LA-UR-08-6891
EP2008-0578

Los Alamos Site Monitoring Area 2 Interim Measure and Monitoring Plan

November 2008

Responsible project leader:

Printed Name	Signature	Title	Organization	Date
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Los Alamos
NATIONAL LABORATORY
EST. 1943

Prepared by the Environmental Programs Directorate

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1.0 SITE DESCRIPTION

Solid Waste Management Unit (SWMU) 01-001(f) is within Los Alamos Site Monitoring Area 2 (LA-SMA-2) and is located in Technical Area 01 (TA-01), mostly on the mesa above Los Alamos Canyon (Figure 1.0-1). SWMU 01-001(f) is the location of a former septic tank and outfall that served HT and FP Buildings. The HT Building was used to heat-treat and machine natural and enriched uranium, and the FP Building was a foundry for nonradioactive and nonferrous metals. Stormwater runoff from this site is currently regulated under the Federal Facility Compliance Agreement (FFCA), which will terminate upon issuance of an individual permit (IP), expected by January 2009.

The SWMU discharged into a tributary canyon of Los Alamos Canyon via a canyon sideslope known as "Hillside 140." In 1975, the septic tank, inlet and outlet lines, and soils within and surrounding SWMU-01-001(f) were removed. In 1995, soils with elevated concentrations of total uranium were removed from the slopes of Hillside 140.

The topography of the tributary canyon is steep and rocky. The canyon is moderately vegetated with mature trees and small shrubs. The tributary canyon floor is bedrock with a steep gradient.

Just downstream of the sampling station at the lower end of LA-SMA-2, the tributary canyon drainage changes direction and flows southeast, paralleling Omega Road. The gradient of the drainage downstream of the sampling station is much flatter than that of the tributary canyon. Significant deposition of sediment has occurred in the area between the sampling station and the culvert crossing under Omega Road.

1.1 Hydrology

The contributing drainage area to SWMU 01-001(f) is urban and consists of rooftops, parking lots, streets, and natural ground with moderate cover. Runoff is generated on the mesa top, which consists of a significant area of impervious land cover, i.e., rooftops, parking lots, and streets. The SMA is subject to frequent runoff because the contributing drainage area is relatively large and contains significant impervious land cover.

The general direction of runoff at the site is from the northeast to the southwest. Downstream of LA-SMA-2, the runoff flows through a 24-in.-diameter culvert under Omega Road and then into Los Alamos Canyon.

1.2 Upstream and Downstream Impacts

Significant upstream or downstream impacts are not anticipated as a result of the proposed alternatives. There is erosion potential at this SWMU, but best management practices (BMPs) have been installed for soil stabilization, sediment retention, and dissipation.

1.3 Erosion from Stormwater Runoff

Currently, the original Hillside 140 site is relatively stable. The area surrounding SWMU 01-001(f) has a covering of fallen pine needles, which suggests that the SWMU is not subject to frequent or significant stormwater run-on or runoff. There is some bare soil on the edge of the mesa near the location of the former outfall pipe, and evidence of minor erosion was observed in this area. This will have no impact on stormwater runoff from the site. As described above, the canyon floor is mostly exposed bedrock. Therefore, the potential for erosion in the canyon waterway is minimal.

2.0 POLYCHLORINATED BIPHENYL ANALYTICAL RESULTS

2.1 Prior Polychlorinated Biphenyl Sediment and Soil Analytical Results

Sediment and soil samples collected in prior characterization phases were analyzed for metals, radiological constituents, and select organic analytical suites (semivolatile organic compounds [SVOCs]) but were not analyzed for polychlorinated biphenyls (PCBs). Therefore, there are no sediment-bound PCB results available to determine distribution of PCBs in sediments and the respective source term.

2.2 PCB Analytical Results in Stormwater Runoff at LA-SMA-2

The FFCA requires Los Alamos National Laboratory (the Laboratory) to collect site-specific stormwater samples as described in the annual "Storm Water Pollution Prevention Plan for SWMUs and AOCs (Sites) and Storm Water Monitoring Plan," which is submitted to the U.S. Environmental Protection Agency (EPA) and the New Mexico Environment Department (NMED) for review and approval. The results of the samples collected are then compared with the appropriate water screening action levels to determine if pollutant transport has occurred.

Aroclor PCBs were detected in 14 out of 16 stormwater-sampling events from August 2004 to August 2007 at LA-SMA-2, an 88% detection rate. Point of sample collection is currently located at the bottom of the drainage, above the receiving stream. There are a total of 124 Aroclor results, of which 21 detections range from 0.7 to 17.4 µg/L, an Aroclor detection rate of 17%. The predominant Aroclor constituents are Aroclor-1254 and Aroclor-1260; none of the other five Aroclor components were detected. Table 2.2-1 presents Aroclor PCB detections in stormwater collected at LA-SMA-2.

3.0 BMP STRATEGY

As the Laboratory transitions from coverage under the FFCA into the IP, a staged approach to establishing and enhancing BMPs at LA-SMA-2 will be adopted as required by the IP. The first stage is to initiate BMPs to divert run-on and trap sediments below the SMA and also to acquire additional sediment and stormwater-sampling data to better understand the source and fate of contaminants in the tributary canyon. Stage 1 BMPs and sampler implementation have been completed. The second stage, if necessary, will be to construct permanent BMPs that significantly reduce or eliminate the potential for contaminants to be transported into the Los Alamos Canyon waterway. Stage 2 actions could include source removal if the results of sediment and soil sample analyses identify significant source material. The two stages are described in more detail below.

3.1 Stage 1—Initial BMPs and Additional Stormwater Sampling

Immediately below the sampler at LA-SMA-2, there is an area of sediment deposition that is approximately 300 ft long × 50 ft wide. Water that drains out of the LA-SMA-2 tributary must flow through this area and under Omega Road through a 24-in. culvert to reach the Los Alamos Canyon waterway. Substantial vegetation and downed woody debris on the surface of this area slow runoff and trap sediments. This capacity has been augmented by the installation of a series of juniper bales to trap sediments from larger flows (Figure 3.1-1).

In addition, the off-site run-on to the sediment deposition area from a tributary west of LA-SMA-2 has been reduced. An existing culvert under Omega Road is located just west of the outfall of LA-SMA-2. This 18-in.-diameter culvert conveys runoff from areas west of LA-SMA-2 under the road and into the

Los Alamos Canyon waterway. Until recently, the 18-in. culvert was plugged with debris, and there was evidence that past runoff had been forced to the southeast, across the depositional area below the LA-SMA-2 tributary, and into the 24-in. roadway culvert described above. The 18-in. culvert has been cleaned, and the drainage just downstream of the existing 18-in. culvert has been bermed to ensure that runoff does not bypass the culvert (Figure 3.1-2). It is estimated that run-on to the sediment deposition area has been reduced by approximately 30%.

In addition to the existing LA-SMA-2 sampling location, three additional ISCO automated samplers have been installed to better understand potential contaminant dynamics in this drainage (see Figures 3-1-3 to 3.1-6). The locations for sampling are as follows:

- at the upstream end of the tributary canyon and just upgradient of the SWMU
- approximately 30 ft below the former 01-001(f) outfall (proposed IP monitoring location)
- the former FFCA LA-SMA-2 sampler location (proposed for removal)
- upgradient of the existing 24-in.-diameter culvert at Omega Road below the sediment deposition area

A sampling station at the upstream end of the tributary canyon will provide a greater understanding of the source of pollutants, including PCBs, in run-on from non-Laboratory property on the mesa top. For example, if the sampling data show PCBs present at the upstream end of the tributary canyon, then more work could be done to identify the source of PCBs on the mesa, and BMPs could be designed and installed that would prevent the transport of PCBs from the tributary into the canyon.

The sampler below the former outfall of SWMU 01-001(f) will demonstrate compliance with the IP and assess BMP effectiveness in preventing runoff or sediment migration from the SWMU.

The current sampling location at the bottom of LA-SMA-2 will be relocated below the sediment deposition area and above the Omega Road culvert following authorization of the IP.

As described earlier, it was observed that sediment has been deposited in the LA-SMA-2 drainage and surrounding overbank just downstream of the existing sampler and just upstream of the existing 24-in. culvert under Omega Road. It is possible that PCB-laden sediments are depositing in this location and not entering the waterway in Los Alamos Canyon. If this is the case, current sampling data acquired upstream of this location may not be indicative of the potential for contaminants to enter the receiving waters in Los Alamos Canyon. By collecting stormwater-runoff samples just upstream of the 24-in. culvert under Omega Road, a better understanding can be obtained of the impacts of the sediment deposition area. If it is found that significant benefits are being derived from the retention of sediment in this area, BMPs could be designed to enhance the detention of stormwater and the retention of sediment.

Stormwater samples will be analyzed as specified in the draft IP sampling plan for LA-SMA-2. No PCB Aroclor data have been collected, pending development of a procedure to implement an IP requirement to use EPA Method 1668 congener-specific analysis.

3.2 Additional Sediment and Soil Sampling

Soils and sediments will be sampled in accordance with the approved "Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area" (LANL 2006, 091916) from approximately 25 locations and multiple depths to characterize potential contaminant inventory associated with the 01-001(f) septic system pipelines, septic tank, outfall, and drainage below the outfall, including the sediment deposition zone below the LA-SMA-2 sampler (Figure 1.0-1).

Samples will be analyzed at off-site fixed laboratories for target analyte metals, cyanide, nitrates, perchlorate, volatile organic compounds (in samples deeper than 0.5 ft below ground surface), SVOCs, PCBs, americium-241, isotopic plutonium, isotopic uranium, strontium-90, tritium, gamma-emitting radionuclides, moisture, particle-size distribution, and pH. Dioxins, explosive compounds, and furans will not be analyzed because they are not related to historical operations at TA-01.

3.3 Stage 2—Enhanced Permanent BMPs

The second stage, if necessary, would consist of enhanced BMP design and construction as regulated under the IP, expected by January 2009. If it is determined by stormwater sampling that Stage 1 activities do not meet IP requirements, the Laboratory will be required to enhance its BMPs to eliminate the source or pollutant or the discharge of pollutants (e.g., a detention pond or series of ponds could be constructed in the sediment deposition area just upstream of the 24-in. culvert). The pond or ponds would be located on the northern side of Omega Road and parallel to the steep hillside of the mesa. Because the proposed location for the BMP is on a grade, the ponds could be split into two different leveled sections. If constructed, the sections would be separated by a berm structure, and an overflow channel would be constructed between the two sections. All BMP enhancement activities necessary to address stormwater runoff of pollutants will be conducted, as required, in compliance with the IP and stormwater regulations under the Clean Water Act.

4.0 BMP DESIGN

Figure 1.0-1 shows an aerial photograph of LA-SMA-2, with Stage 1 and recommended Stage 2 BMPs and sampler locations. If implementation of Stage 2 BMPs is necessary, detailed engineering drawings will be required.

5.0 BMP IMPLEMENTATION

Stage 1 BMPs and sampler implementation have been completed. Stormwater samplers have been installed at three locations. Three rows of juniper bales have been installed above the most downgradient sampler. The 18-in. culvert has been cleaned, and a berm has been constructed to divert run-on from the sediment retention area.

Sediment and soil sampling are on schedule for completion by mid-November 2008. Analytical results from sediment and soil sampling should be available by the end of January 2009.

6.0 BMP MAINTENANCE

BMPs will be inspected and maintained as required by the FFCA, National Pollutant Discharge Elimination System, Storm Water Multi-Sector General Permit, and EPA in accordance with permit requirements, U.S. Department of Energy (DOE) orders, and institutional standard operating procedures. Once the IP is issued and effective, the Laboratory will inspect and maintain BMPs in accordance with permit requirements.

7.0 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 number. This information is also included in text citations. ER ID numbers 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; DOE-Los Alamos Site Office; EPA Agency, Region 6; 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.

LANL (Los Alamos National Laboratory), April 2006. "Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-06-2464, Los Alamos, New Mexico. (LANL 2006, 091916)

Note: The magenta dots represent non-IP sampling locations.

Figure 1.0-1 Aerial photograph of Stage 1 and 2 activities in LA-SMA-2

Figure 3.1-1 Example of juniper bales placed below LA-SMA-2 FFCA sampler and above the LA-SMA-2.15 sampler

Figure 3.1-2 Earthen berm that routes stormwater under paved road through 18-in. culvert and away from LA-SMA-2 drainage

Figure 3.1-3 LA-SMA-2, the run-on sampler located at the upstream end of the tributary canyon and just upgradient of the SWMU

Figure 3.1-4 LA-SMA-2.1, the existing sampler at the outfall of SWMU 01-001(f)

Figure 3.1-5 LA-SMA-2, the existing sampler location at the bottom of the SMA

Figure 3.1-6 LA-SMA-2.15, just upstream of the existing 24-in.-diameter culvert at Omega Road

Table 2.2-1
Aroclor PCB Detection in Stormwater Collected from LA-SMA-2

Location Name	Analyte	Sample Collection Date	Analytical Result (µg/L)	Total PCBs (µg/L)
LA-SMA-2	Aroclor-1254	08/06/04	1.6	1.6
LA-SMA-2	Aroclor-1254	08/15/04	2.4	2.4
LA-SMA-2	Aroclor-1254	08/18/04	3.8	3.8
LA-SMA-2	Aroclor-1254	08/20/04	2.2	2.2
LA-SMA-2	Aroclor-1254	05/03/05	6.7	—*
LA-SMA-2	Aroclor-1260	05/03/05	2	8.7
LA-SMA-2	Aroclor-1254	08/11/05	4.8	—
LA-SMA-2	Aroclor-1260	08/11/05	0.78	5.58
LA-SMA-2	Aroclor-1254	08/22/05	7.6	—
LA-SMA-2	Aroclor-1260	08/22/05	1.3	8.9
LA-SMA-2	Aroclor-1254	07/21/06	1.7	—
LA-SMA-2	Aroclor-1260	07/21/06	0.7	2.4
LA-SMA-2	Aroclor-1254	09/06/06	5.6	—
LA-SMA-2	Aroclor-1260	09/06/06	2.3	7.9
LA-SMA-2	Aroclor-1254	05/02/07	3.7	—
LA-SMA-2	Aroclor-1260	05/02/07	1.4	5.1
LA-SMA-2	Aroclor-1254	05/08/07	3.6	—
LA-SMA-2	Aroclor-1260	05/08/07	1.3	4.9
LA-SMA-2	Aroclor-1254	05/13/07	12.1	—
LA-SMA-2	Aroclor-1260	05/13/07	4.2	16.3
LA-SMA-2	Aroclor-1254	06/11/07	3.7	—
LA-SMA-2	Aroclor-1260	06/11/07	1.4	5.1
LA-SMA-2	Aroclor-1254	08/18/07	17.4	—
LA-SMA-2	Aroclor-1260	08/18/07	7.4	24.8

* — = Cells that either denote space markers between lines of data or show that data are being summed from the previous column.

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