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12/13/99
Final work plan

Plan for Characterization of Groundwater, Surface water, and Sediments at SWMU 3-010(a)

1.0 Introduction

This Plan was prepared to meet the requirement of the New Mexico Environment Department (NMED) letter titled "Response to Response to the Notice of Deficiency for the RFI Report for SWMU 3-010(a)," dated December 1, 1999. NMED requested that a plan be submitted within 30 calendar days to characterize a zone of saturation (groundwater) in tuff by developing and sampling well B1/MW-1 near TA-3-30. NMED requested that the plan also include sampling of surface water in the channel near the SWMU including samples up-channel of the SWMU, and sampling of sediment that is potentially affected by historical releases from the SWMU. NMED also requested that sediment be sampled using the canyons approach to confirm the results of previous composite samples. Sampling of these media will be conducted to evaluate and refine, if necessary, the hydrogeologic conceptual model for this site.

NMED provided clarification during the December 8, 1999 LANL ER/NMED monthly meeting of their December 1, 1999 letter that stated "Regardless of the results of this further characterization, a No Further Action will not be granted for this site prior to the canyons investigation of the drainage and tributary to Two Mile Canyon and Upper Two Mile Canyon". NMED stated at the meeting that the intent of this sentence was to ensure than an appropriate and defined hand-off to the Canyons Focus Area is established. To address this concern all data from this SWMU will be used by the Canyons Focus Area as part of the Two Mile Canyon and Upper Two Mile Canyon investigation in both their planning of the investigations and later in the interpretation of fate and transport of contaminants presented in the Pajarito Canyon Surface Aggregate Report. NMED added that no further action (when supported by the results of this and previous investigations) could be granted for this site prior to completing the canyons investigation of the Two Mile Tributary.

This plan is organized as follows. Section 2.0 summarizes the RFI history of the site. Section 3.0 describes the well development and the groundwater sampling. Section 4.0 describes the surface water sampling in the seep and channel standing water. Section 5.0 describes the sediment sampling. Section 6.0 describes the data analysis process for the data that will be collected in accordance with this plan. Section 7.0 provides references.

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2.0 Site History

1992

- One sample containing visible mercury was collected and analyzed for a full ~~range of~~ contaminants. This sample was used to determine what analytes would comprise the 1993 Phase I RFI.
- The Laboratory and the NMED collaborated on the decision to characterize and remove soil at SWMU 3-010(a) to a level of 20-ppm mercury and 100 ppm total petroleum hydrocarbons (TPH).

1993

- The Phase I RFI SAP was prepared and samples were collected from SWMU 3-010(a) according to the SAP.
- Analytical results from the sampling campaign were received in the fall of 1993. Several analytes (plutonium, tritium, lead, mercury, and TPH) were present at concentrations greater than ER Project screening action levels (SALs) or the specified cleanup levels.
- The voluntary corrective action (VCA) plan outline began.

1994

- The VCA plan was prepared and executed in April and May of 1994. Approximately 120 cubic yards of material were removed during the VCA.
- A Phase II site investigation work plan was written and executed in the fall of 1994. The plan initiated the following activities:

  1) A 12—24 in.-thick, engineered hydraulic barrier of bentonite powder and crushed tuff was placed in the bottom of the VCA trench. The trench was then backfilled with clean soil.

  2) A soil vapor probe survey was performed to guide the placement of seven boreholes that were drilled to collect information on extent of organic contamination at the site. One borehole was cased as a well but was never developed, one was a geologic identification borehole.

  3) Surface samples from north and south of the VCA trench were collected and the site was left recontoured and seeded.
- The Phase II RFI investigation results indicated that the VCA had successfully reduced concentrations of lead, mercury, VOCs, and TPH at the site to concentrations below levels of concern for both human and non-human receptors (based on risk and screening assessments). At 2 ppm, the mercury levels were well below the 20-ppm level of concern; however, below the engineered bentonite fill-layer lining the bottom of the VCA trench the TPH levels were above 100 ppm. Three samples were collected for TPH analysis with the following results: 15,000 ppm, 2000 ppm, and 10 ppm. The TPH in this case consisted of mineral oil. Residual concentrations of 1,2-DCA and 1,1-DCE in subsurface soil were found to be below levels of human health and ecological impacts. Concentrations of volatile contaminants in the seep downgradient from the SWMU were below water quality standards.

1995

- Best management practices (BMPs) were inspected and maintained during 1995.
- An RFI report for SWMU 3-010(a) was submitted to EPA/NMED on April 28, 1995.
- An NOD on the RFI report was submitted to LANL from EPA and copied through NMED in the fall of 1995. The NOD contained the following concerns.
  - Significance of seep and water located in borehole B1/MW1.
  - Revising background concentrations to most current numbers.
  - Revising SALs to most currents numbers.

- Ecological screening methods.
- Remaining TPH levels, and proof that the source term is mineral oil.
- Bounding of contamination.
- Why criteria for borehole termination was changed.
- Exposure equations and input parameters seem overly conservative.
- Need to determine impact of perched aquifer zone and bound area of plume.

1996

- A response to the NOD was submitted to EPA/NMED February 7, 1996.
- BMPs were inspected and maintained during 1996.

1997

- BMPs were inspected and maintained during 1997.

1998

- Water and sediment data from samples, collected during the previous sampling campaigns, were requested by NMED-AIP personnel to help evaluate SWMU 3-010(a) as an AP4.5 site with a score exceeding 60. NMED-AIP personnel noted some erosion of the topsoil from surface water traveling across the site.
- BMPs were inspected and replaced during 1998. The slope was developing rills. Jute matting was placed on the slope. Old sandbags were replaced along the fence above the slope to prevent stormwater run-on. LANL's Roads and Grounds Maintenance personnel re-paved the fire lane adjacent to the eastern edge of the SWMU site.

1999

- Road realignment work, associated with the construction of the new Strategic Computer Complex (SCC), resulted in the submission of an excavation permit and an Environmental Restoration (ER) Project review of the area. The SCC project has proposed building a new road across the drainage downgradient from SWMU 3-010(a). Because the final closure of the site and removal of SWMU 3-010(a) from the HSWA permit had not been completed, NMED was contacted.
- NMED responded to the LANL NOD Response on December 1, 1999, and requested further characterization at SWMU 3-010(a) prior to NFA approval.

3.0 Well Development and Groundwater Sampling

As required by NMED-HRMB, well B1/MW-1 at TA-3 [next to building TA-3-30 (see Figure 1)] will be developed and sampled. The well will be developed following ER-SOP-5.02, Rev. 1, "Well Development." The following activities are included in well development.

• Measure and record depth-to-water and the total depth of the monitoring well according to ER-SOP-7.02.

• Develop the well until the well is free of sediment (to be determined by field team leader) and the appropriate volumes of water have been removed. The Hazardous and Solid Waste Amendments Permit (May, 1990) requires attempting to develop until the turbidity is <5 NTU. If the well is not free of sediment after the appropriate volumes of water have been removed, continue until twice the appropriate volume of water has been removed.

• Note the initial color, clarity, and any obvious odor of the water.

• Measure and record the initial pH, temperature, and specific conductance of the water.

• Groundwater samples may be collected from the monitoring well 72 hours after well development is complete.

After development, the well will be sampled abiding ER-SOP-6.01, Rev. 1, "Purging of Wells for Representative Sampling of Groundwater."

One unfiltered sample will be collected for VOC analysis before well development and one unfiltered sample will be collected after well development and subsequent well purging, refer to Table 1. VOC data from samples collected prior to well development will be used to determine the effects of the agitation associated with well development on the concentration or presence of VOCs in the water. Filtered samples after well development will also be collected and submitted for analysis of target analytes (TAL) metals, and tritium. Unfiltered samples after well development will be submitted for analysis of TAL metals and cesium-137 by gamma spectroscopy. Samples will be submitted to the Sample Management Office (SMO) for off site contract laboratory analysis.

4.0 Surface Water Sampling

Surface water samples will be collected from the channel at locations with standing water and at identified side channel sources of water within the small tributary draining to Twomile Canyon abiding ER-SOP-6.13, Rev. 0, "Surface Water Sampling". The approximate area of surface water occurrence is identified in Figure 1.

One sample will be collected upgradient of the site and three samples will be collected downgradient of the site. At each site, one unfiltered sample will be collected for VOC analysis, TAL metals, and cesium 137 by gamma spectroscopy. Filtered samples will be collected and analyzed for metals, and tritium, refer to Table 1.

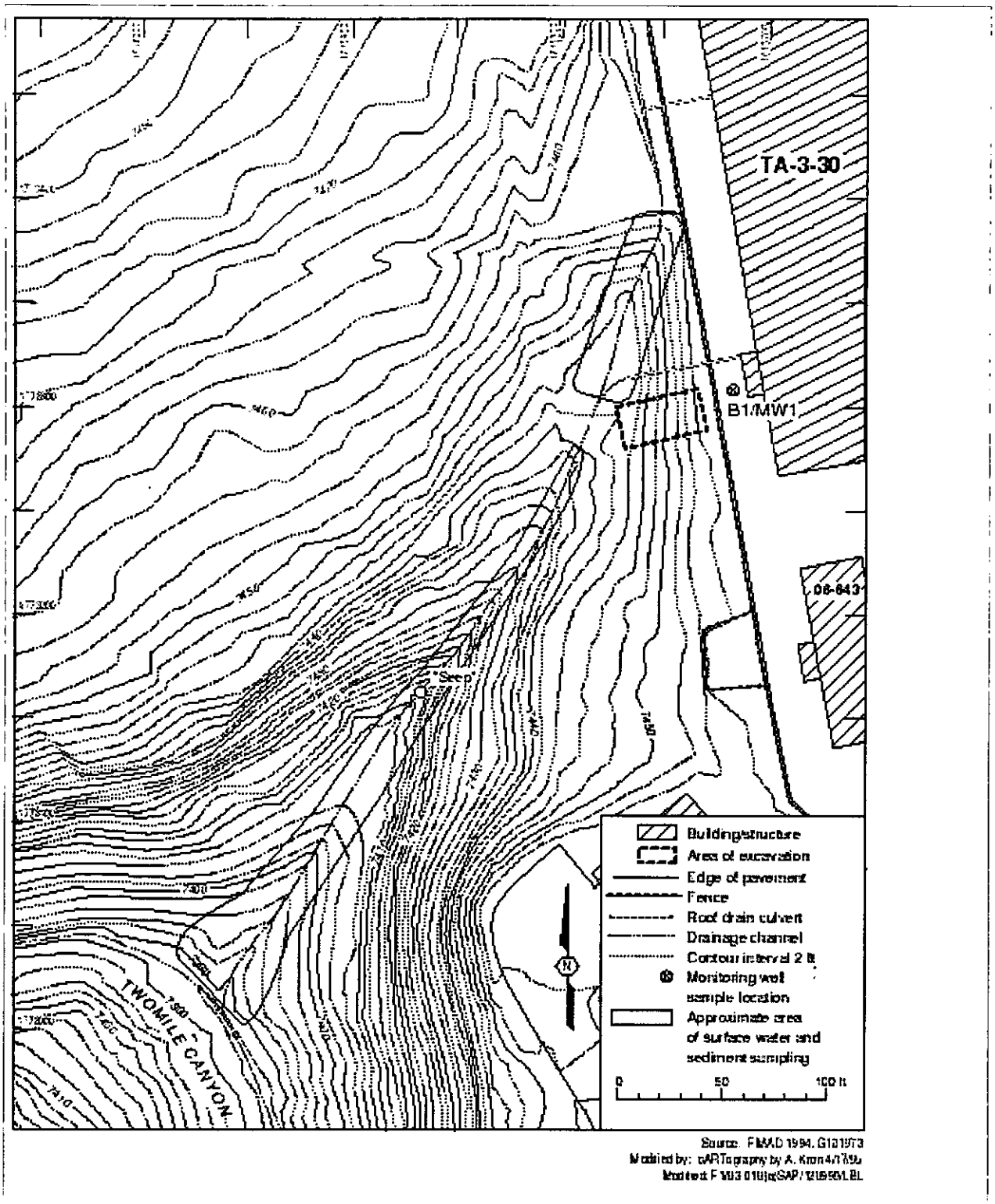

Figure 1. Locations of sediment, surface water, and groundwater samples.

Table 1
Summary of Sampling Suites and Samples to Be Collected

	Samples		Field Screening	Laboratory Analyses			
	Type	Number	Radiological Screening	TAL Metals (SW-846, 6010B, 7000-series for As, Se, PB, Tl, Hg as required)	Volatile Organics plus TICs (SW-846, 8260B)	Cs-137 by Gamma Spectroscopy	Tritium
Media							
Groundwater (B1/MW1)	Pre-well development	1	1		1 NF		
	Post -well development	1	1	1F, 1NF	1 NF	1 NF	1 F
Surface Water	Upgradient	1	1	1F, 1NF	1 NF	1 F	1 F
	Downgradient	3	3	3F, 3NF	3 NF	3 NF	3 F
Sediment	Upgradient	1	1	1	1	1	1
	Downgradient location 1	2	2	2	2	2	2
	Downgradient location 2	1	1	1	1	1	1
	Downgradient location 3	1	1	1	1	1	1
Total Samples:		11	11	15	11	10	10

NF = Not filtered
F= Filtered

5.0 Sediment Sampling

Sampling and analysis for this investigation will follow elements of the technical strategy described in the "Core Document for Canyons Investigations" ("the core document") (LANL 1997, 55622). Fieldwork conducted under this plan will include stratigraphic characterization of post-laboratory aged sediments, and sediment sampling in one phase. Five sediment samples will be collected. One location will be upgradient (one sample), and 3 locations will be downgradient (1 location with two sampled depths and 2 locations with one sample depth), refer to Figure 1 for approximate area where samples will be collected. The depth at which the samples are to be collected will be selected based on the conceptual model that higher concentrations of the contaminants of concern are associated with the finer grain particle size material. The actual depths of samples will be selected based on field observations during a sediment package reconnaissance by the Team geomorphologist.

Investigations to date at this SWMU provide sufficient data to be used in lieu of the typical Phase I full suite analysis for sediment investigations and allow this investigation to focus on contaminants that are of concern to NMED-HRMB and which are necessary for the evaluation of the hydrogeologic conceptual model. The samples will be submitted for the following limited analytical suite: VOCs, tritium, TAL metals, and cesium-137 by gamma spectroscopy (refer to Table 1). The limited suite was verbally approved by NMED during an October 18, 1999 meeting.

Sediment samples will be collected using ER-SOP-6.09, Rev. 0, "Spade and Scoop method for Collection of Soil Samples" or other similar methods. Samples will be submitted to the SMO for off-site contract laboratory analysis.

6.0 Data Assessment

Results of this sampling campaign will be incorporated into the hydrogeologic conceptual model for this site to address questions regarding the fate and transport of groundwater encountered in B1/MW-1 at SWMU 3-010(a). The information gathered as part of this investigation will be used to further the conceptual model for the site, and will be presented with newly collected data in a summary report. The summary report will be prepared for the NMED, and forwarded via cover letter to the appropriate personnel.

7.0 References

LANL, June 1993. "Sampling and Remediation Plan for Mercury Contaminated Soils at TA-3-30," Los Alamos National Laboratory Report, Los Alamos, New Mexico. (LANL 1993, ER ID 48479.9)

LANL, May 1995. "RFI Report for Field Unit 1, PRS 3-010(a)," Los Alamos National Laboratory Report, Los Alamos, New Mexico. (LANL 1995, ER ID 46195.5)

LANL, April 1997. "Core Document for Canyons Investigations," Los Alamos National Laboratory Report LA-UR-96-2083, Los Alamos, New Mexico. (LANL 1997, ER ID 55622)

LANL, February 7, 1996. "Response to the Notice of Deficiency for the RFI Report for SWMU 3-010(a)," Santa Fe, New Mexico. (LANL 1996, ER ID 54083.1)

NMED, December 1, 1999. Response to "Response to Notice of Deficiency for the RFI Report for SWMU 3-010(a)," Los Alamos National Laboratory, NM 0890010515. (NMED 1999, ER ID 64614)

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- Weekly Activities Performance Report
- Subcontractor Change Orders

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- Lessons Learned
- Environmental Regulations Guidance Manual

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- SWPPP, Waste Characterization Strategy Forms
- Radiological Data, Field Logbooks

COM-Construction Management
- Contractors Daily Reports (Tabulation Reports)
- Certified payroll - DAVIS BACON

LPA-Licenses, Permits & Agreements
- Facility Tenant Agreement
- Permits – Rad. Worker, Excavation, NPDES, ESH ID

AF-Accounting & Finance
- Job Condition Statements
- Invoices to Client
- Bill of Lading
- Invoices from Subcontractors

ET - Equipment & Transportation
- Inventory

PRO - Procurement
- PO Register
- Lien Release

WH - Warehouse
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