

**U. S. Department of Energy**

**NESHAP ANNUAL REPORT FOR CY 2016**

**SANDIA NATIONAL LABORATORIES,  
TONOPAH TEST RANGE**

Prepared by

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Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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## **Introduction**

This National Emission Standards for Hazardous Air Pollutants (NESHAP) Annual Report has been prepared in a format to comply with the reporting requirements of 40 CFR 61.94 and the April 5, 1995 Memorandum of Agreement (MOA) between the Department of Energy (DOE) and the Environmental Protection Agency (EPA).

According to the EPA approved NESHAP Monitoring Plan for the Tonopah Test Range (TTR), 40 CFR 61, subpart H, and the MOA, no additional monitoring or measurements are required at TTR in order to demonstrate compliance with the NESHAP regulation.

## **Section I. Facility Information**

### **Site Description**

Sandia National Laboratories/Tonopah Test Range (SNL/TTR) is managed and operated by Sandia Corporation, for the U.S. Department of Energy (DOE) nuclear ordnance programs. SNL/TTR was used as a bombing range during World War II. SNL/TTR activities date from 1957 when SNL/TTR came into limited use after similar facilities at Salton Sea Test Base, California, became inadequate. SNL/TTR was originally designed and equipped to gather raw data on aircraft-delivered inert test vehicles coming under Atomic Energy Commission (AEC) purview. Over the years the facilities and the capabilities of SNL/TTR have been expanded to accommodate tests related to AEC (later, the DOE) weapons development programs, varying from simple tests or hardware components to rocket launches or air drops of test vehicles.

SNL/TTR is located about 140 miles (225 kilometers [km]) northwest of Las Vegas, Nevada, covering 624 square miles (1,616 km<sup>2</sup>) within the boundaries of the Nellis Air Force Range Complex. The nearest population centers are Goldfield (population 659) located about 25 miles (40 km) west of SNL/TTR, and Tonopah (population 4,400) located 30 miles (48 km) northwest of SNL/TTR.

### **Point Radiological Sources**

SNL/TTR does not currently have any facilities or other stack emission points that generate airborne radionuclide releases.

### **Diffuse Radiological Sources**

During the early 1960s, three dispersal tests involving plutonium (Pu) were conducted at SNL/TTR. These tests were conducted at Clean Slates 1, 2, and 3. The total area of contamination due to the three dispersal tests was estimated to be approximately 7.7 square miles ( $2 \times 10^7$  m<sup>2</sup>) as documented in an aerial survey of the three Clean Slate sites (EG&G, 1979). Remediation of these sites has been conducted in the past. These source locations are shown in Figure 1.

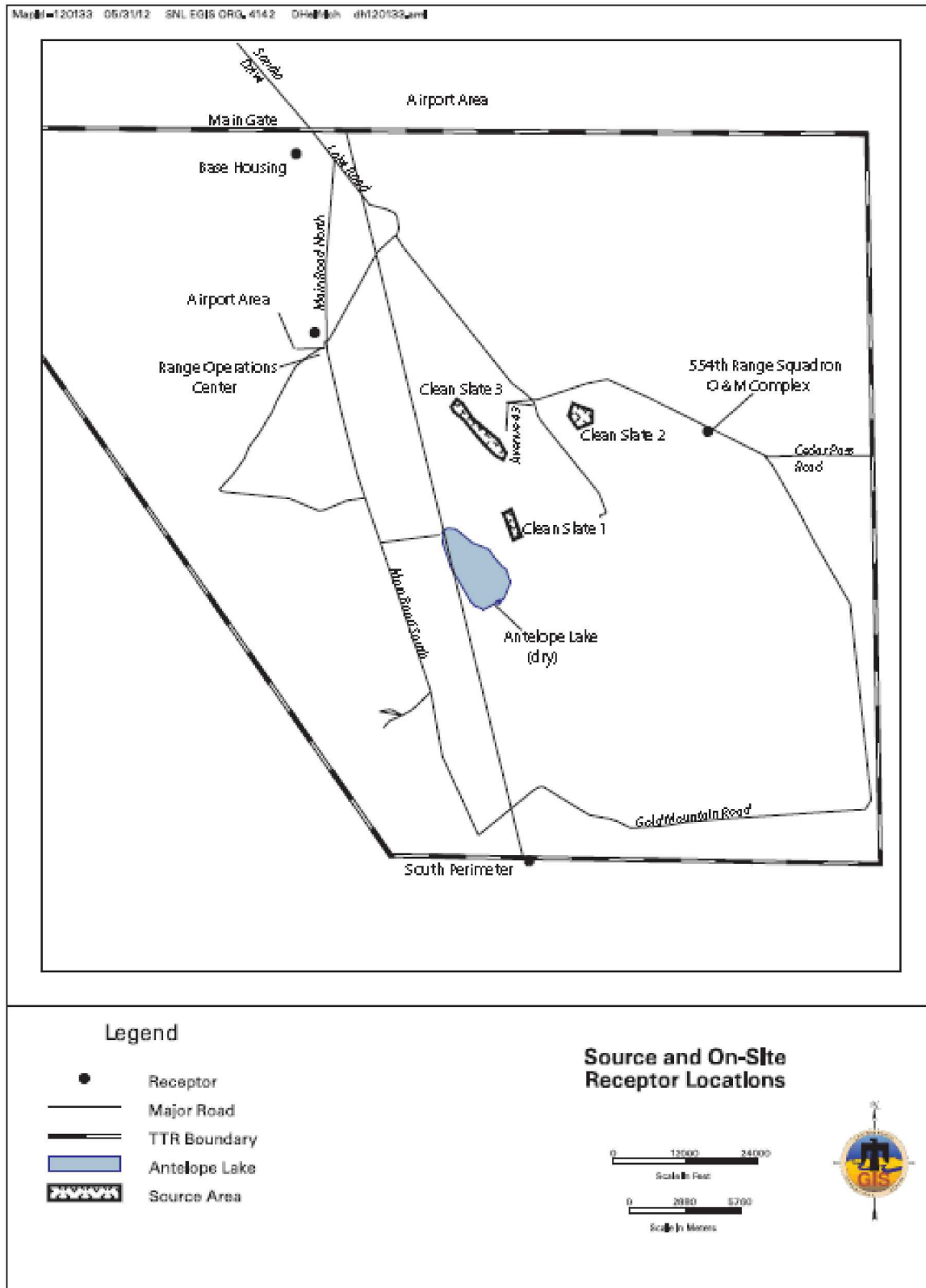


Figure 1. TTR Sources and On-Site Receptors

## **Section II. Air Emission Data**

### **Radiological Releases During 2016**

During 2016, no new radiological air emissions sources were identified. The only sources of airborne radionuclide emissions at SNL/TTR were from diffuse sources of Pu and americium (Am) associated with the original Clean Slate dispersal tests. The radionuclide emissions are uncontrolled and are the result of wind resuspension of contaminated surface soil particulates.

### **Environmental Surveillance Program**

In February of 1977, the EG&G Energy Measurement Group performed an aerial radiological survey at SNL/TTR. The surveyed areas included Clean Slates 1, 2, and 3. This radiological survey indicated the presence of transuranic contamination outside the Clean Slate access control fences and in the predominant downwind direction. An additional aerial survey was conducted in 1993. The results of the 1993 survey confirmed the general shape delineated by the 1977 survey.

Routine environmental surveillance activities were begun by SNL/New Mexico personnel at SNL/TTR in 1992. Included in these activities are soil and air sampling. The objective of the soil sampling and analysis has been to provide data identifying the extent of soil contamination in areas that were either known or suspected of being contaminated. Results from soil sampling have confirmed the presence of Pu and Am in the prevailing downwind directions of Clean Slates 1, 2, and 3. The results also confirmed the general shape and activity concentrations indicated by both EG&G surveys.

All routine environmental surveillance data for SNL/TTR are included in the annual Site Environmental Reports for SNL/TTR. These reports, and the information contained in the reports, are part of SNL's environmental compliance activities.

Initial NESHAP dose assessments at SNL/TTR were based on environmental surveillance data and release estimates from contaminated soil areas, which led to continuous air monitoring in 1996 and 1997. Since that time, NESHAP dose estimates have been based on the results of the continuous air monitoring effort.

### **Section III. Dose Assessment**

#### **Receptor Location**

Current guidance from both DOE and EPA requires addressing the dose impact of diffuse sources (MOA, April 5, 1995). One-year continuous air monitoring (February 22, 1996 through February 25, 1997) was performed at the TTR Airport Area, the location of the maximally exposed individual (MEI) (SNL, 1997). For the purpose of compliance modeling, the concept of "receptor" was conservatively assumed to include members of the military, military contractors, and other non-SNL personnel who work at locations on TTR, over whom SNL personnel have little or no operational control. This definition is consistent with current DOE guidance and EPA regulation. Off-site receptor doses were also evaluated.

#### **Dose To the Maximum Exposed Individual**

The effective dose equivalent (EDE) to the MEI was determined based on measured air concentrations for Am-241, Pu-238, and Pu-239/240, and the dose conversion factors from Federal Guidance Report 11, *Limiting Values of Radionuclide Intake and Air Concentration and Dose Conversion Factors For Inhalation, Submersion, and Ingestion* (EPA 1988). The EDE to the MEI was calculated to be 0.024 millirem per year (mrem/yr) based on measured data.

## **Section IV. Other NESHAP Compliance Criteria**

### **New or Modified Radiological Sources**

During 2016, there were no new or modified radiological sources at SNL/TTR facilities.

### **NESHAP Subparts Q and T**

During 2016, no radon emissions occurred from any of the SNL/TTR facilities.

### **Unplanned Radiological Releases**

During 2016, there were no unplanned or accidental radiological releases from any of the SNL/TTR facilities.

### **NESHAP History at SNL/TTR**

The original NESHAP compliance activities at SNL/TTR consisted of Clean Air Act Assessment Package – 1988 (CAP88) dose calculations based on resuspension calculations of the Clean Slate source term. The resuspension calculations were conservative and demonstrated the need for continuous air monitoring of the Clean Slate sites (1.1 mrem/yr EDE to the MEI).

According to 40 CFR 61, Subpart H, air monitoring is not required for any source with an EDE to the MEI of less than 0.1 mrem/yr. In addition, emissions from sources with less than 0.1 mrem/yr EDE to the MEI are not required for input to calculations performed for the purpose of demonstrating compliance with the regulation. However, these sources are required to be listed in the annual NESHAP report.

To satisfy the requirements of 40 CFR 61, Subpart H, a document entitled National Emission Standards for Emissions of Hazardous Air Pollutants (NESHAP) Monitoring Plan for the Tonopah Test Range (SNL 1995) was submitted to and approved by EPA Region IX. This Plan outlined the technical approach for conducting continuous air monitoring for one year at the MEI location for Clean Slate emissions. The plan included a phased approach for determining future monitoring requirements, based on the results of the one-year monitoring program:

- EDE >0.1 mrem/yr – continuous monitoring at the MEI location, until a one-year period less than 0.1 mrem/yr was established;
- EDE ≤0.1 mrem/yr, but >0.05 mrem/yr – periodic confirmatory monitoring at the MEI location;
- EDE ≤0.05 mrem/yr – no further air monitoring required.



Based on the results of the one-year continuous air-monitoring program, the EDE to the MEI was determined to be 0.024 mrem/yr (SNL 1997). These results demonstrate compliance with 40 CFR 61, subpart H. In accordance with the approved monitoring plan, no additional air sampling is required, since the EDE to the MEI was below 0.05 mrem/yr.

**Future NESHAP Activities**

SNL/NM personnel will continue to prepare annual NESHAP reports according to guidance provided by EPA and DOE. In addition, new sources will be evaluated for NESHAP applicability and modifications to the existing sources will be evaluated for NESHAP applicability.



## REFERENCES

- DOE 2003; U.S. Department of Energy (DOE), DOE Order 450.1, *Environmental Protection Program*, Washington, DC (DOE 2003).
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