



**UNITED STATES  
NUCLEAR REGULATORY COMMISSION**

REGION I  
2100 RENAISSANCE BLVD., SUITE 100  
KING OF PRUSSIA, PA 19406-2713

February 22, 2018

Docket No. 05000201

License No. CSF-1

Bryan C. Bower  
Director  
West Valley Demonstration Project  
U. S. Department of Energy  
10282 Rock Springs Road  
West Valley, NY 14171

**SUBJECT: U. S. NUCLEAR REGULATORY COMMISSION MONITORING VISIT REPORT  
NO. 05000201/2017001, WEST VALLEY DEMONSTRATION PROJECT, WEST  
VALLEY, NEW YORK**

Dear Mr. Bower:

On August 22-23, 2017 and October 24 – 25, 2017, the Nuclear Regulatory Commission (NRC) conducted a series of monitoring visits at the U.S. Department of Energy's West Valley Demonstration Project site to review ongoing decommissioning activities. The monitoring visits consisted of NRC staff observations, interviews with personnel, and an examination of representative records. The results of the 2017 monitoring visits were discussed with you during the February 13, 2018 monitoring visit and are provided in the enclosed report. No public health and safety issues were identified.

No reply to this letter is required. Please contact Mark Roberts at (610) 337-5094 if you have any questions regarding this matter.

Sincerely,

*/RA/*

Raymond J. Powell, Chief  
Decommissioning, ISFSI, and Reactor HP  
Branch  
Division of Nuclear Materials Safety

Enclosure:  
Report No. 05000201/2017001

cc w/enclosure: Craig Rieman, Deputy Director  
Moirá Maloney, Regulatory Strategy and Environmental Compliance  
Janice Williams, Regulatory Affairs  
Paul Bembia, Program Director

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DATE	02/22/2018		02/22/2018		02/22/2018			

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U.S. NUCLEAR REGULATORY COMMISSION  
REGION I

INSPECTION REPORT

Monitoring Visit No. POOM-032/2017001

Project No. POOM-032

NRC Docket No. 05000201

NRC License No. CSF-1

Location: West Valley Demonstration Project  
10282 Rock Springs Road  
West Valley, New York 14171

Monitoring Visit Dates: August 22 – 23, 2017 and October 24 - 25, 2017

Monitoring Visit Exit Date: February 13, 2018

NRC Staff: Mark C. Roberts, Senior Health Physicist  
Decommissioning, ISFSI and Reactor  
Health Physics Branch  
Division of Nuclear Materials Safety, Region I

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Gregory Chapman, Health Physicist  
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Approved By: Raymond J. Powell, Chief  
Decommissioning, ISFSI and Reactor  
Health Physics Branch  
Division of Nuclear Materials Safety, Region I

Enclosure

## **EXECUTIVE SUMMARY**

U.S. Department of Energy  
West Valley Demonstration Project  
NRC Monitoring Visit Report No. 2017001

A series of routine, announced monitoring visits were conducted on August 22 – 23, 2017, and October 23 - 24, 2017, by United States Nuclear Regulatory Commission (NRC) staff at the U.S. Department of Energy (DOE) West Valley Demonstration Project (WVDP) site in West Valley, New York. NRC staff participated in DOE quarterly public meetings on August 23, 2017 (during monitoring visit) and on February 26 and May 28, 2017, via telephone and webinar. NRC staff also participated in the WVDP Regulatory Roundtable Meeting on October 25, 2017. The program for conducting NRC monitoring visits at the WVDP is described in Inspection Manual Chapter (IMC) 0111, "Region I Monitoring Activities for the DOE West Valley Demonstration Project." The monitoring visits included a review of programs and activities associated with the WVDP site decommissioning project. The monitoring visits consisted of interviews with DOE, DOE contractor, and New York State Energy Research and Development Agency (NYSERDA) personnel; a review of documents; tours of the facility; and observations of prepared work areas and in-progress work activities. Based on the results of these activities, no public health and safety issues were identified.

## REPORT DETAILS

### **1.0 Introduction**

In accordance with the WVDP Act of 1980 and as implemented by a Memorandum of Understanding between the DOE and the NRC, a series of routine, announced monitoring visits were conducted on August 22 – 23, 2017, and October 23 - 24, 2017, by NRC staff at the DOE WVDP site in West Valley, New York. NRC staff participated in DOE quarterly public meetings on August 23, 2017 (during monitoring visit) and on February 26 and May 28, 2017, via telephone and webinar. NRC staff also participated in the WVDP Regulatory Roundtable Meeting on October 25, 2017. The program for conducting NRC monitoring visits at the WVDP is described in IMC 0111. The monitoring visits included a review of programs and activities associated with the WVDP site decommissioning project.

### **2.0 Annual Site Environmental Report**

#### a. Inspection Scope

The NRC reviewed WVDP's Annual Site Environmental Report (ASER) for 2016 and discussed the report with DOE and DOE contractor personnel.

#### b. Observations and Findings

The radiological environmental monitoring program at the WVDP site focuses on measuring radioactivity from site activities in air, surface water, groundwater, food products, soil, and sediment. Direct radiation is also measured through a network of thermoluminescent dosimeters (TLDs) on the site and around the site perimeter. The monitoring program provides information about the environmental radiological conditions at the site and is intended to verify that public health and safety and the environment are protected and that relevant regulatory requirements have been met. The most recent ASER (issued September 2017) for the WVDP documents the calendar year 2016 environmental monitoring program data. Air and surface water pathways are the primary means by which radioactive material could move off site. The WVDP's on- and off-site monitoring program includes measuring the concentration of alpha and beta radioactivity in air and water effluents as well as specific radionuclide measurements in all environmental media.

Relevant radiological dose limits for the WVDP include U. S. Environmental Protection Agency (USEPA) regulations for air emissions and DOE limits regarding all exposure modes from DOE activities. Radiological air emissions (other than radon) from DOE facilities are regulated by the USEPA under the National Emission Standards for Hazardous Air Pollutants: (NESHAP) regulation (40 CFR 61, Subpart H), which establishes a standard of 10 millirem/year effective dose equivalent to any member of the public (via the airborne pathway). In 2015, the USEPA gave final approval for WVDP's use of ambient air monitoring data to demonstrate compliance with the NESHAP regulations and stack effluent measurements were no longer required. DOE established sixteen low-volume ambient air samplers surrounding the site, one in each

of the sixteen compass point sectors, and uses the radiological analysis of air sampler filters and modeling assumptions to demonstrate compliance with the NESHAP regulations. DOE Order 458.1 sets the DOE primary standard of 100 millirem/year effective dose equivalent to members of the public considering all exposure modes from DOE activities. For 2016, information in the ASER indicates that the estimated dose to a member of the public was less than 0.5 millirem/year from all WVDP sources. The ASER continues to document elevated Strontium-90 (Sr-90) concentrations in groundwater and groundwater surface seeps from the area north of the Permeable Treatment Wall (PTW). The results from direct radiation measurements from perimeter TLD locations were not significantly different compared to background levels.

c. Conclusions

No offsite public health and safety issues were identified. DOE conducted the environmental monitoring program for the WVDP site in accordance with regulatory requirements. Calculated doses from radiological air and liquid effluents were less than five percent of EPA or DOE limits.

**3.0 North Plateau Permeable Treatment Wall**

a. Inspection Scope

The NRC reviewed the performance of the PTW installed on the WVDP north plateau for mitigation of the previously documented Sr-90 groundwater plume. The monitoring visit consisted of interviews with DOE and DOE contractor personnel, a review of documents, and a tour of the PTW area.

b. Observations and Findings

The NRC reviewed information in the 2016 PTW Comprehensive Monitoring Report that summarizes the performance and condition of the PTW through the first five years following installation. The report includes summaries of the Sr-90 concentrations in groundwater monitoring well samples in the 66 specific PTW wells installed up gradient, in, and down gradient of the PTW, and the network of existing wells in the PTW vicinity. Information in the report indicates that the performance of the PTW continues to meet the established Remedial Action Objectives and Functional Design Requirements (as documented in the PTW monitoring report). These Remedial Action Objectives include: a reduction in the down gradient Sr-90 groundwater concentrations (compared to up gradient concentrations) from the PTW; minimizing expansion of the contaminated groundwater plume; and no substantial diversion or alteration in groundwater flow. The NRC representatives noted that the PTW continues to be removing Sr-90 from the plume as evidenced by the very low or non-detectable concentrations of Sr-90 in groundwater monitoring well samples within the wall. Concentrations of Sr-90 in monitoring well samples immediately down gradient of the PTW were generally lower than the corresponding up gradient wells. This reduction is also evident in wells within the existing network of wells on the down gradient side of the PTW. The groundwater flow patterns have remained consistent with conditions observed prior to PTW installation. There does not appear to be any expansion of the plume except for areas

that were already on the down gradient side of the PTW. Visual inspections of the PTW have not identified any substantial changes to the PTW system.

c. Conclusions

No public health and safety issues were identified. Review of the latest PTW Annual Monitoring Report indicates that the performance of the PTW is meeting the established Remedial Action Objectives.

**4.0 Vitrification Facility Demolition Project**

a. Inspection Scope

The NRC staff discussed DOE's plans for the open-air demolition of the vitrification facility at the WVDP site. Monitoring visits consisted of interviews with DOE and DOE contractor personnel; a review of documents; tours of the work areas outside of the vitrification facility; a walk down of the air monitoring system components; a review of dust control measures for demolition activities; and discussions on waste generation and disposal activities.

b. Observations and Findings

The vitrification facility housed the major equipment that was used for solidifying liquid high level radioactive waste with molten glass and inserting it into stainless steel canisters. These canisters are now stored in shielded concrete casks on the high level waste interim storage pad at the south end of the WVDP site. The vitrification facility was later used for a number of waste processing operations that included size reduction and repackaging. The demolition of the vitrification facility is part of phase 1 (of 2 phases) of the decommissioning of the WVDP. Phase 1 demolition activities primarily include demolition of the vitrification facility and the Main Plant Processing Building (MPPB) to essentially grade level. The vitrification facility is a structural steel and reinforced concrete building approximately 145 feet long, 91 feet wide, and 50 feet high (with a 26-foot vertical extension for the crane house). The vitrification cell within the facility is a robust structure with concrete floors and walls from two to four feet thick and a 3/8-inch thick stainless steel liner. Nearly all of the remaining radioactivity is located within the vitrification cell. The primary radionuclides in the cell include Sr-90, cesium-137, americium-241, and isotopes of plutonium and uranium.

During the August monitoring visit, NRC representatives discussed pre-demolition plans for controlling the environmental release of radioactive materials through air and water pathways and limiting potential exposures to workers through inhalation and direct exposure pathways. WVDP representatives indicated that the operating experience gained during the successful demolition of the 01-14 building was utilized in the development of the vitrification facility demolition plan. Significant pre-demolition actions included removing and separately disposing of major contaminated equipment and vessels, filling piping and electrical conduits with grout or foam, as appropriate, high-pressure washes to decontaminate walls, applying fixatives to walls to limit release of aerosol contamination, and placing a layer of grout on the floor to reduce the gamma

exposure rate. Demolition of the prepared facility is being performed using a variety of large construction apparatus equipped with shearing, crushing, demolition, and water spray attachments.

In September, the WVDP project staff initiated the initial demolition phase of the vitrification facility. Demolition of the facility commenced with work on the roof and aisles of the facility. NRC representatives observed that demolition debris was size-reduced by the construction equipment prior to placement into 32-cubic yard intermodal containers. The intermodal containers were lined with an inner bag in each container to retain debris. Water absorbent material was also placed in each intermodal container to immobilize any accumulated water that had been used for dust suppression.

During one of the walkdowns of the project area, DOE and contractor representatives provided an overview of the waste loading and shipping protocols that were being used. Once intermodal containers are loaded and sealed, the containers are being shipped via one of two pathways, depending on weight and radioactivity content. Lower activity and lighter containers are typically shipped via truck to a licensed trans-loading facility (Alaron) in northwest Pennsylvania. There the containers are dumped into gondola rail cars (typically five to six containers per gondola car). The loaded gondolas are then sent directly to the EnergySolutions burial facility in Utah for dumping and burial. The empty intermodal containers are immediately returned to the WVDP site where they are surveyed for contamination and prepared to be used for the next waste shipment. Turnaround time for the Alaron facility is typically only a couple of days. The typical pathway for higher activity containers is to send the containers via truck to a rail transfer facility outside Buffalo, New York, where the containers are loaded onto flatbed train cars (eight containers to each flatbed car) and then transported by rail to a rail transfer facility in Kingman, Arizona. The intermodal containers are then unloaded from the railcar and shipped via truck to the Nevada National Security Site (NNSS) where they are dumped for disposal. Turnaround time for intermodal containers shipped to the NNSS facility is expected to be several weeks. DOE representatives indicated that approximately 450 filled containers will be needed to dispose of the debris from the vitrification facility demolition.

As indicated earlier, the NRC representatives noted that water sprays were in use during demolition activities for dust control and to limit the potential for airborne release of radioactive contaminants. One observed change from the 01-14 building demolition project was the use of more controlled water sprays to limit the quantity of water that would be retained in the demolition debris so as to reduce any groundwater impact. The NRC representatives noted that a series of berms had been established to control water runoff. Temporary water storage tanks had been staged at the perimeter of the project area for storage of collected water. Any collected water would be monitored, treated if necessary, and released through established processes.

The NRC representatives noted that a series of airborne contamination monitors had been placed around the perimeter of the project area (approximately 30 meters from the vitrification facility) for evaluation of potential airborne radioactive contamination exposure to workers. The monitors provide near real-time measurements of airborne radioactive contamination. Data from the monitors are sent to a central monitoring



location near the project where radiation protection staff provide constant monitoring. The radiation protection staff demonstrated the capabilities of the equipment and indicated that there were multiple alarm levels with subsequent action responses ranging from stopping work to sheltering or evacuation of workers. Radiation protection staff indicated that there had not been any alarms recorded since the initiation of demolition activities. Radiation protection staff also pointed out that additional (approximately 10 to 12) air samplers were positioned within the vitrification facility demolition area for collection of air particulate samples for subsequent measurement and evaluation.

c. Conclusions

No public health and safety issues were identified. The planned demolition activities and the demolition activities observed during monitoring visits at the vitrification facility appear to be controlling air and water effluents as intended and allowing waste to be safely loaded and transported for offsite disposal.

## 5.0 **Regulatory Roundtable and DOE WVDP Quarterly Public Meetings**

### WVDP Regulatory Roundtable Meeting

NRC representatives from Region I and the (NRC headquarters) Office of Nuclear Material Safety and Safeguards participated in the WVDP Regulatory Roundtable meeting on October 25, 2017. The WVDP Regulatory Roundtable Meeting also included representatives from the USEPA (Region II), NYSERDA, the New York State Department of Environmental Conservation, DOE, and DOE WVDP contractors. The purpose of the meeting was to gain an understanding of current and future work activities and to foster dialogue among the participants regarding the regulatory requirements of the project. Items discussed during this meeting included the completed high level waste canister relocation and storage project, waste tank farm status, PTW performance, waste processing and shipping operations, environmental and regulatory programs status, vitrification facility demolition activities, MPPB demolition plans, NYSERDA-directed activities, the Supplemental Environmental Impact Statement planning, and the potential scope of Phase 2 decommissioning decision making.

### DOE WVDP Quarterly Public Meetings

NRC staff participated in the DOE quarterly public meeting on August 23, 2017, as part of the scheduled monitoring visit. The NRC staff also attended the February 26 and May 28, 2017, meetings via telephone conference and webinar. During the public meetings, DOE, DOE contractor, and NYSERDA representatives provided updates on the progress of various project milestones.

## 6.0 **Exit Meeting Summary**

The NRC Region I representatives discussed the 2017 monitoring visit results with Bryan Bower, DOE Project Director, during the February 13, 2018, monitoring visit. Mr. Bower acknowledged the monitoring visit results.

**SUPPLEMENTAL INFORMATION**

**PARTIAL LIST OF PERSONS CONTACTED**

Department of Energy

B. Bower, Project Director  
J. Dundas, Physical Scientist  
C. Eckert, Safety and Site Programs Team Leader  
M. Maloney, Regulatory Strategy and Environmental Compliance Team Leader  
J. Prowse DOE Health Physics Support Contractor  
D. Sullivan, Project Manager

NYSERDA

P. Bembia, Program Director  
A. Mellon, Project Manager

CH2MHILL-B&W West Valley, LLC and Contractors

C. Biedermann, Senior Consulting Engineer  
J. Bradford, President  
S. Chase, Facilities Disposition Operations Manager  
T. Dogal, Facilities Disposition Manager  
J. Ebert, High Level Waste Project Manager  
J. Fox, Regulatory Specialist  
B. Kean, Regulatory Specialist  
P. Loop, Waste Planning and Disposition  
J. Rizzo, Manager, Waste Planning and Disposition  
A. Steiner, Senior Environmental Regulatory Strategist  
R. Steiner, Regulatory Specialist  
J. Williams, Regulatory Affairs

**PARTIAL LIST OF DOCUMENTS REVIEWED**

Monthly WVDP Project Performance Reports (various)  
Weekly WVDP Project Status Reports (various)  
Permeable Treatment Wall Comprehensive Monitoring Report – 2016, September 2016  
U.S. Department of Energy, WVDP Vitrification Facility Demolition Project, Readiness Assessment Plan of Action, June 2017  
U.S. Department of Energy, WVDP Vitrification Facility Demolition Project, Readiness Assessment Implementation Plan, July 2017  
WVDP Annual Site Environmental Report Calendar Year 2016; September 2017  
Presentations from the October 25, 2017, Regulatory Roundtable Meeting, Ashford, New York  
WVDP Vitrification Facility Decommissioning & Demolition Plan, CHBWW, May, 2017

## **LIST OF ACRONYMS USED**

ASER	Annual Site Environmental Report
DOE	Department of Energy
IMC	Inspection Manual Chapter
MPPB	Main Plant Processing Building
NESHAP	National Emission Standards for Hazardous Air Pollutants
NNSS	Nevada National Security Site
NRC	Nuclear Regulatory Commission
NYSERDA	New York State Energy Research and Development Authority
PTW	Permeable Treatment Wall
Sr-90	Strontium-90
TLD	Thermoluminescent dosimeter
USEPA	U. S. Environmental Protection Agency
WVDP	West Valley Demonstration Project