose debris around structures have been mitigated or removed.	
2021			
NV-2021-022	Desert Research Institute (DRI) Frank Rogers Building	DOE entered into a new lease agreement for the Frank Rogers Building located at 755 E. Flamingo Road, Las Vegas, NV. The Rogers building houses the Nevada Test Site Historical Foundation, National Atomic Testing Museum including museum exhibit storage, Cultural Resource Management Program Archives, Dina Titus Public Reading room, and National Testing Archives.	A1 Routine DOE business actions
NV-2021-017	Area 12 Sensitive Compartmented Information Facility (SCIF)	Up to two SCIFs and an armored magazine were installed on an existing concrete slab adjacent to Mars Street in Area 12 Camp on the NNSS.	B1.15 Support Buildings
NV-2021-016	Mobile Test Bed Capability Project - Construction	The proposed action included: Construction of a new concrete pad adjacent to the southwest edge of Building 11-102; Installation of a prefabricated garage on an existing concrete pad, and; Installation of a generator back board south of the garage.	B1.15 Support Buildings
NV-2021-014	Nuclear Accident Dosimetry (NAD) Laboratory	The LLNL NAD Laboratory is in Area 23, Building 703, at the NNSS. The NAD Laboratory is used to measure activated materials that have been exposed to a critical burst of radiation from the National Criticality Experiments Research Center critical machines as part of NAD experimental exercises.	B3.6 Small-scale research and development, laboratory operations, and pilot projects
NV-2021-012	Offices and Unoccupied Buildings	Routine maintenance of facilities. This checklist is an update and replacement of NV-2017-038. This checklist does not cover construction of new buildings, expansion of existing buildings, or installation or relocation of trailers and/or modular buildings.	B1.15, Support Buildings; B1.3, Routine Maintenance
NV-2021-006	Demolition of 13 Buildings at CP Hill	The purpose of this project is to demolish 13 facilities on the NNSS that have no further use, allowing for the construction of new, modernized buildings on the NNSS. The facilities planned for demolition under this project are located in Area 6 of the NNSS.	B1.23 Demolition and disposal of buildings
NV-2021-001	Unexploded Ordnance (UXO) Rocket Warhead	For this project, the UXO mitigation strategy is to blow-in-place (to destroy the UXO in place at the incident location) the warhead using ~1.0 lb of C-4 explosives. The intent is to destroy the warhead and remove all explosives	B1.12 Detonation or burning of explosives or propellants after testing

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
		hazards that can impact environmental safety and health of the NNSS workforce.	
2020			
NV-2020-027 REV1	NNSS Seismic and Remote Diagnostic Monitoring	The purpose of this project is to install sensors in various areas of the NNSS for diagnostic monitoring by field crews.	B3.1 Site characterization and environmental monitoring
NV-2020-026	Mercury Cattle Guard Communications Mast	This proposed project in Area 22 of the NNSS would install a 25-foot-high × 14-inch-wide Communication Mast that would house a camera and a microwave antenna.	B1.19 Microwave, meteorological, and radio towers
NV-2020-024	Procurement of Helicopters for NNSA's Aerial Measuring System	Two of the Aerial Measuring System aircraft, Bell 412HP helicopters, have reached the point at which increasing unscheduled maintenance is adversely affecting the mission readiness posture. Therefore, two new, mission capable rotary-wing aircraft will be procured. The new aircraft will have similar, but improved capabilities as the existing aircraft.	A.1 Routine DOE Business Actions
NV-2020-022	Building 06-914 Equipment Staging and Preparation	Building 06-914 in Area 6 of the NNSS would be used for staging equipment and preparation for activities by national labs.	B1.15 Support Buildings
NV-2020-021	Area 25- Criminal Site Investigation	The FBI is proposing to conduct pedestrian grid surveys at four locations in Area 25 of the NNSS as part of an ongoing investigation. Surveyors would be looking for indications of a potential burial site.	B3.1 Site characterization and environmental monitoring
NV-2020-020	Red Tailed Hawk Nest Relocation (Emergency Action)	A Red-Tailed Hawk nest is currently located on pole DAH1 along the UAE power line in Area 1 of the NNSS. This condition is identified as an emergency that requires the relocation of migratory bird nests located along active power lines.	B1.20 Protection of cultural resources, fish and wildlife habitat
NV-2020-009	Offsite Seismic Monitoring Operations	The M&O contractor would continue to conduct seismic monitoring at existing sites including Darwin, California; Tonopah, Nevada; Battle Mountain, Nevada; Nelson Mine, Utah; and Marysvale, Utah; for an indefinite period of time.	B-3.1-Geological (seismic) monitoring
2019			
NV-2019-025	Mercury Demolition of 23-475 through 23-484 and Associated Block	The buildings to be demolished include: 23-475 (dormitory), 23-476 (dormitory), 23-477 (day room), 23-478 (dormitory), 23-479 (dormitory), 23-480 (dormitory), 23-481 (dormitory), 23-482 (health club), 23-483 (dormitory), and 23-484 (dormitory).	B1.23 Demolition and disposal of buildings
NV-2019-017.01	U1a Modernization Surface- Seismic	Seismic monitoring of existing sensors would be conducted to support U1a activities in and around the vicinity of the U1a complex. Extra geophone sensors and recorders would be used to monitor borehole drilling at U1a.	B3.1 Site characterization and environmental monitoring

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
	Monitoring of U1a drilling activities		
NV-2019-017	U1a Modernization (U1a-M) – Surface	U1a-M is a multi-year set of activities and projects that would design and construct the necessary infrastructure and utilities needed for modernizing and upgrading the surface facilities and areas at the U1a Complex.	B1.13 short Access Roads, B1.15 Support Buildings, B1.26 Small water treatment facilities, B4.11 Electrical power substations and interconnection facilities, B4.12 Construction of powerlines, B5.4 Repair or replacement of pipelines
NV-2019-012	Installation of Radioactive Waste Management Complex (RWMC) Monitoring Well UE5MW-4	To extend the operational lifespan of the Area 5 RWMC and remain in compliance with Federal regulations, specifically the *Resource Conservation and Recovery Act* (RCRA), installation of a new groundwater monitoring well is required.	B3.1 Site Characterization and environmental monitoring
NV-2019-011	Ecological and Environmental Monitoring Field Activities	At the NNSS, ecosystems would be monitored to ensure compliance with laws and regulations for the protection of biota and wetlands.	B-3.3 Research related to conservation to fish, wildlife, and cultural resources
NV-2019-003	Area 6 to U1a Water Supply Line Replacement - Potholing	As part of planning activities for the Area 6 to U1a waterline replacement, subsurface utility discovery work would be performed along selected portions of the existing water lines located in Area 6 and Area 1 at the NNSS.	B3.1 Site Characterization and environmental monitoring
NV-2019-001	Mercury Modernization (MM)– Campus Development and Construction Activities	MM is a multi-year project that would redevelop a central area of the current Mercury town site to provide modern facilities and infrastructure that are required to support ongoing mission operations at the NNSS.	B1.3 Routine Maintenance; B1.4 Air Conditioning Systems for existing equipment; B1.13 Pathways, short access roads, and rail lines; B1.15 Support Buildings; B1.16 Asbestos Removal; B1.23 Demolition of Buildings; B1.27 Disconnection of Utilities; B2.1 Workplace enhancements; B4.6 Additions and modifications to transmission facilities; B4.7 Fiber Optic Cable; B4.10 Removal of electric transmission lines; B4.12 Construction of powerlines; B4.13 Upgrading and rebuilding of existing powerlines; B5.4

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
			Replacement of pipelines; B5.16 Solar photovoltaic (PV) systems (<10 acres)
2018			
NV-2018-054	NNSS AML 20K Rocket Launcher Retrieval	NASA Sounding Rocket Operations Contract (NSROC) would contract a crane and commercial trucking company to dismantle and load the 20k Rocket Launcher on to a truck to be transported back to NASA.	B1.24 Property Transfers
NV-2018-052	Dry Alluvium Geology (DAG) Series Airborne Operations	An aerostat (a tethered aerodynamic helium balloon), a low altitude (15000 m above sea level) solar powered hot air balloon would be fielded during the DAG Project series.	B3.2 Aviation activities
NV-2018-049	Mercury Equipment Storage Structure (Building 23-424) Demolition	Building 23-424, Equipment Storage is a framed tent structure in Area 23 (Mercury) at the NNSS. This structure was erected in 2007 and until 2017 was used to store vehicles and equipment for the Fire Department.	B1.23 Demolition and disposal of buildings
NV-2018-048	SOC Protective Force Training Complex	Scope of work at the Protective Force Training Complex would include administrative work, classroom training, live fire activities, mounted and dismounted maneuver activities, explosives and munitions storage, and range support activities.	B1.2 Training exercises and simulations
NV-2018-047	Exterior Light Detection and Ranging (LIDAR) Scanning of Tunnels or Other Existing Facilities	The project would deploy LIDAR equipment to generate scans of the tunnel exteriors and other facilities.	B3.1 Site Characterization and Environmental Monitoring
NV-2018-039	CP Hill Waterline Replacement - Potholing	As part of planning activities for the CP Hill waterline replacement, subsurface utility discovery work needs to be performed along selected portions of the existing water lines located in Area 6 (CP) at the NNSS.	B3.1 Site Characterization and environmental monitoring
NV-2018-022	Solar Photovoltaic Expansion Project	The Mercury Solar Expansion Project would install a solar PV array on the south side of Mercury Fire Station No. 1 in Area 23 (Mercury) at the NNSS.	B5.16 Solar photovoltaic system
NV-2018-019	Atlas Machine Disassembly	This project would support efforts to permanently decommission, dismantle and remove the Atlas pulsed power machine from Building 06-922.	B1.28 Placing a facility in an environmentally safe condition
NV-2018-013	Mercury Water & Sewer Utility Discovery	As part of planning activities for future water and sewer line upgrades, subsurface utility discovery work would be performed along selected portions of the existing sewer and water lines located in Area 23 (Mercury) at the NNSS.	B3.1 Site Characterization and environmental monitoring
NV-2018-007	Device Assembly Facility (DAF)-18 Full Scale Exercise	An emergency response exercise would be conducted at the DAF, located in Area 6 of the NNSS.	B1.2 Training exercises and simulations

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
NV-2018-005	Mercury Bowling Alley (Building 23-517) Demolition	Building 23-517, also known as the Bowling Alley, is located in Area 23 (Mercury) at the NNSS.	B1.23 Demolition and disposal of buildings
NV-2018-001	Engagement Simulation System (ESS) Training	Various Force-on-Force and ESS training exercises for NFO security personnel would take place at the NNSS.	B1.2 Training exercises and simulations
2017			
NV-2017-059	Mercury Asbestos Sampling	Non-destructive asbestos sampling and analysis would be performed at the following buildings in Mercury (Area 23), located at the NNSS: 23-517, 23-B/C/D, 23-425, 23-426, 23-152, 23-475, 23-476, 23-477, 23-478, 23-479, 23-480, 23-481, 23-482, 23-483, 23-484.	B3.1 Site Characterization and Environmental Monitoring
NV-2017-058	Off-site Seismic Monitoring	The M&O contractor for the NNSS Defense Experimentation and Stockpile Stewardship maintains seismic monitoring stations at mines in the NNSS region (California, Nevada, & Utah).	B3.1 Site characterization and environmental monitoring (seismic monitoring)
NV-2017-056	Mercury Power & Communications Infrastructure Consolidation and Upgrades	The M&O contractor for NNSS is preparing to modernize failing utility infrastructure critical to operability of Mercury at the NNSS.	B4.6 Additions and modifications to transmission facilities; B4.12 Construction of power lines
NV-2017-051	SNL Seismic Monitoring	Seismic monitoring of existing sensors is conducted for Sandia National Laboratory personnel in various areas of the NNSS by NSTec field crews.	B3.1 Site characterization and environmental monitoring
NV-2017-046	Reactivation of Building 23-119, LOTO Training Facility	Plans are under way to reactivate Building 23-119 by Operations and Infrastructure, to be used as a training facility.	B1.15 Support Facilities
NV-2017-045	Nevada Desert Research Center (Nevada Desert FACE Facility [NDFF] and Mojave Global Change Facility [MGCF])	The University of Nevada, Las Vegas, Desert Research Institute (DRI) and University of Nevada, Reno (UNR) are jointly conducting ecological and climate change research at the NNSS. There are two projects within Area 5 of the NNSS. They are the NDFF and the MGCF.	B3.8 Outdoor ecological research project
NV-2017-042	DRI Cultural Resources Management Program	The cultural resources activities are conducted to assist NNSA/NFO's compliance with the legal framework for the cultural resources management program.	B3.3 Research related to conservation of fish, wildlife, and cultural resources
NV-2017-032	Creation of Turnaround Areas	The purpose of this project is to create or widen existing turnaround areas that are located mainly in remote areas of the NNSS.	B1.32 Traffic flow adjustments to existing roads at DOE sites

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
NV-2017-031	Telephone Pole Grading Project	An estimated 8,000 telephone poles located throughout the NNSS have been identified by the Fire & Rescue Department as critical infrastructure that needs to be protected from wildland forest fires.	B2.5 Facility safety and environmental improvements
NV-2017-030	USAF NLVF Project	The NFO M&O contractor would provide support services necessary to enable the bed-down of USAF modular buildings at the southeast corner of the North Las Vegas Facility A compound.	B1.15 - Siting/Construction/ Operation of support buildings support structures
NV-2017-029	USGS Vegetation, Small Mammal, and Reptile Studies	At the NNSS, biologists would continue to work with the common garden experiment that is designed to improve restoration methodologies for native desert species on a former equipment yard in Jackass Flats.	B3.3 Research related to conservation of fish, wildlife, and cultural resources
NV-2017-024	Yucca Mountain Site Property Disposition	The affected Real Property relates to Systems, Structures, and Components that have been deactivated and placed in cold stand-by for final disposition.	B1.24 Property Transfers
NV-2017-023	Building 25-4014	Minor indoor work, routine maintenance, and associated yards would include but not be limited to: electronics repair, minor fabrication, equipment repair and calibrations, driving/parking, routine use of shop tools/equipment, equipment storage and staging, and waste and materials staging and repackaging.	B1.15 Support buildings
NV-2017-022	Remote Sensing Laboratory (RSL) Helicopter Wildland Fire Bucket Training	The RSL in North Las Vegas, Nevada needs a place to conduct helicopter training for fighting wildfires.	B1.2 Training exercises and simulations
NV-2017-014	Weather Support for the NNSS	The Air Resources Laboratory (ARL) Special Operations Research Division (SORD) provides a comprehensive meteorology program for the NNSA/NFO on the NNSS.	B.1.19 Microwave, meteorological, and radio towers
NV-2017-010	Dense Plasma Focus Facility (DPFF) Security Exercise	Centerra-Nevada personnel and personnel from other agencies, including but not limited to the Centerra-Nevada Protective Force and DOE/OA Composite Adversary Team, would conduct training and Force-on-Force exercises using the Los Alamos Technical Facility compound in Area 11, Tweezer Road, Orange Blossom Road and the surrounding area within Area 11 and Area 6 of the NNSS.	B1.2 Training exercises and simulations
NV-2017-003	UNESE Tunnel Test Bed Characterization (Phase I)	Conduct tunnel characterization and determine the suitability of the tunnel for conducting Phases II and III of the Underground Nuclear Explosives Signatures Experiment.	B3.1 Site Characterization and Environmental Monitoring
NV-2017-002	Solar Photovoltaic Demonstration Project	This solar demonstration project would install a 276 kW solar PV system in Area 23 (Mercury) at the NNSS.	B5.16 Solar photovoltaic system
NV-2017-001	Mercury Characterization Activities	For this project, characterization activities would take place in Mercury, Nevada, located in Area 23 at the NNSS. Scope of the characterization phase includes the following activities: (1) Housekeeping and relocation of equipment and materials currently stored in cargo containers at the site near	B1.3 Routine Maintenance - housekeeping B.3.1 (f) - Site Characterization

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
		the former Environmental Restoration dorms, and (2) Non-invasive site surveys.	
2016			
NV-2016-035	Hot Work Operations and General Employee (Hands-on) Live Fire Extinguisher / Live Fire Training Evolutions	The NNSS Fire & Rescue is purchasing the renowned new BullEx Intelligent (Smart-Fire-Extinguisher) Training System.	B1.2 Training Exercises and Simulations
NV-2016-031	LANL Equipment Staging & Preparation – NNSS Building 6-914	LANL would use Building 6-914 for equipment staging and preparation. Mobile diagnostic and firing enclosures/skids and other diagnostic equipment that will be deployed to BEEF or other locations on the NNSS for operations would be staged and prepared in Building 6-914.	B1.15 Support Buildings
NV-2016-026	Project 12-930 Construction	The Defense Threat Reduction Agency (DTRA) is in need of a building to be located in Area 12 of the NNSS. The building, designated Building 12-930, would be used mainly for storage of project-related materials and equipment.	B1.15 Support Buildings: Siting, construction or modification, and operation of support buildings and support structures within or contiguous to an already developed area (where active utilities and currently used roads are readily accessible).
NV-2016-025	Building 23-128 Certified Packaging Center (CPC)	Building 23-128, located in Area 23 of the NNSS, is designated as the CPC and is utilized as an operational, administrative, and training venue for the Nuclear Material Management Certified Packaging Program.	B1.2, Training Exercises and Simulations: Training exercises and simulations (including…) conducted under appropriately controlled conditions and in accordance with applicable requirements.
NV-2016-024	Soil Sampling, Building 12-930	The DTRA is in need of a building to be located in Area 12 of the NNSS. Prior to initiating construction, the soil would be tested to determine its suitability for installing a concrete foundation for the building.	B.3.1 (f) - Site Characterization: Sampling and characterization of water, soil, rock, or contaminants (such as drilling using truck- or mobile-scale equipment, and …)
NV-2016-013	Unexploded Ordnance (UXO) Explosives Disposition: Dog Compound	At the Dog Compound in Area 27, near the JASPER facility, there are approximately 400 very old electric blasting caps lying out in the desert. Some are in a box and some have been scattered, possibly by animals, in the vicinity of the box. Because their age has made them too unstable to safely move, plans are to render safe the incident locations by destroying them in place using the explosives applications.	B6.1 Cleanup Actions – Small scale, short-term cleanup actions under RCRA, Atomic Energy Act, or other authorities, less than approximately 10 million dollars in

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
			cost, to reduce risk to human health or the environment
NV-2016-009	Small Uncrewed Aircraft Systems (sUAS) Flight Operation	The Remote Sensing Laboratory, located at Nellis Air Force Base in North Las Vegas, NV, provides support for various activities using uncrewed aircraft systems (UAS), sUAS, and helicopters. Activities would take place in various areas at the NNSS, Area 22 Desert Rock Airport, and at the North Las Vegas and Boulder City airports.	B3.2 – Aviation Activities
NV-2016-007	UNR Telemetry and Data Collection	Approximately ten additional Seismic Network Stations would be installed in the Rock Valley area (Area 25) of the NNSS.	B3.1 Site Characterization and environmental monitoring
NV-2016-005	Spectral Advanced Radiological Computer System (SPARCS) Training	The Remote Sensing Laboratory would be conducting SPARCS training in Area 3 of the NNSS and also at the North Las Vegas Airport.	B1.2 Training Exercises and Simulations
2015			
NV-2015-027	Nightfall-15 Functional Exercise	The NIGHTFALL-15 exercise is being planned by the NSTec Emergency Planning and Preparedness (EP&P) department. The exercise would take place in area 23 of the NNSS and would simulate a gasoline spill.	B.1.2 Emergency response training exercise
NV-2015-020	NNSS Wildland Fire Training Area	The NNSS Fire & Rescue Department is proposing to establish a Wildland Fire Training Area, to be located in area 23 adjacent to the Fire & Rescue Department's existing training facility.	B.1.2 Training Exercises and Simulations
NV-2015-011	Skull Mountain Microwave Communications Site	The NNSA proposes to renew a license with the State of Nevada ("State") for a microwave communication site at Skull Mountain, located in Area 25 of the NNSS.	B81.19- Microwave tower operation
NV-2015-007	Communications ROW - Seismic and Meteorological Monitoring Activities	The action is to modify the BLM Communication Right-of-Way ROW, N-82646, to include the existing access road from the Yucca Mountain Site to the crest of the mountain as well as the road on the crest to provide access to existing equipment adjacent to the crest road for servicing and maintenance purposes	B83.1 - Site characterization and environmental monitoring
2014			
NV-2014-034	Magpie Demonstration Project	This project would involve operation of the Magpie small sUAS in Class G airspace at, or below 1,500 feet Above Ground Level, at the NNSS in the vicinity of Desert Rock Airport, NV. The purpose of the project would be to demonstrate the platform, systems, and capabilities.	B3.6 - Small-scale research and development
NV-2014-030	Truck Parking Areas Upgrades	Three existing parking areas located in Area 22 of the NNSS would be upgraded.	B1.3(j) Routine maintenance-Road and parking areas
NV-2014-026	Hot Work Operations and General Employee	The NNSS Fire & Rescue is purchasing the renowned new BullEx Intelligent (Smart-Fire-Extinguisher) Training System.	B1.2- Training exercises and simulations

ID	Title	Description	CX(s) Applied (per 10 CFR 1021)
	(Hands-on) Live Fire Extinguisher Training		
NV-2014-018	Offsite Seismic Monitoring Operations	There is an ongoing mission need to maintain monitoring capabilities at these sites (Battle Mountain Nevada, Lucky Day Mine; Darwin California, Anaconda Mine; Marysvale Utah, Marysvale Peak; Nelson Nevada, TAV12A, BLM (new); Tonopah Nevada, Gypsy Queen Mine) for the purpose of continuity of data collection for comparable analysis, transparency and verification monitoring under current Program needs and potential future use as part of the Comprehensive Test Ban Treaty Program.	B3.1- Geological (seismic) monitoring
NV-2014-017	HVAC Replacement and Roof Repair	HVAC units at Building A-1 3 at the North Las Vegas Facility are old and need to be replaced.	B1.3 Routine maintenance (d) reroofing; B-1.4 -Air conditioning systems
NV-2014-016	Energy Way Roadway Renovation and Canopy	The purpose of this project is to rehabilitate the deteriorated Energy Way pavement and to provide shelter for the security force at the Energy Way gate.	B.2.5 Facility safety and environmental improvements
NV-2014-013	Lightning Protection for Explosives Safety Ground Well Install	Seven ground “wells” (ground rods) would be installed at 100' intervals extending east from the Entry Guard Station at OAF.	B2.3 Personnel safety and health equipment
NV-2014-012	WINGS Training Exercise	WINGS is designed to be a series of tabletops and field exercises to give participants the opportunity to improve their aerial emergency response techniques and establish working relationships with other key response agencies.	B8.1.2 Emergency response training exercise
NV-2014-009	AT&T Cell Site and Antenna System Installation	AT&T telecommunications upgrades would be planned for the NNSS and the NLVF.	B81.19 Siting, construction of Communication Tower
NV-2014-003	Radiological Emergency Response Training and Radiological Instrumentation Testing	Remote Sensing Laboratory-Nellis would conduct many different activities at the National Guard Armory and Military Police Prison located in Las Vegas, Nevada.	B1.2 Training exercises and simulations

Table A-2. Categorical Exclusions for TTR (2014 – 2022)

Applicable CX	Number of Actions Covered by CX
B1.3 -- Routine maintenance/custodial services for buildings, structures, infrastructures, equipment	11
B1.15 -- Siting/construction/operation of support buildings/support structures	7
B1.19 -- Siting/construction/operation of microwave/radio communication towers	1
B1.23 -- Demolition/disposal of buildings	4
B2.3 -- Installation of equipment for personnel safety and health	1
B3.1 -- Site characterization/environmental monitoring	4
B3.6 -- Siting/construction/operation/decommissioning of facilities for bench-scale research, conventional laboratory operations, small-scale research and development and pilot projects	1
B3.11 -- Outdoor tests, experiments on materials and equipment components, no source, special nuclear, or byproduct materials involved	4
B4.7 -- Adding/burying fiber optic cable	11
Total	44

APPENDIX B
Comment-Response Document

B INTRODUCTION

B.1 Draft Supplement Analysis Comment Period

This appendix consists of responses to comments received on the Draft SA. Although pertinent regulations do not require that a Draft SA be made available for review and comment, NNSA decided, in its discretion, to provide the Draft SA to the NDEP, Nye and Clark county representatives, the AIWS, and 16 culturally affiliated tribes (listed in alphabetical order below):

1. Benton Paiute Tribe
2. Big Pine Paiute Tribe of the Owens Valley
3. Bishop Paiute Tribe
4. Chemehuevi Indian Tribe
5. Colorado River Indian Tribes
6. Duckwater Shoshone Tribe
7. Ely Shoshone Tribe
8. Fort Independence Indian Reservation
9. Kaibab Band of Paiutes
10. Las Vegas Paiute Tribe
11. Lone Pine Paiute-Shoshone Reservation
12. Moapa Band of Paiutes
13. Pahrump Paiute Tribe
14. Paiute Indian Tribe of Utah
15. Timbisha Shoshone Tribe
16. Yomba Shoshone Tribe

NNSA provided a 30-day review process. During that review process, NNSA received one comment document from the NDEP. The NDEP comments and NNSA's corresponding responses are provided in Section B.2.

B.2 Comment-Responses

Comment 1: *A number of the actions being evaluated by DOE/NNSA at the NNSS that are listed in Table 2-2 are described in the text of Section 2.3.1. However, there are also a number of actions listed in Table 2-2 that are not described in the text in Section 2.3.1. Examples of these omissions include, but are not limited to, the "U1a Modernization and New Facilities," "P-Tunnel Infrastructure Improvements," "Area 6 Industrial Consolidation," and "ERICA Redundant Well Installation in Area 12 and Area 25, and Water Well Upgrades." All of Projects listed in Table 2-2 should be fully described in the text of Section 2.3.1.*

Response. Table 2-2 of the SA contains adequate descriptions of all projects encompassed by the Proposed Action in order to conduct the environmental analyses in the SA. The text in Section 2.3.1 is intended to highlight some of the projects that NNSA considered to be more notable than others. The "U1a Modernization and New Facilities," "P-Tunnel Infrastructure Improvements," and "Area 6 Industrial Consolidation" projects are part of the description in Section 2.3.1 which states that "[m]ore than 600,000 square feet of

new/replacement facility construction could occur between 2023-2028." Well replacement and installation of redundant well projects are adequately described in Table 2-2.

Comment 2: *In Section 2.3.1, as the current Regulatory Objective set by the Nevada Division of Environmental Protection for the Frenchman Flat UGTA CAU is "to protect receptors downgradient of the Rock Valley fault system from radionuclide contamination," the protection of the Regulatory Objective should be addressed in the SA.*

Response. Section 3.1.6.3 has been revised to provide a more detailed discussion of potential impacts to the Frenchman Flat UGTA CAU. The RVDC project is over 6.2 miles down-gradient from the Frenchman Flat Underground Nuclear Tests and therefore will not impact groundwater flow from established Containment Boundaries to the Regulatory Boundary cited in Figure 3-3 of the Frenchman Flat UGTA Closure Report. As discussed in that section, modeling of radionuclide transport originating from the Frenchman Flat CAU shows that limited quantities of contaminants reach the regional Lower Carbonate Aquifer in 1,000 years and that contamination is dominated by tritium, which will decay to levels well below the SDWA standard within 200 years (NNSA 2016). Regional groundwater flow (within the Lower Carbonate Aquifer) flows southwest to the Rock Valley fault system, which is located downgradient of the Frenchman Flat basin, and is the expected groundwater migration pathway for any potential groundwater contamination from the Frenchman Flat CAU.

Comment 3: *In Section 2.3.1, the use of the word "significant" is subjective; the basis on which, or by whom, this determination was made (e.g., literature citation) should be included in the SA.*

Response. The text was revised to eliminate the subjective term in question.

Comment 4: *In Section 2.3.2, the terms "minor" and "slightly" are used. As both these words are subjective, the basis on which, or by whom, this determination was made (e.g., literature citation(s)) should be included in the SA.*

Response. The text was revised to eliminate the subjective terms in question.

Comment 5: *In Table 2-2, for the Global Security/Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs, the terms "minor" and "significant" are used in the Project Description. As both these words are subjective, the basis on which, or by whom, this determination was made should be included (e.g., literature citation(s)) should be included in the SA.*

Response. The text was revised to eliminate the subjective terms in question.

Comment 6: *The Draft Paducah Gaseous Diffusion Plant Environmental Assessment for Disposition of Waste and Materials (DOE/EA-2116) evaluates 5,050,000 ft^3 of waste and excess material and lists the NNSS as a disposal site. DOE/EA-2116 should be evaluated and included in this SA.*

Response. NNSA has revised Section 4.0 of this SA (cumulative impacts) to address the potential disposal of wastes from the Paducah Gaseous Diffusion Plant Environmental Assessment for Disposition of Waste and Materials (DOE/EA-2116) at the NNSS. NNSA notes that DOE/EA-2116 is the appropriate NEPA document to propose that action, assess the alternative disposal locations for those wastes, and provide a basis for any decision regarding those wastes. While addressing the potential disposal of those wastes at the NNSS is appropriately included in the cumulative impact analysis of this SA, NNSA notes that any specific decisions regarding those wastes would be made by DOE based on the analysis in DOE/EA-2116.

Comment 7: *In the Project Description for the Tonopah Test Range, the terms "potential minor," "minor," and "slightly" are used. These words are subjective and therefore the basis on which, or by whom, these determinations were made (e.g., literature citation(s)) should be included in the SA.*

Response. The text was revised to eliminate the subjective terms in question.

Comment 8: *In Section 3.1.2.1, the Nevada Division of Environmental Protection, Bureau of Federal Facilities, is aware of three (3) permitted water systems on the NNSS: (1) NV0000360, which does serve Areas 23 and 6, but is one water system, as indicated by its Permit number; (2) NV0004098 (Area 25); and, (3) NV0004099 (Area 12). Please clarify in the SA the "four distinct water service areas and …eight water systems" statemen*t.

Response. The text in Section 3.1.2.1 has been clarified per the comment.

Comment 9: *In Section 3.1.2.1, the Nevada Division of Environmental Protection, Bureau of Federal Facilities, has permitted six (6) wastewater treatment pond locations on the NNSS as of January 2022 under Permit GNEV93001. Clarify why this sentence implies there are only two (2) lagoons in use.*

Response. Section 3.1.2.1 has been revised to clarify that the NDEP-BFF has permitted six wastewater treatment pond locations on the NNSS as of January 2022 under Permit GNEV93001.

Comment 10: *In Section 3.1.3, the term "insignificant" is subjective. What is the basis on which, or by whom, was this determination made? This information should be included (e.g., literature citation) in the SA.*

Response. The text was deleted to eliminate the subjective term in question.

Comment 11: *In the "Geology and Soils – American Indian Perspectives" section, is it possible to include the "other changes [that] have occurred from 2013 through 2022" that are referred to in this paragraph and if and how these changes have been addressed in this SA?*

Response. The AIWS agrees with the overall descriptions described in the Geology and Soils section in the 2023 SA. The AIWS noted other changes have occurred from 2013 to 2022 which included DOE support to expand opportunities for culturally affiliated tribes appointing the Tribal Revegetation Committee and Tribal Planning Committee which evaluated project areas in various locations on the NNSS to examine and/or evaluate cultural resources including soils and geology during periodic visits as mutually agreed upon.

Comment 12: *In Section 3.1.5.3, as the current Regulatory Objective set by the Nevada Division of Environmental Protection for the Frenchman Flat UGTA CAU is "to protect receptors downgradient of the Rock Valley fault system from radionuclide contamination," (1) the protection of the Regulatory Objective should be addressed in the SA; and (2) the word "significant" is subjective, therefore the basis on which, or by whom, this determination was made (e.g., literature citation) should be included in the SA.*

Response. Section 3.1.5.3 has been revised to include additional information and analysis of the Frenchman Flat UGTA CAU. The RVDC project is over 6.2 miles down-gradient from the Frenchman Flat Underground Nuclear Tests and therefore will not impact groundwater flow from established Containment Boundaries to the Regulatory Boundary cited in Figure 3-3 of the Frenchman Flat UGTA Closure Report (NNSA 2016). With regard to the use of the word "significant," the text was revised to eliminate the subjective terms in question. See also comment-response 2.

Comment 13: *In Section 3.1.6.2, GNEV93001 authorizes the NNSA/NFO to activate, construct, operate, maintain, and/or commission six (6) wastewater treatment pond systems located on the NNSS. This permit prohibits the NNSA/NFO from discharging waste containing constituents whose concentrations are defined or declared as hazardous waste, per 40 CFR 261.24, into a sewer main, pond, or rapid infiltration basin (RIB), without concurrence from the NDEP. Discharges into wastewater treatment ponds neither designated nor authorized to receive them are prohibited. The permit also prohibits the NNSA/NFO from discharging into a sewer main or wastewater treatment pond system an industrial waste which is detrimental to the biota of the wastewater treatment pond. The NNSA/NFO shall not discharge industrial waste into a sewer main or wastewater treatment pond system exceeding the established pretreatment standards that are required to meet a system's design and performance standards for the selected mode of treatment and disposal. As such the wastewater treatment ponds systems are not authorized for industrial discharges. And, there are six (6) wastewater treatment pond systems permitted. Please correct these misstatements in the SA, along with adding that GNEV93001 is issued by the Nevada Division of Environmental Protection Bureau of Federal Facilities as stated in the following paragraph in reference to Permit NEV96021. Also note that there is no "Revision XI" assigned to GNEV93001.*

Response. Section 3.1.6.2 has been revised per the comment. GNEV93001 does not have a revision number and is issued by the NDEP-BFF. A total of 6 Wastewater Treatment Ponds are permitted: Area 1 U1a Complex, Area 6 Yucca Lake Complex, Area 6 DAF, Area 12 Camp, Area 23 Mercury, and Area 25 Engine Test Stand 1 (ETS 1). Industrial

waste is not permitted to be discharged in the sewage lagoons. Wastewater that is discharged into the sewage lagoons must meet the established permit requirements. The U1a Complex sewage lagoon is fully permitted under the WPC GNEV93001 but is currently not in use as the population at the U1a is not large enough to support the use of the lagoon. The lagoon will be put into service once the population increases to adequately support the use of the sewage lagoon; current estimates are in 2024.

Comment 14: *In Section 3.1.6.3, the Nevada Division of Environmental Protection, Bureau of Federal Facilities, has permitted six (6) wastewater treatment pond locations on the NNSS as of January 2022. Clarify why this sentence implies there are only three (3) lagoon systems in use. Also note that there is no "Revision XI" assigned to GNEV93001.*

Response. WPC permits GNEV93001 and NEV96021 do not have revision numbers and are issued by the NDEP-BFF. There are 6 wastewater treatment ponds (sewage lagoons): Area 1 U1a Complex, Area 6 Yucca Lake Complex, Area 6 DAF, Area 12 Camp, Area 23 Mercury, and Area 25 Engine Test Stand 1 (ETS 1). The text in section 3.1.6.3 was revised accordingly.

Comment 15: *In Section 3.1.7.1, the word "negligible" is subjective; the basis on which, or by whom, this determination was made (e.g., literature citation) should be included in the SA.*

Response. The text was deleted to eliminate the subjective term in question.

Comment 16: *In Section 3.1.11.1, given that that NNSA/NFO's Solid Waste Permits only authorize disposal of Department of Energy waste, please clarify this statement to reflect that solid waste from a commercial solar power generation facility would not be permitted to be disposed of in a NDEP-BFF permitted facility on the NNSS.*

Response. The SA does not evaluate a commercial solar project because it was proposed after the SA scope was finalized.

Comment 17: *In Section 3.1.11.2, the updates on both the NFS and Y-12 cases are incomplete, and in some places, incorrect. A complete, correct description of each case needs to be included in the SA.*

Response. Section 3.1.11.2 was revised to correct the text regarding the NFS and Y-12 cases.

Comment 18: *In Section 3.1.11.2, this section should include a description of the FOAV action taken by NDEP in 2015 from the fire and potential spill at the Nonproliferation Test and Evaluation Complex located at NNSS.*

Response. A new paragraph was added to this section: "On June 24, 2015 a release of a D001 oxidizer waste into the air occurred at a 90-day accumulation area on the NNSS at

the Nonproliferation Test and Evaluation Complex. This release was reported to NDEP on June 25, 2015. Further investigation into this release resulted in a FOAV issued by NDEP on August 27, 2015. The FOAV relates to alleged failure of DOE/NNSA/NFO to comply with applicable State and Federal hazardous waste management statutes and regulations. A final settlement was reached in March 2016 with a cash payment of $20,000 and a requirement for DOE/NNSA/NFO to implement a Supplemental Environmental Project."

Comment 19: *In Section 3.1.11.2, the discussion on CAU 577 should be tied to the NFS Settlement Agreement discussed in the previous section. The two discussions should complement one another. In addition, the term "most" is subjective. This should be a quantitative number or percentage.*

Response. Revisions were made to various portions of Section 3.1.11.2 (including the Area 5 Radioactive Waste Management Complex paragraph) to further refine the text regarding the Settlement Agreement and CAU 577. With regard to the term "most," the text was revised to eliminate the subjective term in question.

Comment 20: *In Section 3.1.11.2, there is no mention of Solid waste permit SW-532 under which cells 19, 22, 27 and 28 are permitted by NDEP.*

Response. Text was added to Section 3.1.11.2 to include the SW 532 permit.

Comment 21: *In Section 3.1.11.2, this section should include the resumption of Real-Time Radiography (RTR), the upgrades currently being done to the existing RTR, and the purchase of a stationary RTR for the Area 5 RWMC.*

Response. Text regarding the RTR sessions that were completed was added to Section 3.1.11.2, and installation and operation of a new RTR unit was added to Section 3.1.11.3.

Comment 22: *In Section 3.1.11.2, this section should include text on the USDA fire ant permit required for disposal of Soils from USDA fire ant regions.*

Response. Text regarding the USDA Compliance Agreement has been added to this section.

Comment 23: *In Section 3.1.11.2, the cited years (2022 and 2021) seem to contradict one another. In addition, to be consistent with other citations of NDEP, Bureau of Federal Facilities-issued permits, it should be stated that the landfills are regulated and permitted by NDEP-Bureau of Federal Facilities.*

Response. Section 3.1.11.2 has been revised to eliminate any perceived contradiction in dates. NNSA has also clarified that the landfills are regulated and permitted by NDEP-BFF.

Comment 24: *In Section 3.1.11.2, there is no mention of the Solid Waste Permit SW-532 that is used for asbestos wastes and is permitted by NDEP-Bureau of Federal Facilities.*

Response. Text regarding the SW 532 permit was added to this section.

Comment 25: *In Section 3.1.11.3, the removal of the limitation for Nevada-only waste is not based on if the Palomares and Santa Susanna projects are approved. Removal of this limitation would be contingent on discussions with the State of Nevada.*

Response. The sentence in question has been revised as follows: "Note, the NNSA would potentially pursue removal of the limitation for Nevada-only waste in the Area 3 RWMS if a large project such as Palomares and/or Santa Susanna were to go forward. Removal of this limitation would require concurrence from the State of Nevada."

Comment 26: *In Section 3.11.1.3, NDEP commented on the Draft Paducah Gaseous Diffusion Plant Environmental Assessment for Disposition of Waste and Materials (DOE/EA-2116) recommending that DOE conduct a reanalysis of the NV SWEIS and include this large waste stream (5,050,000 ft3 of waste and excess material). In DOE's response it is stated "DOE acknowledges Nevada Division of Environmental Protection's comment and will consider the need for further NEPA analysis of the 2013 NV SWEIS, as appropriate, to meet DOE's ongoing waste disposition needs." However, this waste stream was not evaluated as it is not listed in this section or in Table 2-2. As such this waste stream should be evaluated and included in this SA.*

Response. NNSA has revised Section 4.0 of this SA (cumulative impacts) to address the potential disposal of wastes from the *Paducah Gaseous Diffusion Plant Environmental Assessment for Disposition of Waste and Materials* (DOE/EA-2116) at the NNSS. NNSA notes that DOE/EA-2116 is the appropriate NEPA document to propose that action, assess the alternative disposal locations for those wastes, and provide a basis for any decision regarding those wastes. While addressing the potential disposal of those wastes at the NNSS is appropriately included in the cumulative impact analysis of this SA, NNSA notes that any specific decisions regarding those wastes would be made by DOE based on the analysis in DOE/EA-2116.

Comment 27: *In Section 3.2, the transfer of the 70 Corrective Action Sites on the Tonopah Test Range from Environmental Management Program to Legacy Management needs to be explained in terms of the Federal Facility Agreement and Consent Order. As written, this paragraph is incomplete and out-of-context. If the 70 Corrective Action Sites on the Tonopah Test Range were included in the 2013 SWEIS, then the deletion of the sites from this SA should be more formally documented/discussed in this SA than in a footnote.*

Response. Section 3.2 of the SA has been revised to include a discussion of the FFACO. There are no proposals in this SA that would change the long-term stewardship of the 70 sites, which are now the responsibility of DOE-LM.

Comment 28: *In Section 3.3.7, please provide the basis for the following sentence: "Impacts to BLM sensitive species…are not anticipated to lead to population-level decline throughout the species range."*

Response. The basis for that conclusion is contained in the BLM 2017 EA. NNSA has revised the sentence as follows: "In the 2017 EA, the BLM concluded that impacts to BLM sensitive species (listed below) are not anticipated to lead to population-level decline throughout the species range (BLM 2017)."

Comment 29: *In Section 3.3.11, note that any hazardous waste shipments from the NWLV Campus to the NNSS would require a licensed hazardous waste transporter and may require a permit modification to the existing NNSS RCRA permit.*

Response. NNSA has revised the sentence in question to reflect that, "NNSA does not expect any hazardous wastes to be generated at the new NWLV Campus."