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

May 12, 2010

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 2010-001

Dear Mr. Bower:

On April 13 - 15, 2010, 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 (WVES). The purpose of the visit was to review activities associated with the WVDP tank and vault drying system; the pressurized liquid nitrogen decontamination process, the north plateau permeable treatment wall, and the WVDP radioactive waste program. The results of this visit were discussed with Christopher Eckert of you staff, WVES representatives, and representatives from the New York State Energy Research and Development Authority (NYSERDA) at the conclusion of the monitoring visit on April 15, 2009. 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.

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/

Judith Joustra, Chief
Decommissioning Branch
Division of Nuclear Materials Safety

Enclosure:
Monitoring Report No. 2010-001

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

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Enclosure:
Monitoring Report No. 2010-001

cc w/encl:
Paul Bembia, Program Director, NYSERDA
State of New York
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U.S. NUCLEAR REGULATORY COMMISSION
REGION I

MONITORING REPORT

Monitoring Visit Number:	POOM-032/2010001
Project Number:	POOM-032
Location:	West Valley Demonstration Project 10282 West Spring Road West Valley, NY 14171-9799
Monitoring Visit Dates:	April 13-15, 2010
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. 2010-001

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 13 -15, 2010 at the WVDP. The purpose of the visit was to review activities associated with the WVDP tank and vault drying system; the pressurized liquid nitrogen decontamination process, the north plateau permeable treatment wall, and the WVDP radioactive waste program.

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

- Liquid wastes from past operations are stored in four underground tanks at the west end of the WVDP site. A tank and vault drying system is being installed to eliminate the residual liquid within the tanks and tank vaults, eliminate the risk of a tank leak, and eliminate the intrusion of groundwater into the tank vaults. The first phase of the installation has commenced and is expected to be completed later in 2010. Preliminary characterization of the large inventory of cesium -137 (Cs-137) in tank 8D4 indicates that most of the activity is apparently not in a soluble form. The special treatment system that was being considered will not likely be used and additional characterization will be needed to develop plans for addressing the Cs-137 inventory in the tank. (Section II)

- Project engineers have initiated the use of the Nitrocision system to remotely decontaminate very high levels of contamination in one of the cells in the Main Plant Processing Building (MPBB). The Nitrocision system uses high pressure liquid nitrogen as the decontamination agent, which results in no secondary waste streams. Visual observations indicate that the system is successfully removing material from the cell wall. A future test will attempt to quantify the effectiveness of the decontamination operation. (Section III)

- The strontium - 90 (Sr-90) contaminated groundwater plume on the north plateau of the WVDP area has been extensively characterized. Plans have been developed for the installation of a vertical Permeable Treatment Wall (PTW) to intercept the major portion of the contaminated groundwater plume and filter Sr-90 ions from the groundwater. Sight preparations are expected to commence in May 2010 with installation of the PTW scheduled for September/October 2010. (Section IV)

- Waste streams at the WVDP include low level waste (LLW), mixed low level waste (MLLW), transuranic (TRU) waste, and high level waste (HLW) categories, with some of the waste streams containing Resource Conservation and Recovery Act (RCRA) hazardous constituents. Most of the LLW and MLLW can be currently shipped to authorized facilities for processing and/or disposal. The TRU waste must be specially packaged for eventual disposal at the Waste Isolation Pilot Plant (WIPP) facility. Canisters of HLW are currently stored in the MPBB. Re-location of these HLW canisters is being considered to allow further progress on the MPBB demolition. (Section V)

REPORT DETAILS

I. Introduction

This report documents the NRC monitoring visit to the WVDP site on April 13 - 15, 2010. The purpose of the visit was to review activities associated with the WVDP tank and vault drying system; the pressurized liquid nitrogen decontamination process, the north plateau permeable treatment wall, and the WVDP radioactive waste program.

II. WVDP Tank and Vault Drying System

A. Inspection Scope

The monitor reviewed the ongoing installation of a system to dry highly contaminated liquid wastes in the four underground tanks in the WVDP tank farm and the revised plans for handling and disposing of high concentrations of Cs-137 in the liquid in one of the tanks. The lead project engineer discussed the progress on the project and accompanied the monitor during a walk-down of the specific work areas. 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. The tanks are not scheduled for removal during the phase one decommissioning project; however, plans have been formulated to dry the liquid wastes in the tanks and replace piping and ventilation to address in-leakage of groundwater into the tank vaults. Warm, dehumidified air will be directed through the tanks and vaults and the resulting moisture in the air exhausted from the tanks and vaults will be removed via a filtered rotary dryer. Effluent air will then be directed through a monitored stack. Objectives of the tank and vault remediation activities include eliminating the liquid volume in the tanks and reducing the corrosion potential by eliminating or minimizing groundwater in-leakage and reducing the relative humidity in the air surrounding the tanks and vaults. The resulting configuration should then eliminate the risk and consequence of a tank leak and prolong the lifetime of the tanks and vaults.

The current tank ventilation system consists of above ground and underground components. Certain underground components appear to be the source of the groundwater in leakage. After site preparatory work in late 2009, contractors have commenced removing and replacing selected components of the ventilation system. The monitor observed activities involved in cutting out large sections of the steel ventilation lines. The project engineers and health physics staff made extensive use of mock-up training to develop the final cutting and removal plan for ventilation lines. The use of the mock-up training and a negative pressure containment tent around the area of the pipe cut appeared to be successful in preventing the spread of contamination. Smear surveys did not identify contamination outside of the containment tent.

In order to handle the high activity Cs-137 waste in tank 8D4, a special treatment system was being considered for installation in a heavily shielded area of a building adjacent to the tanks. Preliminary characterization of the 8D4 tank liquids and radiological measurements along the vertical profile of the tank determined that the Cs-137 in the tank was not uniformly dispersed as a liquid in the tank, but was concentrated in the bottom of the tank. The principal engineer indicated that because the treatment system will not be effective in removing the majority of the Cs-137 from the tank, the system will not likely be utilized and additional characterization will be necessary to develop better plans for addressing the residual Cs-137 in the tank.

C. Conclusions

Liquid wastes from past operations are stored in four underground tanks at the west end of the WVDP site. A tank and vault drying system is being installed to eliminate the residual liquid within the tanks and tank vaults, eliminate the risk of a tank leak, and eliminate the intrusion of groundwater into the tank vaults. The first phase of the installation has commenced and is expected to be completed later in 2010. Preliminary characterization of the large inventory of Cs-137 in tank 8D4 indicates that most of the activity is apparently not in a soluble form. The special treatment system that was being considered will not likely be used and additional characterization will be needed to develop plans for addressing the Cs-137 inventory in the tank.

III. Pressurized Liquid Nitrogen Decontamination Process

A. Inspection Scope

The NRC monitor reviewed the activities involved in utilization of a pressurized liquid nitrogen decontamination system (Nitrocision system) for removing contamination in highly contaminated areas in the MPBB. Monitoring activities consisted of interviews with cognizant personnel and field observations.

B. Observations

Project engineers have initiated the use of a specialized decontamination system (Nitrocision system) that uses high pressure liquid nitrogen as the decontamination agent. The system is initially being used in the Process Mechanical Cell located in the MPPB to remove contamination on the floors and walls that had been previously immobilized with a specialized coating. The Process Mechanical Cell is the location where spent fuel was sheared into smaller pieces prior to undergoing acid dissolution. Radiological exposure rates in the cell range up to 15 Roentgens/hour (R/hr) due to the high levels of contamination. The Nitrocision system is operated at a pressure of approximately 40,000 pounds per square inch (psi) and uses customized tooling developed for this application. The customized spray heads are operated remotely in the cell using a master-slave manipulator. The spray head is directed against the stainless steel walls of the cell and the material that is removed is allowed to fall to the floor. A different spray head configuration with an attached vacuum apparatus is intended to be used on the floors so that contaminated debris can be collected. Engineers have evaluated the criticality potential of the waste that will be collected. One significant advantage of this system is that there is no secondary waste stream as there would be if water or a mechanical agent were to be used.

Through a shielded observation window, the monitor was able to observe that the system had successfully removed the coating from the wall where the system had been operated. The facility engineer indicated that a decontamination factor for the first decontamination pass was unable to be determined because the high levels of contamination in the cell influenced the direct radiation readings made on the wall. However, a test was being planned using a known piece of contaminated material that would be brought into the cell, decontaminated with the nitrocision equipment, and then removed from the cell, and the resultant contamination levels measured. Each area is expected to have two passes of the spray heads. If successful, further use of the system will be considered in other areas of the MPPB.

C. Conclusions

Project engineers have initiated the use of the Nitrocision system to remotely decontaminate very high levels of contamination in one of the cells in the MPBB. The Nitrocision system uses high pressure liquid nitrogen as the decontamination agent, which results in no secondary waste streams. Visual observations indicate that the system is successfully removing material from the cell wall. A future test will attempt to quantify the effectiveness of the decontamination operation.

IV. North Plateau Permeable Treatment Wall

A. Inspection Scope

The NRC monitor reviewed the activities conducted and proposed to mitigate the Sr-90 groundwater contamination plume on the WVDP north plateau. Monitoring activities consisted of reviews of documents and interviews with cognizant personnel.

B. Observations

Previous investigations and routine environmental monitoring programs at the WVDP site have identified a plume of impacted groundwater extending in a northeasterly direction from the MPBB. Measurements of radioactivity concentrations in groundwater samples collected over successive time periods confirm that the plume is spreading to the northeast. 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 above background in samples from groundwater seeps at the edge of the north plateau. Some of these locations are beyond the border of the DOE project area and onto the NYSERDA project property. Representatives from NYSERDA have expressed concern about the migration of the plume onto the NYSERDA property and have identified increasing gross beta activity concentrations (indicative of elevated Sr-90 concentrations) of up to 242 pCi/l where the groundwater seeps to the ground surface.

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 and determine the feasibility of the installation of a vertical permeable treatment wall (PTW) to intercept the major portion of the Sr-90 contaminated groundwater plume. Final plans have now been developed for the PTW and installation is scheduled during the remainder of 2010. The PTW will consist of a vertical trench that is approximately three feet wide, eight

hundred feet long, and twenty to thirty feet deep. The trench will be filled with a zeolite mineral, a natural material 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 base of the PTW will be cut into relatively low permeability soil so that there is no path for the groundwater to go under the PTW. The PTW will intercept the groundwater plume at approximately the 10,000 pCi/l isopleth. Testing has been conducted at the University of Buffalo since February 2009 with non-radiological components and onsite since May 2009 with contaminated groundwater to select an appropriate zeolite material. The trenching equipment has also been successful tested.

Preliminary preparations for installing the trench and PTW are expected to commence in May 2010. The preliminary preparations include procuring the zeolite (approximately 1900 metric tons in 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. The trenching equipment is capable of simultaneously cutting a trench up to thirty-two feet deep and simultaneously backfilling the trench with the zeolite. A temporary containment structure will be erected along the PTW path to contain the excavated contaminated soil. Representatives from NYSERDA had expressed concern that the excavated soil should be appropriately disposed and not be left in the vicinity of the PTW. Final plans on addressing the excavated contaminated soil have not been developed. Installation of the PTW is scheduled for September/October 2010.

C. Conclusions

The Sr-90 contaminated groundwater plume on the north plateau of the WVDP area has been extensively characterized. Plans have been developed for the installation of a vertical PTW to intercept the major portion of the contaminated groundwater plume and filter Sr-90 ions from the groundwater. Site preparations are expected to commence in May with installation of the PTW scheduled for September/October 2010.

V. WVDP Radioactive Waste Program

A. Inspection Scope

The NRC monitor discussed the WVDP radioactive waste program with the manager and staff of the Waste Planning and Disposition organization. Monitoring activities consisted of reviews of documents and interviews with cognizant personnel.

B. Observations

Newly generated and legacy waste at the WVDP site presents a significant challenge in properly segregating, storing, shipping and disposing of the broad range of concentrations of the various radionuclides. Waste streams at the site include LLW, MLLW (i.e. LLW with RCRA non-radiological, hazardous constituents), contact-handled transuranic waste (CH-TRU), remote-handled transuranic waste (RH-TRU), and HLW.

Wastes categorized as LLW include Class A, B, and C wastes in accordance with 10 CFR 61.55, with radiation exposure rates ranging from background to several R/hr. Sources

of LLW include legacy wastes from past operations, operational wastes (resins and contaminated protective clothing, for example), and waste from demolition activities in the MPBB. These wastes are typically shipped by truck or rail to the EnergySolutions disposal site in Utah or to the Nevada Test Site. Wastes categorized as MLLW must be treated and eventually disposed with consideration for both the radiological component and the non-radiological, RCRA hazardous constituents in the waste stream. Most of the MLLW is at background radiation levels, but some require shielded shipping containers. Wastes are typically sent to treatment facilities in Tennessee or Florida to initially address the RCRA components with subsequent disposal in accordance with the radiological components.

Wastes categorized as TRU wastes are contaminated with alpha-emitting transuranic radionuclides with half-lives greater than 20 years and with concentrations greater than 100 nanocuries/gram (nCi/g). The TRU waste is generally legacy waste that must be sorted, size-reduced, and appropriately categorized in accordance with more stringent requirements for identification of the wastes. These requirements include a video record of the waste as it is placed in the waste container with an accompanying audio description. The CH-TRU is TRU waste in containers with contact radiation dose rates less than or equal to 200 milliRoentgens/hour (mR/h). The CH-TRU waste is sorted by hand in specially prepared areas utilizing health physics practices and controls for high levels of alpha contamination. The RH-TRU is typically handled in the Remote Handled Waste Facility (RHWF) using remote manipulator tools. The health physics practices and controls are specified in job-specific Radiation Work Permits (RWPs). The TRU wastes are being retained in onsite storage with the expectation that the waste will be eventually authorized to go to the Waste Isolation Pilot Plant (WIPP) facility for disposal. All TRU waste is packaged in containers that have been specifically approved for disposal at the WIPP facility.

The HLW on the WVDP site consists of 275 stainless steel canisters of vitrified waste in interim storage in the MPBB. Dose rates on the ten-foot high canisters range up to several hundred R/hr. There is currently no permanent facility for disposal of these wastes, but a new interim onsite facility is under consideration so that the canisters can be re-located to a safe, onsite storage location and allow for further demolition in the MPBB.

C. Conclusions

Waste streams at the WVDP include LLW, MLLW, TRU, and HLW categories, with some of the waste streams containing RCRA hazardous constituents. Most of the LLW and MLLW can be currently shipped to authorized facilities for processing and-or disposal. The TRU waste must be specially packaged for eventual disposal at the WIPP facility. Canisters of HLW are currently stored in the MPBB. Re-location of these HLW canisters is being considered to allow further progress on the MPBB demolition.

VI. Meetings

Meeting with the New York State Energy Research and Development Authority Representatives to Discuss the Release of a Portion of the WVDP Site for Unrestricted Use

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 retained project premises. The NYSERDA representatives indicated that local residents and elected officials have been interested in returning portions of the project land to beneficial use and have requested NYSERDA representatives to take action on having non-impacted portions of the facility released for unrestricted use. The NYSERDA representatives have identified approximately 400 acres of non-impacted land that is not directly adjacent to the DOE project area. Additionally, the former Bulk Storage Warehouse and the surrounding 4.574 acres are also being considered for release because the warehouse lies within the 400-acre parcel. The warehouse and the land surrounding the warehouse had previously been used for licensed activities. The NYSERDA representatives indicated that the warehouse and the surrounding 4.574 acres would be considered an impacted area for final status surveys. The NYSERDA West Valley Site Management Program Director has requested support from DOE in confirming that releasing the area will not interfere with DOE's activities in carrying out the remediation project. The monitor accompanied NYSEDRA representatives on a tour of the Bulk Storage Warehouse and the area surrounding the warehouse. The monitor discussed the scope of future final status surveys that NYSERDA would have to perform in support of the request to release the areas. At this time, NYSERDA has not requested release of these areas of the site from the NRC.

Exit Meeting

The monitor presented the results of the monitoring visit to representatives from DOE, WVES, and NYSERDA at the conclusion of the visit on April 15, 2010. Representatives from DOE, WVES, and NYSERDA acknowledged the observations presented by the monitor.

ATTACHMENT: SUPPLEMENTAL INFORMATION

SUPPLEMENTAL INFORMATION

PARTIAL LIST OF PERSONS CONTACTED

Department of Energy

Tom Battaglia, DOE Support Contractor
Kathy Bohan, DOE NEPA Compliance Officer
*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

Chris Andrzejewski, Associate Project Manager
Thomas Attridge, Program Manager
*Paul Bembia, Program Director
*John Kelly, Program Manager
*Andrea Mellon, Project Manager
Paul Piciulo, Program Liaison

WVES

*Sonja Allen, Senior Communications Administrator
Brian Bauer, Engineer
Dave Biela, Radiation Safety Manager
*John Chamberlain, Technical Advisor
Jeff Choroser, Principal Engineer
Joseph Ebert, Engineer
*John Gerber, Manager, Environmental, Safety, Health & Quality
Ida Klahn, Associate Communications Specialist
*Peggy Loop, Manager, Waste Planning & Disposition
*John McKibbin, President and Project Manager
Dan Meess, Chief Engineer
Steve Warren, Deputy Project Manager

*Denotes attendance at the onsite out-briefing held on April 15, 2010.

PARTIAL LIST OF DOCUMENTS REVIEWED

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

Monthly West Valley Demonstration Project Progress Reports (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.

Briefing packages for the tank and vault drying system and the decontamination of Tank 8D-4 liquids.

Briefing package on WVDP waste categories.

Briefing packages on installation of the permeable treatment wall.

LIST OF ACRONYMS

ADAMS	Agencywide Documents Access and Management System
CFR	Code of Federal Regulations
CH-TRU	Contact-handled Transuranic (waste)
Cs-137	Cesium 137
DOE	Department of Energy
HLW	high level waste
LLW	low level waste
MLLW	mixed low level waste
MPBB	Main Plant Processing Building
mR/h	milliRoentgens/hour
nCi/g	nanocuries/gram
NRC	Nuclear Regulatory Commission
NYSERDA	New York State Energy Research and Development Authority
pCi/l	picocuries/liter
psi	pounds per square inch
PTW	Permeable Treatment Wall
RCRA	Resource Conservation and Recovery Act
R/hr	Roentgens/hour
RH-TRU	Remote-handled Transuranic (waste)
RHWF	Remote Handled Waste Facility
RWP	Radiation Work Permit
Sr-90	Strontium 90
TRU	transuranic (waste)
WIPP	Waste Isolation Pilot Plant
WVDP	West Valley Demonstration Project
WVES	West Valley Environmental Services, LLC