U.S. DEPARTMENT of ENERGY

National Nuclear Security Administration

NEVADA NATIONAL NNSS SECURITY SITES

SEPTEMBER 2025

2024

ENVIRONMENTAL REPORT

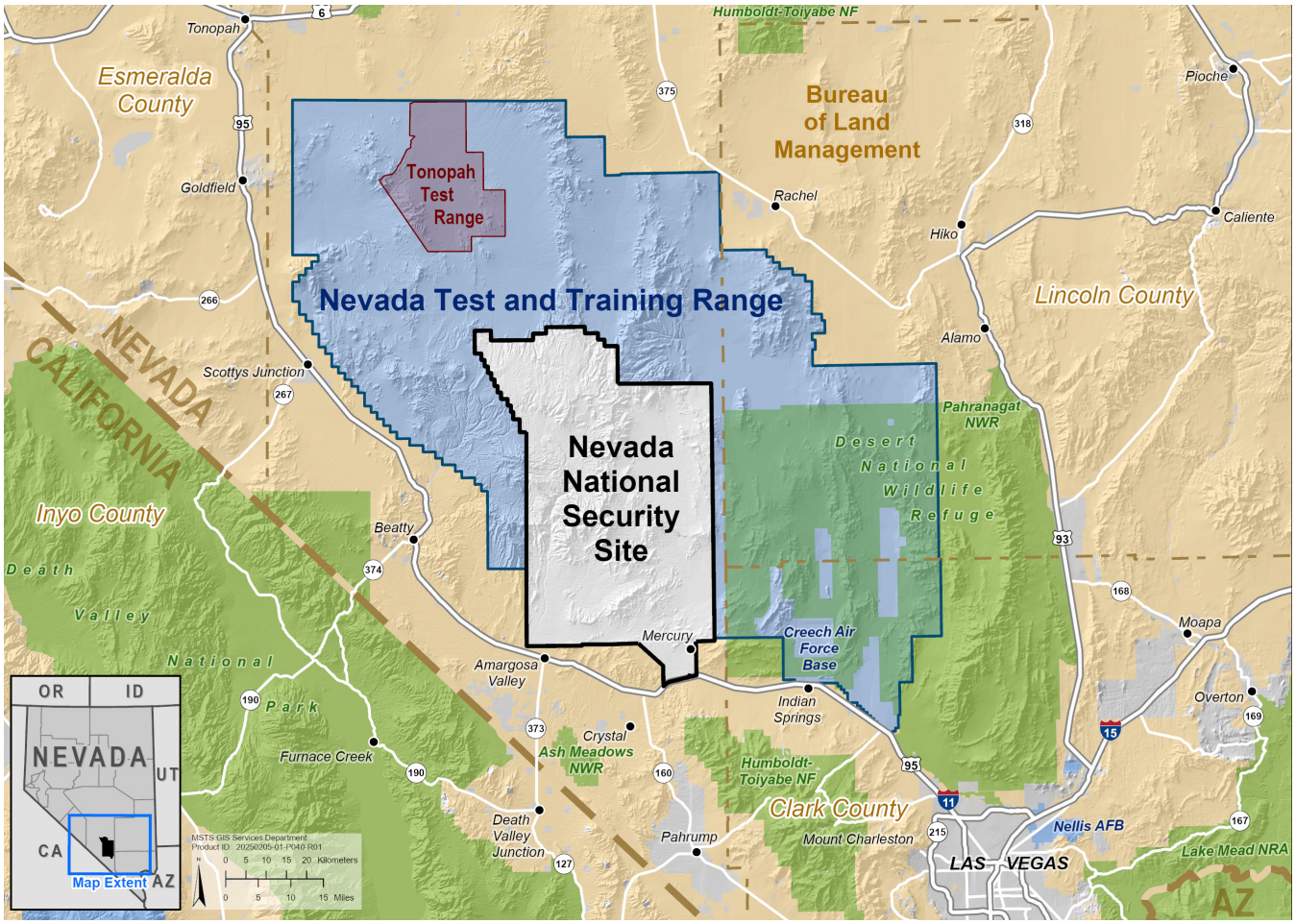
Summary

DOE/NV/03624--2247-SUM

TABLE OF CONTENTS

NEVADA NATIONAL SECURITY SITE

Environmental Report Summary 2024



This document is a summary of the full *2024 Nevada National Security Site Environmental Report* (NNSSER) prepared by the U.S. Department of Energy, National Nuclear Security Administration Nevada Field Office (NNSA/NFO). This summary provides an abbreviated version of the full NNSSER. The reader may obtain hard copy and electronic copies of this report, the full report, and the 2024 Nevada National Security Site Environmental Report Attachment A: Site Description, as directed on the inside back cover of this report.

NNSA/NFO prepares the NNSSER to provide the public an understanding of the environmental monitoring and compliance activities that are conducted on the Nevada National Security Site (NNSS) to protect the public and the environment from radiation hazards and from potential nonradiological impacts. It is a comprehensive report of environmental activities performed at the NNSS and offsite facilities over the previous calendar year.

The NNSS is currently the nation's unique site for ongoing national security–related missions and operations. The NNSS is located about 65 miles northwest of Las Vegas. The approximately 1,360-square-mile site is one of the largest restricted access areas in the United States. It is surrounded by federal installations with strictly controlled access as well as by lands that are open to public entry.

History of the NNSS

Between 1940 and 1950, the area now known as the NNSS was part of the Las Vegas Bombing and Gunnery Range. In 1950, the NNSS was established as the primary location for testing the nation's nuclear explosive devices. A total of 928 tests took place from 1951 to 1992. Tests conducted through the 1950s were predominantly atmospheric tests (100 of the 928 total). These involved a nuclear explosive device detonated while either on the ground surface, on a steel tower, suspended from tethered balloons, dropped from an aircraft, or placed on a rocket. Several tests were categorized as "safety experiments" and "storage-transportation tests," involving the destruction of a nuclear device with non-nuclear explosives, some of which resulted in dispersion of plutonium in the test vicinity. Some of these test areas are off of the NNSS on the Nevada Test and Training Range (NTTR) and on the Tonopah Test Range (TTR).

The first underground test, a cratering test, was conducted in 1951. The first fully contained underground nuclear test was conducted in 1957. Testing was discontinued during a moratorium that began October 31, 1958, but was resumed in September 1961 after tests by the Union of Soviet Socialist Republics began. Beginning in late 1962, nearly all tests were conducted in sealed vertical shafts drilled into Yucca Flat and Pahute Mesa or in horizontal tunnels mined into Rainier Mesa. From 1951 to 1992, a total of 828 underground nuclear tests were conducted at the NNSS. Approximately one-third of these tests were detonated near or below the water table.

Five earth-cratering (shallow-burial) tests were conducted from 1962 to 1968 as part of the Plowshare Program, which explored peaceful uses of nuclear explosives. The first and highest yield Plowshare crater test, Sedan, was detonated at the northern end of Yucca Flat. The second-highest yield crater test was Schooner in the northwest corner of the NNSS. Mixed fission products, tritium, and plutonium from these tests were entrained in the soil, ejected from the craters, and deposited on the ground surrounding the craters.

Other nuclear-related experiments at the NNSS included the Bare Reactor Experiment–Nevada series in the 1960s. These tests were performed using a neutron generator mounted on a 1,527-foot steel tower to study neutron and gamma-ray interactions on various materials and to assess radiation doses experienced by the nuclear bomb survivors of Hiroshima and Nagasaki. From

Continued on Page 6 ...

NNSS – Continental Test Site

After the end of World War II, the United States tested nuclear weapons at Bikini Atoll and Enewetak in the Marshall Islands of the Central Pacific.

In June 1950, with the outbreak of hostilities in Korea and U.S. relations with the Soviet Union continuing to deteriorate, the search began for a continental test site to overcome the difficulties with remoteness and security experienced with testing in the Pacific. The final choices included Dugway Proving Ground–Wendover Bombing Range in western Utah, Alamogordo–White Sands Guided Missile Range in south-central New Mexico, and a North Site and a South Site on the Las Vegas Bombing and Gunnery Range in southern Nevada.

On December 18, 1950, President Truman approved the recommendations of Los Alamos testing officials and the Atomic Energy Commission, christening the South Site on the Las Vegas Bombing and Gunnery Range as the nation's continental test site. It was called the Nevada Proving Ground.

On January 27, 1951, an Air Force B-50D bomber dropped a 1-kiloton yield nuclear bomb over Frenchman Flat. It was the world's tenth nuclear detonation and was the first test at the newly renamed Nevada Test Site (NTS).

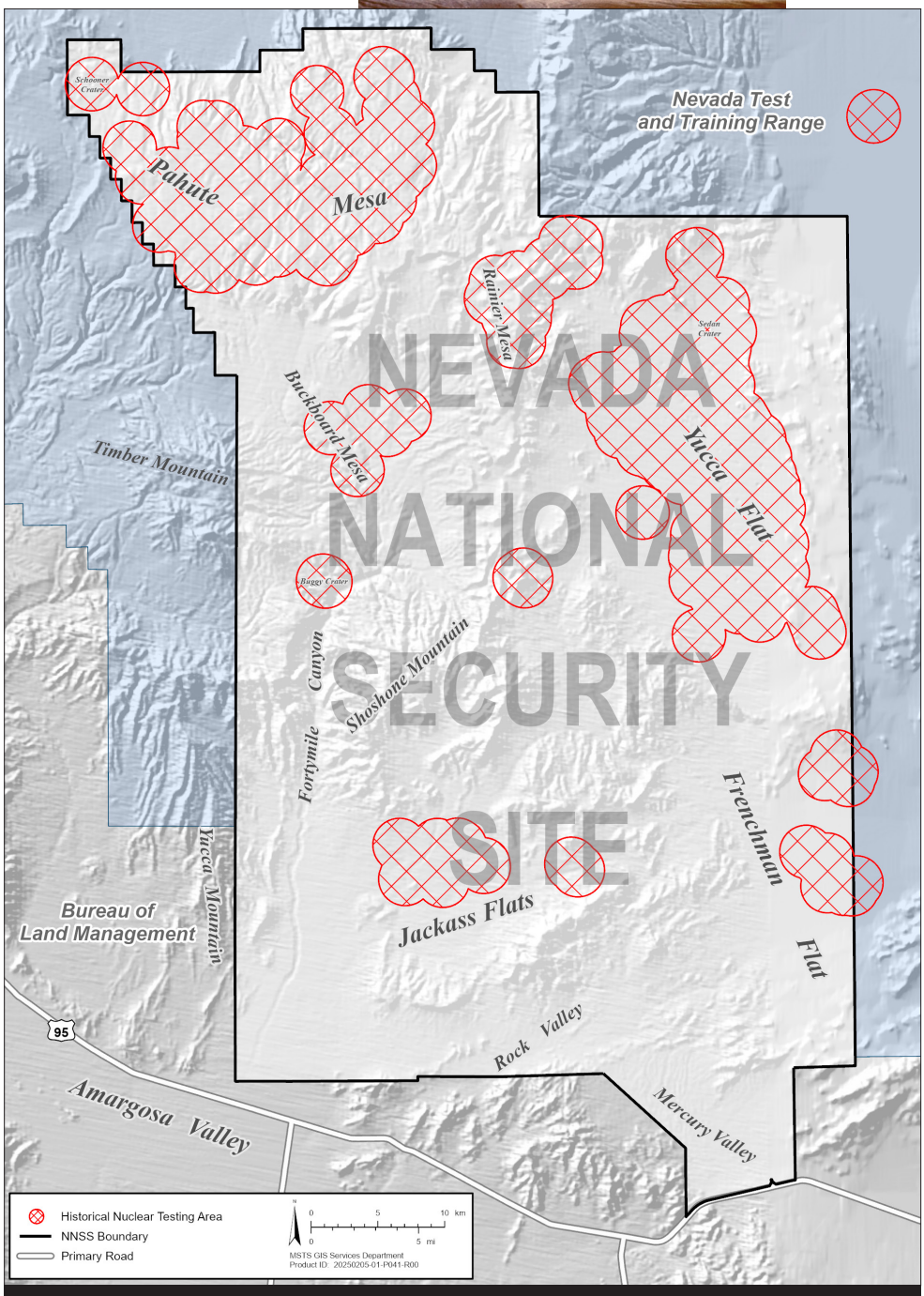
On September 23, 1992, the last underground nuclear test was conducted on the NTS, after which Congress imposed a moratorium on nuclear weapons testing. Since 1951, a total of 100 atmospheric and 828 underground nuclear tests have been conducted at the NTS.

Source: T. R. Fehner and F. G. Gosling, 2000. *Origins of the Nevada Test Site*, DOE/MA-0518, History Division, Executive Secretariat, Management and Administration, U.S. Department of Energy.

On August 23, 2010, the NTS was renamed the Nevada National Security Site to reflect the diversity of nuclear, energy, and homeland security activities conducted at the site.

1959 through 1973, a series of open-air nuclear reactor, engine, and furnace tests were conducted in Area 25, and a series of tests with a nuclear ramjet engine were conducted in Area 26 (not included on this map). The tests released mostly gaseous radioactivity (e.g., radioiodines, radioxenons, radiokryptons) and some fuel particles that resulted in negligible deposition on the ground.

All nuclear device tests are listed in *United States Nuclear Tests, July 1945 through September 1992* (U.S. Department of Energy, Nevada Field Office, 2015, DOE/NV--209, Rev. 16).

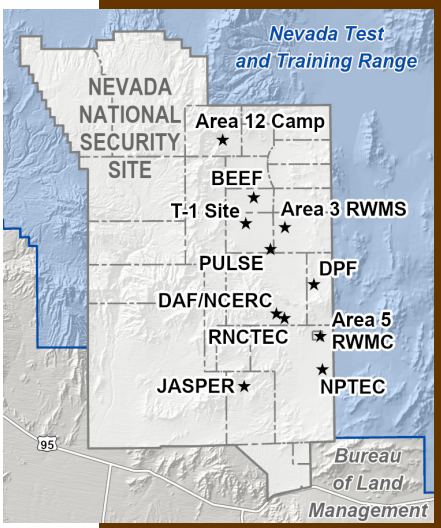


Historical Nuclear Testing Areas on and adjacent to the NNSS

The NNSS Now

NNSA/NFO conducts three major missions and their programs on the NNSS. Experimental programs are sponsored mainly by Los Alamos, Lawrence Livermore, and Sandia National Laboratories. During the conduct of all missions and their programs, NNSA/NFO complies with applicable environmental and public health protection regulations and strives to manage the land and facilities at the NNSS as a unique and valuable national resource. Mission Support and Test Services, LLC (MSTS) is the Management and Operating (M&O) Contractor accountable for ensuring work is performed in compliance with environmental regulations.

NNSS activities in 2024 continued to be diverse, with the primary goal to ensure that the existing U.S. stockpile of nuclear weapons remains safe and reliable. Other activities included weapons of mass destruction first responder training; remediation of legacy contamination sites; characterization of waste destined for offsite disposal facilities; disposal of classified, low-level and mixed low-level waste; and environmental research. Facilities and centers that support the National Security/Defense mission include the Area 12 Camp, Principle Underground Laboratory for Subcritical Experimentation (PULSE) (formerly the U1A Complex), Big Explosives Experimental Facility (BEEF), Device Assembly Facility (DAF), National Criticality Experiments Research Center (NCERC) located in the DAF, Joint Actinide Shock Physics Experimental Research (JASPER) Facility, Dense Plasma Focus (DPF) Facility, Nonproliferation Test and Evaluation Complex (NPTEC), the Radiological/Nuclear Countermeasures Test and Evaluation Complex (RNCTEC), and the Radiological/Nuclear Weapons of Mass Destruction Incident Exercise Site (known as the T-1 Site). Facilities that support the Environmental Management mission include the Area 5 Radioactive Waste Management Complex (RWMC) and the Area 3 Radioactive Waste Management Site (RWMS).



NNSS Missions and Their Programs

National Security/Defense

Stockpile Stewardship and Management Program — Conducts high-hazard operations in support of defense-related nuclear and national security experiments.

Nuclear Emergency Response, Nonproliferation, and Counterterrorism Programs — Provides support facilities, training facilities, and capabilities for government agencies involved in emergency response, nonproliferation technology development, national security technology development, and counterterrorism activities.

Strategic Partnership Program — Provides support facilities and capabilities for other agencies/organizations involved in defense-related activities.

Environmental Management

Environmental Restoration Program — The U.S. Department of Energy (DOE) Environmental Management (EM) Nevada Program is responsible for characterizing and implementing corrective actions to address the environmental legacy of nuclear weapons and other testing at the NNSS and certain offsite locations and develops and deploys technologies that enhance completion of environmental corrective actions safely and efficiently.

Waste Management Program — Manages and safely disposes of classified, low-level and mixed low-level waste received from DOE - and U.S. Department of Defense (DoD)-approved facilities throughout the U.S. and wastes generated in Nevada by the EM Nevada Program and NNSA/NFO. Safely manages and characterizes hazardous and transuranic wastes for offsite disposal.

Nondefense

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.

Conservation and Renewable Energy Programs — Operates the pollution prevention program and supports renewable energy and conservation initiatives at the NNSS.

Other Research and Development — Provides support facilities and NNSS access to universities and organizations conducting environmental and other research unique to the regional setting.

Environmental Compliance

Activities on the NNSS are subject to federal and state laws intended to protect the environment and public health. These laws define emission limits or prohibit the emission of toxic substances into the air, water, and ground; require plans to prevent spills, unplanned releases, and accidents; and call for programs to monitor, measure, document, and report on compliance to regulatory agencies and the public. The U.S. Environmental Protection Agency (EPA) and the Nevada Division of Environmental Protection (NDEP) are the principal regulators of NNSS activities. The following table defines and summarizes results for a few of the many federal regulations with which NNSA/NFO must comply.

Summary of NNSA/NFO's Compliance with Major Federal Statutes

Environmental Statute or Order and What It Covers	2024 Status
Atomic Energy Act (through compliance with DOE O 435.1, "Radioactive Waste Management"): Management of low-level waste (LLW) and mixed low-level waste (MLLW) generated or disposed on site	774,522 cubic feet of waste was disposed on site in LLW and MLLW disposal cells at the Area 5 RWMS. Some of this volume also included classified low-level and nonradioactive items. Waste volumes were within permit limits; vadose zone and groundwater monitoring continued to verify that disposed LLW and MLLW are not migrating to groundwater or threatening biota or the environment. No waste was disposed at the Area 3 RWMS in 2024.
Clean Air Act: Air quality and emissions into the air from facility operations	Onsite air sampling stations detected man-made radionuclides at levels comparable to previous years and well below the regulatory dose limit for air emissions to the public of 10 millirem per year (mrem/yr). The estimated dose from all 2024 NNSS air emissions to the maximally exposed individual (MEI) is 0.065 mrem/yr.
Clean Water Act: Water quality and effluent discharges from facility operations	All domestic and industrial wastewater systems and groundwater monitoring well samples were within permit limits for regulated water contaminants and water chemistry parameters.
Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/ Superfund Amendments and Reauthorization Act (SARA): Cleanup of waste sites containing hazardous substances	No NNSS cleanup operations are regulated under CERCLA or SARA; they are regulated under the Resource Conservation and Recovery Act (RCRA) and Federal Facility Agreement and Consent Order (FFACO) *(see below)*.
DOE O 458.1, "Radiation Protection of the Public and the Environment": Measuring radioactivity in the environment and estimating radiological dose to the public due to NNSA/NFO activities	Radiological monitoring of air, water, wildlife and direct radiation was conducted. The total annual dose to the MEI from all exposure pathways due to NNSA/NFO activities was estimated to be 2.58 mrem/yr, well below the DOE limit of 100 mrem/yr.
Emergency Planning and Community Right to Know Act (EPCRA): The public's right to know about toxic chemicals being stored, released to the environment, and/or managed through recycling or treatment	Approximately 101,524 lbs of lead, 1,076 lbs of mercury, 11 lbs of PCBs, 115,199 lbs of friable asbestos, 15,908 lbs of nickel, and 10,917 lbs of chromium compounds were released as a result of NNSS activities. These amounts exceeded the reporting thresholds of 100 lbs, 10 lbs, 10 lbs, 10,000 lbs, 10,000 lbs, and 10,000 lbs, respectively. About 99% of the lead was disposed onsite, with the remaining amount emitted to air, disposed offsite, and recycled. Almost all of the Mercury, and 85% of the PCBs were disposed onsite.
Endangered Species Act (ESA): Threatened or endangered species of plants and animals	Eighteen projects in desert tortoise habitat were reviewed and 12 projects in progress were carried over from prior years. Nine required biological surveys, and nine were determined to have no effects to the tortoise. No tortoises were observed or reported injured or killed due to project activities. A total of 55.2 acres of tortoise habitat were disturbed in 2024. There were 40 reported tortoise roadside observations, and no reported roadkill. All either moved or were moved off the roadways.

Continued on Page 9 ...

Federal Facility Agreement and Consent Order (FFACO): Identification, prioritization, investigation, and implementation of corrective actions at sites in Nevada contaminated by historic nuclear testing activities, and completing post-closure monitoring, as required	All 2024 corrective action milestones under the FFACO were met and 11 Corrective Action Sites (CASs) were closed. As of December 31, 2024, 2,954 of 3,044 CASs have been closed in accordance with state-approved corrective action plans.
Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA): Storage and use of pesticides and herbicides	Only nonrestricted-use pesticides were applied by state-certified personnel. Storage and use of pesticides were in compliance with federal and state regulations.
Migratory Bird Treaty Act (MBTA): Protecting migratory birds, nests, and eggs from harm	A total of 22 migratory birds were found dead in 2024. One common raven was electrocuted. Five birds were hit by vehicles including one sharp-shinned hawk, one immature red-tailed hawk, one barn owl, one common poorwill, and one northern mockingbird. Four birds (two red-tailed hawks, one great-horned owl, and one northern mockingbird) died of entrapment. Twelve birds were found dead due to unknown causes; a European starling, 2 red-tailed hawks, a sharp-shinned hawk, a mourning dove, a lesser goldfinch, a Say's phoebe, 2 common ravens, a Virginia rail, 1 northern mockingbird, and an ash-throated flycatcher. Some of the mortalities may have been caused by record-breaking heat.
National Environmental Policy Act (NEPA): Evaluating projects for environmental impacts	Thirty-nine proposed projects/activities were reviewed, with 12 being exempted from further NEPA analysis because they were of Categorical Exclusion status, and 27 were exempted due to their being included under the 2013 Site-Wide Environmental Impact Statement (SWEIS) analysis. NNSA/NFO also completed a Supplement Analysis (SA) of the 2013 SWEIS. The Amended Record of Decision was published in the Federal Register on July 30, 2024 (volume 89, number 146). The SA assessed the potential environmental impacts of projects/changes that have occurred at the NNSS and off-site locations in the State of Nevada, since publication of the SWEIS and Record of Decision, and the potential environmental impacts of projects that are expected to occur within approximately the next five years. Based on the analysis, NNSA determined that the potential impacts associated with the actions and operations evaluated in the SA would not be significantly different than impacts presented in the 2013 SWEIS; would not constitute a substantial change to the actions evaluated in the SWEIS relevant to environmental concerns; there were no significant new circumstances or information relevant to environmental concerns; and no additional National Environmental Policy Act (NEPA) documentation was required at this time.
National Historic Preservation Act (NHPA): Identifying and preserving historic properties	Field surveys and historical evaluations for 10 projects were completed, totaling over 73.28 acres. Fifty-three cultural resources were identified, 45 of which were determined eligible for the National Register of Historic Places.
Resource Conservation and Recovery Act (RCRA): Generation, management, disposal of hazardous waste (HW) and MLLW and cleanup of inactive, historical waste sites	Approximately 802 tons of MLLW were disposed on site, 13.99 tons of HW generated on site were temporarily stored at the permitted Hazardous Waste Storage Unit prior to shipment off site for treatment and/or disposal, 9.71 tons of HW, and 14.25 tons of polychlorinated biphenyl waste were shipped off site for disposal, all in accordance with state permits. No explosive ordnance was disposed at the Explosives Management Unit (formerly the Explosive Ordnance Disposal Unit) during 2024. In June 2024, NDEP confirmed that DOE satisfied all obligations under the *June 2021 Settlement Agreement to resolve regulatory actions resulting from the July 2019 waste issue. The thirty-four corrective actions implemented by DOE under the Settlement Agreement contribute to enhancing the rigor of waste management activities for the protection of the DOE workforce, the public, and the environment. * https://ndep.nv.gov/uploads/land-doe-aip-docs/NDEPDOEJune22SASignedF.pdf
Safe Drinking Water Act (SDWA): Quality of drinking water	All three permitted NNSS public water systems (PWS) met applicable national and state water quality standards.
Toxic Substances Control Act (TSCA): Management and disposal of PCBs	NNSS demolition activities generated; 61 containers, 12,926 kg (28,496 lb) of PCB material which were shipped off site for treatment and/or disposal; 3 containers, 699 kg (1,541 lb) of PCB material were disposed of at the Area 5 Mixed Waste Disposal Unit; 36 containers, 228,757 (504,323 lb) of PCB material were disposed of in the Area 9 Solid Waste Disposal Site.

The Legacy of NNSS Nuclear Testing

Approximately one-third of the 828 underground nuclear tests on the NNSS were detonated near or below the water table, resulting in radioactive contamination of groundwater in some areas. In addition, the 100 atmospheric nuclear tests conducted on the NNSS and numerous nuclear-related experiments resulted in radioactive contamination of surface soils, materials, equipment, and structures, mainly on the NNSS.

The mission of the EM Nevada Program is to address this legacy contamination. Mission responsibilities include overseeing characterization and implementation of corrective actions at contaminated sites, post-closure monitoring, and the compliant and safe acceptance and disposal of classified, low-level, and mixed low-level radioactive waste.

Aerial view of Yucca Flat showing subsidence craters from historical underground nuclear tests.

Continued on Page 11 ...

Legacy Contamination

Groundwater — The areas of known and potential groundwater contamination on the NNSS due to underground nuclear testing are called Underground Test Area (UGTA) corrective action units (CAUs). Three of the five UGTA CAUs have, with State approval, transitioned to long-term monitoring. In 2024, extensive model evaluation data was collected for the two remaining Pahute Mesa CAUs to enhance confidence in model results for use in developing a monitoring network and establishing use restrictions that ensure downgradient groundwater users remain protected.

Soil — Corrective actions have been completed at 148 sites on and around the NNSS where radioactively contaminated surface and near surface soils resulted from atmospheric nuclear testing, including Plowshare tests. The soils were contaminated by radioactive materials, oils, solvents, and heavy metals, as well as contaminated instruments and test structures used during testing activities.

Air — Airborne radioactive contamination from the resuspension of contaminated soils at legacy sites and from current activities is monitored continuously. Airborne concentrations of monitored contaminants have been decreasing at most sample locations on the NNSS. Total Ci estimated to be released across the entire NNSS fluctuate annually; the highest annual estimates since 1992 have been 2,240 Ci for tritium, 0.40 Ci for plutonium, and 0.070 Ci for americium. NNSS air emissions cannot be distinguished from background radiation in communities surrounding the NNSS.

Structures/Materials — Facilities, equipment, structures, and/or debris contaminated by historical nuclear activities are referred to as Industrial Sites and include disposal wells, inactive tanks, contaminated buildings, contaminated waste sites, inactive ponds, muck piles, spill sites, drains and sumps, and ordnance sites. During 2024, 11 CASs and the associated CAU were closed with regulatory approval. In addition, ancillary structures at the historic Engine Maintenance, Assembly, and Disassembly (EMAD) and Test Cell C (TCC) facilities were safely demolished. As of December 31, 2024, corrective actions have been completed at more than 1,950 of these sites located on the NNSS and NTTR. The eight remaining sites involve completing demolition and disposal of historic structures, and obtaining regulatory approval to close TCC and EMAD, which is planned for 2026 and 2031, respectively.

Waste Disposal — Classified, low-level and mixed low-level radioactive wastes have been generated by historical nuclear research, development, and testing activities and environmental cleanup activities. From the 1960s, when waste disposal began, through December 31, 2024, more than 2 million cubic yards of waste have been safely disposed at the Area 3 and Area 5 RWMSs.

Curie (Ci) is the traditional measure of radioactivity based on the observed decay rate of 1 gram of radium. One curie of radioactive material will have 37 billion disintegrations in 1 second.

The Federal Facility Agreement and Consent Order (FFACO) between the State of Nevada, DOE, and DoD identifies sites of potential contamination related to legacy (historical) nuclear testing in Nevada and outlines a strategy to address sites identified. Corrective actions have been completed for 97% of the 3,044 sites identified. The public is kept informed of EM Nevada Program activities through outreach events, fact sheets, and EM Nevada Program briefings for the Nevada Site Specific Advisory Board (NSSAB).

The NSSAB, a volunteer group of citizens representing Nevada communities, provides informed feedback, information, and recommendations on EM Nevada Program activities. The public may also provide comments at the beginning of NSSAB public meetings. Public meeting dates and more information can be found at https://www.nnss.gov/NSSAB/.

Numerous man-made and naturally occurring radionuclides occur on the NNSS. The radionuclides produce ionizing radiation in the form of alpha particles, beta particles, and gamma rays, which are emitted from the unstable radionuclides as they decay to form

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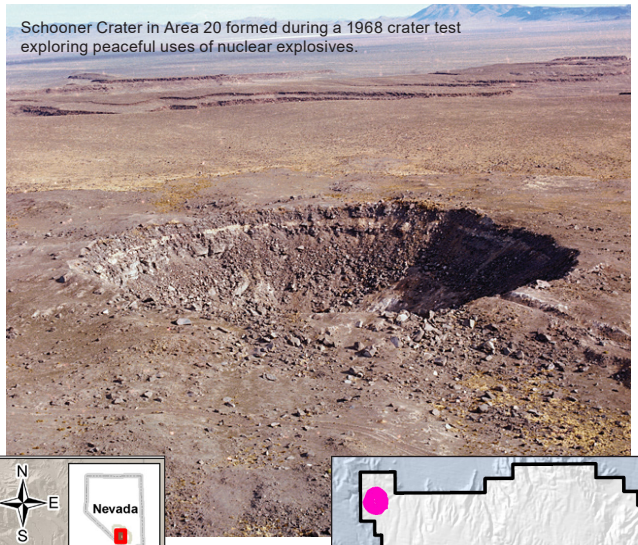
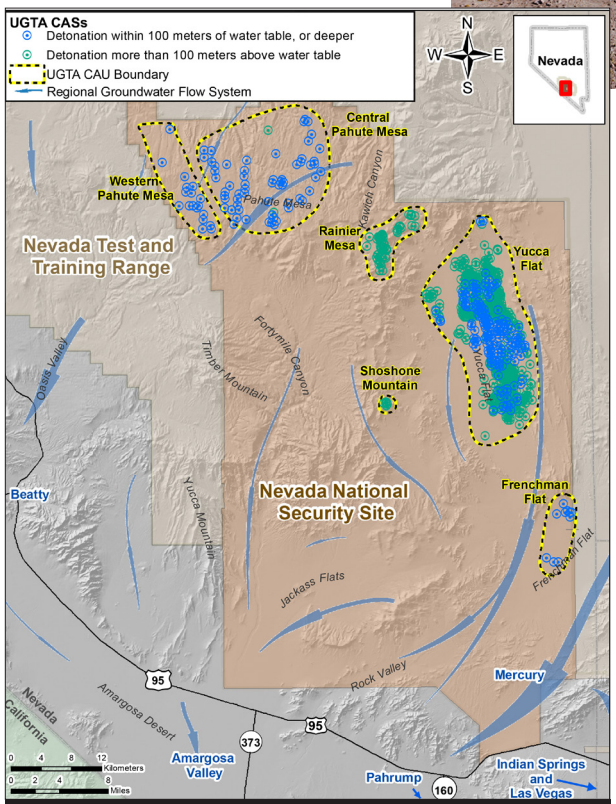
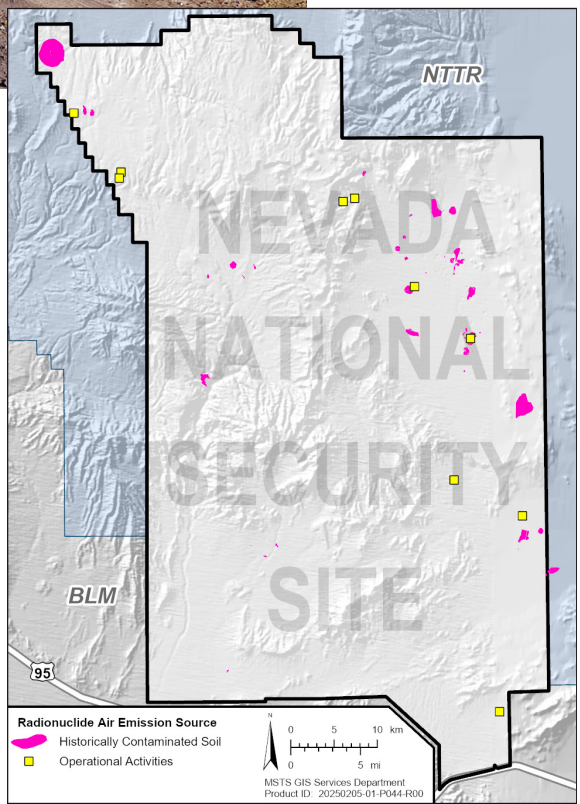


Schooner Crater in Area 20 formed during a 1968 crater test exploring peaceful uses of nuclear explosives.



UGTA CASs in Relation to Regional Groundwater Flow System



Sources of Radiological Air Emissions on the NNSS

more stable atoms. Almost all human exposure to ionizing radiation comes from natural sources that include cosmic radiation from outer space, terrestrial radiation from materials like uranium and radium in the earth, and naturally occurring radionuclides in food, water, and the aerosols and gases in the air we breathe. Man-made sources and applications of ionizing radiation in our everyday life include smoke detectors, X-rays, CT scans, and nuclear medicine procedures. For people living in areas around the NNSS, less than 0.04% of their total radiation exposure is potentially attributable to past nuclear testing or to current NNSS activities.

Forms of Radiation

Alpha particles are heavy, positively charged particles given off by some decaying atoms. Alpha particles can be blocked by a sheet of paper. Atoms emitting alpha particles are hazardous only if they are swallowed or inhaled.

Beta particles are electrons or positrons (positively charged electrons) ejected from the nucleus of a decaying atom. More penetrating than alpha radiation, beta particles can pass through several millimeters of skin. A sheet of aluminum only a fraction of an inch thick will stop beta radiation. Beta particles can damage skin but are most hazardous if swallowed or inhaled.

Gamma rays are waves of pure energy similar to X-rays, light, microwaves, and radio waves. Gamma rays are emitted by certain radionuclides when their nuclei transition from a higher to a lower energy state. They can readily pass into the human body. They can be almost completely blocked by about 40 inches of concrete, 40 feet of water, or a few inches of lead. Gamma rays can be both an external and internal hazard.

X-rays are a more familiar form of electromagnetic radiation, usually with a limited penetrating power, typically used in medical or dental examinations. Television sets, especially color, give off soft (low-energy) X-rays; thus, they are shielded to greatly reduce the risk of radiation exposure.

Neutrons are uncharged heavy particles contained in the nucleus of every atom heavier than ordinary hydrogen. They induce ionization only indirectly in atoms that they strike, but they can damage body tissues. Neutrons are released, for example, during the fission (splitting) of uranium atoms in the fuel of nuclear power plants. They can also be very penetrating. In general, efficient shielding against neutrons can be provided by materials containing hydrogen, such as water. Like gamma rays, neutrons are both an external and internal hazard.

Radionuclides Monitored on the NNSS[a]

	Name[b]	Abbreviation	Primary Type(s) of Radiation	Major NNSS Sources
Man-Made	Tritium	^{3}H	Beta	Some or all of these radionuclides exist in various locations, such as in groundwater in areas of underground nuclear tests, in surface ponds used to contain contaminated groundwater, in soil at nuclear test locations, in waste packages buried in radioactive waste management sites, and may be monitored in water, soil and/or air (due to particulate resuspension or evaporation [Tritium]).
	Carbon-14	^{14}C	Beta	
	Chlorine-36	^{36}Cl	Beta	
	Cobalt-60	^{60}Co	Gamma	
	Strontium-90	^{90}Sr	Beta	
	Technetium-99	^{99}Tc	Beta	
	Iodine-129	^{129}I	Beta	
	Cesium-137	^{137}Cs	Beta, gamma	
	Europium-152	^{152}Eu	Gamma	
	Europium-155	^{155}Eu	Gamma	
	Americium-241	^{241}Am	Alpha, gamma	
	Plutonium-238	^{238}Pu	Alpha	
	Plutonium-239/240	$^{239+240}Pu$	Alpha	
Naturally Occurring	Beryllium-7	^{7}Be	Gamma	Produced by interactions between cosmic radiation from the sun and the earth's upper atmosphere. Detected in air.
	Potassium-40	^{40}K	Beta, gamma	Naturally occurring in the earth's crust. Detected in water, soil, and air.
	Radium-226	^{226}Ra	Alpha, gamma	
	Thorium-232	^{232}Th	Alpha	
	Uranium-234[c]	^{234}U	Alpha	
	Uranium-235[c]	^{235}U	Alpha, gamma	
	Uranium-238[c]	^{238}U	Alpha	

[a] For samples analyzed for gamma-emitting radionuclides, any man-made radionuclide identified by the laboratory will be reported. The most common are listed.

[b] The number given with the name of the radionuclide is the atomic mass number, which is the total number of protons and neutrons in the nucleus of the atom. Atoms with the same number of protons are the same element; atoms of the same element with different mass numbers are called isotopes of one another.

[c] These uranium isotopes, though of natural origin, can also be detected at specific NNSS locations where man-made depleted uranium has been released during experiments, resulting in an alteration of the relative amounts of each isotope.

Completing FFACO Corrective Actions

Corrective Actions Progress

The EM Nevada Program is responsible for evaluating and implementing corrective actions at sites within Nevada as identified in the FFACO that were impacted by historical nuclear testing, research, and development activities. These CASs are located on the NNSS, NTTR, and TTR and are grouped into larger CAUs according to location, physical and geological characteristics, and/or contaminants. Environmental corrective action strategies are developed and completed based on the nature and extent of contamination, the risks posed by contamination, and projected future land use. Since 1989, the EM Nevada Program has obtained regulatory approval to close 99% of the more than 2,100 surface and near-surface CASs and 91% of the 878 UGTA CASs. In addition, post-closure monitoring, required for approximately one-third of all closed sites, has been implemented.

The eight remaining sites involve completing demolition and disposal of historic structures, and obtaining regulatory approval to close TCC and EMAD, which is planned for 2026 and 2031, respectively.

UGTA Sites

The EM Nevada Program gathers data to characterize impacts to groundwater that resulted from historical nuclear testing at the NNSS. The data are used to develop groundwater flow and transport models that forecast groundwater movement and transport of radiological contaminants in five characterization areas, referred to as CAUs. The agreed-upon corrective action for UGTA CAUs is closure in place with institutional controls and monitoring (FFACO, 1996, as amended).

Restoration Progress under FFACO

In 2024, one CAU was closed and all FFACO milestones were met. In addition, ancillary structures at the historic EMAD and TCC facilities were safely demolished. As of December 31, 2024, 2,954 of 3,044 CASs have been closed in accordance with state-approved corrective action plans and closure reports.

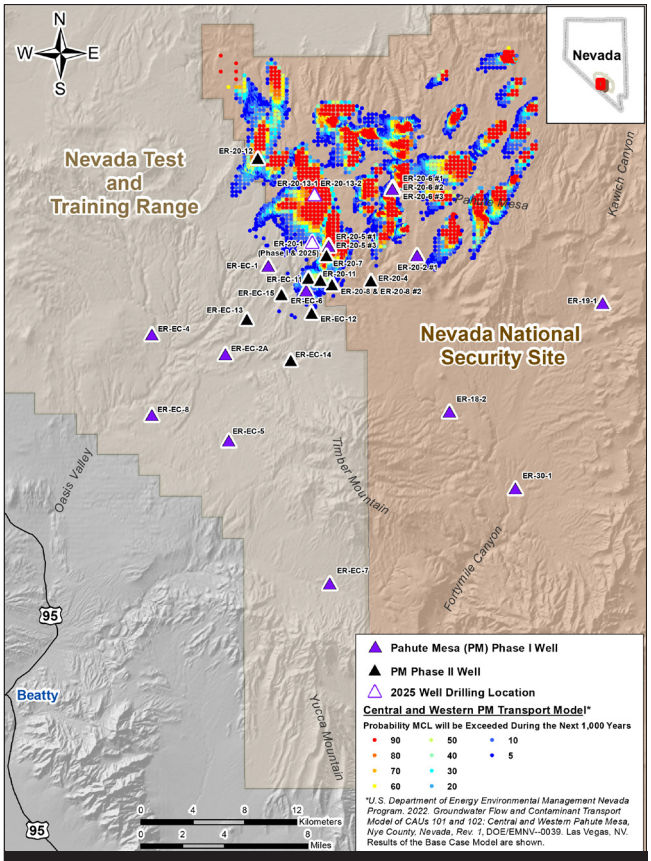
UGTA Sites Closure Process

Investigation Stage	Characterizing groundwater flow system, characterizing groundwater contamination from underground nuclear testing, building flow and contaminant transport models
Model Evaluation	Evaluating models and modeling forecasts with field data
Closure Stage	Implementing long-term groundwater monitoring program and establishing controls to prevent access to contaminated groundwater

Continued on Page 14 ...

Pahute Mesa Groundwater Monitoring Results in Perspective

- Based on conservative scientific calculations and sampling results, it will take at least 100 years for tritium to reach the closest public land boundary, at which time the concentration is estimated to be in compliance with safety standards.
- In approximately 200 years, the concentration of tritium will be nearly zero at the closest public land boundary because of radioactive decay.
- Based on model forecasts supported by sampling results, test-related radionuclides, including tritium, will not exceed safety standards (maximum contaminant levels) at the closest public land boundary within 1,000 years.



Contaminant boundary forecasted by the Pahute Mesa Base-Case Groundwater Flow and Contaminant Transport Model

This corrective action is based on three assumptions: (1) groundwater technologies for removal or stabilization of subsurface radiological contamination are not cost effective; (2) because of high remediation costs, closure in place with monitoring and institutional controls is the only likely corrective action; and (3) in order for workers, the public, and the environment to be exposed to the potential risks from radiological contamination in groundwater, the contaminated groundwater must first be accessed. Three UGTA CAUs, Frenchman Flat (CAU 98), Rainier Mesa/Shoshone Mountain (CAU 99), and Yucca Flat/Climax Mine (CAU 97), are in the closure stage with continued groundwater sampling and water-level

Continued on Page 15 ...

measurements (both on and off the NNSS) conducted in accordance with approved Closure Reports. Two UGTA CAUs, Central and Western Pahute Mesa (CAUs 101/102), advanced to the model evaluation stage in 2023, marking a major step toward achieving regulatory closure.

Central and Western Pahute Mesa CAUs – Model evaluation activities for these CAUs (comprising 82 total CASs) are identified in the Corrective Action Decision Document/ Corrective Action Plan (CADD/CAP) which was submitted to NDEP in October 2023. Model evaluation focuses on improving confidence in the model results for use in developing a monitoring network and establishing use restrictions that ensure downgradient groundwater users remain protected.

The figure on page 14 depicts the model forecasted probability for groundwater to exceed SDWA maximum contaminant levels over the next 1,000 years (i.e., contaminant boundary). The contaminant boundary, primarily defined by tritium, extends a few kilometers beyond the NNSS boundary but remains more than 12 km upgradient of the closest public groundwater user in Oasis Valley.

December 2024 groundwater sampling at ER-20-7.

A Risk Evaluation of Radionuclides in Groundwater for the Pahute Mesa CAUs (Navarro 2024) presents the potential impacts to the health of hypothetical human receptors from exposure to radiological contaminants in groundwater of the Pahute Mesa CAUs. The results of this evaluation provide additional confidence that public groundwater users downgradient of the NNSS in Oasis Valley will not be adversely impacted by the radionuclides within the 1,000-year time frame defined in the FFACO. During 2024, model evaluation activities were conducted for the Pahute Mesa CAUs, to include implementing remote data acquisition, performing Controlled-Source Audio-frequency Magnetotelluric geophysical surveys, and planning for drilling three wells in 2025. These activities provide additional data that will be used to evaluate and update computer models. In addition, groundwater samples were collected from 12 locations within 8 wells in the

In 2024, extensive model evaluation data was collected for Pahute Mesa CAUs as part of the model evaluation stage. Model evaluation activities are focused on improving confidence in the model results for use in developing a monitoring network and establishing use restrictions that ensure downgradient groundwater users remain protected.

Continued on Page 16 ...

Pahute Mesa CAUs. The sampling results (presented in Chapter 5), including samples with no radionuclides present, will continue to be used to ensure that the groundwater flow and contaminant transport model results are consistent with known levels of contamination within the Pahute Mesa CAUs.

Frenchman Flat CAU – The Closure Report for this CAU (comprising 10 CASs) was approved by NDEP in 2016 and includes a description of the monitoring program; contaminant, use-restriction, and regulatory boundaries; and land-use restrictions. During 2024, water levels were measured at 17 completion zones in 15 wells within the Frenchman Flat CAU monitoring network. Groundwater sampling of the six wells in the Frenchman Flat monitoring network will occur in 2026.

All monitoring results continue to indicate closure objectives are being met to protect downgradient groundwater users from exposure to radionuclide contamination.

Rainier Mesa/Shoshone Mountain CAU – The Closure Report for this CAU (comprising 66 CASs) was approved by NDEP in 2020 and includes a description of the monitoring program; contaminant, use-restriction, and regulatory boundaries; and land-use restrictions. The monitoring network includes 16 locations for sampling and/or water-level measurements. Sampling for tritium will occur in 2026 as it is required every 6 years; additional radionuclides are analyzed at three locations that sample water from the tunnels. Rainier Mesa/Shoshone Mountain water levels were measured at five wells, with seven completions, and two vent holes in 2024, as it is required annually.

All monitoring results continue to indicate closure objectives are being met to protect downgradient groundwater users from exposure to radionuclide contamination.

September 2024 node installation at U-12n.10 Vent Hole, a water level monitoring location for the Rainier Mesa/Shoshone Mountain CAU.

Continued on Page 17 ...

Post-closure monitoring results for the Frenchman Flat, Rainier Mesa/ Shoshone Mountain, and Yucca Flat/ Climax Mine CAUs are consistent with the groundwater flow and contaminant transport models. All monitoring results indicate that closure objectives have been met. Use restrictions continue to prevent exposure of the public, workers, and the environment.

Yucca Flat/Climax Mine CAU – The Closure Report for this CAU (comprising 720 CASs) was approved by NDEP in 2020 and includes a description of the monitoring program; contaminant, use-restriction, and regulatory boundaries; and land-use restrictions. The monitoring network includes 10 sampling locations analyzed for tritium every 6 years, an additional well (WW C-1) sampled annually for the first 6 years, and 20 water-level monitoring wells (25 total intervals) measured annually. During 2024, WW C-1 was sampled once and validated tritium results from the laboratory are consistent with the 2023 results, and significantly less than 1 percent of the SDWA limit. In addition, water levels were measured at each of the 25 locations in 2024.

All monitoring results continue to indicate that closure objectives are being met to protect downgradient groundwater users from exposure to radionuclide contamination.

Industrial Sites and Soils

Characterization, corrective action, and closure activities have been completed at 2,115 Industrial Sites and Soils CASs on and off the NNSS. Closure strategies include removal of debris, excavation of soil, decontamination and decommissioning of facilities, and closure-in-place with subsequent monitoring. The contaminants of concern include hazardous chemicals/materials, unexploded ordnance, and low-level radiological materials. Clean closures are those where contaminants above action levels (agreed upon with the regulator) have been removed and properly disposed. Closure-in-place entails the stabilization or isolation of pollutants, hazardous materials, radiological materials, and solid wastes, with or without partial treatment, removal activities, and/or post closure monitoring in accordance with corrective actions plans approved by NDEP under the FFACO.

Post-closure inspection requirements are established at various frequencies (e.g., quarterly, annually, every 5 years) to verify the long-term protection of the public and the environment. During 2024, there were 133 CASs within 70 FFACO Industrial Sites and Soils CAUs on the NNSS with post-closure inspection requirements and 12 CASs (in 7 CAUs) that require inspections by the RCRA Part B Permit. In 2024, the EM Nevada Program conducted post-closure inspections at 113 non-RCRA

Continued on Page 18 ...

Industrial Sites and Soils CASs managed under the FFACO and performed 44 inspections at CASs within the 7 CAUs identified in the RCRA Part B Permit. The results are published in annual inspection reports.

Eight additional Industrial Sites CASs from two other CAUs are still undergoing corrective actions. Both CAUs are located in Area 25: Engine Maintenance, Assembly, and Disassembly Facility (CAU 114) and Test Cell C Ancillary Buildings and Structures (CAU 572) where ancillary structures were safely demolished in 2024. Both CAUs will close prior to the end of the EM Nevada Program mission, which is currently planned in 2031.

November 2024 demolition of an exhaust stack at the Engine Maintenance, Assembly, and Disassembly Facility

Post-Closure Inspection of CASs in 2024

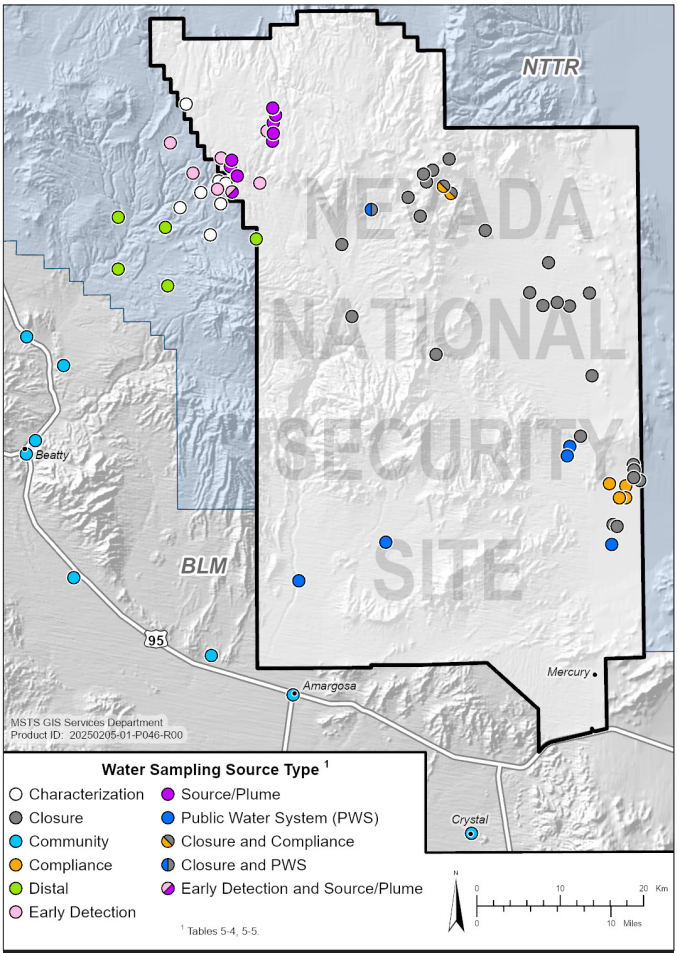
113 non-RCRA CASs were inspected and 44 inspections were performed at sites identified in the RCRA Part B Permit.

Radiological Monitoring of Groundwater

Types of Groundwater Sampling Locations	
Characterization	Used for groundwater characterization or UGTA CAU model evaluation
Source/Plume	Located within the plume from an underground nuclear test; test-related contamination is currently present
Early Detection	Located downgradient of an underground test; no radioisotopes are detected above standard detection levels
Distal	Located outside the Early Detection area
Community	Located on BLM or private land; used as a water supply source or is near one
NNSS PWS	Potable water supply well that is part of a state-designated non-community PWS
Compliance	Monitored to comply with specific regulations or permits

Tritium is analyzed in water samples from all monitoring wells because it is the most mobile in groundwater and is known to exceed its allowable drinking water limit in wells downgradient of underground nuclear testing. Other radionuclides are analyzed depending on the location type (see "Types of Groundwater Sampling Locations" box).

For decades NNSA/NFO and EM Nevada Program have sampled groundwater from wells on and off the NNSS to detect radionuclides that may be present as a result of historical underground nuclear testing. More than 100 wells are available for sampling by NNSA/NFO and the EM Nevada Program to meet various objectives. The radiological water sampling network currently consists of 72 sample locations categorized into eight different well types. Sampling requirements are presented in sampling plans, closure reports, permits, or procedures depending on the well type.



NNSA/NFO and EM NV Program Water Sampling Network

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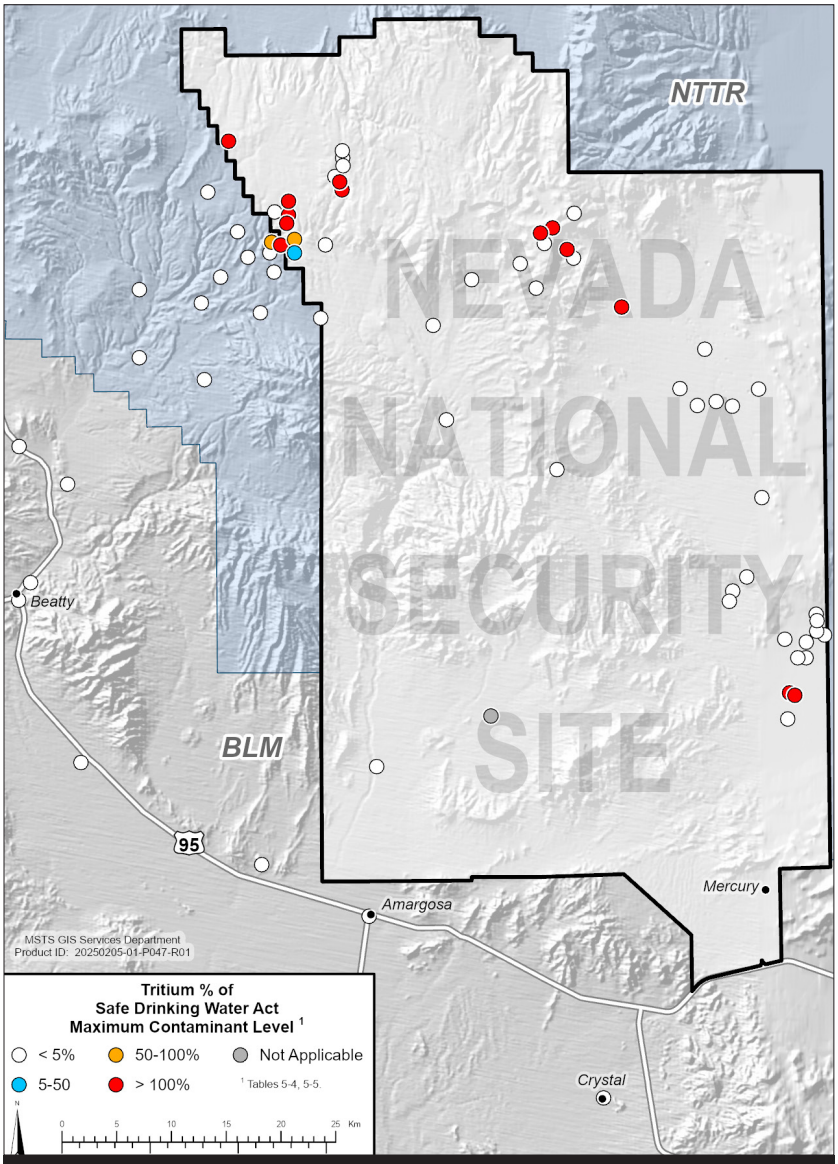


Tritium in NNSA/NFO and EM Nevada Program Groundwater Monitoring Wells

The tritium analysis results for all sampling locations in the network are shown on the map on page 20. The well sites are color coded based on the tritium concentration of their most recent water sample. The maximum contaminant level (MCL) allowed for tritium in drinking water, set by the EPA under the SDWA, is 20,000 pCi/L. The color codes represent tritium levels expressed as a percentage of this MCL. For example, the 5%–50% category means that tritium was found to be between 5% to 50% of the MCL, or between 1,000 and 10,000 pCi/L.

The 13 UGTA wells that currently exceed the SDWA MCL (coded red on the map) are all located on the NNSS and are either Source/Plume, Characterization, or are wells undergoing long-term monitoring for closed CAUs. All Community sampling locations, which are on Bureau of Land Management (BLM) or private land, have undetectable levels of tritium (coded white on the map). Characterization well ER-EC-11 on the NTTR just west of the NNSS is the only offsite well in the network that has tritium concentrations greater than 10,000 pCi/L (coded orange on the map). Tritium has not been detected in any NNSS PWS wells, and all wells and surface waters that are monitored to ensure compliance with NNSS permits had either undetectable levels of tritium or tritium levels that were below permit limits.

Community Environmental Monitoring Program

Offsite water supply wells are also monitored for the presence of tritium by the independent Community Environmental Monitoring Program

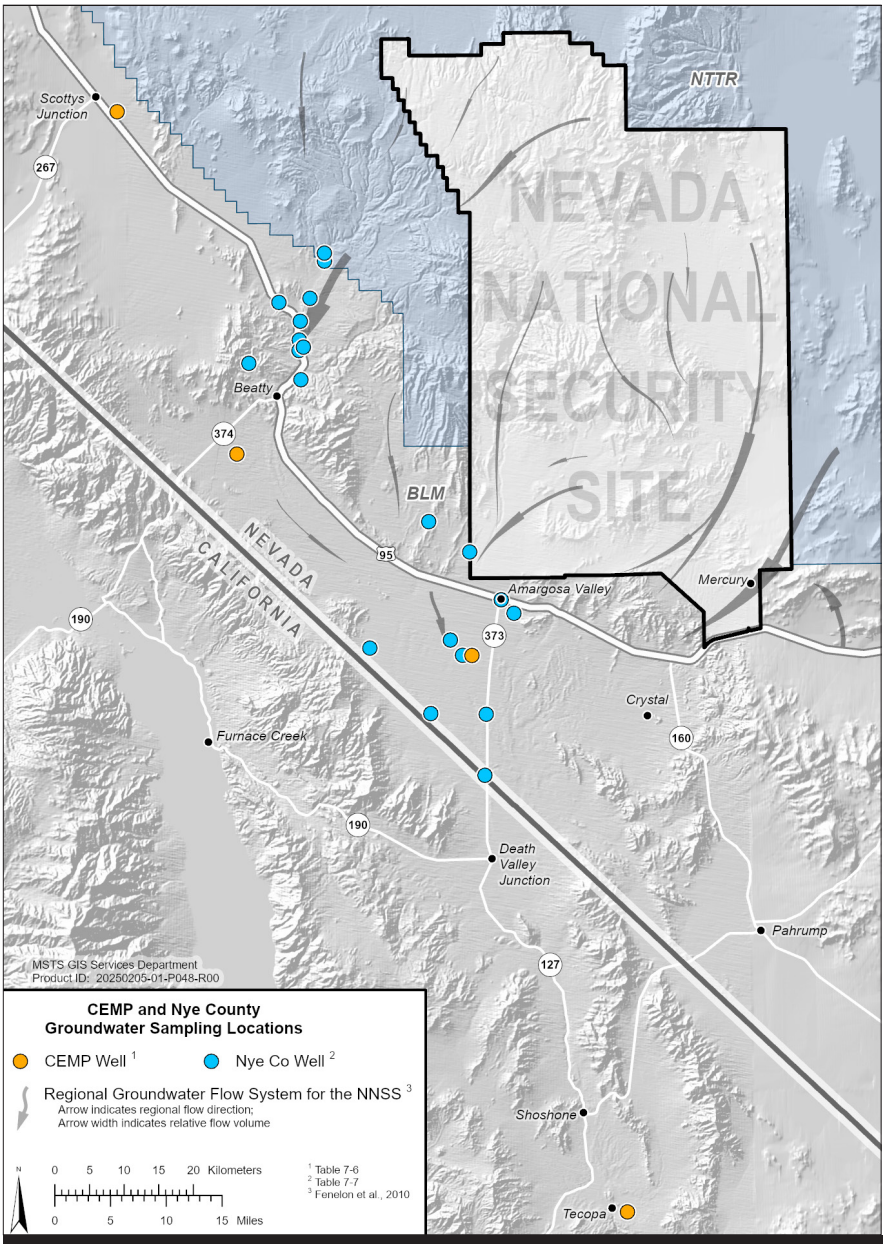
Continued on Page 21 ...

(CEMP), which is coordinated by the Desert Research Institute (DRI) of the Nevada System of Higher Education under contract with NNSA/NFO. The CEMP provides the public with these data as part of a non-regulatory public informational and outreach program.

In 2024, the CEMP monitored groundwater wells in communities located within the regional groundwater flow system that are downgradient or perceived to be downgradient of the NNSS. As in previous years, none of these wells had detectable levels of tritium.

Nye County Tritium Sampling and Monitoring Program

The Nye County Tritium Sampling and Monitoring Program (TSaMP) was initiated in 2015 in response to the county's request to expand its support of offsite community-based monitoring of wells for tritium. EM Nevada Program issued a 5-year grant to Nye County to monitor tritium in wells downgradient of the NNSS. The grant was extended through 2026 and supports the annual sampling of 10 core locations (i.e., the same locations year to year) and 10 additional locations (selections change from year to year). The grant also supports Nye County's involvement in technical reviews of the UGTA sites closure process. The Nye County TSaMP sampled 20 locations (17 wells, 3 springs) in 2024. None of the 20 locations had detectable levels of tritium.



2024 CEMP and Nye County Water Monitoring Locations

Tritium from underground nuclear testing has not been detected in any onsite or offsite drinking water wells.

Radiological Monitoring of Air

NNSS radioactive emissions are monitored to determine the public dose from inhalation and to ensure compliance with the National Emission Standards for Hazardous Air Pollutants (NESHAP) under the Clean Air Act. A network of 18 air sampling stations and a network of 105 thermoluminesc ent dosimeters (TLDs) are located throughout the NNSS (see map to the right). NNSS air sampling stations monitor tritium in water vapor, man-made radionuclides, and gross alpha and beta radioactivity in airborne particles. The TLD stations monitor direct gamma radiation exposure.

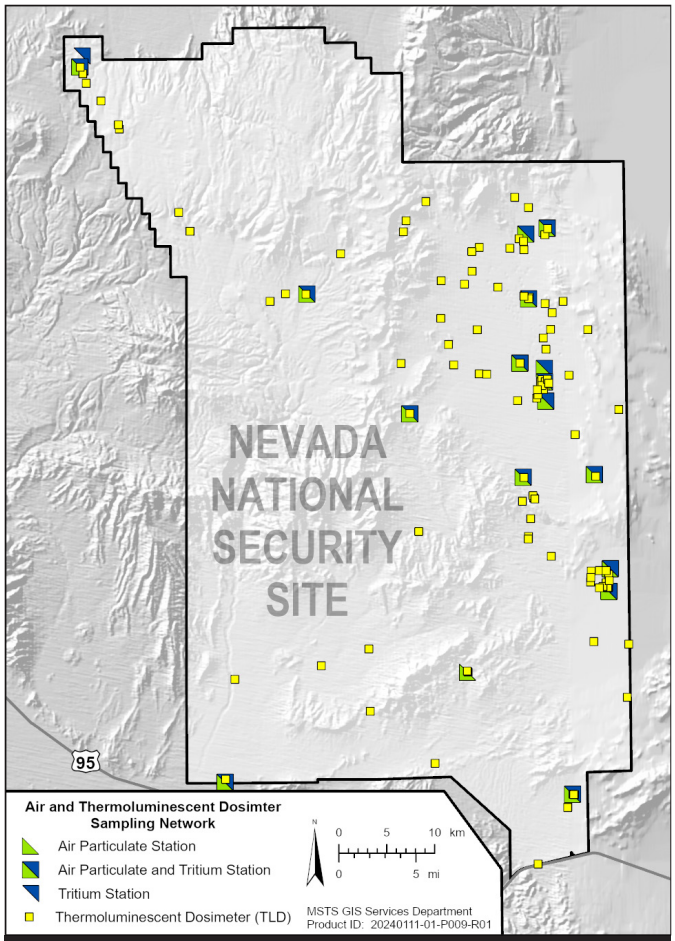
Radioactive emissions are also monitored at stations in selected towns and communities in Nevada, Utah, and California by the CEMP. A network of 24 CEMP stations was operational in 2023 (see map on Page 23). The CEMP stations monitor gross alpha and beta radioactivity in airborne particles using low-volume particulate air samplers, penetrating gamma radiation using environmental dosimeters, gamma radiation exposure rates using pressurized ion chamber (PIC) detectors, and meteorological (MET) parameters using automated weather instrumentation.

Several man-made radionuclides were detected at NNSS air sampling stations in 2024: the Bunker 9-300 annual average for $^{239+240}$Pu exceeded the Clean Air Act concentration level (CL) due to the second quarter result of 3.73687×10^{-15} µCi/mL. Very dry and windy conditions and this sampler's proximity to several contamination areas was likely the reason for the higher concentrations. Although this location's annual average exceeded the CL value, it is not a location where the public has access or resides.

Range in Average Concentrations of Man-Made Radionuclides in Air Samples on the NNSS in 2024 Attributable to NNSS Operations

Radionuclide	Concentration (10^{-15} µCi/mL)[a] Limit[b]	Lowest Average	Highest Average
^{241}Am	1.9	-0.00174	0.39345
^{137}Cs	19	-0.2724	0.794
^{3}H	1,500,000	-780	94,350
^{238}Pu	2.1	-0.00201	0.04596
$^{239+240}$Pu	2.0	-0.0005	3.73687 (c)

(a) The scale of concentration units for radionuclides shown in the table has been standardized to 10^{-15} microcuries per milliliter (µCi/mL). This scale may differ from those reported in detailed radionuclide-specific data tables in the NNSSER.
(b) The concentration established by NESHAP as the compliance limit.
(c) This value was from the Bunker 9-300 location's second quarter composite sample. Very dry and windy conditions and this sampler's proximity to several contamination areas was likely the reason for this higher concentration. Although this value exceeded the Limit value, it is not a location where the public has access or resides.



2024 NNSS Air Sampling Network

Continued on Page 23 ...

Estimated Quantity of Man-Made Radionuclides Released into the Air from the NNSS in 2024 (in Curies)

	Tritium (^{3}H)	Americium (^{241}Am)	Plutonium (^{238}Pu)	Plutonium ($^{239+240}$Pu)	Noble Gases	Other Radionuclides	
	35	0.070	0.038	0.29	293	0	69.3
Half-life*	12 years	432 years	88 years	>6,500 years	<37 days	<3 hours	>3 hours

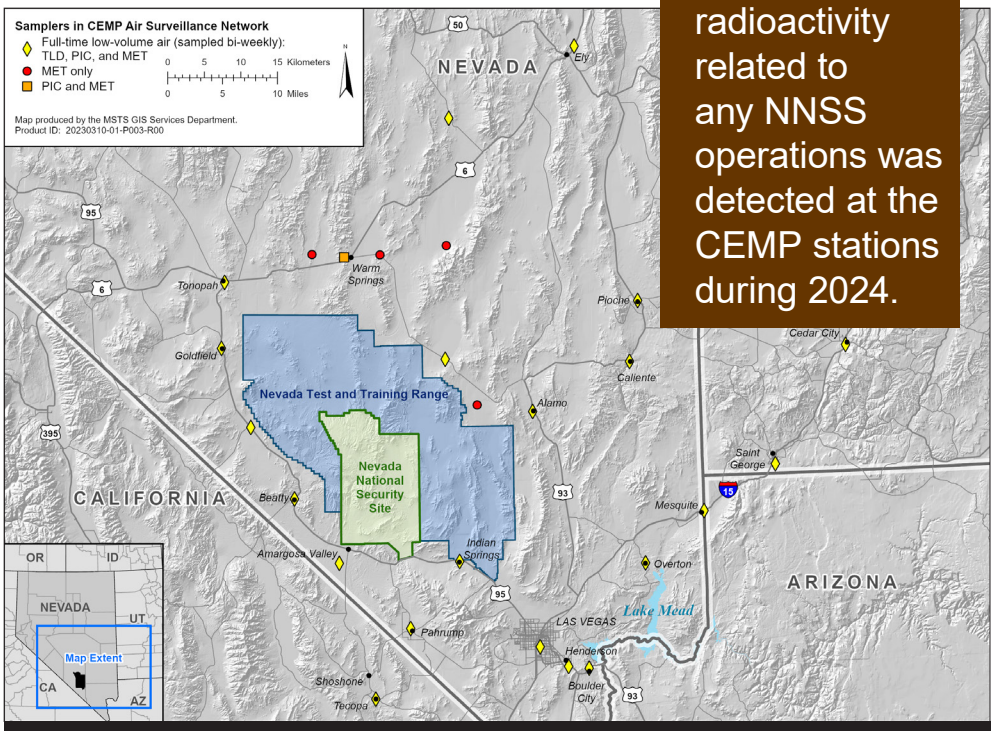
* Half-life is the time required for one-half of the radioactive atoms in a given amount of material to decay.

The highest average levels of ^{241}Am, ^{238}Pu and $^{239+240}$Pu were detected at the Bunker 9-300 station in Area 9, which is located within areas of known soil contamination from past nuclear tests. The highest average level of tritium was detected at Schooner, site of the second-highest yield Plowshare cratering experiment on the NNSS, where tritium-infused ejecta surrounds the crater. ^{137}Cs was detected in seven samples during 2024. These were the second quarter values at Kestrel Crater, U-3AX/BL S, Bunker 9-300, Gate 700 S, and the first, second and third quarter values at Sedan N.

CEMP air monitoring station located in Tonopah, Nevada.

The total amount of man-made radionuclides emitted to the air was estimated to be 398 Ci. All radionuclides detected by environmental air samplers in 2024 are from known sources which include: (1) legacy deposits of radioactivity on and in the soil from past nuclear tests, (2) the upward flux of tritium from the soil at sites of past nuclear tests and low-level radioactive waste burial, and (3) NNSS operations.

No airborne radioactivity related to any NNSS operations was detected at the CEMP stations during 2024.



2024 CEMP Air Surveillance Network

Direct Radiation Monitoring

Ten NNSS TLD stations are located where radiation effects from past or present NNSS operations are negligible, and therefore measure only natural background levels of gamma radiation from cosmic and terrestrial sources. In 2024, the mean measured background level from the 10 stations was 122 milliroentgens per year (mR/yr). This is well within the range of variation in background levels observed in other parts of the U.S. of similar elevation above sea level. Background radiation varies not only by elevation but by the amounts of natural radioactive materials in soil and rock in different geographic regions.

The highest estimated mean annual gamma exposure measured at a TLD station on the NNSS was 382 mR/yr at Schooner, one of the legacy Plowshare sites on Pahute Mesa.

In the fall of 2021, the CEMP began deploying a new type of dosimeter at CEMP stations and implemented calculation methods that more accurately reflect exposure rates at each site. The CEMP offsite dosimeter and PIC results remained consistent with previous years' background radiation levels and are also well within the range of variation in background levels observed in other parts of the U.S. and with the 122 mR/yr level measured on the NNSS. The highest annual gamma exposure measured off site, based on the PIC detectors, was 159 mR at Warm Springs Summit, Nevada. The lowest offsite exposure rate, based on the PIC detectors, was 72 mR at Pahrump, Nevada.

Average Background Radiation of Selected U.S. Cities (Excluding Radon)
Ranked from Highest to Lowest

City	Approximate Elevation Above Sea Level (feet)	Radiation (mR/yr)
Denver, CO	5,280	186
Las Vegas, NV	2,001	122
Wheeling, WV	686	115
St. Louis, MO	465	115
Los Angeles, CA	305	115
Portland, OR	161	115
Fort Worth, TX	686	92
Rochester, NY	505	92
Richmond, VA	150	92
Tampa, FL	48	92
New Orleans, LA	7	92

Elevation source: internet search
Radiation source: main report, Table 7-5

2024 NNSS Background Gamma Radiation

122 mR/yr — This is the mean background radiation measured at 10 TLD stations in areas isolated from past and present nuclear activities.

TLD station (post with TLD attached) located at Schooner Crater.

Average Direct Radiation Measured in 2024 on and off the NNSS

Location	Elevation Above Sea Level (feet)	Radiation Exposure (mR/yr)
NNSS – Schooner TLD station (highest measurement)	5,660	382
NNSS – 35 Legacy Site TLD stations (includes Schooner)	3,077–5,938	189
Las Vegas, Nevada CEMP PIC station	2,001	100
NNSS – 19 Waste Operation TLD stations	3,176–4,021	138
NNSS – 10 Background TLD stations	2,755–5,938	122
Bloomington Hills, St. George, Utah CEMP PIC station	2,706	120
Pahrump, Nevada CEMP PIC station	2,639	72
NNSS – Gate 100 Truck Parking 1	3,602	74

Understanding Radiation Dose

Dose is a generic term to describe the amount of radiation a person receives. The energy deposited generally correlates with the number of molecules potentially affected. The energy the radiation deposits in tissue is called the absorbed dose. The units of measure of absorbed dose are the rad or the gray. The biological effect of radiation depends on the type of radiation (alpha, beta, gamma, or X-ray) and the tissues exposed. A measure of the biological risk of the energy deposited is the dose equivalent. The units of dose equivalent are called rems or sieverts. In the NNSSER, the term dose is used to mean dose equivalent measured in rems. A thousandth of a rem is called a millirem (mrem).

An average person in the United States receives about 310 mrem each year from natural sources and an additional 310 mrem from medical procedures and consumer products (Source: https://www.epa.gov/radiation/radiation-sources-and-doses). Whether there is a "safe" radiation dose equivalent is a controversial subject. Because the topic has yet to be settled scientifically, regulators take a

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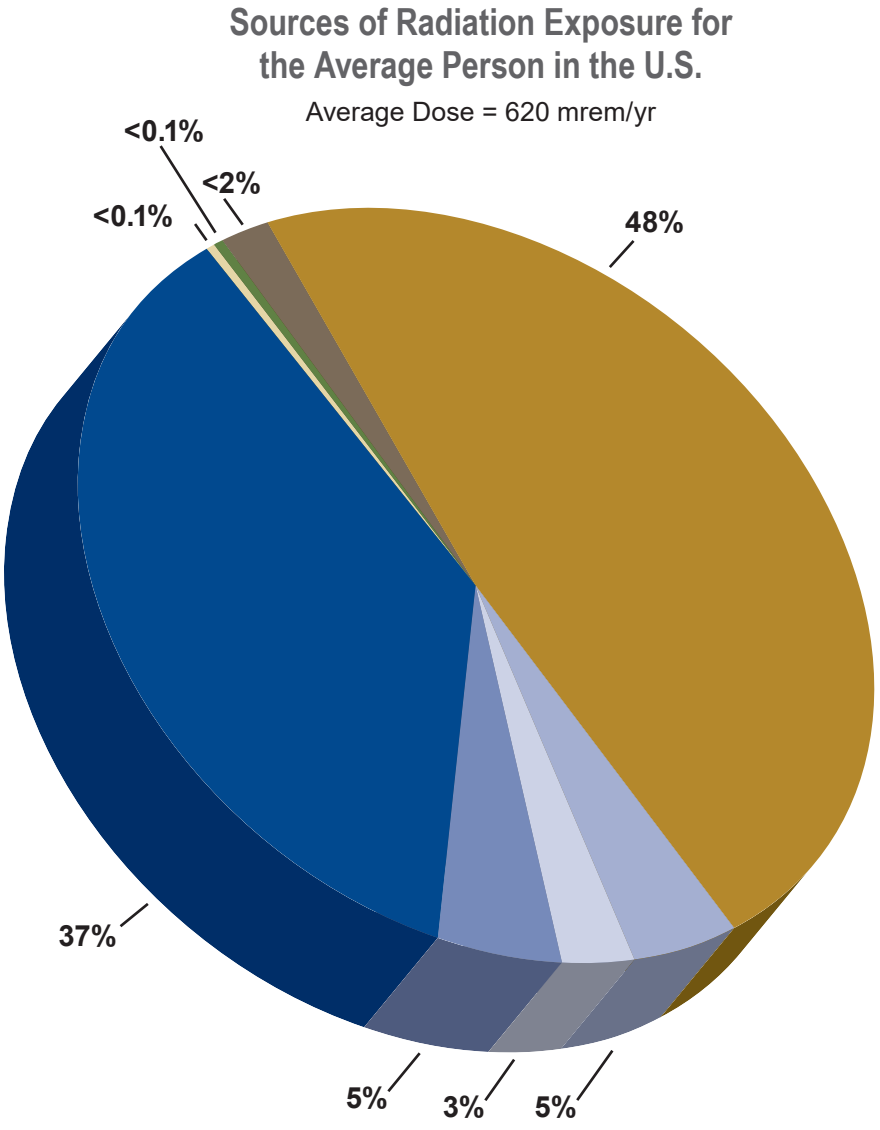


conservative approach and assume that there is no such thing as a 100% safe dose equivalent. It is believed that the risk of developing an adverse health effect (such as cancer) is proportionate to the amount of radiation dose received.

Many human activities increase our exposure to radiation over and above the average background radiation dose of 310 mrem per year. These activities include, for example, uranium mining, airline travel, and operating nuclear power plants. Regulators balance the benefit of these activities with the risk of increasing radiation exposures above background and, as a result, set dose limits for the public and workers specific to these activities. DOE has set the dose limit to the public from exposure to DOE-related nuclear activities to 100 mrem/yr. This is the same public dose limit set by the U.S. Nuclear Regulatory Commission (NRC) and recommended by the International Commission on Radiological Protection and the National Commission on Radiological Protection and Measurements. The NRC has set the dose limit for radiation workers to 5,000 mrem/yr. There are no common or agreed-upon dose limits for workers or the public across industries, states, or countries.

Average Doses from Radiation Sources

Source	Dose (mrem)
Living near a nuclear power station *(annual)*	<1
Chest X-ray *(single procedure)*	10
Terrestrial radioactivity *(annual)*	21
Radiation in the body *(annual)*	29
Cosmic *(at sea level) (annual)*	30
Mammogram *(single procedure)*	42
Cosmic *(in Denver) (annual)*	80
Head CT scan *(single procedure)*	200
Radon in average U.S. home *(annual)*	228
Upper gastrointestinal X-ray with fluoroscopy *(single procedure)*	600
Whole body CT scan *(single procedure)*	1,000

Source: https://www.epa.gov/radiation/radiation-sources-and-doses#tab-2

Dose — The amount of radiation a person receives.

Absorbed dose — The energy the radiation deposits in tissue, where the energy deposited indicates the number of molecules disrupted. The units of measure of absorbed dose are the rad or the gray.

Dose equivalent — A measure of the biological risk of the energy deposited in tissue, which depends on the type of radiation (alpha, beta, gamma, or X-ray) and the tissues exposed. The units of measure of dose equivalent are called rems or sieverts.

Estimating Dose to the Public from NNSS Operations

The release of man-made radionuclides from the NNSS has been monitored since the first decade of atmospheric testing. After 1962, nuclear tests were conducted only underground, greatly reducing the radiation exposure in the areas surrounding the NNSS. Underground nuclear testing nearly eliminated atmospheric releases of radiation but resulted in the contamination of groundwater in some areas of the NNSS. After the 1992 moratorium on nuclear testing, radiation monitoring focused on detecting airborne radionuclides that are resuspended with historically contaminated soils on the NNSS and on detecting man-made radionuclides in groundwater.

There are three pathways in this dry desert environment by which man-made radionuclides from the NNSS might reach the surrounding public:

Estimated Inhalation Dose to the Public

Compliance with radiation dose limits to the general public from the air transport pathway is demonstrated using air sampling results from six onsite "critical receptor" sampling stations, which were proposed and formally submitted to the EPA in 2001. The radionuclides detected at one or more of the NNSS critical receptor samplers were ^{137}Cs, ^{241}Am, ^{238}Pu, $^{239+240}$Pu, and ^{3}H.

As in previous years, the 2024 data from the six critical receptor samplers show that the NESHAP dose limit to the public of 10 mrem/yr was not exceeded. The radioactive air emissions from each 2024 NNSS source were modeled using the Clean Air Package, 1988 model from EPA. The highest value is predicted to be a person residing on the Nevada Test and Training Range and received a predicted dose of 0.065 mrem/yr.

Estimated Ingestion Dose to the Public

There are three potential sources for ingestion dose

Air Transport Pathway –

Members of the public may inhale or ingest radionuclides that are resuspended by the wind from contaminated sites on the NNSS. However, such resuspended radiation measured off and on the NNSS is much lower than natural background radiation in all areas accessible to the public.

NNSS scientist exchanging airborne radiation monitoring samples.

to the public: eating contaminated plants and animals and drinking contaminated groundwater that comes from the NNSS.

Current NNSS land-use practices discourage the harvest of plants or plant parts for direct consumption by humans. However, it is possible that individuals with access will collect and consume edible plant material. One species in particular, the pinyon pine tree, produces pine nuts that are harvested and consumed across the western United States. Pinyon pine trees grow throughout regions of higher elevation on the NNSS. In 2013, pine nuts were sampled from three locations on the NNSS (Area 15, Area 17,

Continued on Page 28 ...

and in Area 12 near the E Tunnel Ponds). The estimated dose from consuming them was shown to be extremely low (0.00056 mrem or 0.0000056 millisieverts) and a negligible contribution to the total potential dose to a member of the public. No other edible plant materials have been collected for analysis on the NNSS in recent history, and no edible plants were sampled in 2024.

NNSS game animals include pronghorn antelope, mule deer, chukar, Gambel's quail, mourning doves, cottontail rabbits, and jackrabbits. Small game animals from different contaminated NNSS sites are trapped each year and analyzed for their radionuclide content. These results are used to construct worst-case scenarios for the dose to hunters who might consume these animals if the animals moved off the NNSS.

In 2024, tissue, bone and/or blood samples were collected from three jackrabbits from Plutonium (Pu) Valley (Area 11), three cottontail rabbits from a control site (Area 27), one bighorn sheep that died of natural causes (Area 25), two mule deer killed by vehicles (Areas 2, 5) and two pronghorn antelope killed by vehicles (Areas 5, 22). Based on the analytical data from these samples, an individual who consumes one animal of each of the sampled species from each location may receive an estimated dose of 1.25 mrem based on the averages. To put this hypothetical dose in perspective, it is about the dose received from naturally occurring cosmic radiation during a 4-hour airplane flight at 39,000 feet. The animal sampled in 2024 with maximum concentrations was a jackrabbit from Pu Valley. The dose from consuming just this one animal would be about 2.5 mrem. Radionuclide concentrations are also below levels considered harmful to the health of plants and animals; the dose resulting from observed concentrations is less than 30% of limits set to protect populations of plants and animals.

The 2024 groundwater monitoring data indicate that groundwater from offsite private and community wells and springs has not been impacted by past NNSS nuclear testing operations.

Continued on Page 29 ...

Groundwater Pathway –

Based on monitoring data, drinking contaminated groundwater is currently not a possible pathway for public exposure, given the restricted public access to the NNSS and the location of known contaminated groundwater on and off the NNSS. No man-made radionuclides have been detected in drinking water sources monitored off and on the NNSS.

NNSS scientists conduct routine sampling of a public water system on the NNSS.

Ingestion Pathway –

Members of the public may ingest game animals that have been exposed on the NNSS, have moved off the NNSS, and have then been hunted.

NNSS scientists collect plant samples at the E Tunnel Ponds.

No man-made radionuclides have been detected in any sampled wells accessible to the offsite public or in sampled private wells or springs. These field monitoring data also agree with the forecasts of current groundwater flow and contaminant transport models. Therefore, drinking water from underground aquifers containing radionuclides is not a possible pathway of exposure to the public residing off site.

Direct Exposure

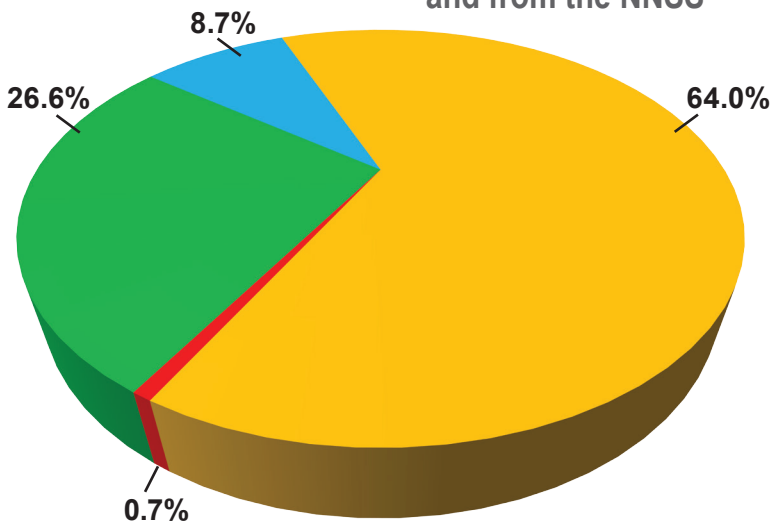
No members of the public are expected to receive direct gamma radiation that is above background levels as a result of NNSS operations. Areas accessible to the public, such as the main entrance gate, had direct gamma radiation exposure rates comparable to natural background rates from cosmic and terrestrial radiation.

Public Dose Limits for NNSS Radiation

10 mrem/yr — This is the dose limit to the public (above natural background) from just the air transport pathway, as specified by the Clean Air Act National Emission Standards for Hazardous Air Pollutants (NESHAP).

100 mrem/yr — This is the dose limit to the public (above natural background) from all possible pathways combined, as specified by DOE O 458.1, "Radiation Protection of the Public and the Environment."

Dose to the Public from Natural Background Sources and from the NNSS



- Dose from cosmic and terrestrial radiation at Indian Springs, 95.1 mrem/yr
- Dose from inhalation of decay products from natural radon, 229 mrem/yr
- Dose from natural radionuclides in body, 31 mrem/yr
- Dose from NNSS emissions to air and consumption of wildlife, 2.58 mrem/yr

2024 Dose to the Public from All Pathways

2.58 mrem/yr — This is the maximum dose to the public from inhalation, ingestion, and direct exposure pathways that is attributable to NNSS operations. It is well below the dose limit of 100 mrem/yr established by DOE O 458.1 for radiation exposure to the public from all pathways combined. This total dose estimate is indistinguishable from natural background radiation experienced by the public residing in communities near the NNSS.

Nonradiological Monitoring of Air and Water

Nonradioactive Air Emissions

The release of air pollutants is regulated on the NNSS under a Class II air quality operating permit. Class II permits are issued for "minor" sources where annual emissions must not exceed 100 tons of any one "criteria pollutant," or 10 tons of any one of the "hazardous air pollutants" (HAPs), or 25 tons of any combination of HAPs. Common sources of such air pollutants on the NNSS include particulates from construction, aggregate production, surface disturbances, fugitive dust from driving on unpaved roads, fuel-burning equipment, open burning, fuel storage facilities, and chemical release and detonation tests.

An estimated 55.8 tons of criteria air pollutants and 0.09607 tons of HAPs were released on the NNSS in 2024. The majority of the emissions were nitrogen oxide compounds. No emission limits for any air pollutants were exceeded.

Estimated Quantity of Pollutants Released into the Air from NNSS Operations in 2024

Criteria Air Pollutants:	Tons
Particulate Matter[a]	1.94
Carbon Monoxide	11.93
Nitrogen Oxides	24.62
Sulfur Dioxide	7.40
Volatile Organic Compounds	9.87
Hazardous Air Pollutants (HAPs)	0.09607

(a) Particulate matter equal to or less than 10 microns in diameter

Nonradiological Monitoring of Drinking Water and Wastewater

NNSA/NFO operates a network of permitted wells that comprise three permitted PWSs on the NNSS that supply the drinking water needs of NNSS workers and visitors. NNSA/NFO also hauls potable water to work locations at the NNSS that are not part of a PWS. Monitoring results for 2024 indicated that water samples from the three PWSs and from the potable water hauling trucks met all applicable National Primary and Secondary Drinking Water Standards.

NNSS Drinking Water

The public water systems that supply drinking water to NNSS workers and visitors meet all applicable Safe Drinking Water Act standards.

Domestic wastewater on the NNSS is discharged to 17 active permitted septic systems, which are permitted to process / store up to 5,000 gallons of wastewater per day. A septic tank pumping contractor is permitted to pump out and dispose of the wastewater. Inspections of the trucks and maintenance and assessments of the septic systems is performed to demonstrate compliance with permit conditions.

Domestic sewage discharges on the NNSS were limited to three operating sewage lagoon systems in 2024: Area 6 Yucca, Area 23 Mercury, and Area 6 DAF. Under the requirements of the state operating permit, liquid discharges to these sewage lagoons were tested quarterly in 2024 for biochemical oxygen demand, pH, and total suspended solids. All sewage lagoon water measurements were within permit limits.

The discharge water from the E Tunnel complex is managed under a state water pollution control permit. The discharge water is monitored monthly for flow rate, conductance and pH, and sampled annually for gross alpha, gross beta and tritium. A monitoring well is sampled bienially for all except flow rate, as well as additional metal parameters and total nitrate and nitrite. All parameters monitored in 2024 were within the permit limits.

Managing Cultural Resources

The historical landscape of the NNSS contains archaeological sites, buildings, structures, and places of importance to American Indians. These are referred to as "cultural resources." NNSA/NFO requires that NNSS activities and programs comply with all applicable cultural resources laws, regulations, and executive orders. The Cultural Resources Management Program (CRMP) is implemented by DRI to meet these requirements.

Compliance with Section 106 of the NHPA under the NNSS PA

NNSA/NFO has two programmatic agreements (PAs) with the Nevada State Historic Preservation Officer (SHPO) and Advisory Council on Historic Preservation (ACHP) to streamline its compliance with Section 106 of the National Historic Preservation Act (NHPA) for undertakings on the NNSS: one for the modernization of the town of Mercury (Mercury PA) and one for the rest of the NNSS (NNSS PA). The Mercury PA was executed in December 2018 and has a 20-year term. The NNSS PA was executed in April 2024 and has a ten-year term.

The execution of the NNSS PA in 2024 marked a significant milestone in NNSA/NFO's CRMP history. It represents the conclusion of several years of negotiations with the SHPO and ACHP and provides streamlined Section 106 compliance procedures for routine undertakings and common NNSS property types. In 2024, NNSA/NFO completed six cultural resources inventories and architectural surveys in four areas of the NNSS under the NNSS PA. At NNSA/NFO's direction, DRI surveyed over 73.28 acres and identified/recorded 18 cultural resources, 10 of which were determined to be eligible for the National Register of Historic Places (NRHP). Documented cultural resources consist of isolated prehistoric archaeological artifacts and Cold War-era buildings, structures, and districts. In accordance with the NNSS PA, NNSA/NFO consults with the Nevada SHPO regarding the adequacy of the identification efforts, eligibility determinations, and findings of effect prior to initiating an undertaking that has the potential to affect historic properties.

Building 01-103 in the Area 1 Subdock (Source: DRI)

NNSA/NFO completed mitigation in compliance with the NNSS PA for two undertakings. First, for demolition of Building 01-103, the Drill Bit Repair Building. Second, demolition of Building 01-202681, a small, galvanized metal portable building in the Main Storage Yard. Both are contributing elements to the Area 1 Subdock Historic District. NNSA/NFO completed the standard mitigation in the NNSS PA for contributing elements in historic districts to mitigate the adverse effects of the undertakings. NNSA/NFO submitted the mitigation documents to the SHPO and the SHPO concurred with their adequacy.

NNSA/NFO completed one supplemental identification, evaluation, and finding of effects report for additional proposed demolition at U12g Tunnel. The U12g Tunnel Historic District is eligible for listing in the NRHP for its role as an underground testing environment for the development of nuclear weapons during the Cold War and its distinctive character as a horizontal tunnel complex. NNSA/NFO originally initiated consultation on demolition at the U12g Tunnel portal in 2023. In 2024, NNSA/NFO expanded the scope of work for proposed demolition. Two additional buildings (12-B100933 and 12-B100944) and three storage areas (Storage Areas 1, 2, and 3) were evaluated and included in an updated district recording and finding of adverse effect. NNSA/NFO intends to use the standard mitigation in the NNSS PA for historic districts to mitigate the adverse effects of the undertaking. As

Continued on Page 32 ...

of the end of 2024, NNSA/NFO was awaiting a response from the SHPO on its updated documentation, findings, and intended mitigation.

A second supplemental identification, evaluation, and finding of effect report was prepared for the Rock Valley Direct Comparison Project. NNSA/NFO expanded the Area of Potential Effect (APE) for the project, resulting in additional pedestrian inventory and survey reporting. The inventory did not identify any historic properties. Two identified resources were considered categorically not eligible for the NRHP per Appendix B of the NNSS PA.

NNSA/NFO completed an identification and evaluation report for the proposed demolition of four blasting cap and magazine storage buildings and their accessory resources in Area 12. NNSA/NFO determined that none of the buildings are historic properties eligible for listing in the NRHP and made a finding of no historic properties affected. The SHPO concurred with NNSA/NFO's determinations and findings.

NNSA/NFO completed a finding of effect report for five resources in Area 25. NNSA/NFO proposes to demolish five resources in the Nuclear Rocket Development Station (NRDS) Historic District (Buildings 25-3124, 25-3153, 25-4314, and 25-4838, and the remaining foundation of Building 25-3113/3113A). The district is eligible for listing in the NRHP primarily for its role in the U.S. Space Program and advancing nuclear rocket propulsion for space travel. The resources proposed for demolition have all been previously evaluated as contributing elements to the district.

The Huron King Test Chamber (Source: DRI)

As a result, NNSA/NFO prepared a finding of adverse effect report and submitted it to the SHPO for concurrence. NNSA/NFO intends to use the standard mitigation in the NNSS PA for historic districts to mitigate the adverse effects of the undertaking. As of the end of 2024, NNSA/NFO was awaiting a response from the SHPO on its updated documentation, findings, and intended mitigation.

Compliance with Section 106 of the NHPA under the Mercury PA

The Mercury PA specifies the approach NNSA/NFO takes to streamline the Section 106 compliance process for modernization activities in Mercury. Pursuant to this PA, NNSA/NFO completed NRHP evaluation and finding of effect reports and other mitigation documents for four primary resources and 24 accessory resources in Mercury. One of the primary resources is the former Mercury Airfield. The other resources are primarily concrete foundations of previously demolished buildings and structures that represent the former locations of environmental support program buildings including a greenhouse, industrial warehouses, offices, dormitories, and two with unknown purposes. Two other accessory resources include a newly documented buried storage tank and sidewalks.

Other Section 106 Compliance Activities

As part of Section 106 compliance and prior to initiating proposed projects, NNSA/NFO completes preliminary project reviews to identify potential cultural resource concerns. The reviews include researching cultural resource records to identify previous cultural resource studies and previously identified historic properties near or within the project area. Under some circumstances, the review also includes a pre-activity inventory of a project area. The research and inventory help determine whether further evaluation is required and the potential of a proposed project to affect historic properties. In some cases, the preliminary project review results in preparing full technical studies and consulting with the SHPO. In other cases, the preliminary project review finds that full technical studies and SHPO consultation

Continued on Page 33 ...

are not necessary. In 2024, NNSA/NFO's subject matter experts who meet the professional qualification standards set by the Secretary of the Interior reviewed 62 proposed projects. Of these projects, five required pre-activity pedestrian inventories.

Compliance with Section 110 of the NHPA

NNSA/NFO fulfills its stewardship responsibilities by supporting the following: maintenance and continual updating for a Cultural Resources Geographic Information System (GIS) Database; routinely monitoring the condition of known historic properties on the NNSS; and evaluating at least one new potential historic property for NHRP eligibility annually. In 2024, NNSA/NFO monitored, updated the inventory forms, and assessed the physical integrity of six historic properties. NNSA/NFO also evaluated one potential historic property, the Huron King Test Chamber, for NRHP eligibility.

The aboveground Huron King Test Chamber in Area 3 was associated with the underground Huron King nuclear test conducted on June 24, 1980. The test chamber was specially designed to hold a defense communications satellite and was connected to a nuclear device placed 1,050 feet below the ground. Upon detonation, the satellite was exposed to an electromagnetic pulse and nuclear radiation and then evaluated for effects. Following an archival review, survey, and evaluation, NNSA/NFO determined that the Huron King Test Chamber is eligible for listing in the NRHP. Consultation with the SHPO will be completed in 2025.

American Indian Consultation Program

NNSA/NFO's American Indian Consultation Program (AICP) was established in 1991 to formalize its consultations with 16 Southern Paiute/Chemehuevi, Western Shoshone, and Owens Valley Paiute and Shoshone Tribes with cultural and historical ties to the NNSS.

NNSA/NFO supported the goals of the AICP:

- Met regularly with the DRI AICP Coordinator to identify topics of interest and enhance communications with Tribal representatives

TPC and additional Tribal representatives at Topopah Spring (Source: DRI)

- Facilitated and participated in quarterly Tribal Planning Committee (TPC) meetings, and the annual Tribal Update Meeting, which brings together Tribal representatives from the 16 culturally affiliated Tribal governments
- Distributed quarterly letters to Tribal governments regarding Section 106 activities and copies of the fully executed NNSS PA
- Supported TPC field visits to four NNSS locations: Gold Meadows, Kawich Cabin and an archaeological site in Area 16, Bighorn Sheep Rockshelter, and Topopah Spring
- Prepared and distributed reports following all TPC meetings, field visits, and Tribal Update Meeting.

In 2024, NNSA/NFO did not receive any requests from culturally affiliated tribes to access the NNSS for ceremonial or traditional use.

Curation

DRI continues to maintain the NNSS archaeological collections and associated records consistent with all professional standards on NNSA/NFO's behalf. These collections contain more than 467,000 artifacts. Activities include spot checks of collections, providing tours upon request, facilitating loan renewals, maintaining the physical curation environment, and maintaining document archives.

Endangered Species Protection and Ecological Monitoring

The Ecological Monitoring and Compliance (EMAC) Program monitors the ecosystem of the NNSS and ensures compliance with laws and regulations pertaining to NNSS natural resources. Sensitive and protected/regulated species of the NNSS include 1 mollusk, 2 insects, 2 reptiles, 31 mammals, 242 birds, 20 sensitive plants, and 23 plants protected from unauthorized collection. These species are protected, regulated, or considered sensitive according to state or federal regulations and natural resource agencies and organizations.

The desert tortoise is the only resident species on the NNSS listed under the Endangered Species Act as threatened. Habitat of the desert tortoise is in the southern portion of the NNSS. Activities conducted in desert tortoise habitat must comply with the terms and conditions of a Biological Opinion issued to NNSA/NFO by the U.S. Fish and Wildlife Service (FWS). Eighteen projects occurring within the range of the tortoise were reviewed by biologists in 2024 and 12 projects in progress were carried over from previous years. Of the projects reviewed, 9 required biological surveys, and 9 were determined to have no effects to the tortoise. These determinations were based on the amount of anticipated habitat disturbance, habitat quality, and location of projects (e.g., within developed versus undisturbed areas). In 2024, no tortoises were observed on project sites, and none were reported injured or killed due to project activities. There were 40 reported tortoise roadside observations on the NNSS during 2024.

Of the 40 reported observations, there were no reported roadkill. Two small and 38 large tortoises were observed. Of the 38 large tortoises, 3 did not need to be handled and 4 were moved off the road twice in one day. Thirty-one large tortoises were determined to be incidental take. The small tortoises did not count towards incidental take but were detected and reported to FWS.

In 2012, 60 juvenile tortoises were moved from captivity at the Desert Tortoise Conservation Center near Las Vegas to undisturbed tortoise habitat at the NNSS to investigate the fate of translocated individuals. The San Diego Zoo Institute for Conservation Research started the study and transferred it to NNSS biologists in 2013. At the end of 2024, 10 of the 60 juveniles were still alive and continue to be monitored.

Biological surveys for the presence of sensitive and protected/regulated species and important biological resources on which they depend were conducted for 21 proposed projects. A total of 279.5 acres were surveyed for these projects. Some of the sensitive and protected/regulated species found during the surveys included tortoise burrows, an inactive owl nest, an inactive red-tailed hawk nest, relocation of five horned lizards, chukar, Sahara mustard (an invasive plant), Monarch butterfly habitat (milkweed), and yucca plants (Joshua tree and Mojave yucca). Important biological resources within project sites were flagged, avoided, or removed.

Ongoing monitoring and surveys of sensitive and protected/regulated animal and plant species continued to demonstrate the long-standing stewardship of the NNSS ecological resources. Additional information may be found in the annual EMAC report found at https://nnss.gov/publication-library/environmental-publications/.

Gold Meadows Spring and Camp 17 Pond continue to be valuable resources for these animals, especially during the hot, dry summer. A total of 321 and 345 photos of horses were recorded using a motion-activated camera at Gold Meadows Spring and Camp 17 Pond, respectively.

NNSA/NFO is committed to working collaboratively with other agencies to provide research opportunities on the NNSS that benefit ecological and conservation science.

An NNSS Tortoise with transmitter eating beavertail cactus

Eighteen pronghorn and 23 mule deer were captured and collared in 2019. Radio-collars were programmed to drop off in November 2022, which they did successfully. At the end tracking period, four pronghorn (two does, two bucks) and seven mule deer (all does) were still alive.

Environmental Stewardship

NNSA/NFO's Environmental Management System (EMS) is a business management practice that incorporates concern for environmental performance throughout the NNSS and its support facilities. The goal of the EMS is continual reduction of NNSA/NFO's impact on the environment. An EMS ensures that environmental issues are systematically identified, controlled, and monitored, and it provides mechanisms for responding to changing environmental conditions and requirements, reporting on environmental performance, and reinforcing continual improvement. Environmental commitments are incorporated into an Environmental Policy with goals to protect environmental quality; mitigate environmental impacts; collaborate with employees, customers, subcontractors, and suppliers on sustainable development; comply with environmental laws and regulations; and, commit to environmental excellence in company activities.

The **Energy Management Program** was formed specifically to reduce the use of energy and water in NNSA/NFO facilities, to advance the use of solar and other renewable energy sources, and to help NNSA meet DOE's sustainability goals.

In December 2024, the Sustainability Division completed the FY 2025 NNSA/NFO Site Sustainability Plan, which reported the progress toward meeting DOE's sustainability goals. Thus far, the Energy Management Program is on track to meet the majority of the DOE long-term goals.

The **Pollution Prevention and Waste Minimization Program** helps to reduce the volume and toxicity of waste that must be disposed.

Clean and Renewable Energy

- The goal was to Achieve 100 percent carbon pollution-free electricity on a net annual basis by 2030, including 50 percent 24/7 carbon pollution-free electricity.

  Status: 49%, with the consumption breakdown as; 1% on-site carbon pollution-free energy (CFE), 31% grid-supplied CFE, 17% Western Area Power Administration, 51% grid-supplied fossil based electricity. Fire Station #1 solar produced 736 megawatt-hours (MWh), off-grid solar estimated at 253 MWh.
- Developed a bundled 4-site solar & battery energy storage system procurement and conceptual design.
- Engaged in the Cleanup to Clean Energy initiative.

Energy Efficiency and Management

- The goal was to reduce energy use intensity in goal-subject buildings.

  Status: Energy use intensity increased 19.6% from the FY 2015 baseline.

- The goal was to meter all individual buildings for electricity, natural gas, steam and water, where cost-effective and appropriate.

  Status: Two new buildings were metered for electricity and water. Current metered buildings: Electric 33/39 = 85%; Gas 10/10 = 100%; Water 14/36 = 39%.

- The goal is to achieve a net-zero emissions building portfolio by 2045 through building electrification and other efforts.

  Status: the NNSS currently has 2 net-zero facilities.

- The goal was to ensure that eligible facilities under Section 432 of the Energy Independence and Security Act are assessed once every 4 years.

  Status: year 4 of the 4 year cycle was completed and 33 assessments were conducted.

Water Efficiency and Management

- The goal was to reduce potable water use intensity (gallons [gal.] per gross square foot).

  Status: potable water use intensity increased 37.3% from FY 2023, which was a 4.4% reduction from the 2007 baseline.

- The goal was to reduce non-potable freshwater consumption (gal) for industrial, landscaping, and agricultural.

  Status: there was a 143% increase from the 2010 baseline.

Wildlife watering trough that replaced the closed Well 5b sump.

Fleet Management

- The goal was to increase alternative fuel consumption by at least 150,859 gal.

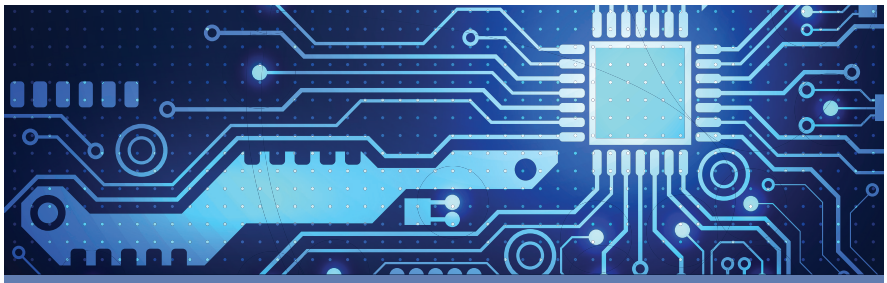
  Status: increased consumption by 369,793 gal.

- The goal was to reduce petroleum consumption to 850,532 gal.

  Status: 376,473 gal, 71.7% below the FY 2005 baseline.

- The goal is to achieve 100% zero-emission vehicle acquisitions by 2035, including 100% zero-emission light-duty (LD) vehicle acquisitions by 2027.

  Status: 84% of Light Duty (LD) received were Zero-emission vehicles (ZEV). Hosted NNSA 2024 Fleet and Sustainability Summit. Leidos Electric Vehicle Supply Equipment (EVSE) Assessment was conducted. Planned/designed three EVSE at building 23-460. Incorporating National Renewable Energy Laboratory (NREL) Comments in EVSE Plan.



Electronic Stewardship and Data Centers

- The goal was electronics stewardship from acquisition, operations, to end of life.

  Status: Disposition goal met. All electronic equipment that passes excess screening is e-recycled. Asset and Material Management (AMM) partnered with Blind Center of Nevada for e-recycling of monitors. 6% of computers and monitors have power management enabled. 100% of printers have duplex printing enabled. Information Technology organization received the Electronic Product Environmental Assessment Tool (EPEAT) Award.

- The goal was to increase energy and water efficiency in high performance computing and data centers.

  Status: Were unable to begin energy performance collection with the current data centers. Planning the migration of the primary data center to an energy efficient co-located data center, and the migration of the demand response data center to an energy efficient modular data center.

Climate Change Resilience

- The goal was to further implement climate adaptation and resilience measures.

  Status: Conducted combined Earthquake and Extreme Event drill onsite. Participated in U.S. Department of Energy, Headquarters Eagle Horizon-24 Continuity of Operations Functional Exercise and Accountability Drill. Developing an Emergency Management Organizational Strategic Plan and a discussion-based sitewide evacuation drill for wildland fire scenario. Completed operational readiness of the new Principal Underground Laboratory for Subcritical Experimentation (PULSE) Facility (Bldgs. 01-350 and 23-462). Continued joint operation with Nevada Test and Training Range on wildland fire fuels control. Updated resiliency solutions. Installed two new solar weather stations. Participated in the Continuity of Operations Program Subcommittee's 2024 Pursuits & Progress meeting held in Los Alamos, New Mexico in October 2024.

Investments: Improvement Measures, Workforce and Community

- The goal was to implement life-cycle cost effective efficiency and conservation measures with appropriated funds and/or performance contracts.

  Status: Proposed preferred option to Contracting Officer Representative (COR) for Shooting Range lighting replacement for Energy Savings Performance Contract (ESPC) Delivery Order 2 (DO2) scope. Supported Year 14 ESPC DO2 Measurement and Verification (M&V) activities. Conducted virtual and in person Energy Action Month (EAM) and Earth Day activities. Continued the Acts of Sustainability employee outreach program. Evaluated placement of two SafeNest bins: one at NNSA/NFO and the other at the North Las Vegas Facility (NLVF) to assist with waste diversion numbers. Included two EVSE projects in the Construction Acceleration Planning Process (CAPP). Received Community and Junior College Trade Occupation Program Grant.

High Performance Sustainable Buildings (HPSBs)

- The goal was to increase the number of owned buildings that are compliant with the Guiding Principles for Sustainable Buildings.

  Status: There are 18 certified facilities. Re-certified 4 existing facilities using 2020 Guiding Principles. Two new construction facilities are in progress for third party certification. Received Green Lab recertification at Green level for building 23-652 Environmental Monitoring laboratory.

Pollution Prevention and Waste Minimization

- The goal was to reduce non-hazardous solid waste sent to treatment and disposal facilities (TSDFs).

  Status: Diverted 39.3% of non-hazardous solid waste.

  Added multiple recycling battery boxes for facility participants. Increased recycling efforts through excess.

- The goal was to reduce construction and demolition materials and debris sent to TSDFs.

  Status: Diverted 5.1% of construction waste

  Increased construction and demolition activity on site

  Increased data collection to include more construction projects

Acquisition and Procurement

- The goal was to promote sustainable acquisition and procurement to the maximum extent practicable, ensuring all sustainability clauses are included as appropriate.

  Status: Relevant sustainable acquisition clauses are included in applicable subcontracts. Increased employee awareness of sustainable purchase requirements and options.

Greenhouse Gas (GHG) Emissions

- The goal was to reduce Scope 1 & 2 greenhouse gas (GHG) emissions.

  Status: 64.5% below the baseline. Solar scope was developed. Installed energy efficient equipment upgrades.

- The goal was to reduce Scope 3 GHG emissions.

  Status: 64.9% below the baseline. Continued telework arrangements. Regional Transportation Commission's Club Ride program updated the system to streamline employee reporting. Working with Procurement to better track emissions.

GHG emissions targeted for reduction are carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride (SF6) and are classified depending on their source:

Scope 1 — from sources owned or controlled by a federal agency.

Scope 2 — resulting from the generation of electricity, heat, or steam purchased by a federal agency.

Scope 3 — from sources not owned or directly controlled by a federal agency but related to agency activities.

Sustainability and Outreach

Energy Action Month (EAM)

Employees continued to actively participate in activities. EAM is a time to raise awareness about the importance of the critical role we all play in sustainable acts that drive behavioral change. Every year, employees are invited to be involved and help facilitate NNSS sustainability initiatives during various EAM events during the month of October. Activities began on the first Wednesday in October and lasted the entire month. EAM activities included the following:

- NNSS employees participated in the nationwide Energy Efficiency Day. Employees were given the opportunity to educate themselves on how to "Save Money, Cut Carbon, and Breathe Easier." Activities included sharing tips, tools and stories that promoted the multiple benefits of energy efficiency, from lowering energy costs to tips for healthier homes.

- The Sustainability Treasure Hunt gave employees the chance to test their knowledge about the NNSS sustainability initiatives by answering questions about some of the initiatives that NNSS has implemented to make the site more sustainable. These answers were found in the FY 2024 NNSS Site Sustainability Plan.

- NNSS employees enjoyed a Lunch & Learn presented by the local waste disposal and recycling services company, Republic Services. Employees were educated about quick and easy ways to make a difference in their communities by following simple guidelines to become a better recycler. The Recycling Coordinator of Southern Nevada Recycling Center for Republic Services brought a wealth of recycling knowledge to communicate to employees in attendance on the basics of properly preparing acceptable recyclable materials for their curbside recycling cart. One participant won the raffle prize, a composting barrel, and used it right away.

Continued on Page 41 ...

NNSS employees and family members at an Earth Day tree planting activity.

NNSS employees and family members at an Earth Day tree planting activity.

Earth Day

The Earth Day 2024 theme was Planet vs. Plastics, calling for a 60 percent global reduction in plastic production by 2040. NNSS employees learned how to reduce their plastic usage and were given the opportunity to engage in various events and activities during the entire month of April. These activities included:

- Employees and their families participated in a fun family tree planting and tree give-a-way event at the Hollywood Recreational Center in Las Vegas, NV. Employees were educated about the correct method of planting a tree and how planting trees is beneficial to the environment. They also received a FREE tree of their choosing.
- Employees attended the Platinum Leadership in Energy and Environmental Design (LEED) Facility Building Tour at the Las Vegas Cyclery in Summerlin, NV. This LEED building is designed to have 100% of its energy provided throughout the calendar year by wind power, making it a Net Zero Energy Building. The tour covered the following LEED credits: Sustainable Sites, Water Efficiency, Energy & Atmosphere, Materials & Resources, and Indoor Environmental Quality. Essentially, the Las Vegas Cyclery is its own power plant.
- Employees also participated in the recycling reality check quiz to test their knowledge about the best ways to reuse materials and save our natural resources.
- NNSA/NFO employees continued to donate items to SafeNest, a local non-profit organization that donates clothing and other items to women who have been victims of domestic violence. In FY 2024, NNSA/NFO employees contributed a total of 5,247 pounds of donations to SafeNest.

SafeNest

Document Availability

Available for sale to the public from:

U.S. Department of Commerce
National Technical Information Service
5301 Shawnee Road
Alexandria, Virginia 22312

Available electronically (no charge) at **https://ntrl.ntis.gov/NTRL/, https://www.osti.gov/, https://nnss.gov/publication-library/environmental-publications/**

Available, in paper, for a processing fee to the U.S. Department of Energy and its contractors from:

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Work performed under contract number:

DE-NA0003624

This report was prepared for:

U.S. Department of Energy
National Nuclear Security Administration
Nevada Field Office

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