

**Monthly Progress Report**  
**Corrective Measures Study (CMS) for Potential Release Site (PRS) 16-021(c)**  
**December 2001**

This report summarizes Los Alamos National Laboratory (LANL) activities completed during December of fiscal year (FY) 2002 on the CMS for PRS 16-021(c), the 260 outfall. Both the activities described in the CMS plan ([LA-UR-98-3918]), which was submitted to the New Mexico Environment Department-Hazardous Waste Bureau [NMED-HWB] on 9/30/98, and approved by NMED-HWB on 9/8/99), and other related activities are described herein.

**Description of Activities and Contacts**

**High Performing Team (HPT) Activities** – The 260 HPT met on December 10, 2001. Topics discussed included: 1) an update on ongoing TA-16-260 CMS activities; 2) geophysics results for Canon de Valle; 3) the potential need for intermediate depth boreholes at TA-16; 4) HE ratios as tracers; and 5) the RFI Report and CMS Report outlines.

The status of the CdV-R-37-2 well, the Interim Measure, and the CMS sampling were updated (see detailed discussion in the November CMS Progress Report and below).

Preliminary Hydrogeophysics results for Canon de Valle were discussed. The high resolution resistivity results show zones of high conductance associated with Burning Ground spring and with a west-dipping zone with near-surface manifestation adjacent to MDA-P. If these zones of high conductance are due to saturation, this suggests that the region of Canon de Valle west of MDA-P is a potential pathway to perched water. This hypothesis probably needs to be tested via additional investigations.

The HPT discussed the potential need for intermediate-depth wells at TA-16 rather than another deep well. The consensus was that intermediate-depth wells were vital to address three important data quality objectives (DQOs): 1) to better determine the extent of the contaminated perched zone that was observed in R-25; 2) to identify the hydrologic gradients in that zone; and 3) to provide locales in which to sample in support of a potential monitored natural attenuation (MNA) remedy. It was suggested that geophysical sounding might be used to help locate potential drill holes. The team did not reach consensus on the number of wells that might be needed. The team agreed that LANL should further discuss and refine DQOs for such wells, continue to interact with the HPT on their location, and provide a modification to the CMS Addendum, which remains unapproved by NMED.

LANL presented information from a recent Geological Society of America presentation that suggests that RDX/HMX ratios may be good tracers of hydrologic pathways at TA-16. The most interesting result of this analysis is the suggestion that Canon de Valle is a more likely source of the HE in R-25 than are the TA-16 mesa springs.

LANL provided provisional outlines for the upcoming Phase III RFI and CMS Reports. The former is similar to the outline that was used for the Phase II RFI Report and the latter is an expanded version of the outline in the approved CMS Plan. NMED was in agreement with proceeding with these outlines. It was suggested that LANL minimize repetition between the Phase II RFI and the Phase III RFI Reports, and that LANL provide brief summaries of CMS studies in the body of the CMS Report text, with more detail in appendices. The HPT will continue to discuss and further annotate these outlines in future months.

It was noted that the HPT should strive for an increased level of public involvement in the upcoming months.

The next HPT meeting is scheduled for Monday January 14, 2002. Agenda items may include ecorisk results, a data update, intermediate-depth well DQOs, and a discussion of the RFI and CMS Reports.

***RCRA Facility Investigation (RFI) Report and CMS Plan***– No new activities occurred during this reporting period.

***Best Management Practices (BMPs)***– BMPs are inspected quarterly and following significant precipitation events. Due to low levels of precipitation in December, no BMP repairs were required.

***CMS Hydrogeologic Investigations***–CMS hydrogeologic investigations include ongoing Phase II RFI sampling as well as continuing investigations outlined in the CMS plan.

The ongoing Phase II RFI sampling program includes collecting samples at Martin and Burning Ground spring every other day for stable isotopes. Quarterly sampling was completed. Several locations were dry including: SWSC Spring, the 90s Line Pond, the Fish Ladder seep, and the confluence of Canon de Valle and Water Canyon.

The wells, both alluvial and deep, were checked for both presence and level of water. Four out of five alluvial wells in Canon de Valle contained water, the uppermost well was dry. No water was present in all three alluvial wells in Martin Spring Canyon. All of the intermediate depth boreholes were dry.

Two samples from precipitation events were collected and archived for analysis during this reporting period.

For well CdV-R-37-2, the site restoration activities were completed. Site housekeeping, regrading, and reseeding were all completed. The well head location was surveyed. Geological investigation of cuttings were initiated. Based on these examinations, it appears that the entire well below a depth of 1072 ft is Tschicoma dacite. Preliminary examination of cutting during drilling had suggested that the bottom 50 ft of the borehole

consisted of Puye formation. This observation will require a significant revision of the 3-D geologic model for this part of the Laboratory.

### ***Ecological Risk Pilot***–

A presentation was made to the Society of Risk Assessors meeting. This was entitled “Baseline ecological effects characterization for terrestrial receptors in a semi-arid canyon with perennial flow.” Rodent samples that were negative for hantavirus were submitted to the external laboratories for analysis.

***CMS Bench and Pilot Studies***–Bench and pilot studies continued in collaboration with the Innovative Treatment Remediation Demonstration (ITRD) Program. The ITRD HE program is focused on two DOE sites: LANL and Pantex. Studies include:

1. A study of the passive barrier technology of Stormwater Management, Inc., which is potentially useful for removing HE and barium from waters.
2. A study of chemical treatment of HE-contaminated soil using zero-valent iron (ZVI). The LANL portion of this study has been completed.
3. At Pantex, a study of in situ anaerobic bioremediation of HE using gas-phase carbon additions.
4. A study of ex situ anaerobic bioremediation of HE-contaminated soils using the W. R. Grace process, which combines anaerobic bioremediation with a ZVI treatment. The LANL portion of this study has been completed.
5. A study of HE composting. Amendments appropriate to northern New Mexico were tested on both clean and contaminated soils. The LANL portion of this study has been completed.
6. A study of immobilization of barium-contaminated sediments from Cañon de Valle. A preliminary study has been completed and further investigations are planned for FY 02.
7. Phytoremediation studies in Cañon de Valle. Native plants are being evaluated for their ability to remove HE from surface waters. Preliminary results suggest that low levels of phytoremediation are occurring in the Burning Ground spring area.
8. Oxidation, reduction, and in-situ bioremediation studies of groundwater contamination at Pantex.

A LANL representative attended the ITRD meeting at Pantex on December 11, 2001. Results for the oxidation, reduction and in-situ bioremediation studies were discussed and presented.

### ***Interim Measure (IM)*** –

The IM Report is being written by the subcontractor. An internal rough draft was completed in December.

***Public and Stakeholder Involvement***– A presentation to the New Mexico Citizens’ Advisory Board on ecological risk was made on December 17, 2001. One portion of this

presentation was a discussion of the Society of Risk Assessors meeting poster on Canon de Valle.

### **Percentage of CMS Completed**

LANL estimates 84 % of the CMS has been completed to date. Note that this percentage does not reflect the deep and potential intermediate wells that will be drilled per the CMS plan addendum.

### **Problems Encountered/Actions to Rectify Problems**

*General Problem (1)* The Cerro Grande fire has severely impacted the 260 RFI/CMS activities. These problems have been discussed in detail in previous monthly reports.

*Action to Rectify General Problem (1):* LANL will work closely with NMED through the HPT to mitigate the effects of the Cerro Grande fire. Effects of the fire on the monitoring data in Canon de Valle continue to be addressed.

### ***CMS Hydrogeologic Investigations***

*Problem (1):* Questions relating to the quality of data from well R-25 remains a concern to the TA-16-260 team.

*Action to Rectify Problem (1):* LANL will evaluate the data from the quarterly sampling of the R-25 well to evaluate its reliability.

### ***CMS Bench and Pilot Studies***

*Problem (1):* The fact that the Stormwater Management unit does not appear to be removing barium is of concern,

*Action to Rectify Problem (1):* LANL will work with ITRD to determine if there are problems with the barium-specific resin and will potentially evaluate other barrier materials.

### ***IM***

None.

### **Key Personnel Issues**

None

### **Projected Work for January 2002**

### ***RFI Report and CMS Plan***

- Discussion will be held on modifying the CMS Addendum to address intermediate depth boreholes.

### ***BMPs***

- Inspection of existing BMPs following significant precipitation events will continue.

### ***CMS Hydrogeologic Investigations***

- Maintenance of autosamplers
- Checking for levels and presence of water in alluvial and deep wells.
- Sampling of flow-integrated autosamplers
- Continued precipitation monitoring and sampling for stable isotopes.
- Data analysis for geophysical investigations in Canon de Valle
- Data analysis
- Selection of samples from CdV-R-37-2 for further characterization
- Completion of CdV-R-37-2 fact sheet
- Review of data quality objectives for groundwater modeling
- Review of data quality objectives for drilling

### ***Ecological Risk Pilot***

- Evaluation of data from ecotoxicity samples

### ***CMS Bench and Pilot Studies***

- Evaluation of data from Stormwater units

### ***IM***

- Data analysis and writing of IM Report

***Public and Stakeholder Involvement***

None