



SEC-00252 West Valley Demonstration Project

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West Valley Demonstration Project Site

- West Valley, New York
- Commercial nuclear fuel reprocessing plant, operated by Nuclear Fuel Services, Inc. (NFS)

Covered Period

- AWE: January 1, 1966 through December 31, 1973
- Residual Radiation: January 1, 1974 through February 25, 1982
- DOE: February 26, 1982 through present



Background

- The WVDP Site Profile was completed on August 17, 2007
- SC&A completed a review of the Site Profile on December 5, 2013
- Among the Findings were comments that the Site Profile did not address the adequacy and accuracy of internal dose records at the site

After additional data capture efforts and research NIOSH determined that for the AWE Covered Period:

1. DOE was unable to provide complete internal monitoring data for claimants
2. There is limited workplace monitoring and source term data with which to estimate potential internal exposures

Background, continued

- NIOSH initiated an 83.14 SEC petition for the 1966 through 1973 time period due to the lack of adequate and accurate internal dose records and workplace monitoring data with which to estimate dose
- The feasibility of external dose estimations were not evaluated because the SEC petition was based on NIOSH determining that internal radiation doses could not be estimated

NIOSH Proposed Class for SEC-00252

- All Atomic Weapons Employees who worked at the West Valley Demonstration Project in West Valley, New York, during the AWE operational period from January 1, 1969 through December 31, 1973
- **Basis:** insufficient personal and workplace monitoring data to reconstruct internal dose
- The early operational period from January 1, 1966 through December 31, 1968, was not included in this evaluation because NIOSH has significantly more internal dosimetry data available to assess intakes for this period
- NIOSH continues to evaluate the quality and sufficiency of the 1966-1968 data

West Valley Demonstration Project Claims

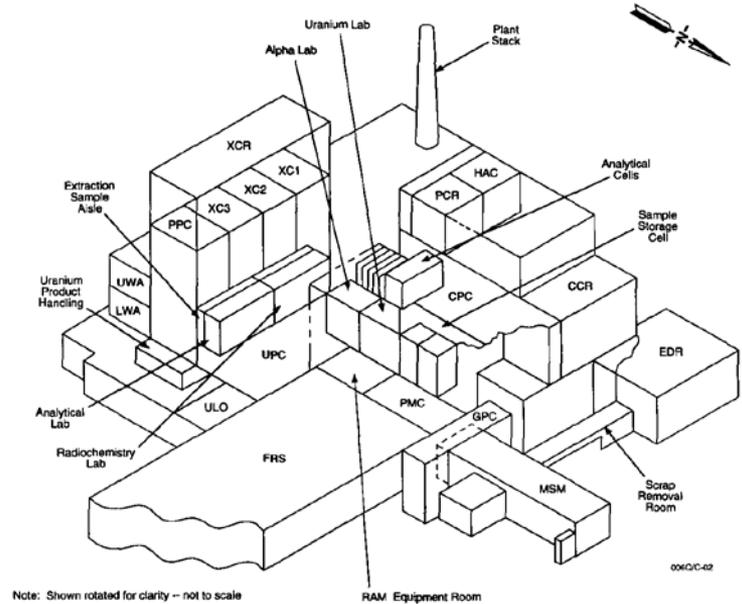
Description	Totals
Total number of claims submitted for dose reconstruction as of July 19, 2019	150
Total number of claims submitted for energy employees who worked during the period under evaluation (January 1, 1969 through December 31, 1973)	35
Number of dose reconstructions completed for energy employees who worked during the period under evaluation	33
Number of claims for which internal dosimetry records were obtained for the time period under evaluation	24
Number of claims for which external dosimetry records were obtained for the time period under evaluation	33

Site Description

- In 1962 the state of New York's Atomic and Space Development Authority (ASDA) and NFS partnered to build a privately owned nuclear fuel reprocessing plant
- Construction of the plant began in June 1963 on land NFS leased from the ASDA and took 3 years to complete
- The reprocessing plant was in a 300-acre security area site bounded by barbed wire fence and posted as a restricted area

Site Description, continued

- The plant was arranged in the shape of a U with the Fuel Receiving and Storage facility on one end and the product removal facilities on the other
- Most of the areas in the process building were either shielded cells, operating aisles, or unshielded rooms
- Chemical operations were directed from the Control Room
- Mechanical operations were directed from operating aisles adjacent to viewing windows



CCR = Chemical Process Cell Crane Room	LWA = Lower Warm Aisle	UPC = Uranium Product Cell
CPC = Chemical Process Cell	MSM = Master-Slave Manipulator Repair Shop	UWA = Upper Warm Aisle
EDR = Equipment Decontamination Room	PCR = Process Chemical Room	XC1 = Extraction Cell #1
FRS = Fuel Receiving and Storage	PMC = Process Mechanical Cell	XC2 = Extraction Cell #2
GPC = General Purpose Cell	PPC = Product Purification Cell	XC3 = Extraction Cell #3
HAC = Hot Add Cell	ULO = Uranium Loadout Area	XCR = Extraction Chemical Room

Project Operations

- NFS received its license to receive and store fuel on May 27, 1965
- NFS received its operating license for the reprocessing plant on April 19, 1966
- Fuel reprocessing began on April 22, 1966
- From 1966 to 1972, the West Valley facility handled and reprocessed a total of 630 tons of fuel from nine different reactors during 28 campaigns using the Plutonium Uranium Extraction (PUREX) process
- One Thorium Extraction (THOREX) process campaign took place between November 15, 1968 and January 20, 1969

Project Operations, continued

- Fuels processed
 - Light-water reactor fuels
 - Fuels from AEC-owned reactors
 - A uranium-thorium fuel cycle core from the Indian Point 1 reactor
- Materials shipped
 - Recovered uranium was sent to the Fernald Plant located in Ohio
 - The AEC-owned plutonium was sent to Hanford located in Washington
 - The utility-owned plutonium was retained by the utilities, sold to industry, or sold to NFS for later resale

Process Summary

- Fuel receipt and storage (Fuel Receiving and Storage Facility)
 - Fuel arrived in shipping casks
 - Fuel was unloaded underwater and stored in a pool
- Mechanical preparation (Process Mechanical Cell)
 - Shearing and sawing equipment was used to segment the fuel into fixed lengths
- Fuel dissolving (Chemical Process Cell)
 - The fuel was dissolved in acid leaving behind the cladding and any structural components

Process Summary, continued-1

- Solvent extraction
 - The uranium and plutonium in the dissolved fuels were separated from the fission products and purified
- Uranium and plutonium product concentration, storage, and loadout
 - The purified products were shipped as nitrate solution
 - After May 1971, plutonium solutions were sometimes also sent to the Plutonium Storage Facility, which was owned and operated by the state of New York near the West Valley site
 - High-level liquid waste generated in the process was stored in underground tanks

Process Summary, continued-2

- In March 1972, the reprocessing plant was shut down to complete a series of improvements intended to increase capacity and meet new regulatory requirements
- Due to a new licensing process that would be required to be met, and more stringent requirements on plant effluents, NFS concluded that reprocessing no longer made economic sense
- In 1977 management of the facility was transferred to the New York State Energy Research and Development Authority
- In 1980 the U.S. Congress passed the West Valley Demonstration Act
- DOE assumed operational control of the site on February 26, 1982

Estimating Internal Dose

- Bioassay Data
 - Urinalysis
 - Fecal samples
 - Whole body counts
- Workplace Monitoring Data
 - Breathing zone air samples
 - General area air samples
 - Surface contamination surveys
- Source Term Evaluations
 - Process information
 - Characterizing and quantifying the source term

Internal Dose Feasibility

Bioassay Data

- DOE is unable to provide complete internal monitoring data for claimants for the AWE Operational Period January 1, 1969 through December 1, 1973
 - For claims with internal monitoring data, the majority of monitoring information was obtained from NIOSH data capture efforts, not from DOE
 - Some data provided by DOE was not found during NIOSH data capture
- Neither set of data includes all bioassay data

Internal Dose Feasibility, continued

- Unable to develop a co-worker model for all radionuclides due to inadequate bioassay for U (1969-1973) and mixed fission products (1972-1973)

Summary of Bioassay Analysis by Major Radionuclide and Year

Year	Total Pu Analysis (urine + fecal)	Total U Analysis (only urinalysis is available)	Total MFP Analysis (urine, fecal and WBC)
1966	2	0	4
1967	888	46	386
1968	595	89	250
1969	22	5	186
1970	179	1	242
1971	195	1	143
1972	177	1	50
1973	260	1	2

Internal Dose Feasibility, continued-1

Workplace Monitoring Data

- Air Sampling
 - No breathing zone air sample data
 - Nasal smears were relied on to assess the potential for intakes from plutonium and fission products and were used as indicators for the need to obtain follow-up bioassay
 - Incident driven collection
 - High action limits
 - Potential for unmonitored intakes
- Air sample data from March 1970 in the General Purpose Cell Room, and from 1973 in the Analytical Aisle
- Copies of logbook pages with gross alpha and gross beta results from routine air monitoring for 1969-1973

Internal Dose Feasibility, continued-2

Contamination Surveys

- Surface contamination levels were quite variable depending on location
 - Ranging from non detectable to several million dpm/100 cm² smearable gross alpha and gross beta
- No isotopic information for the contamination survey data
- Infeasible to determine occupancy locations and times for workers
 - Site-specific and claimant-specific data is insufficient to characterize employee movements across the site

Internal Dose Feasibility, continued-3

Source Term Data

- Known information
 - Process and source descriptions
 - Identities and quantities of radionuclides of concern
 - Processes through which radiation exposures may have occurred

- Unknown information
 - The available documentation does not indicate any definite boundaries between radiological and non-radiological areas for the period being evaluated
 - Occupancy locations and times for workers

Summary of SEC-00252

- There is insufficient internal bioassay data and accurate workplace monitoring data to reconstruct internal dose from uranium and mixed fission products from January 1, 1969 through December 31, 1973
- NIOSH intends to use any internal monitoring data that is available for an individual claim to conduct partial dose reconstructions for individuals not part of the SEC
- The early operational period from January 1, 1966 through December 31, 1968, was not included in this evaluation because NIOSH has significantly more internal dosimetry data available to assess intakes for this period. NIOSH is continuing to evaluate the quality and sufficiency of the 1966 through 1968 data

Feasibility Findings for SEC-00252 January 1, 1969 to December 31, 1973

Source of Exposure	Dose Reconstruction Feasible
Internal	No
Uranium	No
Mixed Fission Products	NO