



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

September 1, 2006

Bryan Bower, Director  
Department of Energy  
West Valley Demonstration Project  
10282 Rock Springs Road  
P.O. Box 191  
West Valley, NY 14171-0191

SUBJECT: U.S. NUCLEAR REGULATORY COMMISSION MONITORING VISIT 2006-002

Dear Mr. Bower:

On April 24-27, 2006, Robert Prince of this office and Jon Peckenpaugh from NRC Office of Nuclear Materials Safety and Safeguards conducted a routine monitoring visit at the Department of Energy's (DOE) West Valley Demonstration Project to review the activities of West Valley Nuclear Services Company (WVNSC), Inc., the DOE contractor at the site. The purpose of the monitoring visit was to evaluate activities associated with the North Plateau groundwater monitoring program, maintenance of the NRC licensed disposal area (NDA), review of selected occurrence reports and performance analysis and trending program activities, and review of selected waste profile packages. The results of this monitoring visit were discussed with you and other members of your staff on April 27, 2006 and via conference call on August 2, 2006. Details of this review are provided in the enclosed report.

As a result of this review, the monitor determined that evaluation of certain aspects of the North Plateau groundwater monitoring and sampling program should be considered to facilitate interpretation of monitoring data. The monitor also determined that the maintenance of the NDA, characterization of waste streams, and performance analysis and trending are performed in accordance with the requirements of established programs.

Please contact me at (610) 337-5205 if you have any questions about this report.

Thank you for your cooperation.

Sincerely,

*/RA/*

Marie Miller, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure:  
Monitoring Report No. 2006-002

B. Bower  
Department of Energy

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cc:  
Paul Piciulo, Ph.D., Program Director, NYSERDA  
State of New York  
Herman Moore, Team Leader, DOE, WVDP

B. Bower  
Department of Energy

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

MONITORING REPORT

Monitoring Visit Number: POOM-032/2006002

Project Number: POOM-032

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

Visit Dates: April 24-27, 2006

Monitors: Robert Prince  
Health Physicist  
Decommissioning Branch

Jon Peckenpaugh  
Systems Performance Analyst  
Division of Waste Management and Environmental Protection

Approved by: Marie Miller, Chief  
Decommissioning Branch  
Division of Nuclear Materials Safety

Enclosure

## **EXECUTIVE SUMMARY**

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

NRC Monitoring Report No. 06-002

This report summarizes the monitoring visit conducted over the period of April 24-27, 2006, at the West Valley Demonstration Project (WVDP). The purpose of this monitoring visit was to review ongoing activities associated with the monitoring of the North Plateau groundwater plume and the NRC licensed disposal area (NDA), review selected occurrence reports (ORs) and performance analysis and trending program activities and review selected waste profile packages.

DOE and contractor organizations have implemented and continue to manage an environmental monitoring and sampling program to evaluate radioactivity concentrations of the North Plateau Sr-90 groundwater plume. The current monitoring program is adequate to ensure the health and safety of the public. Evaluation of certain aspects of the current monitoring program should be considered to facilitate the interpretation of monitoring data as it pertains to determining any future changes, relating to the advancement or migration of the groundwater plume.

Issues relating to performance analysis and trending are effectively identified. Adverse trends are identified and corrective actions implemented in a timely manner. Responsible personnel were knowledgeable of the details associated with specific ORs and were directly involved in the identification and implementation of corrective measures, and aware of the status of corrective actions.

DOE and contractor personnel adequately accessed the characterization data associated with the drum cell waste and submitted the required documentation and information to Nevada Test Site (NTS) in order to perform a waste acceptance criteria (WAC) review of the packaged waste.

Maintenance, inspection, and monitoring activities for the NDA are performed routinely in accordance with approved procedures.

## **REPORT DETAILS**

### **I. Introduction**

This report documents the monitoring visit to the WVDP on April 24-27, 2006. The purpose of the monitoring visit was to evaluate ongoing activities associated with the monitoring of the North Plateau groundwater, performance analysis and trending program, and processing and shipment of radioactive material.

### **II. North Plateau Groundwater Monitoring Program**

#### **A. Inspection Scope**

The NRC monitor reviewed recent groundwater monitoring data and details associated with ongoing activities relating to the evaluation of the strontium-90 (Sr-90) plume migration and the location, purpose, and function of various ground water monitoring wells. The NRC monitor toured areas outside the site premises observing the geology and hydrology aspects relevant to long-term migration of groundwater. The review included interviews with cognizant personnel, field observations, and examination of documentation.

#### **B. Observations**

DOE and contractor personnel provided a summary of the North Plateau groundwater monitoring program. The groundwater plume is attributable to activities associated with operation of the former West Valley reprocessing facility, the primary source of which is believed to have occurred in 1967. The portion of the plume, with the highest radioactivity concentrations, is primarily limited to the DOE-controlled portion of the site. Portions of the leading edge of the plume, with lower radioactivity concentrations, have migrated beyond the DOE project premises area of the site. However, the extent of the Sr-90 groundwater plume remains well within the confines of the area owned and controlled by the New York State Energy Research and Development Authority (NYSERDA).

The NRC monitor was provided a tour of the North Plateau area. DOE and contractor representatives identified and discussed selected sampling locations. The tour included key monitoring well locations; seepage sampling points; one surface water sampling site; and an overview of local topography, hydrology, and hydro-geology characteristics influencing groundwater flow and infiltration.

The Sr-90 groundwater plume has been monitored since 1989. Based on historical records the leak occurred in 1967 within the Process Building while Nuclear Fuel Services (NFS) was the operator of the facility. Based on a review of historical records, multiple leaks may have occurred during the operational period of the facility, that could be contributors to the plume source term. As of mid 2006 the leading edge of the plume had migrated approximately 450 meters from the process building. Consequently the plume has migrated at a rate of approximately 11.5 meters a year over 39 years.

The North Plateau Sr-90 groundwater plume is monitored via a series of wells, seepage points, one surface water site, and recovery locations. Sampling and analysis details are described in the WVDP Site Environmental Monitoring Program. A recovery system, referred to as the North Plateau Groundwater Recovery System (NPGRS), was installed by DOE in 1995. The purpose of the NPGRS was to limit the advance of the plume's main western lobe and remove strontium-90 (Sr-90) from the processed groundwater. The monitor noted that the NPGRS has removed approximately 6.4 curies of Sr-90 as of October 2005. Based on groundwater monitoring data, the system appeared to slow the advance of portions of the main western lobe. A review of plume concentration monitoring data obtained over the last few years is inconclusive concerning the rate of plume advancement or widening of the plume flanks. Some monitoring wells depict a decreasing trend in Sr-90 concentrations, while at other locations Sr-90 concentrations are increasing. Based on the most recent environmental monitoring data, the hypothetical exposure to the most critical offsite member of the public, is conservatively calculated to be less than 1 mrem per year.

The DOE project premises area of the WVDP site is enclosed within a fenced area, access to which is via a Security check point. Additionally the site boundary of the NYSERDA premises is located within a fenced area with posted warning signs in place to restrict public access to the site. Based on ground water monitoring results and environmental sampling program data, exposure to a member of the public based on conservative dose calculations is well below regulatory limits. Additionally, changes in the migration pattern of the ground water plume or in ground water contamination levels, would occur over an extended period of time (e.g., on the order of years) actions could be implemented if necessary to ensure the continued health and safety of the public. Consequently the current configuration of the ground water plume does not pose a risk to the health and safety of the public.

The release point for liquid effluents from the DOE project premises is at the discharge of Lagoon 3. The point of compliance for determining the dose to a member of the public is at the NYSERDA site boundary, based on environmental and ground water monitoring data and, calculated for a hypothetical individual that would most likely receive the highest offsite dose based on conservative assumptions.

Even though at this time the Sr-90 groundwater plume does not pose an immediate risk to the health and safety of the public, several points to consider, are offered to enhance the effectiveness of the current Sr-90 monitoring program. These points are offered based on a review of monitoring data and associated reports, information obtained during this monitoring visit, and tours conducted on the North Plateau.

1. The 1995 Geoprobe report makes reference to the possibility that the structural support piles beneath the Process Building could provide a downward path for Sr-90 migration. Although the Kent Recessional Sequence (KRS) in the North Plateau is below the Lavery Till, it is possible that Sr-90 may have reached this unit by preferential flow. An evaluation of previous monitoring activities and associated documentation should be performed to determine if contaminated ground water may have migrated to the KRS. Based on the outcome of this evaluation a determination regarding whether or not any further monitoring of the KRS is necessary should be conducted.

2. The pilot Permeable Treatment Wall (PTW) that was installed in 1999 had numerous monitoring wells installed to evaluate the effectiveness of the pilot project. The PTW was installed to cover a limited portion of the Sr-90 groundwater plume, and the plume has since encircled and migrated past the PTW test area. It appears that sufficient data has been obtained to determine the effectiveness of the project. The scope of the monitoring program should be reduced based on the current situation.
3. The screened interval for each monitoring well should be assigned to its appropriate water-bearing unit (i.e., Sand and Gravel Layer, Slack-Water Sequence, Lavery Till) so that the Sr-90 or gross beta concentrations can be assigned properly. This would facilitate interpretation of Sr-90 and gross beta concentration data when monitoring results for adjacent wells differ significantly.
4. The monitor noted that action levels associated with ground water contamination concentrations are specified in various WVDP procedures, that if exceeded, require an evaluation be performed and appropriate actions implemented as necessary. These action levels include values for Sr-90 concentrations measured at strategic monitoring locations. The actions and possible control measures that could be considered in the event that an action level was exceeded will be reviewed during a future monitoring visit.

Discussions are currently ongoing between various regulatory, DOE and other interested parties, concerning the preferred alternative to address the long-term remediation of the North Plateau. The NRC recommends that monitoring data and plume migration patterns continue to be closely monitored and evaluated on a routine basis to ensure the continued health and safety of the public. The NRC will continue to monitor activities and review periodic updates of monitoring data associated with the Sr-90 ground water monitoring program.

### C. Conclusions

DOE and contractor organizations have implemented and continue to manage an environmental monitoring and sampling program to evaluate radioactivity concentrations of the North Plateau Sr-90 groundwater plume. The current monitoring program is adequate to ensure the health and safety of the public. Evaluation of certain aspects of the current monitoring program should be considered to facilitate the interpretation of monitoring data as it pertains to determining any future changes, relating to the advancement or migration of the groundwater plume.

## III. **Performance Analysis and Trending**

### A. Inspection Scope

The inspector reviewed the latest performance analysis and trending data summary report and selected ORs issued since the last monitoring visit. Supporting documentation including root cause analysis reports and critique minutes were also reviewed. Cognizant personnel presented overviews of selected ORs including the status of corrective actions.



## B. Observations

Cognizant personnel presented a summary of the WVNSCO 4<sup>th</sup> Quarter Performance Analysis and Trending Report. Various performance trends are displayed in this report. Trending data is obtained from ORs, Critique Minutes, and Issue Reports in addition to various audits and assessments. The inspector noted that the various performance indicators were adequately accessed for adverse trends. Appropriate recommendations were provided in the report along with the identification of associated corrective actions and assignment of responsibilities. Cognizant personnel presented summaries of recent ORs. Individuals, including management-level personnel, were knowledgeable of specific details associated with ORs for which they were the responsible group. Responsible individuals demonstrated ownership of specific ORs and were actively involved in the establishment and status of corrective actions. The inspector noted a decrease trend in both the number and relevant severity level of issues since the last monitoring visit.

## C. Conclusions

Issues relating to performance analysis and trending are effectively identified. Adverse trends are identified and corrective actions implemented in a timely manner. Responsible personnel were knowledgeable of the details associated with specific ORs, were directly involved in the identification and implementation of corrective measures, and aware of the status of corrective actions.

## IV. **Characterization and Disposal of Drum Cell Waste**

### A. Inspection Scope

Contractor and DOE personnel provided a summary of the disposal plans for the drum cell waste. Cognizant personnel presented an overview of the associated waste profile and evaluations performed to ensure that the packaged waste met WAC requirements for the proposed burial facility. The inspector reviewed relevant supporting documentation and discussed details of the characterization process with cognizant personnel.

### B. Observations

Drum cell waste is currently stored at the WVDP in a storage facility that was specifically designed for that purpose. The waste was processed and packaged over a several year period commencing in 1988 and ending in 1995. The waste originated from the PUREX supernatant, PUREX sludge, and THOREX wash waste streams; collectively referred to as the "drum cell" waste stream. Drum cell waste was cement-solidified and packaged in 71-gallon drums. Approximately 20,000 drums were generated during the packaging campaign.

The inspector reviewed the waste profile package developed by WVDP personnel. Based on discussions with cognizant personnel it was noted that close coordination was maintained between WVDP personnel and Nevada Test Site (NTS) representatives during the waste stream acceptance review and approval process. Cognizant personnel stated that the drum

cell waste would most likely be sent to the NTS for disposal. The WAC for the NTS facility requires various documents to be submitted by the generator as part of the approval process. Based on discussions with WVDP personnel, the inspector confirmed that the required documents were submitted and approved by NTS. The waste profile package summarized sampling data and provided a detailed overview of the original processing and process control program applied at the time that the drum cell waste was processed and solidified. The technical justification and background information provided in the waste profile package was adequate to allow DOE to make a characterization determination for comparing against the requirements of the WAC.

C. Conclusions

DOE and contractor personnel adequately accessed the characterization data associated with the drum cell waste and submitted the required documentation and information to NTS in order to perform a WAC review of the packaged waste.

**V. Maintenance of the NRC Licensed Disposal Area**

A. Inspection Scope

A review of the inspection and monitoring activities associated with the maintenance of the NDA was performed. The purpose of the review was to evaluate the continued maintenance of the inactive NDA facility while under DOE control. The review included field observations of the NDA, interviews with cognizant personnel, and review of documentation. The inspector reviewed the procedural requirements associated with the maintenance of the NDA facility and reviewed selected NDA inspection data sheets.

B. Observations

The inspector noted that documented inspections of the NDA are performed on a quarterly basis. These inspections evaluate the physical condition of the NDA grounds and include such items as observing for depressions, presence of standing water, settling, cracks or other indications that may warrant repair efforts. The inspector noted that appropriate procedural controls were established to ensure that maintenance activities that may effect the integrity of the NDA are properly controlled. No significant items were noted based on a review of the most recent NDA inspection data sheets reviewed by the monitor.

A sampling and monitoring program has been established to monitor effluent from the NDA facility. The program monitors for the presence of Resource and Conservation Recovery Act (RCRA) materials and for the presence of radionuclides. Monitoring data is obtained from manholes located within the interceptor trench and various monitoring locations. The routine maintenance, inspection and monitoring activities associated with the NDA are conducted in accordance with approved procedures. The evaluation, tracking, and trending of NDA monitoring data will be further evaluated during upcoming monitoring visits.

C. Conclusions

Maintenance, inspection, and monitoring activities for the NDA are performed routinely in accordance with approved procedures.

V. **Management Meetings**

Exit Meeting Summary

The inspector presented the monitoring visit results during an out-briefing meeting with yourself and members of your staff, NYSERDA representatives and others upon conclusion of the onsite visit on April 27, 2006. On August 2, 2006 the inspector presented the results associated with the North Plateau groundwater monitoring program during a conference call out briefing to you and others as noted below. DOE and DOE contractor personnel acknowledged the observations presented by the inspector.

## Partial List of Persons Contacted

### Department of Energy

^Bryan Bower, Deputy Director  
 \*\*Jennifer Dundas  
 \*\*Moira Maloney  
 ^Herman Moore, Facility & Waste Disposition Projects, Team Leader

### NYSERDA

^Paul Bembia, Program Manager  
 \*\*Colleen Gerwitz, Program Manager  
 \*\*Andrea Mellon  
 ^Paul Piciulo, Director  
 ^Ted Sonntag, Program Manager  
 \*\*Marti Willet

### WVNSCO

^John Bleech, Environmental Affairs  
 John Borini  
 ^M. Neil Brosee  
 \*\*Lettie Chilson, Nuclear Safety & Emergency Management  
 Joe Curcio, Drum Cell Operations  
 \*\* Jack Gerber, Manager - Environmental, Safety, Health & Quality  
 \*Richard Hazard, Radiation Protection  
 Joe Jablonski, Waste Facility Operations  
 \*\*Dave Klenk, Environmental Affairs  
 \*Russell Mellor  
 ^Lawrence Myszka, Nuclear Safety & Emergency Management  
 \*Howard Payne, Senior Engineer  
 Dave Ploetz, Chief Engineer  
 \*Laurene Rowell, Waste Disposition Project Manager  
 \*\*Douglas Ruszczky  
 ^David Steiner  
 \*\*Paula Uszak  
 Tom Wheelan

\*Denotes attendance at the onsite out-briefing held on April 27, 2006.

\*\*Denotes attendance during the conference call out-briefing held on August 2, 2006.

^Denotes attendance at both the April 27, 2006 and August 2, 2006 out-briefings.

Enclosure

### **List of Documents Reviewed**

DOE/NV-325-Rev. 6, Nevada Test Site Waste Acceptance Criteria  
 WVDP Waste Profile Package, Drum Cell Cement Solidified Waste  
 SOP 02-20, Rev. 9, Low Level Waste Water (LLW2) Treatment Sampling  
 SOP 40-04, Rev. 2, Landfill Inspection and Maintenance Plan  
 SOP 82-01, Rev. 5, Routine NDA Operations  
 WVNSCO 4<sup>th</sup> Quarter Performance Analysis and Trending Report

### **List of Acronyms**

DOE	Department of Energy
KRS	Kent Recessional Sequence
NDA	NRC licensed disposal area
NFS	Nuclear Fuel Services
NPGRS	North Plateau Groundwater Recovery System
NTS	Nevada Test Site
NYSERDA	New York State Energy Research Development Authority
ORs	Occurrence Reports
PRW	Permeable Treatment Wall
Sr-90	Strontium 90
WAC	Waste Acceptance Criteria
WVDP	West Valley Demonstration Project
WVNSCO	West Valley Nuclear Services Company