

Sandia National Laboratories- Albuquerque Special Exposure Cohort Petition Evaluation Report 188

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February 2012

Oakland, CA

Petition Overview

- **Petition received on July 18, 2011**
- **Petitioner proposed class definition:**
 - **All Security Inspectors, Security Clerks, Firemen, Non-regular Recurrent Security Inspectors, Security Officers, Security Police Officers I, Security Police Officers II, Security Police Officers III, and Central Alarm System Operators that worked in any area at SNL-A for the period from January 1, 1963 through May 21, 2011**

Petition Overview—cont.

- Petition qualified for evaluation on October 21, 2011
- Petition basis: radiation monitoring records for members of the proposed class have been lost, falsified, or destroyed
 - Monitoring data retrieval problems incurred by NIOSH while processing individual claims and performing site data capture work supported the petition basis

Petition Overview—cont.

- **NIOSH evaluated class:**
 - All personnel that worked in any area at Sandia National Laboratories in Albuquerque, New Mexico, for the period from January 1, 1963 through May 21, 2011.
- **Sandia recently had a class added to the SEC:**
 - All personnel that worked in any area at Sandia National Laboratories in Albuquerque, New Mexico, for the period from January 1, 1949 through December 31, 1962.

Sources of Available Information

- ORAU Team Technical Basis Documents (TBDs)
- ORAU Team Technical Information Bulletins (TIBs) and Procedures
- Interviews with former employees
- Existing claimant files
- Documentation provided by petitioner

Data Capture Efforts

- NIOSH Site Research Database (over 2500 documents)
- Fourteen data capture visits at Sandia
- Data capture of Sandia-related records at facilities across the DOE complex
- DOE Opennet (OSTI database)
- Internet search

Previous Dose Reconstructions

NIOSH OCAS Claims Tracking System

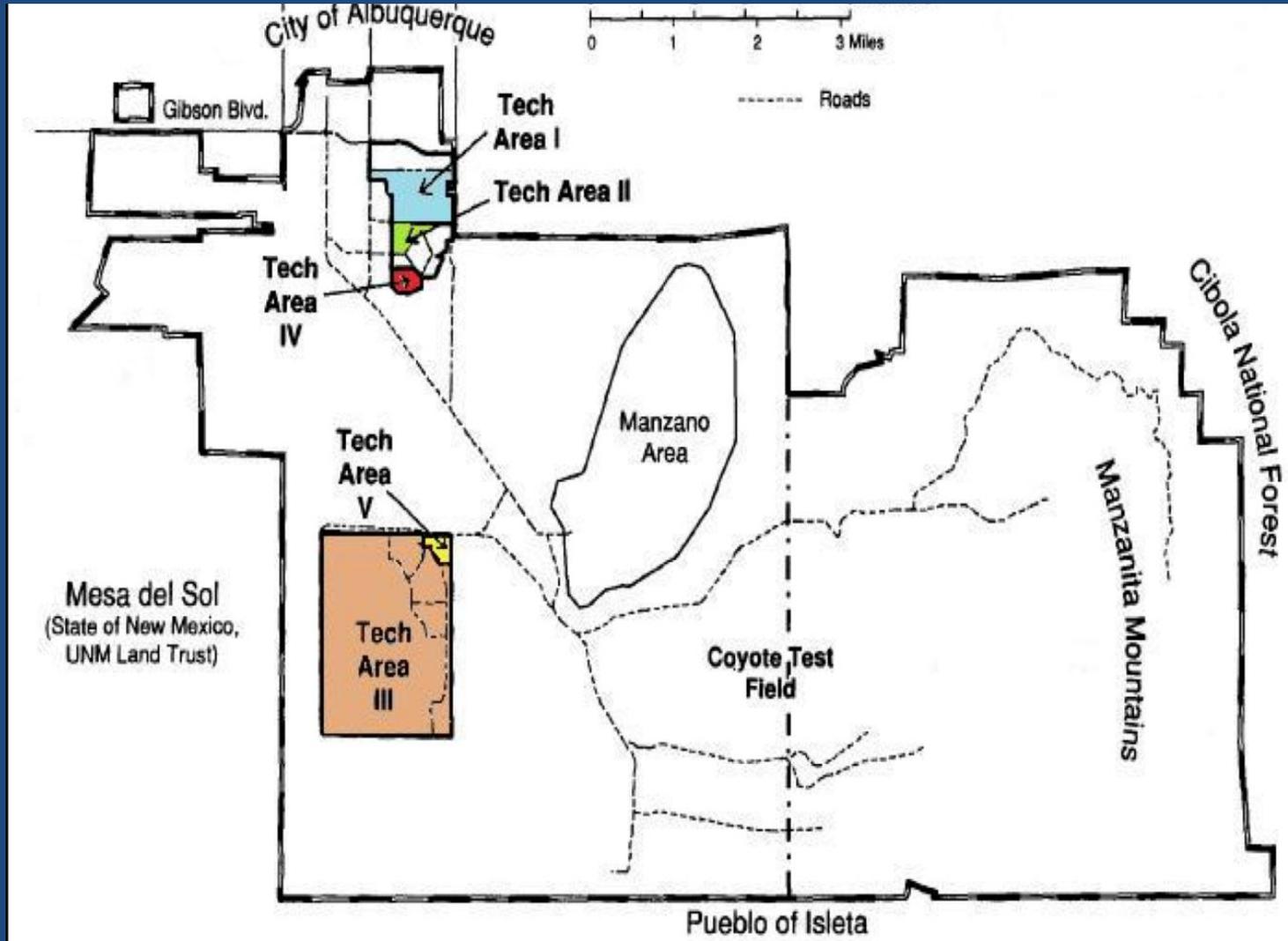
Information available as of March 22, 2011

- Sandia National Laboratory claims submitted to NIOSH **367**
- Claims with employment during the period evaluated (1949-1962) **323**
- Dose reconstructions completed for claims with employment during the period **270**
- Claims containing internal dosimetry **37**
- Claims containing external dosimetry **256**

Background

- In 1945, Z-Division of Los Alamos moved to what was to become the Sandia National Laboratory
- Covered period for Sandia National Laboratory, Albuquerque, as established by the Department of Labor began in 1949
- Weapons assembly, weapon ordnance engineering, and production coordination among various Atomic Energy Commission facilities (such as Clarksville, Medina, Pantex)

Background—cont.



Potential External Radiological Exposures During the Class Period

- **Broad spectrum of external hazards**
 - Photon exposures related to generators and accelerators and materials returned from weapons testing, reactors, and other research and waste materials
 - Beta exposures from activated components, materials returned from weapons testing, and air filters from cloud sampling
 - Neutron: weapons related, accelerators, reactors, neutron sources
 - Sandia National Laboratory dosimeters did not measure neutrons until 1958

Potential Internal Radiological Exposures During the Class Period

- Broad spectrum of activities resulted in numerous radionuclides of concern
 - Plutonium
 - Tritium
 - Uranium
 - Americium
 - Fission and activation products
 - Thorium

Health Physics at SNL

- Health physics was the responsibility of the industrial hygiene division prior to 1957 at which point a health physics section was formed
- NIOSH located minimal documentation of the practices and requirements during the evaluation period
- Monitoring requirements were developed based on the judgment of departments, divisions, and supervisors
- Interviews indicate that coverage was temporal and ad hoc in nature, which continues until the time of the Tiger Team audits

Personal Monitoring Data

- Availability of monitoring data remains a significant concern
- November 2009: NIOSH notified DOE that case responses were incomplete, particularly as related to internal dosimetry data
 - NIOSH acquired some individual data during data captures which were not provided in the responses

Personal Monitoring Data—cont.

- **January 2010: NIOSH re-requested the records for open Sandia National Laboratory cases**
- **DOE and Sandia National Laboratory are currently reviewing the best path forward for records at the site**

Internal Dosimetry Data Availability

- Unlike many DOE facilities, Sandia National Laboratory did not report the number of bioassay samples analyzed
- Based on interviews, it is thought to be a small number per year
- NIOSH has obtained copies of some bioassay records as part of its site data captures and claim data requests

Internal Dosimetry Data

Availability—cont.

- Number of samples, by year, from NIOSH records are provided in the following table (after 1991 Sandia is providing a database)
- Data collected during the 1992 and 1994 were from Controls for Environmental Pollution (CEP)
 - Company was convicted of fraud
 - CEP data during this time frame is not used by NIOSH for dose reconstruction

Summary of *In Vitro* Bioassay Samples Obtained by NIOSH

Table 6-1: Summary of Individual *In Vitro* Bioassay Results

Year	Tritium	Uranium ^a	Plutonium	Beta/Gamma ^b
1963	281	23	2	32
1964	248	14	4	-
1965	224	-	13	-
1966	222	-	98	-
1967	540	41	85	-
1968	78	5	74	-
1969	187	17	46	-
1970	147	47	24	-
1971	281	85	6	-
1972	184	74	-	5
1973	193	110	-	8
1974	99	60	-	3
1975	46	62	-	-
1976	126	64	-	-
1977	83	50	-	-
1978	138	30	-	1
1979	155	24	-	1
1980	147	40	-	-
1981	213	40	-	-
1982	79	59	-	-
1983	26	26	-	-
1984	28	74	-	-
1985	25	29	-	-
1986	33	70	-	-
1987	24	29	-	-
1988	24	24	-	-
1989	10	-	-	-
1990	442	-	-	-
1991	281	-	-	-

External Monitoring Data

- External dosimetry results were centralized from the beginning at Sandia National Laboratory
 - Personal data requests seem fairly complete for external dosimetry data based on NIOSH records
- Documentation of the pre-1957 external dosimetry program was not obtained by NIOSH
- Post-1957 documentation indicates workers in radiation areas were to be badged
- Available data represents a fairly substantial population and NIOSH has further developed external co-worker models and neutron-to-photon correction factors to determine dose to unmonitored workers

Feasibility of Dose Reconstructions

- NIOSH has determined that monitoring data, process information, and monitoring program information are insufficient to support bounding internal doses for the evaluated class.
 - There are indications that additional data exist (microfilm /microfiche record set), but these data are not readily accessible nor is there completeness ascertained.
 - Based on a lack of internal monitoring program documentation and source term information data for the evaluated period, NIOSH feels it cannot establish a bounding approach even if the microfilm/microfiche records were to become available.
- NIOSH concludes it cannot bound internal doses for the period from January 1, 1963 through December 31, 1994, but will continue to assess post-1994 dose reconstruction feasibility in a subsequent evaluation for SNL.

NIOSH Recommendation Regarding Non-SEC Claims

Although NIOSH found that it is not possible to completely reconstruct internal radiation doses for the proposed class, NIOSH intends to use any internal and external monitoring data that may become available for an individual claim (and that can be interpreted using existing NIOSH dose reconstruction processes or procedures)

NIOSH Recommended Class

All employees of the Department of Energy, its predecessor agencies, and its contractors and subcontractors who worked in any area at Sandia National Laboratories in Albuquerque, New Mexico, from January 1, 1963 through December 31, 1994, for a number of work days aggregating at least 250 work days, occurring either solely under this employment, or in combination with work days within the parameters established for one or more other classes of employees in the Special Exposure Cohort

NIOSH Recommendation

Summary of Feasibility Findings for SEC-00162 (January 1, 1963 through December 31, 1994)

Sources of Exposure	Reconstruction Feasible	Reconstruction Not Feasible
Internal		X
External	X	
- Gamma	X	
- Beta	X	
- Neutron	X	
- Occupational Medical X-ray	X	

NIOSH Recommendation

Summary of Feasibility Findings for SEC-00162 (January 1, 1995 through May 21, 2011)

Sources of Exposure	Reconstruction Feasible	Reconstruction Not Feasible
Internal	NIOSH continues to review the feasibility of dose reconstruction for this period for internal dose	
External	X	
- Gamma	X	
- Beta	X	
- Neutron	X	
- Occupational Medical X-ray	X	