



UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION I
475 ALLENDALE ROAD
KING OF PRUSSIA, PENNSYLVANIA 19406-1415

May 27, 2011

Mr. Bryan Bower
Project Director
Department of Energy
West Valley Demonstration Project
10282 Rock Springs Road
P.O. Box 191
West Valley, NY 14171-9799

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION WEST VALLEY
DEMONSTRATION PROJECT MONITORING VISIT 2011-001

Dear Mr. Bower:

On April 26 – 28, 2011, Mark Roberts of this office conducted a routine monitoring visit at the Department of Energy's (DOE) West Valley Demonstration Project (WVDP) site to review ongoing decommissioning activities at the site. These activities are conducted and coordinated by DOE and their site contractor, West Valley Environmental Services, LLC (WVES). The purpose of the visit was to review activities associated with the WVDP tank and vault drying system, the north plateau permeable treatment wall, and to attend the meetings of the Nuclear Waste Technical Review Board and the West Valley Citizen Task Force. The results of this visit were discussed with you, WVES representatives, and a representative from the New York State Energy Research and Development Authority (NYSERDA) at the conclusion of the monitoring visit on April 28, 2011. Details of the NRC review are provided in the enclosed report.

Current NRC regulations are included on the NRC's website at www.nrc.gov; select **Nuclear Materials; Medical, Academic, and Industrial Uses of Nuclear Material**; then **Regulations, Guidance, and Communications**. You may also obtain these documents by contacting the Government Printing Office (GPO) toll-free at 1-866-512-1800. The GPO is open from 7:00 a.m. to 6:30 p.m. EST, Monday through Friday (except Federal holidays).

In accordance with 10 CFR 2.390 of the NRC's "Rules of Practice," a copy of this letter and the enclosed report will be available electronically for public inspection in the NRC Public Document Room or from the NRC's document system (ADAMS), accessible from the NRC Web site at <http://www.nrc.gov/reading-rm/adams.html>.

B. Bower

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

Thank you for your cooperation.

Sincerely,

/RA K. D. Modes for/

Judith Joustra, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure:
Monitoring Report No. 2011-001

cc w/ encl:
Paul Bembia, Program Director, NYSERDA
State of New York
Christopher Eckert, Lead Physical Scientist, DOE, WVDP

B. Bower

2

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Enclosure:
Monitoring Report No. 2011-001

cc w/encl:
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State of New York
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NAME	MRoberts/mcr		JJoustra/kdm f/				
DATE	05/26/11		05/27/11				

**U.S. NUCLEAR REGULATORY COMMISSION
REGION I**

MONITORING REPORT

Monitoring Visit Number: POOM-032/2011001

Project Number: POOM-032

Location: West Valley Demonstration Project
10282 West Spring Road
West Valley, NY 14171-9799

Monitoring Visit Dates: April 26 – 28, 2011

Monitor: Mark Roberts, Senior Health Physicist
Decommissioning Branch
Division of Nuclear Materials Safety

Approved by: Judith Joustra, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

EXECUTIVE SUMMARY

U. S. Department of Energy (DOE)
West Valley Demonstration Project (WVDP)

NRC Monitoring Report No. 2011-001

In accordance with the WVDP Act of 1980 and as implemented by a Memorandum of Understanding between the DOE and the NRC, NRC Region I staff conduct technical monitoring visits at the WVDP site to review WVDP facilities and operations. NRC technical monitors use NRC Inspection Manual Chapter 0111, "Region I Monitoring Activities for the DOE West Valley Demonstration Project" as guidance for the monitoring visits. This report summarizes the monitoring visit conducted during the period of April 26 - 28, 2011 at the WVDP. The purpose of the visit was to review activities associated with the WVDP tank and vault drying system, the north plateau permeable treatment wall (PTW), and to attend meetings of the Nuclear Waste Technical Review Board (NWTRB) and West Valley Citizen Task Force (WVCTF).

The NRC monitor interviewed cognizant personnel, performed field observations, and examined documentation during the visit. Based on this review, the monitor noted the following:

- A tank and vault drying system was installed to reduce or eliminate the residual liquid within the tanks and tank vaults and eliminate the intrusion of groundwater into the tank vaults. Reducing the volume of liquid in the tanks and eliminating the intrusion of groundwater into the tanks is expected to reduce the potential for the tanks to leak their highly radioactive contents. Installation was completed in late 2010 and the performance of the system has exceeded expectations in the rate that the liquid volume in the tanks has been reduced. Air effluents exhausted into the monitored stack have been generally less than detectable for gross alpha and gross beta activities. (Section II)
- The Sr-90 contaminated groundwater plume on the north plateau of the WVDP area has been extensively characterized. DOE and West Valley Environmental Services, LLC (WVES) staffs evaluated various mitigation methodologies for the groundwater plume and selected installation of a vertical PTW to intersect the groundwater plume perpendicular to the direction of plume travel. Installation of the PTW was completed in late 2010. The initial round of groundwater performance testing indicates that the natural zeolite material is effectively removing Sr-90 from the groundwater. Long-term performance of the PTW will be evaluated in accordance with a monitoring plan that includes visual inspections, hydraulic monitoring, and quarterly groundwater quality monitoring. (Section III)
- The Meeting of the Nuclear Waste Technical Review Board on April 27 provided status updates for re-locating the vitrified high level waste out of the Main Plant Processing Building (MPPB) and submitting the waste class determination of the contaminated glass melter. (Section IV)

REPORT DETAILS

I. Introduction

This report documents the NRC monitoring visit to the WVDP site on April 26 – 28, 2011. The purpose of the visit was to review activities associated with the WVDP tank and vault drying system, the north plateau PTW, and to attend meetings of the NWTRB and WVCTF.

II. WVDP Tank and Vault Drying System

A. Scope

The monitor reviewed the completed installation of the system to dry highly contaminated liquid radioactive wastes in the four underground tanks in the WVDP tank farm. Monitoring activities consisted of reviews of documents, discussions with cognizant personnel, and field observations.

B. Observations

Liquid radioactive wastes from past operations are currently stored in four underground tanks at the west end of the WVDP site. Two large carbon steel tanks, 8D1 and 8D2, (each tank has a capacity > 500,000 gallons) are each located in their own tank vaults and are no longer in active service. The two smaller stainless steel tanks, 8D3 and 8D4 (14,000 gallon capacity) are located in a common tank vault. Each tank has a large inventory of radioactive liquid and sludge. The tanks are not scheduled for removal during the phase one decommissioning project; however, due to concerns for the potential for tank leakage, plans were developed to dry the liquid wastes in the tanks and to replace underground piping and ventilation lines that were allowing in-leakage of groundwater into the tank vaults. Installation of the system was completed in late 2010. Warm, dehumidified air is directed through the tanks and vaults and the resulting moisture in the air is exhausted through a filtered rotary dryer. The effluent air is then directed through a monitored stack. Samples of stack effluent particulates are collected on filter paper and counted for gross alpha and gross beta activity in the onsite laboratory. The results from the stack effluent measurements since the beginning of 2011 indicate that the stack effluent concentrations are generally less than detectable for both alpha and beta activities (approximately 2×10^{-16} and 5×10^{-16} microcuries/milliliter, respectively). The system has been successful in reducing the volume of liquids in the tanks and has exceeded the expectations on the volumes removed.

A previous plan to capture the approximately 14,000 curies of cesium 137 (Cs-137) from the liquid in tank 8D4, using a special treatment system, was not implemented because characterization of the tank contents found that a large fraction of the Cs-137 was not distributed in the liquid phase of the tank contents.

C. Conclusions

A tank and vault drying system was installed to reduce or eliminate the residual liquid within the tanks and tank vaults and eliminate the intrusion of groundwater into the tank vaults. Reducing the volume of liquid in the tanks and eliminating the intrusion of groundwater into the tanks is

Enclosure

expected to reduce the potential for the tanks to leak their highly radioactive contents. Installation was completed in late 2010 and the performance of the system has exceeded expectations in the rate that the liquid volume in the tanks has been reduced. Air effluents exhausted into the monitored stack have been generally less than detectable for gross alpha and gross beta activities.

III. North Plateau Permeable Treatment Wall

A. Scope

The NRC monitor reviewed the activities associated with the installation of a PTW to mitigate the strontium-90 (Sr-90) groundwater contamination plume on the WVDP north plateau. Monitoring activities consisted of a review of documents, review of a narrated video, a tour of the post-construction area, and interviews with cognizant personnel.

B. Observations

Previous investigations and routine environmental monitoring programs at the WVDP site identified a plume of impacted groundwater extending approximately 1000 feet in a northeasterly direction from the Main Plant Processing Building (MPBB). Measurements of radioactivity concentrations in groundwater samples collected over successive time periods within the plume confirm that radioactivity concentrations have been gradually increasing over time. Peak concentrations in the center of the contaminated groundwater plume exceed 100,000 picocuries/liter (pCi/l) of Sr-90. In some locations at the far northeast edge of the plume, Sr-90 concentrations have been detected in samples from groundwater seeps at the edge of the north plateau and where groundwater exits the edge of the slope of the plateau. Some of these locations are beyond the border of the DOE project area and onto the NYSERDA retained premises. Over the past three years, WVES staff and contractors have conducted extensive sampling and analysis on the north plateau to characterize the lateral and vertical extent of the groundwater contamination. Staff also evaluated various methodologies for mitigation of the Sr-90 in the plume and selected installation of a vertical PTW to intercept the major portion of the Sr-90 contaminated groundwater plume as the optimal alternative.

The final PTW installation consisted of a vertical trench, 39 inches wide, 860 feet long, and 19 - 30 feet deep. The base of the PTW was cut into relatively low permeability soil so that there was no path for the groundwater to go under the PTW. The trench was filled with more than 2300 metric tons of zeolite, a natural mineral that has the capability of filtering out specific ions in the groundwater (in this case the Sr-90 cations and other similarly charged ions) and allowing the groundwater to pass through. The trenching equipment had the capacity to simultaneously cut a trench up to 32 feet deep and simultaneously backfill the trench with the zeolite. The PTW intercepted the groundwater plume at approximately the 10,000 pCi/l isopleth. Zeolite testing was conducted at the University of Buffalo since February 2009 with non-radiological components and onsite since May 2009 with contaminated groundwater in order to select an appropriate zeolite material.

Site preparations for installing the trench and PTW commenced in early 2010. The preliminary preparations included procuring the zeolite (one-metric ton supersacks) and trenching equipment, decommissioning existing groundwater wells in the vicinity of the wall, and preparing the path for the PTW and trenching equipment. In addition, because of concerns for the

disposition of the contaminated soil excavated from the trench, a temporary containment structure was erected along the PTW path to contain the excavated soil. Installation of the PTW commenced on October 17, 2010 and was completed on November 18, 2010. More than 120,000 cubic feet of soil was removed during the trenching operation. Final plans on addressing the excavated contaminated soil have not been developed.

A performance monitoring plan (Plan) was developed to evaluate the effectiveness of the PTW for removing Sr-90 from the plume. The Plan includes visual inspections of the wall integrity, hydraulic monitoring of the groundwater, and groundwater quality monitoring to assess performance of the PTW. For the groundwater quality monitoring, 66 monitoring wells were installed in 12 stations along the wall that will initially be sampled and analyzed quarterly. A set of monitoring wells at any given location consists of one well in the PTW and wells upgradient and downgradient of the wall. In some locations, wells are screened to different depths to get information on the vertical concentration profile. The initial set of monitoring data indicates that the concentration of Sr-90 downgradient of the wall was less than the concentration entering the wall (upgradient) in eleven of twelve stations, indicating that Sr-90 is being removed from the groundwater. The long-term performance of the PTW will be monitored in accordance with the Plan.

C. Conclusions

The Sr-90 contaminated groundwater plume on the north plateau of the WVDP area has been extensively characterized. DOE and WVES staffs evaluated various mitigation methodologies for the groundwater plume and selected installation of a vertical PTW to intersect the groundwater plume perpendicular to the direction of plume travel. Installation of the PTW was completed in late 2010. The initial round of groundwater performance testing indicates that the natural zeolite material is effectively removing Sr-90 from the groundwater. Long-term performance of the PTW will be evaluated in accordance with a monitoring plan that includes visual inspections, hydraulic monitoring, and quarterly groundwater quality monitoring.

IV. **Meetings**

Meeting of the Nuclear Waste Technical Review Board (NWTRB) Focusing on the Status of the Ongoing Remediation Activities at the WVDP site

The monitor attended the all-day meeting of the NWTRB held April 27th in Buffalo, NY. The NWTRB is an independent federal agency, established by the 1987 amendments to the Nuclear Waste Policy Act (NWPA). The Board's role is to evaluate DOE activities relating to implementing the NWPA and provide reports and recommendations to Congress and the Secretary of Energy. The April 27th meeting included historical perspectives on the spent fuel reprocessing activities conducted at West Valley and the vitrification of some of the high level waste (HLW) generated as a result of the reprocessing. Subsequent presentations provided updates on current activities at the WVDP site that included the status of the interim onsite storage of the vitrified HLW at a new onsite location and the waste class determination of the glass melter that was used to solidify the HLW as glass logs (vitrification) in stainless steel canisters.

The stainless steel canisters holding the vitrified waste are currently stored in the MPPB. Dose rates on the ten-foot high canisters range up to a few thousand Roentgens/hour (R/hr). The canisters must be re-located to allow for further demolition in the MPBB. Because there is no current offsite storage capability for the vitrified HLW, the project staffs are evaluating onsite storage of the 275 stainless steel canisters away from the MPPB. Under consideration is a facility similar to those at reactor sites that are storing spent fuel assemblies in specially designed shielded casks in dry storage at Independent Spent Fuel Storage Installations.

The glass melter, a relatively large piece of equipment, has been stored at the WVDP site since completion of the vitrification activities. Because there is some residual vitrified waste in the melter, DOE had to determine the waste classification of the melter. If the melter is not classified as HLW, then it is suitable for disposal at a current operating facility. DOE has been in discussion with NRC over the last few years and has submitted its determination that the melter should not be classified as HLW and is suitable for disposal. The determination is currently under review by NRC staff.

Meeting of the West Valley Citizen Task Force (WVCTF)

The monitor attended the monthly meeting of the WVCTF on the evening of April 27th. The WVCTF was provided with briefings on the earlier NWTRB meeting and the DOE Project Director provided a routine project update. A portion of the WVCTF meeting was only open to members for the discussion of comments on the DOE glass melter waste class determination document.

Meeting with the New York State Energy Research and Development Authority (NYSERDA) Representatives to Discuss NYSERDA Work Activities in the NYSERDA Retained Premises

The monitor met with NYSERDA representatives to continue a dialogue regarding the potential release of an area of the WVDP site that remains under the NYSERDA NRC License CSF-1, but is not part of the DOE-controlled area, and to discuss routine work by NYSERDA staff in their ongoing evaluation of stream erosion and evaluation of erosion controls on the NYSERDA retained premises. In previous discussions with the NRC, NYSERDA representatives indicated that the DOE-controlled portion of the WVDP site has a strong radiation protection program, but with the exception of the State Disposal Area (SDA), there is no active radiological protection program for the remainder of the NYSERDA retained premises. Although areas outside of the DOE-controlled area and SDA have a low potential for radiological contamination due to migration of material (chiefly through groundwater), there is concern for previously unidentified contamination from migration of material from the main plant. The monitor and NYSERDA representatives concluded that it would be prudent for NYSERDA to consider a program commensurate with the levels of material likely to be encountered. NYSERDA representatives also demonstrated their recent outputs from the topographic modeling measurements recently conducted. Topographical data were generated from overflight surveys and digitally recorded as survey map records. NYSERDA can then use this information in subsequent evaluations of stream erosion and effectiveness of erosion controls.

Exit Meeting

The monitor discussed the results of the monitoring visit with representatives from DOE and WVES, and also met with NYSERDA representatives at the conclusion of the visit on April 28, 2011. The representatives acknowledged the observations presented by the monitor.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Department of Energy (DOE)

*Bryan Bower, Project Director
Matt Brady, Environmental Specialist
Dave Cook, Facility Representative
Christopher Eckert, Safety and Site Programs Team Leader
Geoff Gorsuch, Industrial Hygienist
Jamie Prowst, DOE Support Contractor
Dan Sullivan, Project Management and Execution Team Leader

NYSERDA

Lee Gordon, Associate Project Manager
Thomas Attridge, Program Manager
*Paul Bembia, Program Director
Andrea Mellon, Project Manager

WVES

John Chamberlain, Technical Advisor
Joseph Ebert, Engineer
*John Gerber, Manager, Environmental, Safety, Health & Quality
*John McKibbin, President and Project Manager
Dan Meess, Chief Engineer

*Denotes attendance at onsite out-briefings held on April 28, 2011.

PARTIAL LIST OF DOCUMENTS REVIEWED

Weekly Status Reports of WVDP Projects and Support Activities (various)

Monthly West Valley Demonstration Project Progress Reports (various)

WVDP Hot Sheets (weekly project updates) (various)

Letter dated March 11, 2010 from NYSERDA to U. S. DOE requesting support for release of a portion of the Western New York Nuclear Service Center from the NYSERDA NRC 10 CFR 50 License, CSF-1.

Presentations from the April 27, 2011 Meeting of the Meeting of the Nuclear Waste Technical Review Board in Buffalo, New York

Presentations from the April 27, 2011 Meeting of the Meeting of West Valley Citizens Task Force in Ashford, New York

Permeable Treatment Wall Post-Construction Baseline Monitoring Report, West Valley Demonstration Project – North Plateau Sr-90 Plume, March 2011, AMEC Geomatrix Inc.

Installation of a Permeable Treatment Wall at the West Valley Demonstration Project, narrated video presentation, 2010

North Plateau Permeable Treatment Wall Performance Monitoring Plan, WVDP-512, 3/15/2011

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
Cs-137	Cesium 137
DOE	U.S. Department of Energy
HLW	high level waste
MPBB	Main Plant Processing Building
NRC	Nuclear Regulatory Commission
NWPA	Nuclear Waste Policy Act
NWTRB	Nuclear Waste Technical Review Board
NYSERDA	New York State Energy Research and Development Authority
pCi/l	picocuries/liter
Plan	Performance Monitoring Plan
PTW	Permeable Treatment Wall
R/hr	Roentgens/hour
SDA	State Disposal Area
Sr-90	Strontium 90
WVCTF	West Valley Citizen Task Force
WVDP	West Valley Demonstration Project
WVES	West Valley Environmental Services, LLC