

Nevada National Security Site (NNS) Tour Booklet



Nevada Site Specific Advisory Board

October 3, 2019



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Prohibited Articles On NNSS Public Tours

The following items are prohibited within the boundaries of the NNSS public tours.

Tour escorts are required to do random checks.

- Cellular Phones
- Bluetooth Enabled Devices
- PDA, BlackBerry, etc.
- Computers
- Portable Data Storage Devices
- Global Positioning System (GPS)
- Cameras/Camcorders
- Binoculars
- Optical Instruments
- Geiger Counters/Dosimeters
- Recording Devices
- Pets and Animals
- Weapons
- Explosives
- Ammunition
- Incendiary Devices
- Chemical Irritants
- Alcoholic Beverages
- Controlled Substances
- Any Item Prohibited by Law

Possession of these items may delay the tour and prevent your participation.

If at any point during the tour these items are discovered, the tour may be terminated.



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NNSS Tour Agenda*

- | | |
|--|---|
| 7:30 a.m. Depart for NNSS | 1:25 p.m. Depart for Fire Station |
| 8:45 a.m. Arrive at Mercury Badge Office | 1:55 p.m. Arrive at Fire Station for Briefing. Rest stop. (photo opp) |
| 9:10 a.m. Depart for Area 5 Radioactive Waste Management Complex (RWMC) | 2:45 p.m. Depart for Gate 100 |
| 9:25 a.m. Arrive at Area 5 RWMC for Briefing ~ Work Plan Item 1. Rest stop. | 2:50 p.m. Drop off at Mercury and return to Las Vegas |
| 10:30 a.m. Depart for Test Cell C | 4:00 p.m. Arrive National Atomic Testing Museum, LV |
| 11:00 a.m. Arrive at Test Cell C for Briefing ~ Work Plan Item 3 (photo opp) | |
| 11:45 a.m. Depart for EMAD. Lunch on the bus. | |
| 12:00 p.m. Arrive at EMAD for Drive-by Briefing ~ Work Plan Item 6 | |
| 12:15 a.m. Depart for JASPER | |
| 12:45 p.m. Arrive at JASPER for Briefing. Rest stop. (photo opp) | |

VISITORS MAY NOT PICK UP OR REMOVE SOIL, ROCK, PLANT SAMPLES, OR METAL OBJECTS FROM THE NNSS.

* *Subject to change*

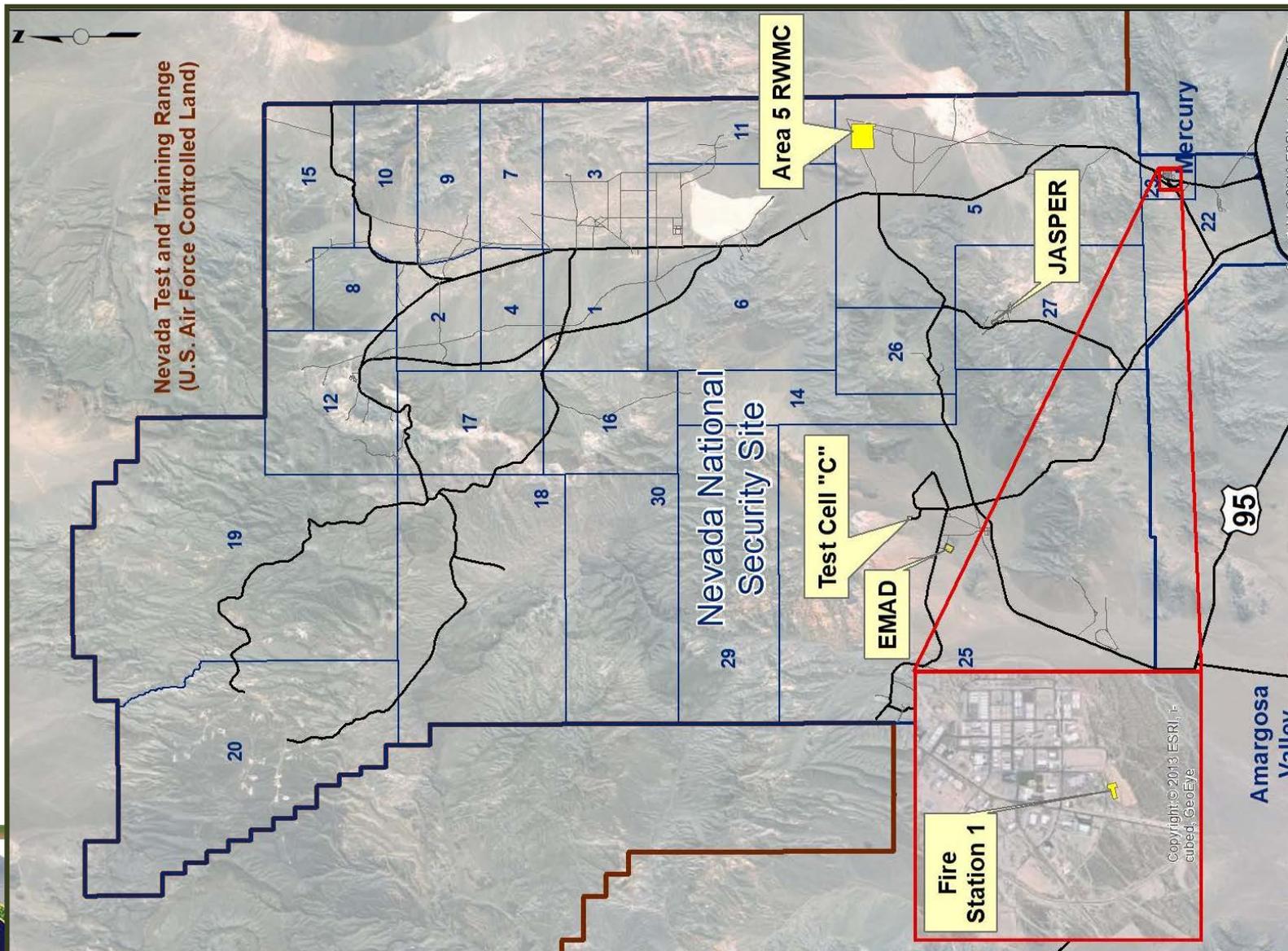


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NNSS Tour Map



Low-Level Waste (LLW) Disposal at NNSS



Tom Hergert

Area 3/5 Nuclear Facility Manager
Mission Support and Test Services (MSTS)



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NNSS Waste Disposal Facilities

- LLW can be disposed at two disposal sites at the NNSS
 - Area 3 uses subsidence craters created by past underground nuclear tests to dispose of bulk and containerized waste
 - Area 5 uses engineered shallow-land burial to dispose of containerized waste



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Area 3 Radioactive Waste Management Site (RWMS)

- 128-acre disposal area with seven craters configured into five disposal cells
- Total disposed volume is over 19 million cubic feet (ft³)
- Maintained in “cold standby” mode from 2006 – Sept 2018



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Area 3 RWMS (continued)

Excavation of Contaminated
Soil and Debris at Clean Slate III



- Between October 2018 – August 2019, operations resumed to make use of existing capacity for over 224,000 ft³ of waste from Clean Slate III on the Tonopah Test Range
 - ~8.9 million ft³ of disposal capacity remains
- Clean Slate III waste will be covered and Area 3 RWMS put back in cold standby until needed for future Nevada waste (i.e. EMAD concrete)



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Area 5 Radioactive Waste Management Complex (RWMC)

- Located in Frenchman Flat, near first atmospheric nuclear test in Nevada (24 nuclear tests conducted within four (4) miles of Area 5)
- Arid and isolated disposal facility with no groundwater pathway and deep groundwater
- Supports ongoing cleanup activities at NNSA and across the U.S. Department of Energy (DOE) complex
- Can safely dispose of classified waste that requires additional security



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Geographic and Geologic Isolation of Disposed Waste

- Protection against intrusion
 - ~740 acres owned by DOE
 - Protected by armed security force and security devices 24/7
 - Surrounded by ~4,500 miles of Air Force controlled land
 - More than 8 feet of soil covers disposal cells
- No groundwater pathway
 - Rainfall either evaporates or is used by plants (evapotranspiration 12 times average precipitation)
 - No recharge of upper aquifer (located ~800 feet deep) in more than 25,000 years
 - Little to no lateral movement of groundwater (estimated at 10 centimeters per year in 2017)



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Geographic and Geologic Isolation of Disposed Waste

(continued)

- No surface pathway
 - Frenchman Flat is a hydrographically closed basin where runoff moves through normally dry washes toward a dry lakebed
 - Any water that accumulates eventually evaporates or is taken up by the native vegetation
 - Depositional basin geology and arid environment provides for a slow accumulation/layering of soil (or other loose, solid rock material) through natural agents, such as wind and gravity
 - Berms around the facility provide protection against storm water events and erosion
 - Most of the alluvial fan surfaces near the Area 5 disposal facility are 3,000 to 128,000 years old



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Ongoing Monitoring to Ensure the Safe Performance of the Disposal Facility

- 30 monitoring locations sample for air, groundwater, meteorology, radon flux, soil moisture and temperature, evapotranspiration, and direct radiation exposure
 - No health risk to the public
 - Potential health risk to workers is minimized through programmatic controls



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Ongoing Monitoring to Ensure the Safe Performance of the Disposal Facility

(continued)

- Long-term vadose zone monitoring data indicate no drainage through bottoms of vegetated lysimeters (more than 6 feet deep)
- More than 20 years of groundwater sampling results indicate hydrologic conditions remain stable and there is no contamination in the aquifer from waste disposal activities



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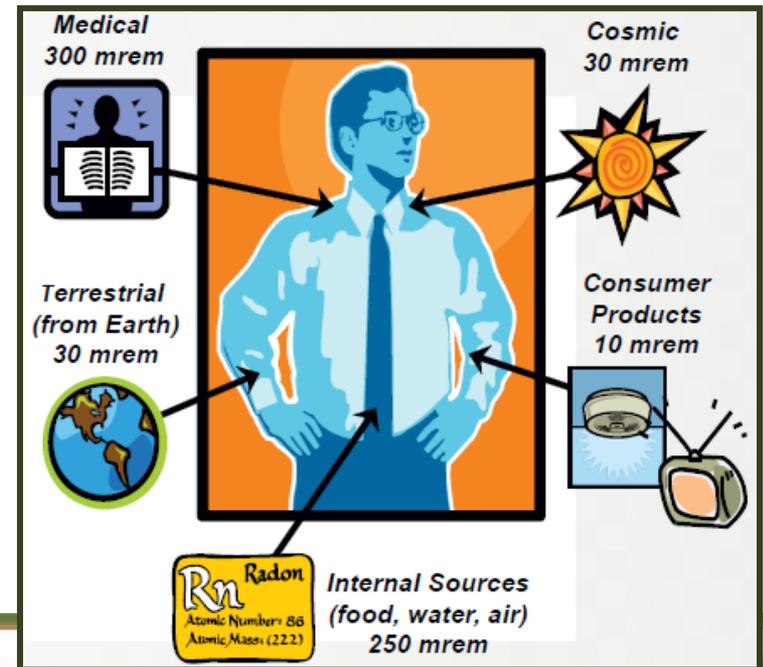
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As Low As Reasonably Achievable (ALARA)

- ALARA practices (time, distance and shielding) reduce worker dose during LLW disposal operations – Administrative Control Level for each radiological worker is 500 mrem
- Approximately 8% of shipments require workers to implement additional ALARA practices and personal protective equipment beyond the standard hard hat, safety boots and glasses, and reflective vest
- Annually, a cumulative radiation dose goal is established for the Disposal Operations crew (43 workers in 2018 and 37 in 2019)
 - In 2018, the goal was 405 mrem and the cumulative crew dose was 258 mrem
 - Through the 2nd quarter of 2019, monitoring results show a cumulative dose for all 37 disposal facility workers at 73 mrem for the entire crew versus a goal of 405 mrem

Average Annual Radiation Source and Dose*



**The average person receives ~620 mrem of radiation per year from all sources*



safety

Waste Disposed at NNSS

- Four (4) types of waste accepted: low-level radioactive waste (LLW), mixed low-level radioactive waste (MLLW), classified non-radioactive (CNR) waste and classified non-radioactive hazardous (CNRH) waste
 - LLW not classified as high-level radioactive waste, transuranic waste, spent fuel, by-product material, etc.
 - MLLW is a combination of LLW with a hazardous constituent (i.e., toxic, corrosive, reactive, ignitable or listed by U.S. Environmental Protection Agency as hazardous)
 - CNR consists of classified components that have no radioactive or hazardous contamination but must be securely disposed in the interest of national security
 - CNRH classified components with no radioactive contamination but do contain hazardous constituents



Waste Disposed at NNSS

(continued)

- No free liquids allowed for MLLW and no more than 1% by volume for LLW and classified waste
- Must be containerized (i.e., 55-gallon steel drums, cargo containers, burrito wraps, soft-sided containers, and carbon steel boxes)
- Must be generated at a DOE facility or defense-affiliated site or have a clear nexus to a DOE-sponsored program



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Waste Disposed at NNSS

(continued)

- As of June 30, 2019, the NNSS safely disposed 756,900 ft³ of waste
- Examples include:
 - Soils and debris (i.e. concrete, piping and building)
 - Equipment, clothing and tools
 - Solidified liquids and sludges
 - Laboratory waste
 - Irradiated metal
 - Depleted uranium
 - Sealed sources (radioisotopes used in equipment for power and medical)
 - Uranium wastes
- MLLW disposed under a state-issued permit



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NNSS Waste Acceptance Process

- NNSS uses a structured/stringent waste review and acceptance process that must be met by all on-site and off-site waste generators
 - Rigorous reviews, inspections and certification processes conducted for waste characterization, packaging and transportation
 - Proposed waste streams detail radionuclide action levels to ensure there is no compromise to the safety of the disposal facility
 - NNSS auditors conduct reviews at generator sites to confirm all disposal requirements are met
 - Disposal operations and monitoring activities are factored into the review process



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NNSS Waste Acceptance Process

(continued)

- Waste streams are approved for disposal at NNSS only after successfully demonstrating compliance with waste acceptance requirements
- At NNSS, State of Nevada participates directly in the waste acceptance review process



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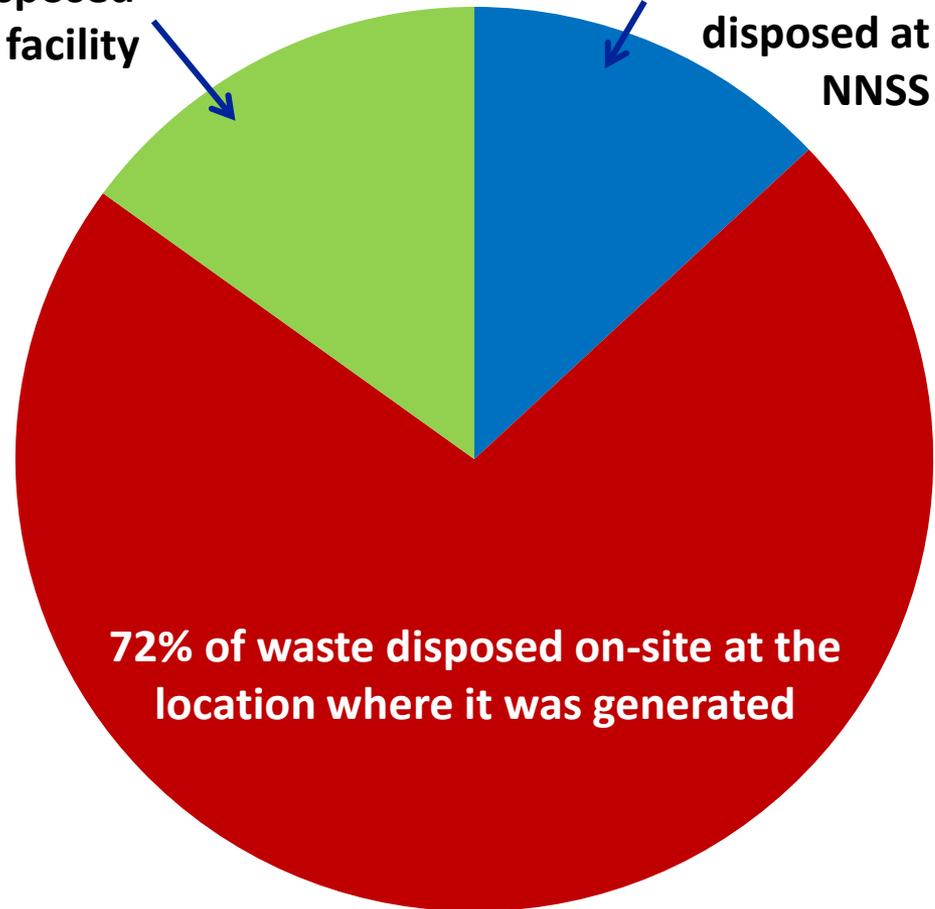
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Overview of DOE Complex Disposal

15% of waste disposed
at a commercial facility

13% of waste
disposed at
NNSS



- 7.62M cubic feet of LLW disposed throughout the DOE complex in fiscal year 2018



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Transporting Waste to the NNSS

- Packaging and transportation of all radioactive waste must comply with U.S. Department of Transportation (DOT) regulations, including dose limits for worker and public exposure
- Routing includes prohibiting use of the I-15/US-95 interchange and Hoover Dam bypass bridge, preferences for summer and winter months, and CA-127 blackout dates
- Transportation of radioactive waste shipments to/from the NNSS are summarized and reported quarterly
 - Includes maps depicting routes
 - Online at www.nnss.gov/pages/Programs/RWM/Reports.html



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Emergency Management Grant Funding

- Radioactive waste disposal program contributed more than \$14.8M to fund enhancement of emergency response capabilities in Nevada counties (Clark, Elko, Esmeralda, Lincoln, Nye and White Pine)
- Nevada Division of Emergency Management administers the funding, which is needs-based and distributed according to applications submitted by the counties
- Provides for updating/recalibrating radiological equipment/detectors, communications equipment, emergency operations and hazardous material plans, and more



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LLW Disposal at the NNSS In Summary...

- Waste acceptance, transportation and disposal at the NNSS is conducted responsibly and safely to protect workers, the public and environment
- NNSS infrastructure and environmental conditions provide for the long-term protection of disposed waste
- DOE is committed to conducting its LLW disposal activities in an open and transparent manner



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Test Cell C

Ancillary Buildings and Structures

- Originally supported Nuclear Rocket Development Station activities on the NNSS in Area 25
- Five buildings, comprising approximately 18,550 square feet
- Reactor Cooling Station
- Three water tanks
- Four hydrogen tanks
- One water tower



Ancillary Structures at Test Cell C



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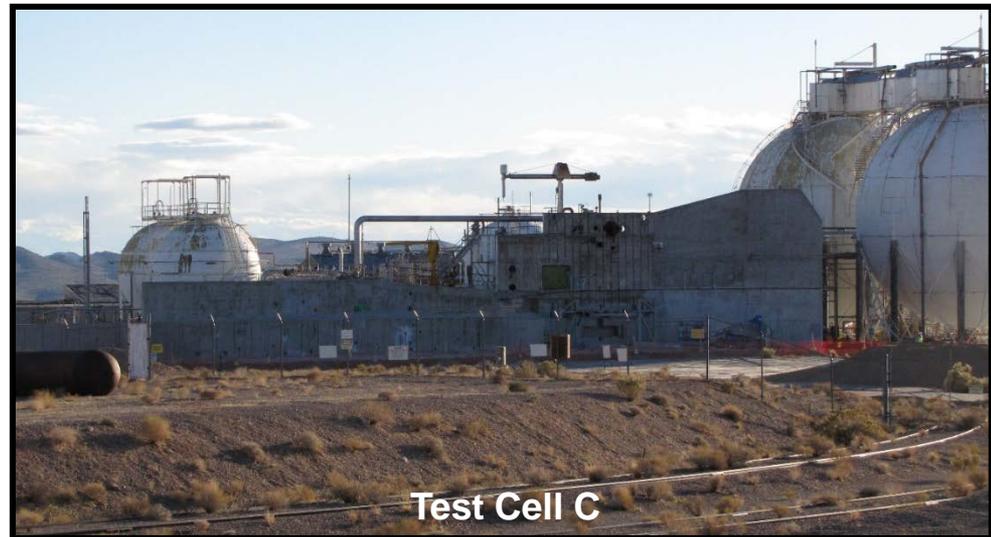
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Test Cell C

(continued)

- No current or future mission
- Scheduled for decontamination and decommissioning starting in FY 2023 and completed by FY 2024
- Remove and demolish the structures and properly dispose the generated waste
- Limits the long-term cost of surveillance and maintenance
- End state is anticipated to be demolition to slab



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Engine Maintenance Assembly and Disassembly (EMAD) Facility

- Originally supported Nuclear Rocket Development Station activities on the NNSS in Area 25
- An approximately 165,000 square foot, four-story building that is 80 feet high with walls constructed of either concrete, asbestos-coated corrugated steel, or concrete block



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EMAD Facility (continued)

- No current or future mission
 - Scheduled for decontamination and decommissioning starting in fiscal year (FY) 2024 and completed by FY 2026 (includes water tower)
 - Removes facility from service and demolishes the facility and properly disposes of the generated waste
 - Limits the long-term cost of surveillance and maintenance
- End state is anticipated to be demolition to slab



NSSAB Visit to EMAD October 2017



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NSSAB FY 2020 Work Plan

Item 1	Work Plan Item:	<i>Waste Verification Strategy</i>
	Deadline for Recommendation:	September 2020
	Description:	<p>Background: EM NV will identify existing and potential verification strategies regarding verification of waste sent to the Nevada National Security Site (NNSS) for disposal. This information will be used to determine if the existing verification strategy can be improved.</p> <p>NSSAB Scope: From a community perspective, the NSSAB will provide a recommendation on the potential verification strategies identified and/or how these strategies may be implemented.</p>
Item 2	Work Plan Item:	<i>FY 2022 Baseline Prioritization</i>
	Deadline for Recommendation:	March 2020
	Description:	<p>Background: As part of the federal budget process, the EM NV Program must provide funding request information to HQ as it relates to planned FY 2022 activities. The request is based on planned baseline activities.</p> <p>NSSAB Scope: From a community perspective, the NSSAB will provide a recommendation ranking the baseline activities.</p>



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NSSAB FY 2020 Work Plan (continued)

Item 3	Work Plan Item:	<i>Test Cell C Path Forward</i>
	Deadline for Recommendation:	November 2019
	Description:	<p>Background: EM NV will provide a briefing to the NSSAB explaining historic activities that took place at Test Cell C, already completed remediation activities, and the anticipated path forward for the facility.</p> <p>NSSAB Scope: From a community perspective, the NSSAB will provide a recommendation on the Department's planned end state for Test Cell C or how the plan could be improved.</p>
Item 4	Work Plan Item:	<i>NSSAB Long-Term Strategy</i>
	Deadline for Recommendation:	September 2020
	Description:	<p>Background: The EM NV mission is scheduled to end in 2030. As such, EM NV will have to determine how the NSSAB will transition into completion as well.</p> <p>NSSAB Scope: Provide a recommendation for how the NSSAB envisions its future role as the EM NV mission transitions to completion. This includes recommendations on the frequency of meetings, number of members, and overall community expectations.</p>



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NSSAB FY 2020 Work Plan (continued)

Item 5	Work Plan Item:	<i>Yucca Flat/Climax Mine Long-Term Monitoring Network</i>
	Deadline for Recommendation:	November 2019
	Description:	<p>Background: EM NV and NDEP will be establishing the long-term monitoring requirements for the Yucca Flat / Climax Mine Corrective Action Unit in early Fiscal Year 2020. EM NV will provide a briefing to the NSSAB explaining the proposed long-term monitoring network as well as the factors considered when establishing monitoring network requirements.</p> <p>NSSAB Scope: From a community perspective, the NSSAB will determine if they support the proposed long-term monitoring network and recommend how it could be enhanced.</p>
Item 6	Work Plan Item:	<i>EMAD</i>
	Deadline for Recommendation:	September 2020
	Description:	<p>Background: EM NV will provide a briefing to the NSSAB explaining historic activities that took place at EMAD, already completed remediation activities, and the anticipated path forward for the facility.</p> <p>NSSAB Scope: From a community perspective, the NSSAB will provide a recommendation on the Department's planned end state for EMAD or how the plan could be improved.</p>



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