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Date: June 15, 2000  
 Refer to: ER2000-0262

Mr. John Kieling  
 NMED-HRMB  
 P.O. Box 26110  
 Santa Fe, NM 87502

**SUBJECT: APRIL 2000 AND MAY 2000 CORRECTIVE MEASURES STUDY (CMS)  
 PROGRESS REPORT FOR POTENTIAL RELEASE SITE (PRS)  
 16-021(c)**

Dear Mr. Kieling:

Enclosed are the April 2000 and May 2000 CMS Progress Report for PRS 16-021(c), the 260 Outfall. This report is being submitted as part of the reporting conditions outlined in Section R, *Scope of work for a Resource conservation and Recovery Act CMS at the Laboratory, Task IX, Reports, Part A, Progress of Module VIII* of the Laboratory's Hazardous Waste Facility Permit.

If you have any questions, please call Dave McInroy at (505) 667-0819 or Joe Mose at (505) 667-5808.

Sincerely,

Julie A. Canepa, Program Manager  
 Los Alamos National Laboratory  
 Environmental Restoration

Sincerely,

Theodore J. Taylor, Program Manager  
 Department of Energy  
 Los Alamos Area Office

JC/TT/NR/ev

- Enclosure: 1) April 2000 CMS Progress Report  
 2) May 2000 CMS Progress Report



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*JL*

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**Monthly Progress Report**  
**Corrective Measures Study (CMS) for Potential Release Site (PRS) 16-021(c)**  
**April 2000**

This report summarizes Los Alamos National Laboratory (LANL) activities completed during April of fiscal year (FY) 2000 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 and Radioactive Materials Bureau [NMED-HRMB] on 9/30/98, and approved by NMED-HRMB 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 April 3, 2000. The HPT spent most of the meeting discussing the IM Plan and IM activities. The primary issues were related to areas in the IM Plan where more specificity was needed and where better addressing of possible contingencies was required. Resolution was not reached on the waste status of blended material, particularly material that had an original HE concentration between 5% and 10%. It was not resolved whether the best way to update the IM Plan was via an addendum, by replacing individual chapters, by replacement pages, or by a letter of clarification. It was decided that once the Area of Contamination (AOC) was approved that all potential hazardous waste streams excavated (i.e. > 10% possible D003 material, possible D005 material, possible D005/blended material) would be carefully segregated during excavation in order not to limit possible paths forward for the wastes. HRMB representatives indicated that they would attempt to utilize the approval of the IM Plan as a means of approving many of the individual activities that might normally require separate notifications. Further discussions of the IM Plan will occur during the coming weeks. The HPT also discussed the upcoming presentations that will be made at the ER Colloquium on April 6, 2000. LANL representatives will take the lead on preparing for these presentations. The next meeting will be May 1, 2000.

**RCRA Facility Investigation (RFI) Report and CMS Plan**– No new activities occurred during April 2000.

**Best Management Practices (BMPs)**–BMPs were inspected weekly during April. The BMPs were in good condition

**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 included sampling the Sanitary Wastewater System Consolidation (SWSC) Spring, Burning Ground Spring, and Martin Spring every other day for bromide, other anions, and stable isotopes. The analyses from the April sampling are in process. No new bromide breakthrough has been observed in samples to date. The

flow in SWSC spring is at a very low level. Flow integrated samples were collected and submitted for laboratory analysis.

The wells, both alluvial and deep, were checked weekly for water level and presence of water. Four of the five alluvial wells contained water; the exception was still alluvial well 2655, which is located in the steam plant drainage. None of the intermediate-depth boreholes contained water.

In April, 2 samples from precipitation events were collected.

At well CdV-R-15-3, air rotary open hole drilling continued seven days per week, 24 hours per day. Drilling proceeded from 1140 ft to 1722 ft during April. Drilling proceeded quickly until April 4, 2000, when the 12 ¼ in. tricone bit became stuck at 1522 ft. Efforts to free the drill bit proceeded until April 15, 2000 when the bit was freed. The original drill rig on the hole was replaced with the Foremost DR-24 rig from R-19. During the period between April 4, 2000 and April 15, 2000, the hydraulic ram also malfunctioned, requiring repairs to the ram in Albuquerque. Equipment problems with the bit and rods, the Bean pump, and a hydraulic hose delayed re-initiation of drilling until April 20, 2000.

Drilling continued to the total depth (TD) of the hole (1722 ft), which was reached on April 26, 2000. There was a great deal of sloughing at this point. In order to continue the drilling contractor estimated that a casing advance system would be needed, and that this would not guarantee success. NMED personnel were informed that total depth (TD) had been reached in a phone conversation on April 26, 2000.

The Schlumberger geophysical contractor completed the downhole logging of the borehole on April 28 and April 29.

Major geological contacts intersected include: the Tshirege member/Cerro Toledo contact at ~ 365 ft; the Cerro Toledo/Otowi contact at ~ 575 ft; the Otowi/Guaje pumice contact at ~ 770 ft; and the Guaje pumice/Puye formation contact at 805 ft. A thin lens of Cerros del Rio basalts within the Puye formation was intersected at 982 ft. The Puye Formation continued from the base of the Cerros del Rio basalts at 997 ft. to the total depth of the hole at 1722 ft. The static water level in the borehole during the Schlumberger geophysical logging was approximately 1245 ft. These contacts and water levels are preliminary and their location will be refined based on geophysical logs and on detailed study of the drill cuttings.

A siting visit for CdV-R-11-2 was held on April 28, 2000 for LANL and NMED personnel. Sites at TA-16-380 and near the entrance of TA-37 were the preferred locations.

### ***Ecological Risk Pilot–***

A site briefing and tour for the combined ecological risk and 260 high performing teams was held on April 14, 2000. The revised ecological screening was reviewed and comments were provided to LANL by NMED. The site tour examined geomorphological units, wetland invertebrates, and other biota. The LANL/NMED team decided to utilize biota sampling to refine the ecological screening assessment. An ongoing ESH-20 study of biota in Canon de Valle will be used as a starting point for these studies.

***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. Five studies are now ongoing under the auspices of ITRD, all of which may benefit the PRS 16-021(c) CMS:

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). This study has been completed.
3. A study of in situ anaerobic bioremediation of HE using gas-phase carbon additions.
4. A study of ex situ anaerobic bioremediation of Pantex soils using the W. R. Grace process, which combines anaerobic bioremediation with a ZVI treatment.
5. A study of HE composting. Amendments appropriate to northern New Mexico are being tested on clean soils.

No new results were received on the first four studies.

Equivocal results from the fourth study, specifically the ZVI pilot test for HMX, led LANL and ITRD personnel to implement a series of tests of HE composting as a replacement for the ZVI process. These tests were continued at TA-16 during April 2000. These are being completed with clean soil and various mixtures of stable waste, horse manure, cow manure, yard waste, potato waste, etc. to optimize an HE compost mix for northern New Mexico. Thermophilic conditions were obtained in several plots. Confounding factors to successful composting appear to be: 1) the presence of conifer waste in the tests which inhibits microbial activity; and 2) ambient temperature variations, which damp out the Thermophilic conditions. These problems are being addressed by using conifer-free systems and by conducting the tests in an insulated building.

### ***Interim Measure (IM) –***

Excavation of the upper drainage continued throughout the month of April 2000. Following receipt of a letter of approval of the Area of Contamination (AOC) from NMED on April 4, 2000, several pedestals of potentially hazardous soils were removed. Those materials that were potentially D005 waste were stored in 'king waste bags' within

the AOC. Those that were greater than 5% HE or potential D003 waste were moved, by hand, into segregated areas in the pond area for future blending. Screening sampling by HPLC indicated that soil remaining in the banks of the upper drainage following the first round of excavation was still elevated (> 1% HE), thus another soil lift was completed along each bank of the upper drainage. The total soil volume excavated as of the end of April was approximately 600 cu. yds.

A large fraction, approximately 100 cu. yds, of the excavated material was oversized rock material. This was washed and the clean material was staged for ultimate use as stabilizing material during site reclamation.

A tour of the site was held on April 14, 2000 for the ecorisk/260 HPTs.

Soil will be blended pending availability of the remote excavator from the MDA-P project. Phone discussions between NMED and LANL personnel indicate that blending will require a letter from LANL to NMED, and NMED approval prior to initiation.

**Public and Stakeholder Involvement**– LANL personnel attended the ER availability session on April 19, 2000.

### **Percentage of CMS Completed**

LANL estimates that 55% of the CMS has been completed to date. Note that this percentage does not reflect the deep wells that will be drilled per the CMS plan addendum.

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

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

*Problem (1)* The lack of a completed well at R-25 remains a concern to the TA-16-260 team.

*Action to Rectify Problem (1):* The screens have been installed and the well has been purged. The well is now being readied for Westbay installation.

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

*Problem (1)* The ZVI pilot test did not work effectively for HMX. The additional ZVI added during November did not significantly improve breakdown for HMX.

*Action(s) to Rectify Problem (1).* Composting is being investigated in place of ZVI.

## **IM**

*Problem (1)* Several regulatory issues still need to be resolved prior to final implementation of the IM.

*Problem(2)* Schedule delays/impacts at MDA-P will adversely impact availability of the remote excavator. This will delay portions of the IM.

*Action(s) to Rectify Problem (1)* LANL is meeting frequently with NMED representatives to solve these regulatory issues..

*Action(s) to Rectify Problem (2)* LANL will wait until the remote excavator is available.

## **Key Personnel Issues**

None.

## **Projected Work for May 2000**

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

- No work is scheduled for this month.

### ***BMPs***

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

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

- Continued bromide sampling of springs.
- Weekly checking for presence and level of water in alluvial and deep wells.
- Sampling of flow-integrated ISCO samplers.
- Continued precipitation monitoring and sampling for stable isotopes.
- Data analysis
- Well completion at CdV-R-15-3.
- Well siting at CdV-R-11-2.

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

- The combined 260/eco HPT will meet on May 1, 2000. Personnel from these teams will work with ESH-20 to ensure that ESH-20's biota studies are relevant to ER's data needs.

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

- Modification of Stormwater Management pilot design.
- Continuation of composting tests on HE-bearing materials.
- Initiation of study designs for stabilization and phytoremediation.

### ***IM***

- Soil removals and soil staging of < 5% HE soils from lower drainage. Soil blending and removal from the pond area, pending NMED approval of blending and availability of the remote excavator.

### ***Public and Stakeholder Involvement***

No activities planned.

**Monthly Progress Report**  
**Corrective Measures Study (CMS) for Potential Release Site (PRS) 16-021(c)**  
**May 2000**

This report summarizes Los Alamos National Laboratory (LANL) activities completed during May of fiscal year (FY) 2000 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 and Radioactive Materials Bureau [NMED-HRMB] on 9/30/98, and approved by NMED-HRMB on 9/8/99, and other related activities are described herein.

The Cerro Grande fire impacted TA-16, including the 260 outfall and Canon de Valle, during May 2000. Fieldwork associated with the TA-16-260 CMS was conducted between May 1, 2000 and May 7, 2000, when TA-16 was evacuated. Office work was also suspended for most of the month, due to reprioritization of HEPS activities to fire recovery efforts. Hence, very little activity is shown for this month.

**Description of Activities and Contacts**

**High Performing Team (HPT) Activities** – The 260 HPT met on May 1, 2000 and discussed ecological data needs and the draft soil-blending letter. NMED personnel suggested that the following changes were desirable: 1) better documentation of the potential volumes to be blended; 2) better documentation of why a 5% blending criteria was proposed, rather than a 10% criterion; and 3) elimination of explicit mention of the HPT. LANL personnel provided a brief review of both the zero-valent iron (ZVI) study data and the temperature data from the HE-free composting studies. The scope of the upcoming HE-bearing tests of composting and the W.R. Grace process was outlined.

The well siting field visit for deep borehole CdV-R-11-2 was briefly discussed. A location near TA-37 appears to be the preferred location.

The combined eco/260 HPT discussed data needs as related to the upcoming ESH-20 studies in Canon de Valle and in other Canyons. Key needs included: 1) addition of inorganics to the sample suite; 2) tying the contaminants measured in biota to population studies; 3) ensuring that ESH-20 collected analytical data with adequate quality assurance/quality control (QA/QC); 4) attempting to tie the biota sampling closely to the well-characterized geomorphic zones in Canon de Valle; and 5) identifying whether plant sampling or vegetation counts would be required. LANL ER personnel will communicate these needs to ESH-20 personnel. A potential problem with all of these studies will be the lack of biota data from an appropriate 'clean' background canyon. One possible solution would be to propose ongoing biota monitoring in both Canon de Valle and a reference canyon in the upcoming Phase III RFI report.

Note that many of these ecological issues may no longer be relevant, inasmuch as much of Canon de Valle was burned in the Cerro Grande fire and the ecosystem in this area will be in recovery for a period of time.

The next meeting will be June 5, 2000.

**RCRA Facility Investigation (RFI) Report and CMS Plan**— No new activities occurred during May 2000.

**Best Management Practices (BMPs)**—BMPs were inspected following the Cerro Grande fire. Several of the straw bale BMPs were destroyed. They will be replaced during June, 2000.

**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 included sampling the Sanitary Wastewater System Consolidation (SWSC) Spring, Burning Ground Spring, and Martin Spring every other day for bromide, other anions, and stable isotopes. Samples were only collected during the first week of the month due to the fire. The autosampler at SWSC Spring was damaged by the fire.

The wells, both alluvial and deep, were checked for the presence and level of water during the week of May 1, 2000. Four of the five alluvial wells in Canon de Valle contained water; the exception continues to be alluvial well 2655, located in the steam plant drainage. One of the three wells in Martin Springs Canyon contained water; the two up-stream wells were dry. None of the intermediate-depth boreholes contained water.

No precipitation samples were collected during May 2000 due to conditions caused by the Cerro Grande fire.

At well, CdV-R-15-3, backfilling continued during the first week of May. The site was evacuated May 8, 2000. Backfilling was completed through the saturated zone and was left at a depth of 1045 ft.

The Schlumberger geophysical consultant met with LANL personnel on May 1, 2000. The geophysical logs suggested that there were areas at or near saturation within the vadose zone in the Tsankawi pumice, within the upper Otowi formation, within the Guaje pumice, and within the Cerros del Rio basalts. The latter three zones either produced small amounts of water during drilling or were moist based on the borehole video, hence screens were selected for those intervals. Screens in the saturated zone were selected at the top of the regional aquifer (1240-1250 ft), approximately 100 ft into the regional aquifer where a slight inflection was seen on the water temperature log; and near the bottom of the borehole in a high-production zone. The inflection in temperature may indicate an inflow of differing temperature water in a localized zone. These tentative locations were communicated to NMED personnel on May 1, 2000.

Major geological contacts intersected include: the Tshirege member/Cerro Toledo contact at ~ 365 ft; the Cerro Toledo/Otowi contact at ~ 575 ft; the Otowi/Guaje pumice contact at ~ 770 ft; and the Guaje pumice/Puye formation contact at 805 ft. A thin lens of Cerros del Rio basalts within the Puye formation was intersected at 982 ft. The Puye Formation continued from the base of the Cerros del Rio basalts at 997 ft. to the total depth of the hole at 1722 ft. The static water level in the borehole during the Schlumberger geophysical logging was approximately 1245 ft. These contacts and water levels are preliminary and their location will be refined based on geophysical logs and on detailed study of the drill cuttings.

### ***Ecological Risk Pilot***–

Ecological risk issues were discussed as part of the HPT meeting on May 1, 2000 (see above). Many of the issues discussed may no longer be relevant, due to the fact much of Canon de Valle was burned in the Cerro Grande fire, and the ecosystem will be in recovery for a period of time.

***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. Five studies are now ongoing under the auspices of ITRD, all of which may benefit the PRS 16-021(c) CMS:

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). This study has been completed.
3. A study of in situ anaerobic bioremediation of HE using gas-phase carbon additions.
4. A study of ex situ anaerobic bioremediation of Pantex soils using the W. R. Grace process, which combines anaerobic bioremediation with a ZVI treatment.
5. A study of HE composting. Amendments appropriate to northern New Mexico are being tested on clean soils.

No new results were received on the first four studies.

The fifth study, the composting pilot using uncontaminated soil, ceased after the first week of May due to the Cerro Grande fire. Temperatures reached a maximum of 45° C. The drum of soil slated for the HE-bearing composting test was damaged in the fire, but remained intact. Additional soil for the study will be collected and characterized.

### ***Interim Measure (IM)*** –

Excavation of the lower drainage began during the first week of May 2000, prior to evacuation of the site on May 8, 2000. Two drums of soil were excavated using a soil

vacuum. The total soil volume excavated as of the end of May was still approximately 600 cu. yds.

A large fraction, approximately 100 cu. yds, of the excavated material was oversized rock material. This was washed and the clean material was staged for ultimate use as stabilizing material during site reclamation.

Soil blending is on hold pending availability of the remote excavator from the MDA-P project. Based on phone discussions between NMED and LANL personnel, this blending will commence only after receipt of an NMED approval to initiate.

Fire damage at the 260 IM site was minimal. No heavy equipment was damaged. The soil pile and pond area were not burned. Burning was primarily confined to the grasses and brush on the banks of the drainage and to the lower drainage. Burned items included soil drums, access boundary tapes, straw BMPs in the drainage, and hoses for the soil vacuum and trash pump. These will be replaced in June.

***Public and Stakeholder Involvement***– None.

#### **Percentage of CMS Completed**

LANL estimates that 55% of the CMS has been completed to date. Note that this percentage does not reflect the deep wells that will be drilled per the CMS plan addendum.

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

*General Problem* – The Cerro Grande fire impacted both the 260 outfall area and Canon de Valle. CMS activities will be delayed due to the effects of the fire.

*Action to Rectify General Problem* – LANL representatives will work closely with NMED and DOE representatives to evaluate and reprioritize the 260 CMS activities.

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

*Problem (1)* The lack of a completed well at R-25 remains a concern to the TA-16-260 team.

*Action to Rectify Problem (1):* The screens have been installed and the well has been purged. The well is now being readied for Westbay installation. Note that the R-25 site did not burn.

*Problem (2):* There has been fire damage to autosamplers at SWSC spring. One to two months of data will be lost.

*Action to Rectify Problem (2):* The autosampler will be replaced following consultation with NMED.

*Problem (3):* Canon de Valle is moderately to severely burned. Several activities such as geophysical studies, phase two geomorphological investigations, ecorisk studies, and downstream potholing, may not be appropriate in a burned canyon due to possible flooding hazards as well as a dearth of vegetation and biota.

*Action to Rectify Rectify Problem (3):* LANL will work closely with NMED to determine a path forward on these issues.

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

*Problem (1)* The ZVI pilot test did not work effectively for HMX. The additional ZVI added during November did not significantly improve breakdown for HMX.

*Action(s) to Rectify Problem (1).* Composting is being investigated in place of ZVI.

*Problem (2):* Canon de Valle is moderately to severely burned. Several activities such as the Stormwater management pilot and phytoremediation studies may not be appropriate in a burned canyon due to possible flooding hazards and a lack of vegetation.

*Action to Rectify Problem (2):* LANL will work closely with NMED to determine a path forward on these issues.

### ***IM***

*Problem (1)* Several regulatory issues still need to be resolved prior to final implementation of the IM.

*Problem(2)* Schedule delays due to the Cerro Grande fire and at MDA-P will adversely affect availability of the remote excavator. This will delay portions of the IM.

*Action(s) to Rectify Problem (1)* LANL is meeting frequently with NMED and DOE representatives to solve these regulatory issues.

*Action(s) to Rectify Problem (2)* LANL will wait until the remote excavator is available.

### **Key Personnel Issues**

Three members of the HEPS team lost their homes in the Cerro Grande fire.

## **Projected Work for June 2000**

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

- No work is scheduled for this month.

### ***BMPs***

- Burned out BMPs will be reinstalled. Inspection of existing BMPs following significant precipitation events will continue when the canyons have been declared safe for entry.

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

- Field assets will be restored to their pre-fire conditions.
- Continued bromide sampling of springs.
- Weekly checking for the presence and level of water in alluvial and deep wells.
- Sampling of flow-integrated ISCO samplers.
- Continued precipitation monitoring and sampling for stable isotopes.
- Data analysis
- Well completion at CdV-R-15-3.
- Well siting at CdV-R-11-2.
- Quarterly sampling of alluvial wells, deep wells and surface waters.

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

- The impacts of the Cerro Grande fire on the ecological risk pilot will be evaluated.

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

- Initiation of composting tests on HE-bearing materials.
- Initiation of study designs for stabilization.

***IM***

- Excavation and staging of low-level HE soils from lower drainage. Soil blending and removal from the pond area, pending NMED approval of blending and availability of the remote excavator.

***Public and Stakeholder Involvement***

No activities planned.