ERID-255597

LA-UR-14-22910
April 2014
EP2014-0136

Semiannual Progress Report for Corrective Measures Evaluation/Corrective Measures Implementation for Consolidated Unit 16-021(c)-99

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

The subsurface corrective measures evaluation and surface corrective measures implementation for Consolidated Unit 16-021(c)-99 (the 260 Outfall) proceeded at a reduced pace during this reporting period. The primary reason for the lack of activity is the redirection of funds to continue the focus on accelerating the shipment of aboveground transuranic waste from Los Alamos National Laboratory (the Laboratory) to the Waste Isolation Pilot Plant. This redirected focus allows the Laboratory to support the environmental priorities established by the New Mexico Environment Department and the State of New Mexico.

The most significant work accomplished during this reporting period consisted of the restart of the CdV-16-4ip interim measure source removal testing for RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) in groundwater and the Technical Area 16 geophysics study projects. These two projects are scheduled to be implemented in the field in May 2014 and to be completed by the end of fiscal year 2014.

CONTENTS

1.0 INTRODUCTION

This report serves as both the 2013–2014 summary report for the Technical Area 16 (TA-16) permeable reactive barrier (PRB) and associated corrective measures implementation (CMI) projects and the semiannual progress report for the corrective measures evaluation (CME)/CMI for Consolidated Unit 16-021(c)-99.

The report summarizes activities Los Alamos National Laboratory (LANL or Laboratory) completed from October to March of fiscal year (FY) 2014 on the CME/CMI for Consolidated Unit 16-021(c)-99, the TA-16 260 Outfall. Activities outlined in the 1998 corrective measures study (CMS) plan (LANL 1998, 062413; LANL 1999, 064873), approved by the New Mexico Environment Department (NMED) Hazardous Waste Bureau on September 8, 1999 (NMED 1999, 093666), and other related activities are described herein.

2.0 DESCRIPTION OF ACTIVITIES AND CONTACTS—OCTOBER 2013 TO MARCH 2014

No specific activities or contacts were made concerning the TA-16 260 corrective measures process. Programmatic issues concerning well development and the development of the RDX in the Groundwater Campaign have been presented. The RDX in Groundwater Campaign is being constructed to address groundwater contamination beginning in FY2015.

3.0 SURFACE CMI

3.1 Best Management Practices

Inspection of best management practices (BMPs) associated with Consolidated Unit 16-021(c)-99 is completed under the Individual Storm Water Permit, pursuant to the requirements of National Pollutant Discharge Elimination System (NPDES) Permit No. NM0030759 (hereafter, the Individual Permit), as authorized by the U.S. Environmental Protection Agency (EPA). Current BMPs, called controls in the Individual Permit, include a low-permeability cap consisting of a 20-in.-thick crushed tuff/bentonite cap installed on top of the former settling pond, five earthen berms and one rock check dam installed to control run-on/runoff, riprap within the former channel to control runoff, and established vegetation to control erosion from the site. Controls are inspected annually and following a significant rain event of 0.25 in. or greater within 30 min, as measured at rain gage 257, per the Individual Permit.

In the period from October 2013 to March 2014, no significant rain events were recorded at rain gage 257. The 2013 annual inspection was conducted on October 1, 2013, during which repairs were recommended for four earthen berms and the rock cap. All recommended repairs were completed on April 18, 2014. Per the Individual Permit, if several storms exceeding the intensity threshold occur over a period not to exceed 15 d from the first event, a single inspection is sufficient to achieve compliance (hence the number of events may differ from the number of inspections). Inspection results were reported in the “Storm Water Individual Permit Annual Report, Reporting Period: January 1–December 31, 2013” (LANL 2014, 254067), which was submitted to the EPA Region 6 Enforcement Division as well as to the NMED Surface Water Quality Bureau on February 28, 2014.

3.2 Hydrogeologic Investigations

Hydrogeologic investigations include periodic water sampling as outlined in the 1998 Resource Conservation and Recovery Act facility investigation report (LANL 1998, 059891) as well as continuing

investigations delineated in the 1998 CMS plan (LANL 1998, 062413). The current groundwater sampling program, conducted per the Laboratory's Interim Facility-Wide Groundwater Monitoring Plan (LANL 2013, 241962), includes semiannual sampling at Martin and Burning Ground Springs.

Two groundwater sampling campaigns were conducted in the Cañon de Valle watershed in December 2013 and in March 2014. Data from the sampling campaigns will be included in the upcoming periodic monitoring reports.

Recently reconfigured monitoring wells CdV-16-4ip, CdV-R-37-2, and CdV-R-15-3 were sampled on December 18, 2013. From March 3 to March 20, 2013, all TA-16 260 monitoring group wells were sampled, except for FLC-16-25280, which was dry, and MSC-16-06295, which was destroyed during the storms on September 12 and 13, 2013.

The September 2013 storms produced a total of 5.39 in. of precipitation at the TA-06 weather station. This flood caused geomorphic changes to Cañon de Valle and Water Canyon that was assessed in fall 2013 and spring 2014. Wells 16-25280 and CdV-16-1(i) were damaged, but not destroyed. This damage is described in the September 2013 Storm and Flood Assessment Report (LANL 2013, 251021).

One year earlier, floods in July, August, and October 2012 impacted both canyons, causing localized scouring in parts of the canyons and sediment deposition in downgradient areas. A follow-up study focused on the effects of floods on the geomorphology and sediment chemistry following the 2012 monsoon season. The results are summarized in the "Results of 2012 Sediment Monitoring in the Water Canyon and Cañon de Valle Watershed" (LANL 2013, 241083). The study showed very low concentrations of key chemicals of potential concern, consistent with, or less than, pre-fire concentrations and less than residential and recreational soil screening levels.

Sediment sampling of key reaches within Cañon de Valle and Water Canyon was conducted during March and April of 2014. The sampling program was designed to evaluate the effects of post–Las Conchas fire flooding on the alluvial systems in Cañon de Valle and Water Canyon. The results will be summarized in the Sediment Monitoring in the Water Canyon and Cañon de Valle Watershed report, to be submitted to NMED in June 2014. Previous inspections and sampling have shown the sediment reaches are variably disturbed, with the highest impacts in the more western reaches. In most reaches, sediment packages with the highest contaminant levels were not disturbed by post-fire flooding. This finding will be reevaluated based on the sampling results.

3.3 2014 CMI Activities

The Cañon de Valle pilot PRB remains nonoperational because of post–Las Conchas fire flooding, which destroyed the capture wall for the PRB. Continued risks of flooding preclude reinstalling the PRB at this time. The current location of the PRB is not feasible for barrier reinstallation because of the deep scouring of the alluvial sediment in that area.

The carbon-filtration treatment systems at the springs remain in place but are not operational because a permit has not been issued.

4.0 SUBSURFACE CME

4.1 CME for Deep Groundwater

The primary work accomplished during this reporting period consisted of the preparation activities for the geophysics study and the upcoming RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) source removal testing activities at CdV-16-4ip.

- **Geophysics Study:** The "Work Plan for Direct Current Resistivity Profiling in Cañon de Valle" (LANL 2012, 215111) was submitted to NMED in April 2012 and approved by NMED on May 18, 2012 (NMED 2012, 520404). On November 7, 2013, the Laboratory submitted a request for extension to submit the "Summary Report for Direct Current Resistivity Profiling in Cañon de Valle" to May 30, 2014 (LANL 2013, 250970). It is anticipated that before May 30, 2014, an additional extension request will be submitted with a revised date, based on NMED priorities, funding constraints, and adequate time to complete the work. Plans are underway to begin field work on this project starting in mid-May 2014. The work will consist of conducting six direct current resistivity profiles across and parallel to Cañon de Valle to address uncertainties regarding the site conceptual model for TA-16.
- **CdV-16-4ip Source Removal Testing for RDX in Groundwater**: The "Interim Measures Work Plan for Source Removal Testing at Well CdV-16-4ip" was submitted to NMED on March 22, 2013 (LANL 2013, 239235) and was approved with modifications by NMED in its letter dated April 30, 2013 (NMED 2013, 522441). The testing activities will consist of a 45- to 60-d aquifer test, followed by rebound sampling for an indeterminate period of time. The sampling plan for the testing activities has been developed, and components of the granular activated carbon treatment system have been procured or are in the process of being procured. Testing is tentatively scheduled to start around mid-May.

Other work accomplished concerning the CME for deep groundwater from October 2013 to March 2014 includes the following:

- **Tracer Deployment:** On March 14, 2014, a follow-up extension request was submitted to NMED, requesting an extension from the March 31, 2014, date to deploy tracers at Consolidated Unit 16-021(c)-99 to a new date of December 31, 2014. It is anticipated that before December 31, 2014, an additional extension request will be submitted with a revised date, based on NMED priorities, funding constraints, and adequate time to complete the work. This additional time may allow the Laboratory to obtain sufficient data from planned new wells to evaluate whether a tracer is still appropriate.

5.0 PUBLIC AND STAKEHOLDER INVOLVEMENT

No public meetings or meetings with stakeholders were held between October 2013 and March 2014.

6.0 PROBLEMS ENCOUNTERED/ACTIONS TO RECTIFY PROBLEMS

The hydrologic system in Cañon de Valle was strongly perturbed by the August 2011 flooding because of severe damage to the watershed caused by the Las Conchas wildfire. As a result, baseline contaminant levels within the canyon system need to continue to be reevaluated. Two long-term alluvial wells were destroyed in this flooding, and the PRB capture wall was severely damaged. The TA-16 storm filters in springs have not been turned on because of issues with the NPDES permit. However, meetings with

NMED to address a path forward for the alluvial system are planned and will be scheduled in the near future.

7.0 KEY PERSONNEL ISSUES

No issues regarding key personnel occurred between October 2013 and March 2014.

8.0 PROJECTED WORK FOR APRIL 2014 TO SEPTEMBER 2014

8.1 Surface CMI

8.1.1 BMPs

- Continue to inspect existing BMPs following significant precipitation events

8.1.2 Hydrogeologic Investigations

- Check for the presence and levels of water in the Cañon de Valle alluvial system
- Evaluate geomorphic changes in Cañon de Valle resulting from post–Las Conchas fire storm events in FY2013
- Continue precipitation monitoring

8.1.3 Surface CMI Activities

- Meet with NMED personnel to determine a path forward for the PRB and storm filters
- Monitor the bentonite cap in the TA-16 260 Outfall pond

8.2 Subsurface CME

- Conduct interim measures source removal testing activities at CdV-16-4ip
- Install CME intermediate and regional aquifer wells R-63i, R-47, and CdV-9-1(i)
- Conduct surface geophysics (direct current resistivity) in and around Cañon de Valle

8.3 Public and Stakeholder Involvement

- Continue discussions with NMED personnel regarding the optimal path forward for both surface CMI and groundwater CME
- Meet with NMED to discuss CdV-16-4ip source removal testing activities and the sampling plan for those activities.

9.0 RECOMMENDATIONS

Key recommendations for the TA-16 260 Outfall subsurface CME and surface CMI for future FYs include the following:

- Activities relevant to the groundwater CME should be given priority in light of recent observations in deep groundwater associated with the TA-16 260 CME. These observations include increasing RDX) concentrations in R-18 and high (>200 µg/L) RDX concentrations in the upper screen of CdV-16-4ip.
- The crucial next steps for the groundwater CME focus on improving the deep groundwater monitoring network; thus, the geophysical survey and the drilling of new wells are key near-term activities.
- These drilling activities are important precursors to both the groundwater CME report and any interim actions that may be deemed necessary to minimize high explosives migration into regional groundwater.
- The Laboratory believes decisions to replace the pilot PRB or destroyed alluvial wells should be deferred until 2015, at the earliest. Experience following the Cerro Grande and other fires within the region suggests large floods are likely for up to 3 yr following severe burning in a watershed's headwaters. Nearby alluvial wells with similar concentrations and trends can provide continued alluvial groundwater monitoring for the TA-16 260 monitoring group.
- The use of the storm filters currently located at several TA-16 springs is strongly recommended. This action would be a useful interim measure pending future decisions on the fate of the PRB. These springs currently provide a large fraction of the mass-flux of RDX within the canyon system. In the absence of the PRB, these storm filters may remove a large percentage of the flux of RDX in the alluvial waters within Cañon de Valle.

10.0 REFERENCES

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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