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Document Title: **SUBMITTAL OF VOLUNTARY CORRECTIVE ACTION (VCA) REPORT FOR SOLID WASTE MANAGEMENT UNIT (SWMU) 46-003(h) AT TECHNICAL AREA (TA) 46**

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ENVIRONMENTAL RESTORATION PROJECT

A Department of Energy
Environmental Cleanup Program

LA-UR-02-5956
September 2002
ER2002-0659

Voluntary Corrective Action Completion Report for SWMU 46-003(h) at Technical Area 46

(Area of Contamination below a Sink Drainpipe)

Los Alamos
NATIONAL LABORATORY

Los Alamos NM 87545

Produced by the Regulatory Compliance Focus Area

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EXECUTIVE SUMMARY

This voluntary corrective action (VCA) completion report addresses the characterization and remediation of Solid Waste Management Unit (SWMU) 46-003(h) in Technical Area (TA) 46 at Los Alamos National Laboratory (the Laboratory). SWMU 46-003(h) is listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit.

SWMU 46-003(h) is a small area of soil from a drainpipe that once served a sink in Building 46-77, located at the eastern end of TA-46. This building was originally a warehouse used for general storage, but currently serves as a welding and machine shop. Historically, wastewater from a sink discharged directly onto the soil beneath the drainpipe. A Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) was conducted from August through November of 1994. Before the RFI was conducted, it was believed that small amounts of volatile organic compounds, semivolatile organic compounds, and inorganic chemicals may have been discarded in the sink. RFI sampling detected the presence of contaminants, and VCA activities were conducted in August and September 1996. VCA activities involved removing contaminated soil, collecting confirmation samples, and performing site restoration. Combined RFI and VCA sampling results confirmed that extent of contamination was defined and residual concentrations pose no unacceptable risk to human or ecological receptors under current and projected future land use.

Based on the results of the VCA, SWMU 46-003(h) is proposed for no further action (NFA) under Criterion 5 (Table ES-1). This criterion states that the SWMU has been characterized or remediated in accordance with applicable state or federal regulations and that the available data indicate that chemicals of concern are either not present or are present at concentrations that pose no potential unacceptable risk to human health or ecological receptors under projected future land use.

Table ES-1
Summary of Proposed Actions

SWMU Number	SWMU Description	HSWA[a]	Radionuclide Component[b]	Proposed Action	Rationale for Recommendation
46-003(h)	Small area of contamination resulting from an operational release	Yes	No	NFA, Criterion 5[c]	The site has been characterized and the available data indicate that contaminants pose no potential unacceptable risk to human and ecological receptors.

[a] Indicates whether the site is listed in the Hazardous and Solid Waste Amendments (HSWA) Module VIII of the Laboratory's Hazardous Waste Facility Permit.

[b] Indicates whether the site has a radionuclide component.

[c] NFA criteria are listed in Section II.B.4.a.(4).(b) of NMED's Resource Conservation and Recovery Act permits management program documents requirement guide.

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1.0 INTRODUCTION

Los Alamos National Laboratory (the Laboratory) is a multidisciplinary research facility owned by the US Department of Energy (DOE) and managed by the University of California. The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 miles northwest of Santa Fe. The Laboratory site covers 43 square miles of the Pajarito Plateau, which consists of a series of finger-like mesas separated by deep canyons. These canyons contain ephemeral and intermittent streams that run from west to east. Mesa tops range in elevation between approximately 6200 ft and 7800 ft. The eastern portion of the plateau stands 300 ft to 900 ft above the Rio Grande.

The Laboratory's Risk Reduction and Environmental Stewardship – Remediation (RRES-R) Program, formerly known as the Environmental Restoration (ER) Project, is involved in a national DOE effort to clean up facilities that had been involved in weapons production. The goal of RRES-R is to ensure that DOE's past operations do not threaten human or environmental health and safety in and around Los Alamos County. To achieve that goal, RRES-R is investigating sites that potentially are contaminated by past Laboratory operations.

Solid Waste Management Unit (SWMU) 46-003(h) is listed in Module VIII of the Laboratory's Hazardous Waste Facility Permit ID# NM0890010515-1 (EPA 1990, 01585; EPA 1994, 44146) issued to the Laboratory by the US Environmental Protection Agency (EPA) on May 23, 1990, and modified on May 19, 1994. Radionuclide contamination levels are regulated under DOE Order 5400.5, "Radiation Protection of the Public and the Environment." SWMU 46-003(h) does not have a radionuclide component.

This voluntary corrective action (VCA) completion report addresses the characterization and remediation of SWMU 46-003(h), a small area of contaminated soil (approximately 3.5 x 4 ft) located in Technical Area (TA)-46 at the Laboratory (Figure 1.0-1). Wastewater from a sink within Building 46-77 historically discharged directly onto the soil from a drainpipe that protruded from the east wall of the building. The drainpipe has since been removed. Building 46-77 originally served as a general storage warehouse and now serves as a welding and machine shop.

The VCA performed at this SWMU, including sampling and analysis, was conducted in accordance with the requirements of the Resource Conservation and Recovery Act (RCRA) and the New Mexico Hazardous Waste Act. The objectives of this VCA were to

- determine the nature and extent of soil contamination;
- perform remedial actions;
- collect confirmation soil samples; and
- assess potential human health and ecological risks.

Section 2.0 of this report discusses the site description and operational history, remedial activities, analytical results for soil samples, and human health and ecological assessments. Section 3.0 describes site waste management activities. References are listed in Section 4.0. Appendix A contains a list of acronyms, a glossary of terms, and a metric to English conversion table. Appendix B provides the analytical data for both the RCRA facility investigation (RFI) and the VCA. Appendix C contains the ecological screening evaluation and ecological scoping checklist for this SWMU. Appendix D presents the Surface Water Assessment Erosion Matrix for SWMU 46-003(h).

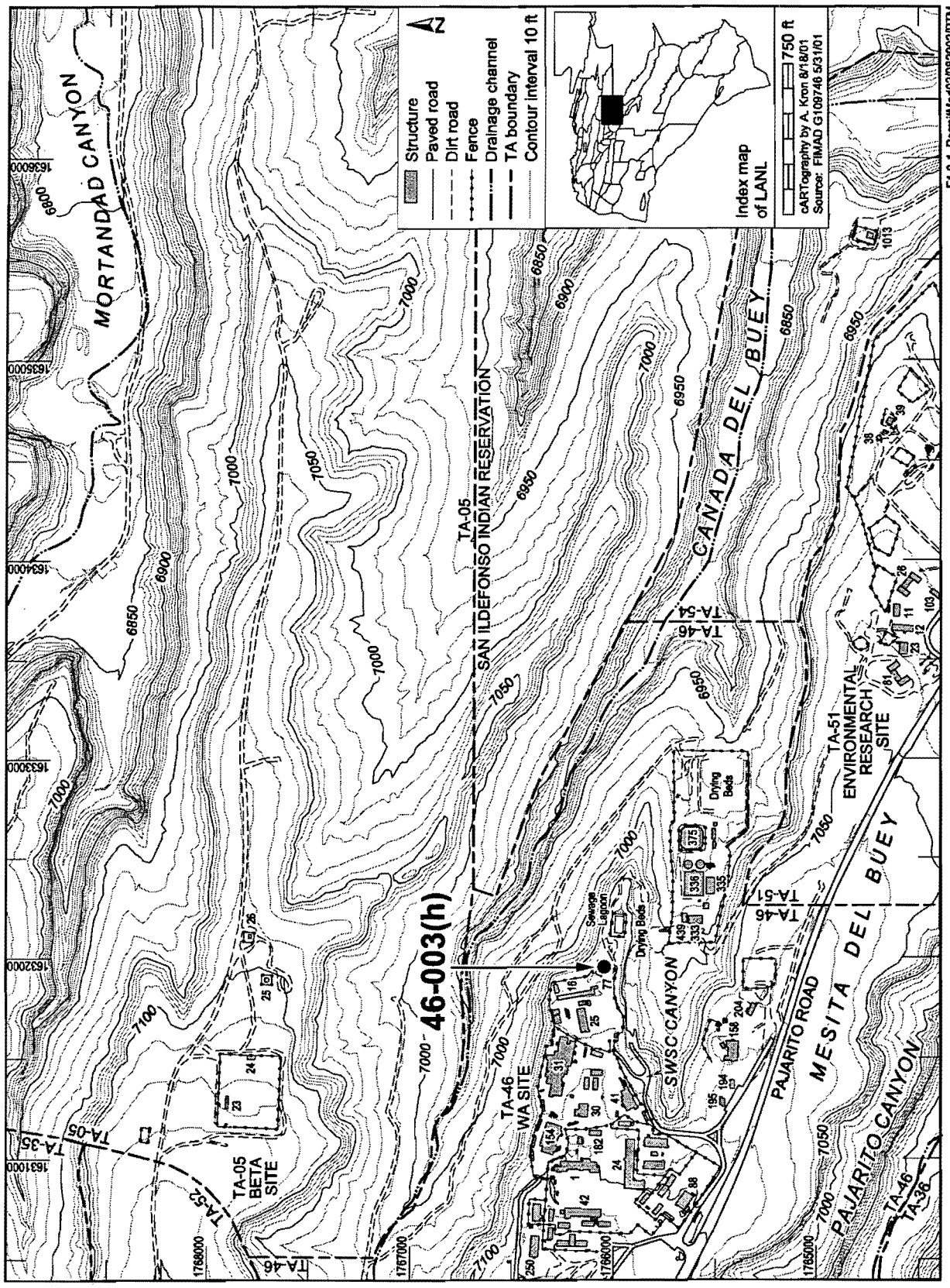


Figure 1.0-1. Location of SWMU 46-003(h) within TA-46

2.0 SWMU 46-003(h)

2.1 Site Description and Operational History

SWMU 46-003(h) is an approximately 3.5- x 4-ft area of soil located beneath a 1-in.-diameter drainpipe that historically served a sink in Building 46-77, located at the eastern edge of TA-46 (Figure 1.0-1). Building 46-77 is a 30- x 40-ft metal building that rests on a concrete foundation. This building was constructed in the early 1960s for use as general warehouse storage. The building is currently used as a welding and machine shop.

Before it was cut flush with the building and plugged (Figure 2.1-1), the drainpipe protruded from the east wall of the building, approximately 1 ft above the ground. Wastewater from the drainpipe discharged onto a concrete splashguard that was removed as part of the VCA. The sink wastewater ran off the concrete splashguard into a small drainage channel that runs northeast approximately 60 ft into Cañada del Buey (Figure 2.1-2). The area around and beneath the former drainpipe/splashguard is unpaved and sparsely covered by vegetation (Figure 2.1-3).

Figure 2.1-1. Eastern exterior wall of Building 46-77 showing metal patch over the location of the former drainpipe

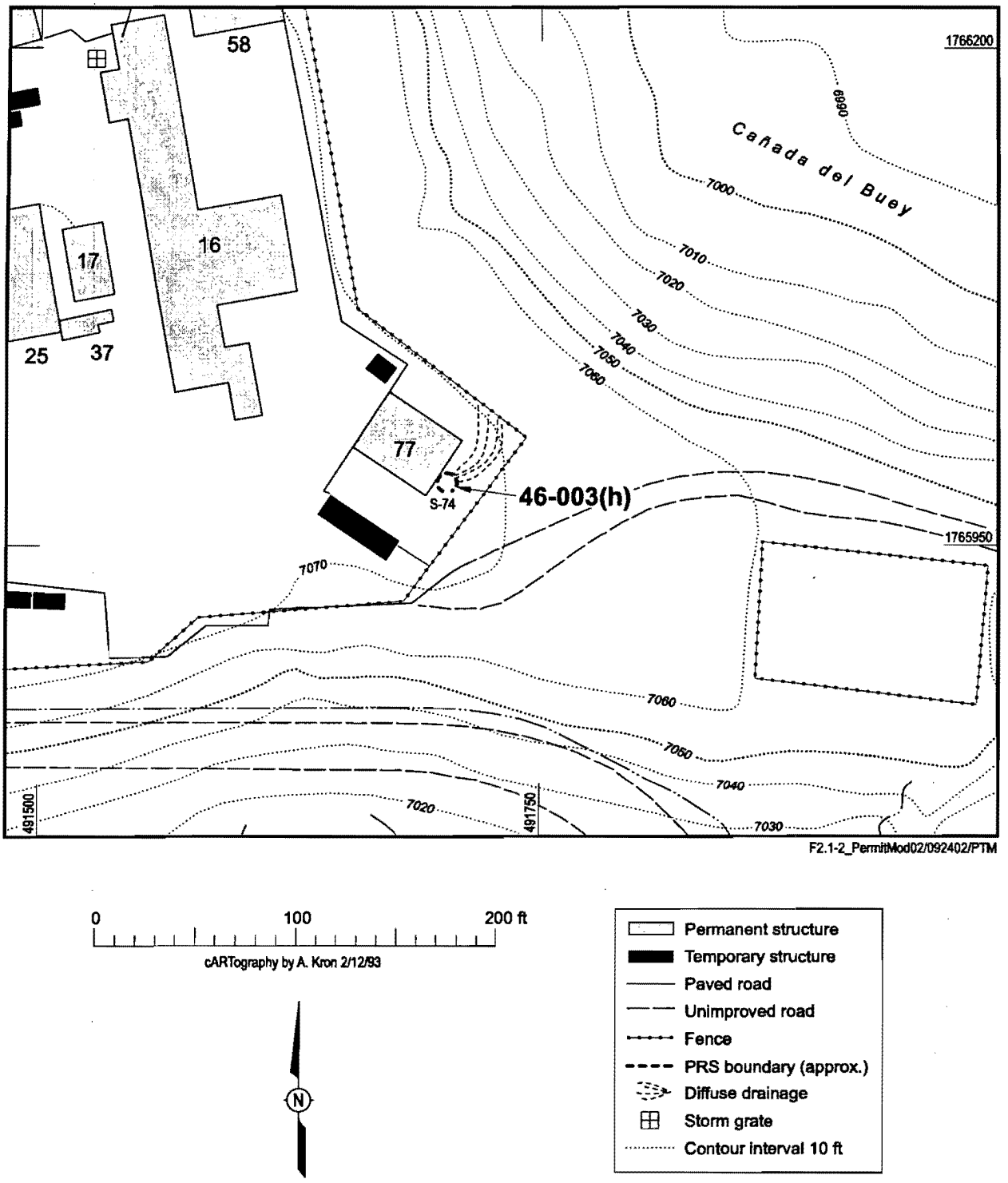


Figure 2.1-2. Close-up view of Building 46-77 showing drainage to Cañada del Buey

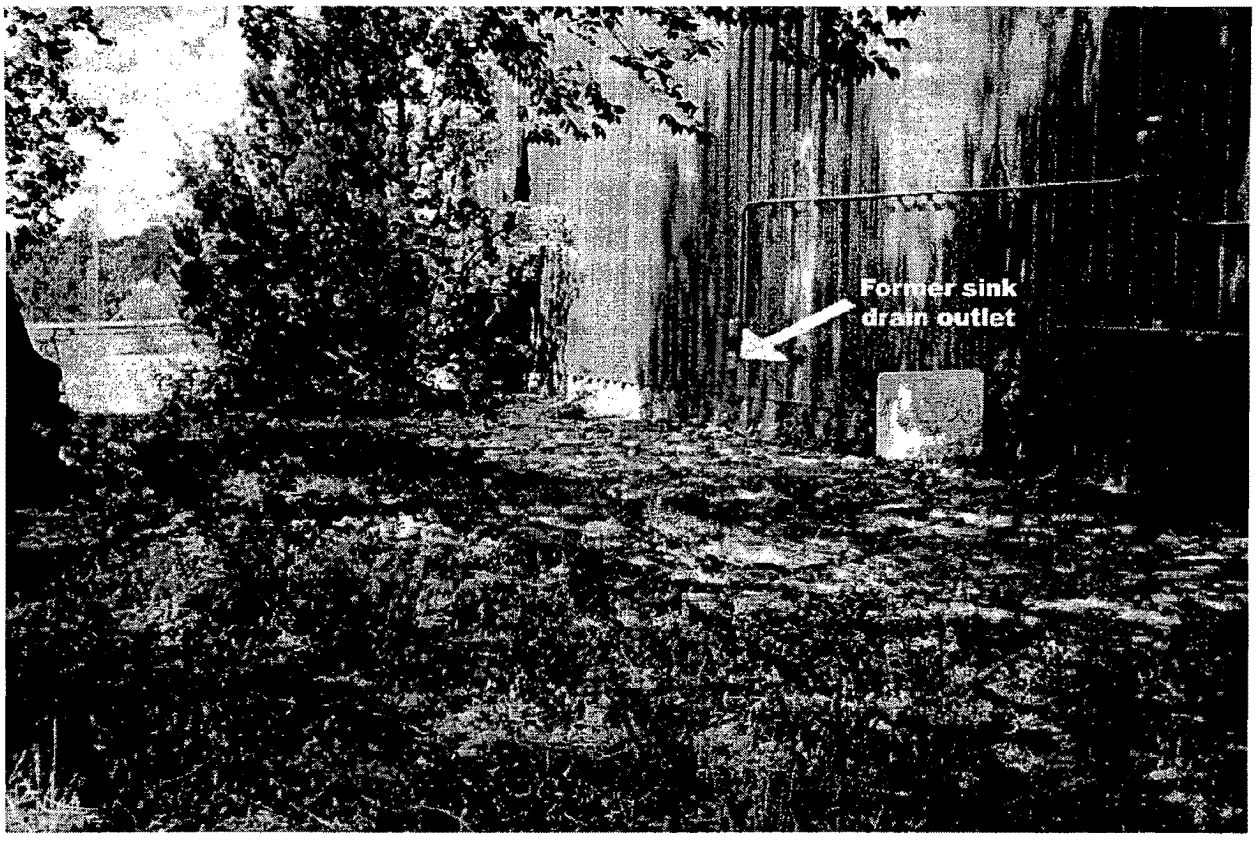


Figure 2.1-3. Eastern exterior wall of Building 46-77 showing former location of SWMU 46-003(h) drainpipe

There are no other SWMUs or areas of concern (AOCs) in the immediate vicinity of SWMU 46-003(h).

2.2 Previous Activities

2.2.1 Previous Investigations

In 1994, an RFI was conducted at SWMU 46-003(h). Based on the RFI results, a VCA was implemented at the site in the summer of 1996 (Environmental Restoration Project 1996, 55033). A more detailed discussion of RFI activities is presented in the RFI report for potential release sites in TA-46 (Environmental Restoration Project 1996, 54929).

2.2.1.1 RCRA Facility Investigation

An RFI for SWMU 46-003(h) was conducted from August through November of 1994 in accordance with the Operable Unit 1140 RFI work plan (LANL 1993, 20952.1). The RFI was designed to determine whether contamination was present in the soil located beneath the drainpipe and within the adjacent downgradient drainage area.

During the RFI, field personnel collected three soil samples: one from below the drainpipe (at a depth of 1 ft) and two in the drainage (at a depth of 6 in.). All three samples were analyzed for inorganic chemicals, volatile organic compounds (VOCs), and semivolatile organic compounds (SVOCs).

The RFI analytical results indicated that cadmium, chromium, cobalt, lead, mercury, nickel, silver, and zinc were present above background values (BVs) in the area of soil beneath the drainpipe. In addition, one SVOC, bis(2-ethylhexyl)phthalate, and one VOC, toluene, were detected in the soil beneath the drainpipe. Lead, copper, mercury, and zinc were also present at levels slightly elevated above BVs in the drainage area. Therefore, cadmium, chromium, cobalt, copper, lead, mercury, nickel, silver, zinc, bis(2-ethylhexyl)phthalate, and toluene were identified as chemicals of potential concern (COPCs) as a result of the RFI (Environmental Restoration Project 1996, 54929).

Of these COPCs, cadmium, copper, and lead were detected at concentrations above screening action levels (SALs) (LANL 1996, 54929) in the area directly beneath the drainpipe; no COPCs were detected above SALs in the drainage. Therefore, a VCA was implemented in 1996 to remove contaminated soil from the localized area beneath the drainpipe.

2.2.2 Preliminary Conceptual Model

SWMU 46-003(h) received untreated wastewater from a sink formerly located in Building 46-77. The primary release of contaminants was by means of a drainpipe that deposited wastewater directly onto the surface soil. Other than historical discharges from the sink, the primary migration pathway for these contaminants would be surface runoff following rain events or snowmelt.

The site conceptual model for releases assumed that the area under the pipe would contain the maximum concentrations of contaminants and that concentrations would decrease as the distance from the outfall increased. For human receptors, potential exposure pathways include incidental soil ingestion, inhalation of particulate, and dermal contact. For ecological receptors, plant uptake and food web transport are also potential exposure pathways. Human receptors would be site workers at the facility, and ecological receptors would be plants, birds, and small mammals.

2.3 Remedial Activities

2.3.1 Investigative and Remediation Activities During the VCA

VCA activities for SWMU 46-003(h) were conducted during August and September of 1996. Field activities for this VCA were conducted in accordance with the VCA plan for SWMU 46-003(h) (Environmental Restoration Project 1996, 55033). Approximately 1.1 yd^3 of soil was removed using a high-powered, high-volume vacuum system, which placed the removed soil directly into 55-gal. drums. The total excavated area measured 3.4 x 4 x 0.5 ft.

Two confirmation samples were collected from two locations at SWMU 46-003(h). One sample was collected from the bottom of the excavated area at a depth of 1 ft below the original soil surface (0 to 6 in. depth interval), and one sample was collected in undisturbed soil immediately adjacent to and downgradient from the excavated area at a depth of 0 to 6 in. (Figure 2.3-1). Samples were submitted for fixed-laboratory analysis of inorganic chemicals (including total cyanide) and VOCs (Table 2.3-1).

Following completion of all VCA activities, the excavation was backfilled with clean soil and graded. Soil stabilization activities consisted of planting the area with a native plant seed mixture and covering it with biodegradable jute matting. The site was monitored until vegetation was reestablished.

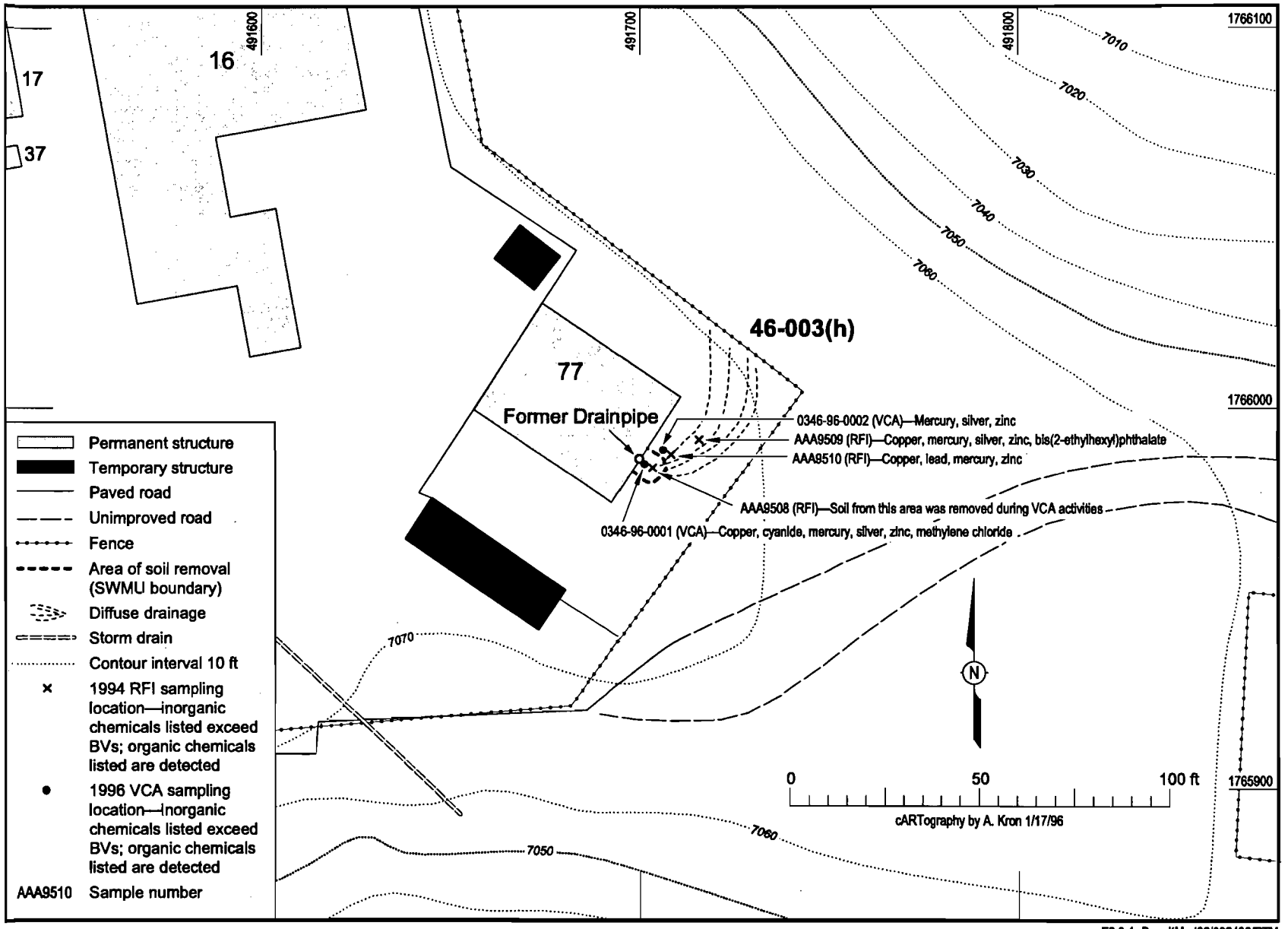


Figure 2.3-1. SWMU 46-003(h) RFI and VCA sample locations, analytical results, and area of soil removal

Table 2.3-1
Summary of Samples Collected (Combined RFI and VCA Data) at SWMU 46-003(h)

Sample ID Number	Investigation	Location ID Number	Depth (ft)	Media	Cyanide	Inorganic Chemicals	SVOCs	VOCs
AAA9508[a]	RFI	46-01146	0.5–1	Soil	—[b]	19881[c]	19416	19416
AAA9509	RFI	46-01147	0–0.5	Soil	—	19881	19416	—
AAA9510	RFI	46-01148	0.5–1	Soil	—	19881	19416	19416
0346-96-0001	VCA	46-01190	0–0.5	Soil	2564	2564	—	2563
0346-96-0002	VCA	46-01191	0–0.5	Soil	2564	2564	—	2563

[a] The results of RFI sample ID AAA9508 were not considered in risk screening evaluations, because the VCA resulted in the removal of all soil at and surrounding this sample location.

[b] — = analysis not requested.

[c] Sample request numbers.

2.3.2 Data Review for VCA and RFI Samples

Since the implementation of the VCA in 1996, certain BVs have changed. The data review presented in this section reflects current BVs (LANL 1998, 59730.2) and reviews relevant RFI data (i.e., data from soil not excavated during the VCA) combined with the VCA data. All RFI data, including soil excavated during the VCA, and all VCA data are included in Appendix B.

2.3.2.1 Inorganic Chemical Comparison with Background

Table 2.3-2 summarizes inorganic sample results, including comparison of concentrations to BVs, the range of concentrations, and frequency of detected concentrations above BVs. Although cadmium was detected at 0.62 mg/kg and 1.9 mg/kg, which are above its BV of 0.4 mg/kg, these concentrations are within the range of concentrations in the background data set (0.2 mg/kg to 2.6 mg/kg) (LANL 1998, 59730.2). Lead was also detected above its BV (22.3 mg/kg) in one RFI sample that was not in the remediated area, at a concentration of 24.2 mg/kg. This concentration is within the range of lead values in the background data set (2 mg/kg to 28 mg/kg). Thallium was reported in the RFI and VCA samples at detection limits ranging from 0.84 mg/kg (RFI) to 1.1 mg/kg (VCA). Although these detection limits are above the BV (0.73 mg/kg), they are similar to or within the range of concentrations within the background data set (0.063 mg/kg to 1.0 mg/kg) (LANL 1998, 59730.2). Antimony was reported in the VCA confirmation samples with detection limits of 10 mg/kg to 11 mg/kg but was reported in the RFI samples at detection limits of 0.27 mg/kg to 0.28 mg/kg, which are below the BV of 0.83 mg/kg. Based on these comparisons, cadmium, antimony, lead, and thallium are not considered to be different from background at this SWMU and are not retained as COPCs. However, silver, with reported detection limits above its BV of 1.0 mg/kg (2.1 mg/kg and 2.2 mg/kg), is a COPC, as well as copper, cyanide, mercury, and zinc.

Table 2.3-2
Frequency of Inorganic Chemicals
(Combined RFI and VCA Data) Detected above BVs at SWMU 46-003(h)

Analyte[a]	Investigation	Media	Number of Analyses	Number of Detects	Concentration Range (mg/kg)[b]	Background Value (mg/kg)[c]	Frequency of Detects above BV	Frequency of Non-detects above BV
Aluminum	RFI	Soil	2	2	3410 to 3440	29200	0/2	0/2
Aluminum	VCA	Soil	2	2	1800 to 2500	29200	0/2	0/2
Antimony	RFI	Soil	2	0	[0.27 to .27]	0.83	0/2	0/2
Antimony	VCA	Soil	2	0	[10 to 11]	0.83	0/2	2/2
Arsenic	RFI	Soil	2	0	[1.5 to 1.6]	8.17	0/2	0/2
Arsenic	VCA	Soil	2	2	1 to 1.1	8.17	0/2	0/2
Barium	RFI	Soil	2	1	[38] to 38.6	295	0/2	0/2
Barium	VCA	Soil	2	2	24 to 26	295	0/2	0/2
Beryllium	RFI	Soil	2	0	[0.44 to 0.57]	1.83	0/2	0/2
Beryllium	VCA	Soil	2	0	[0.52 to 0.54]	1.83	0/2	0/2
Cadmium	RFI	Soil	2	1	[0.66 to .83]	0.4	0/2	2/2
Cadmium	VCA	Soil	2	2	0.62 to 1.9	0.4	2/2	0/2
Calcium	RFI	Soil	2	2	1950 to 2330	6120	0/2	0/2
Calcium	VCA	Soil	2	2	1200 to 1300	6120	0/2	0/2
Chromium	RFI	Soil	2	2	4.4 to 5.7	19.3	0/2	0/2
Chromium	VCA	Soil	2	2	3.9 to 6.9	19.3	0/2	0/2
Cobalt	RFI	Soil	2	1	[1.2 to 1.6]	8.64	1/2	0/2
Cobalt	VCA	Soil	2	2	1.2 to 2	8.64	0/2	0/2
Copper	RFI	Soil	2	2	18.2 to 37	14.7	2/2	0/2
Copper	VCA	Soil	2	2	12 to 36	14.7	1/2	0/2
Cyanide (Total)	VCA	Soil	2	1	[0.54] to 1.2	0.5	1/2	1/2
Iron	RFI	Soil	2	2	4260 to 5780	21500	0/2	0/2
Iron	VCA	Soil	2	2	4300 to 4400	21500	0/2	0/2
Lead	RFI	Soil	2	2	17.3 to 24.2	22.3	1/2	0/2
Lead	VCA	Soil	2	2	12 to 15	22.3	0/2	0/2
Magnesium	RFI	Soil	2	1	[775 to 779]	4610	0/2	0/2
Magnesium	VCA	Soil	2	2	320 to 560	4610	0/2	0/2
Manganese	RFI	Soil	2	2	159 to 205	671	0/2	0/2
Manganese	VCA	Soil	2	2	140 to 190	671	0/2	0/2
Mercury	RFI	Soil	2	2	0.57 to 0.75	0.1	2/2	0/2
Mercury	VCA	Soil	2	2	0.21 to 0.22	0.1	2/2	0/2
Nickel	RFI	Soil	2	1	[3.6 to 4.6]	15.4	0/2	0/2
Nickel	VCA	Soil	2	2	2.6 to 4.6	15.4	0/2	0/2

Table 2.3-2 (continued)

Analyte[a]	Investigation	Media	Number of Analyses	Number of Detects	Concentration Range (mg/kg)[b]	Background Value (mg/kg)[c]	Frequency of Detects above BV	Frequency of Non-detects above BV
Potassium	RFI	Soil	2	0	[753 to 768]	3460	0/2	0/2
Potassium	VCA	Soil	2	2	460 to 490	3460	0/2	0/2
Selenium	RFI	Soil	2	1	[0.89 to 0.89]	1.52	0/2	0/2
Selenium	VCA	Soil	2	0	[1 to 1.1]	1.52	0/2	0/2
Silver	RFI	Soil	2	0	[0.55 to 1.7]	1	0/2	1/2
Silver	VCA	Soil	2	0	[2.1 to 2.2]	1	0/2	2/2
Sodium	RFI	Soil	2	0	[64.9 to 65.1]	915	0/2	0/2
Sodium	VCA	Soil	2	2	90 to 130	915	0/2	0/2
Thallium	RFI	Soil	2	0	[0.84 to 0.85]	0.73	0/2	2/2
Thallium	VCA	Soil	2	0	[1 to 1.1]	0.73	0/2	2/2
Vanadium	RFI	Soil	2	1	[6.5 to 73]	39.6	0/2	0/2
Vanadium	VCA	Soil	2	2	3.9 to 6.4	39.6	0/2	0/2
Zinc	RFI	Soil	2	2	114 to 186	48.8	2/2	0/2
Zinc	VCA	Soil	2	2	70 to 160	48.8	2/2	0/2

[a] The results of RFI sample ID AAA9508 are not included in this table because the VCA resulted in the removal of all soil at and surrounding this sample location.

[b] Values in brackets indicate nondetects.

[c] BVs obtained from LANL (1998, 59730.2).

Table 2.3-3 presents the inorganic chemicals that were detected above BVs during both the RFI (excluding sampling data from the remediated area) and VCA. Of the primary COPCs (cadmium, copper, and lead) identified in the RFI, cadmium was detected above its BV of 0.4 mg/kg in both VCA confirmation samples; copper was detected above its BV of 14.7 mg/kg in one VCA sample; and lead was not detected above its BV in either of the two VCA samples. In addition, mercury was detected above its BV of 0.1 mg/kg in both VCA samples; zinc was detected above its BV of 48.4 mg/kg in both VCA samples; and total cyanide was detected above its BV of 0.5 mg/kg in one VCA sample.

2.3.2.2 Evaluation of Organic Chemicals

Three organic chemicals (one VOC and two SVOCs) were detected in samples collected during the RFI and VCA. The detected organic chemicals were bis(2-ethylhexyl)phthalate, methylene chloride, and toluene. A trace amount of toluene was detected in the RFI sample from soil that was excavated as part of VCA activities (sample ID AAA9508); toluene was not detected in either VCA sample or in the RFI samples from areas not remediated. Therefore, toluene is not evaluated further. Table 2.3-4 summarizes the organic chemical data including frequency of detected concentrations, range of concentrations, and the estimated quantitation limits (EQLs) for the samples.

Table 2.3-3
Samples with Inorganic Chemicals above BV
(Combined RFI and VCA Data) at SWMU 46-003(h)

Analyte	Investigation	Location ID Number	Sample ID Number[a]	Depth (ft)	Media	Sample Concentration (mg/kg)	Background Value (mg/kg)
Copper	RFI	46-01147	AAA9509	0.00–0.50	Soil	37	14.7
		46-01148	AAA9510	0.50–1.00	Soil	18.2	14.7
	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	36 (J-)[b]	14.7
Cyanide (Total)	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	1.2	0.5
Mercury	RFI	46-01147	AAA9509	0.00–0.50	Soil	0.75 (J)[c]	0.1
		46-01148	AAA9510	0.50–1.00	Soil	0.57 (J)	0.1
	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	0.21	0.1
		46-01191	0346-96-0002	0.00–0.50	Soil	0.22	0.1
Silver	RFI	46-01147	AAA9509	0.00–0.50	Soil	1.7 (U)[d]	1
	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	2.1 (U)	1
		46-01191	0346-96-0002	0.00–0.50	Soil	2.2 (U)	1
Zinc	RFI	46-01147	AAA9509	0.00–0.50	Soil	114	48.8
		46-01148	AAA9510	0.50–1.00	Soil	186	48.8
	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	160 (J-)	48.8
		46-01191	0346-96-0002	0.00–0.50	Soil	70 (J-)	48.8

[a] The results of RFI sample ID AAA9508 are not included in this table because the VCA resulted in the removal of all soil at and surrounding this sample location.

[b] J- = The reported value should be regarded as estimated and biased low.

[c] J = The reported value is an estimate of the sample-specific detection or quantitation limit.

[d] U = The analyte was analyzed for but not detected.

Table 2.3-4
Frequency of Detected Organic Chemicals (Combined RFI and VCA Data) at SWMU 46-003(h)[a]

Analyte	Investigation	Media	Number of Analyses	Number of Detects	Concentration Range (mg/kg)[b]	EQLs (mg/kg)	Frequency of Detects
Bis(2-ethylhexyl)phthalate	RFI	Soil	2	1	[0.34] to .41	0.34	1/2
Methylene Chloride	VCA	Soil	2	1	[0.0055] to 0.0095	0.0055	1/2

[a] The results of RFI sample ID AAA9508 are not included in this table because the VCA resulted in the removal of all soil at and surrounding this sample location.

[b] Values in brackets indicate nondetects.

All samples with detected organic chemicals remaining at the site are presented in Table 2.3-5. Bis(2-ethylhexyl)phthalate was not detected in either VCA sample, but was detected in the one RFI sample collected from the area that was not remediated. Methylene chloride was detected in one VCA sample, but not in the RFI samples. Therefore, bis(2-ethylhexyl)phthalate and methylene chloride are retained as COPCs.

Table 2.3-5
Detected Organic Chemicals (Combined RFI and VCA Data)*

Analyte	Investigation	Location ID Number	Sample ID Number	Depth (ft)	Media	Sample Concentration (mg/kg)
Bis(2-ethylhexyl)phthalate	RFI	46-01147	AAA9509	0.00–0.50	Soil	0.41
Methylene Chloride	VCA	46-01190	0346-96-0001	0.00–0.50	Soil	0.0095

* The results of RFI sample ID AAA9508 are not included in this table because VCA soil removal resulted in the removal of all soil at and surrounding this sample location.

To summarize, copper, cyanide, mercury, silver, zinc, bis(2-ethylhexyl)phthalate, and methylene chloride are retained as COPCs and carried forward to the screening assessments (Table 2.3-6).

Table 2.3-6
Results of Data Review

Analyte	Media	Result	Rationale
Inorganic Chemicals			
Antimony	Soil	Eliminated	Eliminated as COPC because detection limits were less than BVs in the RFI samples.
Cadmium	Soil	Eliminated	Eliminated as COPC because detected concentrations and detection limits were above BV, but within the range of background concentrations.
Copper	Soil	Retained	Retained as COPC because three sample concentrations exceeded BV.
Cyanide (Total)	Soil	Retained	Retained as COPC because one sample concentration exceeded BV.
Lead	Soil	Eliminated	Eliminated as COPC because a detected concentration in the RFI samples was above BV, but this concentration was within the range of background concentrations and was detected below BVs in the VCA samples.
Mercury	Soil	Retained	Retained as COPC because two sample concentrations exceeded BV.
Silver	Soil	Retained	Retained as COPC because detection limits in three samples were above the BV.
Thallium	Soil	Eliminated	Eliminated as COPC because detection limits were above BV, but within or similar to the range of background concentrations.
Zinc	Soil	Retained	Retained as COPC because four sample concentrations exceeded BV.
Organic Chemicals			
Bis(2-ethylhexyl)phthalate	Soil	Retained	Retained as COPC because it was detected in one sample remaining at the site.
Methylene Chloride	Soil	Retained	Retained as COPC because it was detected in one sample remaining at the site.

2.3.3 Revised Site Conceptual Model

The preliminary site conceptual model assumed that the area under the drainpipe would contain the maximum concentrations of contaminants and that concentrations would decrease as the distance from the outfall increased. It also assumed that any migrations would be in surface soil by means of runoff. Results from the RFI and VCA confirmed the preliminary conceptual model, so no revisions are necessary.

2.3.3.1 Nature and Extent of Contamination

The samples collected at SWMU 46-003(h) were from the area beneath the drainpipe as well as downgradient from the pipe outfall. The RFI sampling and VCA confirmation sampling results support the conceptual model: concentrations of inorganic and organic chemicals were highest directly below the outfall drainpipe and decreased in the downgradient samples. Vertical extent of contamination was determined using the VCA confirmation sample collected at the bottom of the excavation. This sample (0346-96-0001) detected contaminants at concentrations lower than reported in the original sample (AAA9805) that was removed as part of the VCA. Methylene chloride, which was not detected in sample AAA9805, was detected in the confirmation sample at a concentration that was slightly above the EQL, so further sampling for extent of contamination is not warranted. The horizontal and vertical extent of contamination from releases at this SWMU is defined.

2.3.3.2 Environmental Fate

The physiochemical properties of detected inorganic chemicals cause them to bind to soil and move by transport of soil particles by water as opposed to moving as dissolved chemicals in water or moving in air because of volatilization. Methylene chloride is a VOC and, therefore, likely to volatilize into the air over time. It is also soluble and may be transported by means of surface water runoff. Bis(2-ethylhexyl)phthalate is relatively stable and is likely bound to soil particles. Because of the low potential for erosion at this SWMU, migration by way of surface runoff is limited (see Section 2.4.2.1).

2.4 Site Assessments

2.4.1 Screening Assessments

The analytical results from two of the three RFI samples (sample IDs AAA9509 and AAA9510), along with the results from both VCA confirmation samples, are considered in the human health and ecological risk evaluations. The results of sample ID AAA9508 were not considered in the risk screening evaluations, because the VCA implementation resulted in the removal of all soil at and surrounding this sample location (sample ID AAA9508 results may be viewed in Appendix B). The soil in the vicinity of sample IDs AAA9509 and AAA9510 was not removed during the VCA; therefore, the analytical results for these RFI samples are included in the risk screening evaluations. RFI and VCA analytical results are included in Appendix B.

2.4.1.1 Human Health

In this screening assessment, COPCs are compared with SALs, which are based on a residential scenario. The SALs were calculated according to the methodology presented in Appendix C of the approved IWP (LANL 1998, 62060) and LANL 2002, 72639, which is based on guidance from the New Mexico Environment Department (NMED) and EPA Region 6 (NMED 2000, 68554; EPA 2001, 71466). Comparison with SALs is presented in Tables 2.4-1 and 2.4-2 for noncarcinogens and carcinogens, respectively.

Table 2.4-1
Comparison of Noncarcinogenic COPCs with SALs

Analyte	Sample ID Number	Location ID Number	Depth (ft)	Maximum Concentration (mg/kg)	SAL (mg/kg)	HQ (unitless)
Copper	AAA9509	46-01147	0–0.5	37	2800	0.01
Cyanide	0346-96-0001	46-01190	0–0.5	1.2	1200	0.001
Mercury	AAA9509	46-01147	0–0.5	0.75(J)[a]	23	0.03
Silver	0346-96-0002	46-01191	0–0.5	2.2(U)[b]	380	0.006
Zinc	AAA9510	46-01148	0–0.5	186	23000	0.008

[a] J = The reported value is an estimate of the sample-specific detection or quantitation limit.
[b] U = The analyte was analyzed for but not detected.

Table 2.4-2
Comparison of Carcinogenic COPCs with SALs

Analyte	Sample ID Number	Location ID Number	Depth (ft)	Maximum Concentration (mg/kg)	SAL (mg/kg)	Cancer Risk*
bis(2-ethylhexyl)phthalate	AAA9509	46-01147	0–0.5	0.41	35	10^{-8}
Methylene chloride	036-96-0001	46-01190	0–0.5	0.0095	65	10^{-10}

*Cancer risk is calculated by dividing the ratio of the maximum concentration to the SAL by 1,000,000.

All noncarcinogenic COPCs (copper, cyanide, mercury, silver, and zinc) were detected at concentrations below their respective SALs. The individual hazard quotients (HQs), which are the ratios of the maximum COPC concentration to SAL, were less than 1.0. The hazard index (HI), the sum of hazard quotients, for the noncarcinogenic COPCs is approximately 0.06, which is below NMED's target level of 1.0 (NMED 2000, 68554).

The total cancer risk for the carcinogens, bis(2-ethylhexyl)phthalate and methylene chloride, is 10^{-8}, which is below NMED's target cancer risk level of 10^{-5} (NMED 2000, 68554). Thus, the VCA confirmation sample results verify that the concentrations of COPCs remaining at SWMU 46-003(h) pose no potential unacceptable risk to human health.

2.4.1.2 Ecological

The complete ecological screening assessment, including the ecological checklist for this SWMU, is provided as Appendix C (Mirenda 2002, 73290). A summation of that assessment is presented in this section.

The purpose of the ecological screening evaluation is to identify chemicals of potential ecological concern (COPECs) and not to calculate risk. The evaluation involves the calculation of HQs and HIs for all COPCs identified in the data review for all appropriate screening receptors as described in "Screening Level Ecological Risk Assessment Methods" (LANL 1999, 64783). The HQ analysis is based on the exposure concentration (i.e., maximum detected concentration) for each COPC and is calculated by dividing these values by the soil ecological screening levels (ESLs) for the screening receptors. The ESLs for this assessment were obtained from the ECORISK database, Version 1.4 (LANL 2002, 72802.1). If the maximum HQ resulting from this comparison is greater than 0.3, a more detailed HI analysis is conducted

for that chemical to determine if the potential for adverse ecological impacts exists and to determine the overall contribution of the chemical to the HI for each receptor. An HI is the sum of HQs across contaminants with like effects for a given screening receptor. The chemicals resulting in an HQ greater than 1.0 or contributing more than 0.3 to an HI greater than 1.0 are identified as COPECs.

Table 2.4-3 presents a comparison of the maximum detected concentrations with the minimum terrestrial ESL for each COPC. Because the maximum HQs for the inorganic COPCs are greater than 1.0 and the maximum HQ for bis(2-ethylhexyl)phthalate is greater than 0.3, these contaminants are considered to be COPECs. The maximum HQ for methylene chloride is less than 0.3 and is not evaluated further.

Table 2.4-3
Comparison with Final ESLs, SWMU 46-003(h)

Analyte	Maximum Value (mg/kg)	Minimum ESL (mg/kg)	Receptor	HQ
Copper	37	10	Plant	3.7
Cyanide	1.2	0.1	Robin	12
Mercury	0.75(J)	0.05	Earthworm	15
Silver	2.2(U)	0.05	Plant	44
Zinc	186	10	Plant	18.6
Methylene chloride	0.0095	7.1	Deer mouse	0.001
Bis(2-ethylhexyl)phthalate	0.41	1.0	Robin (100% invert diet)	0.4

The COPECs were further evaluated by calculating the HQs for each COPEC/receptor combination in addition to the HI for each receptor. The HI clarifies the potential for adverse effects on ecological receptors by identifying how many receptors may potentially be affected by the residual contamination at the site (Table 2.4-4). The HI analysis found that the fox was the only receptor that had an HI less than 1.0.

Table 2.4-4
Hazard Index Analysis for SWMU 46-003(h)

Analyte	Plant HQ	Earthworm HQ	Mouse HQ	Shrew HQ	Cottontail HQ	Robin (Herbivore) HQ	Robin (Omnivore) HQ	Robin (100% Invert Diet) HQ	Kestrel HQ	Kestrel (100% Meat Diet) HQ	Fox HQ
Copper	3.7	2.8	0.2	0.2	0.1	0.1	0.09	0.1	0.01	0.002	0.004
Cyanide	—*	—	0.004	0.004	0.002	12	12	12	2.0	0.9	0.0002
Mercury	0.02	15	0.002	0.004	0.0003	0.08	0.1	0.2	0.02	0.01	0.0002
Silver	44	—	15.7	24.2	4.2	0.07	0.2	0.1	0.02	0.0009	0.2
Zinc	18.6	0.5	0.6	0.8	0.2	1.0	1.4	1.9	0.3	0.04	0.01
Bis(2-ethylhexyl)-phthalate	—	—	0.007	0.01	0.0001	0.02	0.2	0.4	0.2	0.2	0.006
HI	**66.3**	**18.3**	**16.5**	**25.2**	**4.5**	**13.3**	**14**	**14.7**	**2.6**	**1.2**	**0.2**

*Dash indicates that an HQ cannot be calculated because there is no ESL for that chemical/receptor combination.

The HQ and HI analyses presented in Tables 2.4-3 and 2.4-4 are based on assumptions that each receptor will be exposed to the residual contamination 100 percent of the time, which overestimates the actual exposure to the receptors. If home ranges are considered for those wildlife receptors with HI values greater than one (all except the fox), then the potential risks decreases. The home ranges are as follows: for the deer mouse, 0.075 hectares (ha); for the vagrant shrew, 0.39 ha; for the desert cottontail, 1.5 ha; for the robin, 0.42 ha; and for the kestrel, 13.1 ha (EPA 1993, 59384). These areas are considerably larger than the footprint of SWMU 46-003(h) (approximated to be 0.004 ha). The ratio of the site footprint to the home range of a receptor is termed the area use factor (AUF) and is used to adjust HQ and/or HI values for more realistic receptor exposures (EPA 2000, 73306). The AUFs for SWMU 46-003(h) are 0.05, 0.01, 0.01, and 0.0003 for the deer mouse, shrew, robin, and kestrel, respectively. Thus, the original HIs in Table 2.4-4 are adjusted by multiplying each value by the appropriate AUF, resulting in adjusted HIs of 0.9, 0.3, 0.1, and 0.0008, respectively. Based on this analysis, there is no potential risk to the wildlife receptors.

Although the plant- and soil-dwelling invertebrates (of which the earthworm is a surrogate receptor) may be largely or entirely contained within the SWMU, the site currently has vegetation growing on and around it and appears healthy, as assessed visually during the site visit. There are two large Chinese elms growing approximately 10 to 15 ft away from the site and various grasses that are typical of disturbed areas. Earthworms are not likely to be present at this site because of the rocky and sandy nature of the soil (i.e., low organic matter content) and relatively thin layer of soil (0-6 in. or less). Therefore, there is no potential for adverse ecological impacts to the plant and soil invertebrate populations.

Based on the ecological screening assessment, the concentrations of COPECs at SWMU 46-003(h) pose no potential risk to ecological receptors.

2.4.2 Other Applicable Assessments

2.4.2.1 Surface Water Assessments

The RRES-R Program has developed a procedure to assess sediment transport and erosion concerns at individual SWMUs. It provides a basis for prioritizing and scheduling actions to control the erosion of potentially contaminated soils at specific SWMUs. The procedure is a two-part evaluation. Part A is a compilation of existing analytical data for the SWMU, site maps, and knowledge-of-process information. Part B is an assessment of the erosion/sediment transport potential at a SWMU. Erosion potential is numerically rated from 1 to 100 using a matrix system. SWMUs that score below 40 have low erosion potential; those that score from 40 to 60 have medium erosion potential; and those that score above 60 have high erosion potential.

After VCA activities were completed, a surface water assessment was conducted for SWMU 46-003(h) (Appendix D). The assessment, completed on July 12, 1999, resulted in an erosion matrix score of 8.8. The assessment found no debris in any nearby watercourse. There are no wetlands or springs in the vicinity of SWMU 46-003(h). There are no man-made or natural hydraulic structures or features that might affect the hydrology of the site. Therefore, the results of the surface water assessment indicated little potential for contaminant transport by means of surface water or sediment.

As part of the VCA, SWMU 46-003(h) was regraded and reseeded. A best management practice (BMP) in the form of biodegradable jute matting was put in place to prevent runoff from the site until vegetation from reseeding established itself. The BMP was monitored and maintained until vegetation was established.

2.4.2.2 Groundwater

SWMU 46-003(h) presents no potential pathway for contaminant release to groundwater. The regional aquifer is approximately 875 ft to 1100 ft below the ground surface at TA-46 and well below the vertical extent of contamination at SWMU 46-003(h), which was defined. There are no active or inactive local water supplies and no production wells in the vicinity of SWMU 46-003(h).

2.5 Conclusions and Recommendations

The VCA for SWMU 46-003(h) consisted of removing contaminated soil, collecting confirmation samples, and performing site restoration. This VCA completion report

- documents all cleanup activities and sampling results;
- demonstrates that the nature and extent of contamination for SWMU 46-003(h) was adequately defined; and
- confirms that residual concentrations of COPCs pose no potential unacceptable risk to human and ecological receptors under current and projected future land use.

Therefore, the Laboratory RRES-R Program recommends no further action (NFA) for SWMU 46-003(h) based on Criterion 5. This criterion states that the SWMU has been characterized or remediated in accordance with applicable state and/or federal regulations and that the available data indicate that chemicals of concern are either not present or are present at concentrations that pose no potential unacceptable human health or ecological risk under projected future land use (NMED 1998, 57897).

3.0 WASTE MANAGEMENT

Contaminated soil from SWMU 46-003(h) was vacuumed into three 55-gal. steel drums and managed and disposed of in accordance with solid waste requirements. One composite waste characterization sample (0346-96-003) was obtained from three grab samples (one from each drum) and submitted for fixed-laboratory analyses (inorganics and VOCs). Total concentrations of cadmium and lead were detected above BVs; however, at concentrations below regulatory levels for hazardous characteristic waste (defined in 20.4.1 NMAC Subpart II, 261.24). The drums of soil were disposed of as nonhazardous industrial waste at an appropriate disposal facility.

4.0 REFERENCES

The following list includes all references cited in this document. The parenthetical information that follows each reference provides the author, publication date, and the Environmental Restoration Record Identification (ER ID) Number. This information also is included in the citations in the text and can be used to locate the documents.

ER ID numbers are assigned by the Laboratory's RRES-R Program to track records associated with the Program. These numbers can be used to locate copies of the actual documents at the RRES-R Program's Records Processing Facility and, where applicable, within the RRES-R Program reference library titled Reference Set for Operable Unit 1140.

Copies of the reference library are maintained at the New Mexico Environment Department Hazardous Waste Bureau; the Department of Energy Office of Los Alamos Site Operations; United States Environmental Protection Agency, Region 6; and the RRES-R Remedial Actions Focus Area. This library

is a living document that was developed to ensure that the administrative authority (AA) has all the necessary material to review the decisions and actions proposed in this document. However, documents submitted to the AA are not included in the reference library.

LANL (Los Alamos National Laboratory), June 1996. "RFI Report for Potential Release Sites in TA-46, 46-003(h) 46-004(b), 46-004(g), 46-004(h), 46-004(m), 46-004(q), 46-004(s), 46-004(u), 46-004(v), 46-004(x), 46-004(y), 46-004(z), 46-004(a2), 46-004(b2), 46-004(c2), 46-004(d2), 46-004(e2), 46-004(f2), 46-006(a), 46-006(b), 46-006(c), 46-006(d), 46-006(f), 46-006(g), 46-007, 46-008(b), 46-010(d), C-46-002, C-46-003, Field Unit 3," Los Alamos National Laboratory report LA-UR-96-1957, Los Alamos, New Mexico. (Environmental Restoration Project 1996, 54929)

Environmental Restoration Project, August 1996. "Voluntary Corrective Action Plan for a Solid Waste Management Unit at TA-46, 46-003(h)," Los Alamos National Laboratory report LA-UR-96-2943, Los Alamos, New Mexico. (Environmental Restoration Project 1996, 55033)

EPA (US Environmental Protection Agency), April 10, 1990. Module VIII of RCRA Permit No. NM0890010515, EPA Region VI, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, EPA Region VI, Hazardous Waste Management Division, Dallas, Texas. (EPA 1990, 01585)

EPA (Environmental Protection Agency), December 1993. "Wildlife Exposure Factors Handbook," Volumes I and II, Office of Research and Development, EPA/600/P-93/187a, Washington DC 20460 (EPA 1993, 59384)

EPA (Environmental Protection Agency), April 1994. "Module VIII, Special Conditions Pursuant to the 1984 Hazardous and Solid Waste Amendments to RCRA for Los Alamos National Laboratory, EPA ID NM 0890010515 38817," Module of EPA Hazardous Waste Facility Permit issued to Los Alamos National Laboratory, Dallas, Texas. (EPA 1994, 44146)

EPA (Environmental Protection Agency), July 10, 2000. "Ecological Soil Screening Level Guidance," draft, Office of Emergency and Remedial Response, Washington DC. (EPA 2000, 73306)

EPA (US Environmental Protection Agency), November 2001. "EPA Region 6 Human Health Medium-Specific Screening Levels," Dallas Texas. (EPA 2001, 71466)

LANL (Los Alamos National Laboratory), August 1993. "RFI Work Plan for Operable Unit 1140,) Los Alamos National Laboratory report LA-UR-93-1940, Los Alamos, New Mexico. (LANL 1993, 20952)

LANL (Los Alamos National Laboratory), September, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory report LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 59730.2)

LANL (Los Alamos National Laboratory), November 1, 1998. "Installation Work Plan for the Environmental Restoration Project, Revision 7," Los Alamos National Laboratory report LA-UR-98-4652, Los Alamos, New Mexico. (LANL 1998, 62060)

LANL (Los Alamos National Laboratory), December 1999. "Screening Level Ecological Risk Assessment Methods," Los Alamos National Laboratory report LA-UR-99-1405, Los Alamos, New Mexico. (LANL 1999, 64783)

LANL (Los Alamos National Laboratory), March 2002. "LANL ECORISK Database, Version 1.4," Los Alamos National Laboratory CD ROM, LANL ER Records Package 186, Los Alamos, New Mexico. (LANL 2002, 72802.1)

LANL (Los Alamos National Laboratory), April 2002. "Human Health Risk-Based Screening Methodology," Los Alamos National Laboratory report LA-UR-02-1563, Los Alamos, New Mexico. (LANL 2002, 72639)

Mirenda, R., April 2002. "Ecological Screening Evaluation for PRS 46-003(h)," Los Alamos National Laboratory, Los Alamos, New Mexico. (Mirenda 2002, 73290)

NMED (New Mexico Environment Department), 1998. "RPMP Document Requirement Guide," Hazardous and Radioactive Materials Bureau, RCRA Permits Management Program, Santa Fe, New Mexico. (NMED 1998, 57897)

NMED (New Mexico Environment Department), December 2000. "Technical Background Document for the Development of Soil Screening Levels (Volume I)," NMED Hazardous Waste and Ground Water Bureaus Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2000, 68554)

Appendix A

Acronyms, Glossary, and Conversion Table

APPENDIX A ACRONYMS, GLOSSARY, AND CONVERSION TABLE

A-1.0 ACRONYMS AND ABBREVIATIONS

AA	administrative authority
AOC	area of concern
AUF	area use factor
BMP	best management factor
BV	background value
CFR	Code of Federal Regulations
COPC	chemical of potential concern
COPEC	chemical of potential ecological concern
DOE	US Department of Energy
EPA	US Environmental Protection Agency
EQL	estimated quantitation limit
ER	Environmental Restoration (Project)
ESL	ecological screening level
HI	hazard index
HQ	hazard quotient
HSWA	Hazardous and Solid Waste Amendments
Laboratory	Los Alamos National Laboratory
NFA	no further action
NMED	New Mexico Environment Department
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RRES-R	Risk Reduction and Environmental Stewardship Division–Remediation Program
SAL	screening action level
SVOC	semivolatile compound
SWMU	solid waste management unit
TA	technical area
VCA	voluntary corrective action
VOC	volatile organic compound

A-2.0 GLOSSARY

administrative authority (AA). The New Mexico Environment Department, the US Environmental Protection Agency, or the US Department of Energy, as appropriate.

analysis. Includes physical analysis, chemical analysis, and knowledge-of-process determinations. (Laboratory Hazardous Waste Facility Permit)

analyte. The element, nuclide, or ion a chemical analysis seeks to identify and/or quantify; the chemical constituent of interest.

background value (BV). A threshold used to identify site sample results that may be greater than background levels.

chemical of potential concern (COPC). A chemical, detected at a site, that has the potential to adversely affect human receptors due to its concentration, distribution, and mechanism of toxicity. A COPC remains a concern until exposure pathways and receptors are evaluated in a site-specific human health risk assessment.

chemical of potential ecological concern (COPEC). A chemical, detected at a site, that has the potential to adversely affect ecological receptors due to its concentration, distribution, and mechanism of toxicity.

corrective action. Action to rectify conditions adverse to human health or the environment.

ecological screening level (ESL). An organism's exposure-response threshold for a given chemical constituent. The concentration of a substance in a particular medium corresponds to a hazard quotient (HQ) of 1.0 for a given organism below which no risk is indicated.

estimated quantitation limit (EQL). The lowest concentration that can be reliably achieved within specified limits of precision and accuracy during routine analytical-laboratory operating conditions. The low point on a calibration curve should reflect this quantitation limit. The EQL is not used to establish detection status. Sample estimated quantitation limits are highly matrix-dependent, and the specified estimated quantitation limits might not always be achievable. See the statement of work (SOW) for analytical services (RFP No. 9-XS1-Q4257) for a more complete definition.

exposure pathway. Mode by which a receptor may be exposed to contaminants in environmental media (e.g., drinking water, ingesting food, or inhaling dust).

hazard index (HI). The sum of hazard quotients for multiple contaminants to which a receptor (j) is determined to be exposed, i.e., $HI_j = \sum I\ HQ_{ij}$.

hazard quotient (HQ). The ratio of a calculated exposure (E) to or dose (D) from a given contaminant (I) to a given receptor (j) over a reference value (TRV) for contaminant (I) determined to be protective of receptor (j), i.e., $HQ_{ij} = E_{ij}$ [or D_{ij}]TRV_{ij}.

Hazardous and Solid Waste Amendments (HSWA). The Hazardous and Solid Waste Amendments of 1984 (Public Law No. 98-616, 98 Stat. 3221), which amended the Resource Conservation and Recovery Act of 1976, 42 U.S.C. § 6901 et seq.

institutional controls. Controls that prohibit or limit access to contaminated media: use restrictions, permitting requirements, standard operating procedures, Laboratory Implementation Requirements, Laboratory Implementation Guidance, Laboratory Performance Requirements, etc.

migration. The movement of inorganic and organic species through unsaturated or saturated materials.

migration pathway. A route (e.g., a stream or subsurface flow path) that controls the potential movement of contaminants to environmental receptors (plants, animals, humans).

no further action (NFA). A recommendation that no further investigation or remediation is warranted based on specific criteria.

operable unit (OU). At the Laboratory, one of 24 areas originally established for administering the ER Project. Set up as groups of potential release sites, the OUs were aggregated based on geographic proximity for the purpose of planning and conducting RCRA facility assessments and RCRA facility investigations. As the project matured, it became apparent that 24 were too many to allow efficient communication and to ensure consistency in approach. Therefore, in 1994, the 24 OUs were reduced to 6 administrative "field units."

RCRA facility investigation (RFI). The investigation that determines if a release has occurred and the nature and extent of the contamination at a hazardous waste facility. The RFI is generally equivalent to the remedial investigation portion of the Comprehensive Environment Response, Compensation, and Liability Act (CERCLA) process.

receptor. A person, plant, animal, or geographical location that is exposed to a chemical or physical agent released to the environment by human activities.

release. Any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing of hazardous waste or hazardous constituents into the environment (including the abandonment or discarding of barrels, containers, and other closed receptacles that contain any hazardous wastes or hazardous constituents).

residential-use scenario. The standards for residential use are the most stringent of the three current- and future-use scenarios being considered by the ER Project and is the level of cleanup the EPA is currently specifying for SWMUs located off the Laboratory site and for those released for non-Laboratory use.

Resource Conservation and Recovery Act (RCRA). The Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act of 1976. (40 CFR 270.2)

screening action level (SAL). Medium-specific concentration level for a chemical derived using conservative criteria below for which it is generally assumed that there is no potential for unacceptable risk to human health. The derivation of a SAL is based on conservative exposure and land-use assumptions. However, if an applicable regulatory standard exists that is less than the value derived by risk-based computations, it will be used for the SAL.

screening assessment. A process designed to determine whether contamination detected in a particular medium at a site may present a potentially unacceptable human-health and /or ecological risk. The assessment utilizes screening levels that are either human-health or ecologically based concentrations derived by using chemical-specific toxicity information and standardized exposure assumptions below which no additional actions are generally warranted.

site characterization. Defining the pathways and methods of migration of the hazardous waste or constituents, including the media affected, the extent, direction, and speed of the contaminants, complicating factors influencing movement, concentration profiles, etc. (US Environmental Protection Agency, May 1994. "RCRA Corrective Action Plan, Final," Publication EPA-520/R-94/004, Office of Solid Waste and Emergency Response, Washington, DC)

site conceptual model. A qualitative or quantitative description of sources of contamination, environmental transport pathways for contamination, and biota that may be impacted by contamination

(called receptors) and whose relationships describe qualitatively or quantitatively the release of contamination from the sources, the movement of contamination along the pathways to the exposure points, and the uptake of contaminant by the receptors.

solid waste management unit (SWMU). Any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste. Such units include any area at a facility at which solid wastes have been routinely and systematically released. This definition includes regulated units (i.e., landfills, surface impoundments, waste piles, and land treatment units) but does not include passive leakage or one-time spills from production areas and units in which wastes have not been managed (e.g., product-storage areas).

technical area (TA). The Laboratory established technical areas as administrative units for all its operations. There are currently 49 active TAs spread over 43 square miles.

A-3.0 METRIC TO ENGLISH CONVERSION TABLE

Metric to English Conversions

Multiply SI (Metric) Unit	by	To Obtain US Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

Appendix B

Analytical Data for SWMU 46-003(h)

APPENDIX B

Table B-1
Analytical Data for SWMU 46-003(h)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Acenaphthene	0.34	n/a[b]	mg/kg	U[c]
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Acenaphthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Acenaphthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Acenaphthylene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Acenaphthylene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Acenaphthylene	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Acetone	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Acetone	0.022	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Acetone	0.021	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Acetone	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Aluminum	2500	29200	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Aluminum	1800	29200	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Aluminum	4600	29200	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Aluminum	3410	29200	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Aluminum	3440	29200	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Aniline	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Aniline	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Aniline	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Anthracene	0.34	n/a	mg/kg	UJ[d]
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Anthracene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Anthracene	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Antimony	10	0.83	mg/kg	UJ
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Antimony	11	0.83	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Antimony	0.28	0.83	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Antimony	0.27	0.83	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Antimony	0.27	0.83	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Arsenic	1	8.17	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Arsenic	1.1	8.17	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Arsenic	1.7	8.17	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Arsenic	1.5	8.17	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Arsenic	1.6	8.17	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Barium	24	295	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Barium	26	295	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Barium	84.9	295	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Barium	38.6	295	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Barium	38	295	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Benzene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Benzene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benz(a)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benz(a)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benz(a)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzo(a)pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzo(a)pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzo(a)pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzo(b)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzo(b)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzo(b)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzo(g,h,i)perylene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzo(g,h,i)perylene	0.34	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzo(g,h,i)perylene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzo(k)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzo(k)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzo(k)fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzoic Acid	3.4	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzoic Acid	3.4	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzoic Acid	3.4	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Benzyl Alcohol	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Benzyl Alcohol	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Benzyl Alcohol	1.6	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Beryllium	0.52	1.83	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Beryllium	0.54	1.83	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Beryllium	0.38	1.83	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Beryllium	0.44	1.83	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Beryllium	0.57	1.83	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bis(2-chloroethoxy)methane	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Bis(2-chloroethoxy)methane	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bis(2-chloroethoxy)methane	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bis(2-chloroethyl)ether	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Bis(2-chloroethyl)ether	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bis(2-chloroethyl)ether	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bis(2-ethylhexyl)phthalate	1.1	n/a	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Bis(2-ethylhexyl)phthalate	0.41	n/a	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bis(2-ethylhexyl)phthalate	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Bromobenzene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Bromobenzene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromobenzene	0.005	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromobenzene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Bromochloromethane	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Bromochloromethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromochloromethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromochloromethane	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Bromodichloromethane	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Bromodichloromethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromodichloromethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromodichloromethane	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Bromoform	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Bromoform	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromoform	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromoform	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Bromomethane	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Bromomethane	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromomethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromomethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Bromophenyl-phenylether[4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Bromophenyl-phenylether[4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Bromophenyl-phenylether[4-]	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Butanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Butanone[2-]	0.022	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Butanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Butanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Butylbenzene[n-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Butylbenzene[n-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Butylbenzene[n-]	0.005	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Butylbenzene[n-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Butylbenzene[sec-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Butylbenzene[sec-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Butylbenzene[sec-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Butylbenzene[sec-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Butylbenzene[tert-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Butylbenzene[tert-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Butylbenzene[tert-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Butylbenzene[tert-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Butylbenzylphthalate	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Butylbenzylphthalate	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Butylbenzylphthalate	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Cadmium	1.9	0.4	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Cadmium	0.62	0.4	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Cadmium	62.8	0.4	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Cadmium	0.66	0.4	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Cadmium	0.83	0.4	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Calcium	1300	6120	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Calcium	1200	6120	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Calcium	5980	6120	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Calcium	1950	6120	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Calcium	2330	6120	mg/kg	None
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Carbon Disulfide	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Carbon Disulfide	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Carbon Disulfide	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Carbon Disulfide	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Carbon Tetrachloride	0.0053	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Carbon Tetrachloride	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Carbon Tetrachloride	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Carbon Tetrachloride	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloro-3-methylphenol[4-]	0.69	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chloro-3-methylphenol[4-]	0.67	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloro-3-methylphenol[4-]	0.68	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloroaniline[4-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chloroaniline[4-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloroaniline[4-]	1.6	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chlorobenzene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chlorobenzene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorobenzene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorobenzene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chlorodibromomethane	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chlorodibromomethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorodibromomethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorodibromomethane	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chloroethane	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chloroethane	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloroethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloroethane	0.01	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chloroform	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chloroform	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloroform	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloroform	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chloromethane	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chloromethane	0.011	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloromethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloromethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chloronaphthalene[2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chloronaphthalene[2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chloronaphthalene[2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorophenol[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chlorophenol[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorophenol[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorophenyl-phenyl[4-] Ether	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chlorophenyl-phenyl[4-] Ether	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorophenyl-phenyl[4-] Ether	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chlorotoluene[2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chlorotoluene[2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorotoluene[2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorotoluene[2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chlorotoluene[4-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chlorotoluene[4-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chlorotoluene[4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chlorotoluene[4-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Chromium	6.9	19.3	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Chromium	3.9	19.3	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chromium	149	19.3	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chromium	5.7	19.3	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chromium	4.4	19.3	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Chrysene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Chrysene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Chrysene	0.34	n/a	mg/kg	UJ

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Cobalt	2	8.64	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Cobalt	1.2	8.64	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Cobalt	24	8.64	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Cobalt	1.6	8.64	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Cobalt	1.2	8.64	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Copper	36	14.7	mg/kg	J-[e]
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Copper	12	14.7	mg/kg	J-
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Copper	7640	14.7	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Copper	37	14.7	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Copper	18.2	14.7	mg/kg	None
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Cyanide (Total)	1.2		mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Cyanide (Total)	0.54		mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dibenz(a,h)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dibenz(a,h)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dibenz(a,h)anthracene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dibenzofuran	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dibenzofuran	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dibenzofuran	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dibromo-3-Chloropropane[1,2-]	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dibromo-3-Chloropropane[1,2-]	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dibromo-3-Chloropropane[1,2-]	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dibromo-3-Chloropropane[1,2-]	0.01	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dibromoethane[1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dibromoethane[1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dibromoethane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dibromoethane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dibromomethane	0.0053	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dibromomethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dibromomethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dibromomethane	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichlorobenzene[1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichlorobenzene[1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dichlorobenzene[1,2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,2-]	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichlorobenzene[1,3-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichlorobenzene[1,3-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,3-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dichlorobenzene[1,3-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,3-]	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichlorobenzene[1,4-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichlorobenzene[1,4-]	0.0055		mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzene[1,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dichlorobenzene[1,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzene[1,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorobenzidine[3,3'-]	0.69	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dichlorobenzidine[3,3'-]	0.67	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorobenzidine[3,3'-]	0.68	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichlorodifluoromethane	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichlorodifluoromethane	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorodifluoromethane	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorodifluoromethane	0.01	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloroethane[1,1-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloroethane[1,1-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloroethane[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloroethane[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloroethane[1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloroethane[1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloroethane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloroethane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloroethene[1,1-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloroethene[1,1-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloroethene[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloroethene[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloroethene[cis/trans-1,2-]	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloroethene[cis/trans-1,2-]	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloroethene[cis-1,2-]	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloroethene[cis-1,2-]	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloroethene[cis-1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloroethene[cis-1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloroethene[trans-1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloroethene[trans-1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichlorophenol[2,4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dichlorophenol[2,4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichlorophenol[2,4-]	0.34	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropane[1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropane[1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropane[1,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropane[1,3-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropane[1,3-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropane[1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropane[1,3-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropane[2,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropane[2,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropane[2,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropane[2,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropene[1,1-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropene[1,1-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropene[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropene[1,1-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropene[cis-1,3-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropene[cis-1,3-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropene[cis-1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropene[cis-1,3-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Dichloropropene[trans-1,3-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Dichloropropene[trans-1,3-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dichloropropene[trans-1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dichloropropene[trans-1,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Diethylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Diethylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Diethylphthalate	0.34	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dimethyl Phthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dimethyl Phthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dimethyl Phthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dimethylphenol[2,4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dimethylphenol[2,4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dimethylphenol[2,4-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Di-n-butylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Di-n-butylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Di-n-butylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dinitro-2-methylphenol[4,6-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dinitro-2-methylphenol[4,6-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dinitro-2-methylphenol[4,6-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dinitrophenol[2,4-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dinitrophenol[2,4-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dinitrophenol[2,4-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dinitrotoluene[2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dinitrotoluene[2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dinitrotoluene[2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Dinitrotoluene[2,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Dinitrotoluene[2,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Dinitrotoluene[2,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Di-n-octylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Di-n-octylphthalate	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Di-n-octylphthalate	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Ethylbenzene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Ethylbenzene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Ethylbenzene	0.005	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Ethylbenzene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Fluoranthene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Fluorene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Fluorene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Fluorene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexachlorobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Hexachlorobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexachlorobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexachlorobutadiene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexachlorobutadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Hexachlorobutadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexachlorobutadiene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexachlorobutadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexachlorocyclopentadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Hexachlorocyclopentadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexachlorocyclopentadiene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexachloroethane	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Hexachloroethane	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexachloroethane	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Hexanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Hexanone[2-]	0.022	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Hexanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Hexanone[2-]	0.021	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Indeno(1,2,3-cd)pyrene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Indeno(1,2,3-cd)pyrene	0.34	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Indeno(1,2,3-cd)pyrene	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Iodomethane	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Iodomethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Iodomethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Iodomethane	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Iron	4400	21500	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Iron	4300	21500	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Iron	17700	21500	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Iron	5780	21500	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Iron	4260	21500	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Isophorone	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Isophorone	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Isophorone	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Isopropylbenzene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Isopropylbenzene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Isopropylbenzene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Isopropylbenzene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Isopropyltoluene[4-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Isopropyltoluene[4-]	0.0055	n/a[b]	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Isopropyltoluene[4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Isopropyltoluene[4-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Lead	15	22.3	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Lead	12	22.3	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Lead	902	22.3	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Lead	17.3	22.3	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Lead	24.2	22.3	mg/kg	None
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Magnesium	560	4610	mg/kg	None

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Magnesium	320	4610	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Magnesium	1450	4610	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Magnesium	775	4610	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Magnesium	779	4610	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Manganese	140	671	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Manganese	190	671	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Manganese	108	671	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Manganese	205	671	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Manganese	159	671	mg/kg	None
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Mercury	0.21	0.1	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Mercury	0.22	0.1	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Mercury	12.2	0.1	mg/kg	J[f]
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Mercury	0.75	0.1	mg/kg	J
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Mercury	0.57	0.1	mg/kg	J
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Methyl-2-pentanone[4-]	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Methyl-2-pentanone[4-]	0.022	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Methyl-2-pentanone[4-]	0.021	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Methyl-2-pentanone[4-]	0.021	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Methylene Chloride	0.0095	n/a	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Methylene Chloride	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Methylene Chloride	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Methylene Chloride	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Methylnaphthalene[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Methylnaphthalene[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Methylnaphthalene[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Methylphenol[2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Methylphenol[2-]	0.34	n/a	mg/kg	UJ

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Methylphenol[2-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Methylphenol[4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Methylphenol[4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Methylphenol[4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Naphthalene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Naphthalene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Naphthalene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Naphthalene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Naphthalene	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Nickel	4.6	15.4	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Nickel	2.6	15.4	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nickel	70.3	15.4	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nickel	4.6	15.4	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nickel	3.6	15.4	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitroaniline[2-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitroaniline[2-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitroaniline[2-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitroaniline[3-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitroaniline[3-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitroaniline[3-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitroaniline[4-]	0.69	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitroaniline[4-]	0.67	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitroaniline[4-]	0.68	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitrobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitrobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitrobenzene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitrophenol[2-]	0.34	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitrophenol[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitrophenol[2-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitrophenol[4-]	1.7	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitrophenol[4-]	1.6	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitrophenol[4-]	1.6	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitrosodimethylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitrosodimethylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitrosodimethylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitroso-di-n-propylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitroso-di-n-propylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitroso-di-n-propylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Nitrosodiphenylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Nitrosodiphenylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Nitrosodiphenylamine[N-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Oxybis(1-chloropropane)[2,2'-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Oxybis(1-chloropropane)[2,2'-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Oxybis(1-chloropropane)[2,2'-]	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Pentachlorophenol	1.7	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Pentachlorophenol	1.6	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Pentachlorophenol	1.6	n/a	mg/kg	UJ
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Phenanthrene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Phenanthrene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Phenanthrene	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Phenol	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Phenol	0.34	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Phenol	0.34	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Potassium	460	3460	mg/kg	None

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Potassium	490	3460	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Potassium	926	3460	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Potassium	768	3460	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Potassium	753	3460	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Propylbenzene[1-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Propylbenzene[1-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Propylbenzene[1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Propylbenzene[1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Pyrene	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Selenium	1	1.52	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Selenium	1.1	1.52	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Selenium	1.1	1.52	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Selenium	0.89	1.52	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Selenium	0.89	1.52	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Silver	2.1	1	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Silver	2.2	1	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Silver	62.5	1	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Silver	1.7	1	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Silver	0.55	1	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Sodium	130	915	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Sodium	90	915	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Sodium	67.7	915	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Sodium	65.1	915	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Sodium	64.9	915	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Styrene	0.0053	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Styrene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Styrene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Styrene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Tetrachloroethane[1,1,1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Tetrachloroethane[1,1,1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Tetrachloroethane[1,1,1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Tetrachloroethane[1,1,1,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Tetrachloroethane[1,1,2,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Tetrachloroethane[1,1,2,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Tetrachloroethane[1,1,2,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Tetrachloroethane[1,1,2,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Tetrachloroethene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Tetrachloroethene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Tetrachloroethene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Tetrachloroethene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Thallium	1	0.73	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Thallium	1.1	0.73	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Thallium	0.88	0.73	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Thallium	0.85	0.73	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Thallium	0.84	0.73	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Toluene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Toluene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Toluene	0.005	n/a	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Toluene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.005	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichloro-1,2,2-trifluoroethane[1,1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorobenzene[1,2,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorobenzene[1,2,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorobenzene[1,2,4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorobenzene[1,2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Trichlorobenzene[1,2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorobenzene[1,2,4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorobenzene[1,2,4-]	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichloroethane[1,1,1-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichloroethane[1,1,1-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichloroethane[1,1,1-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichloroethane[1,1,1-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichloroethane[1,1,2-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichloroethane[1,1,2-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichloroethane[1,1,2-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichloroethane[1,1,2-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichloroethene	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichloroethene	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichloroethene	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichloroethene	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichlorofluoromethane	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichlorofluoromethane	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorofluoromethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorofluoromethane	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorophenol[2,4,5-]	1.7	n/a	mg/kg	U
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Trichlorophenol[2,4,5-]	1.6	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorophenol[2,4,5-]	1.6	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichlorophenol[2,4,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Trichlorophenol[2,4,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichlorophenol[2,4,6-]	0.34	n/a	mg/kg	UJ
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trichloropropane[1,2,3-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trichloropropane[1,2,3-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trichloropropane[1,2,3-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trichloropropane[1,2,3-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trimethylbenzene[1,2,4-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trimethylbenzene[1,2,4-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trimethylbenzene[1,2,4-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trimethylbenzene[1,2,4-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Trimethylbenzene[1,3,5-]	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Trimethylbenzene[1,3,5-]	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Trimethylbenzene[1,3,5-]	0.005	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Trimethylbenzene[1,3,5-]	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Vanadium	6.4	39.6	mg/kg	None
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Vanadium	3.9	39.6	mg/kg	None
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Vanadium	28.9	39.6	mg/kg	J
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Vanadium	7.3	39.6	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Vanadium	6.5	39.6	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Vinyl Chloride	0.011	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Vinyl Chloride	0.011	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Vinyl Chloride	0.01	n/a	mg/kg	U
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Vinyl Chloride	0.01	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Xylene (Total)	0.0053	n/a	mg/kg	U
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Xylene (Total)	0.0055	n/a	mg/kg	U
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Xylene (Total)	0.005	n/a	mg/kg	U

Table B-1 (continued)

SWMU	Investigation	Location ID	Sample ID	Depth (ft)	Eval Class	Analyte	Result	Background Values[a]	Units	Report Qualifier
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Xylene (Total)	0.005	n/a	mg/kg	U
46-003(h)	VCA	46-01190	0346-96-0001	0–0.5	ALLH	Zinc	160	48.8	mg/kg	J-
46-003(h)	VCA	46-01191	0346-96-0002	0–0.5	ALLH	Zinc	70	48.8	mg/kg	J-
46-003(h)	RFI	46-01146	AAA9508	0.5–1	ALLH	Zinc	1130	48.8	mg/kg	None
46-003(h)	RFI	46-01147	AAA9509	0–0.5	ALLH	Zinc	114	48.8	mg/kg	None
46-003(h)	RFI	46-01148	AAA9510	0.5–1	ALLH	Zinc	186	48.8	mg/kg	None

[a] Background values obtained from Ryti et al. (1998, 59730).

[b] n/a = Not applicable.

[c] U = The analyte was analyzed for, but not detected.

[d] UJ = The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.

[e] J- = The reported value should be regarded as estimated and biased low.

[f] J = The reported value is an estimate of the sample-specific detection or quantitation limit.

Appendix C

Ecological Screening Evaluation and Scoping Checklist for SWMU 46-003(h)

Memo to File

Date: July 10, 2002

To: PRS 46-003(h) File

From: Richard Mirenda, RRES-R RM

RE: ECOLOGICAL SCREENING EVALUATION FOR PRS 46-003(h)

Attached is the ecological screening evaluation for Potential Release Site 46-003(h) conducted for the Los Alamos National Laboratory Environmental Restoration Project. This evaluation, originally completed in the summer of 1999, was revised in July 2002 to reflect the current ecological screening methodology and screening values. This packet includes the following items:

- screening evaluation and discussion,
- scoping checklist with conceptual model diagrams,and
- threatened and endangered habitat review by ESH-20.

Ecological Screening Evaluation for PRS 46-003(h)

The PRS is an inactive outfall area of a drainpipe that once served a sink in Building TA-46-77. The outfall pipe was plugged in 1994. Archival information indicates that volatile and semivolatile organic compounds as well as metals may have been discarded in the sink. There is no indication that uranium was ever brought into the building.

The RFI sampling conducted in 1994 at this PRS detected cadmium, copper, and lead at levels above SALs as well as elevated concentrations of chromium, mercury, nickel, silver, zinc, and bis(2-ethylhexyl)phthalate. Based on these results, a VCA was conducted in 1996 that involved the removal of soil in a 3.5 ft x 4 ft area beneath the outfall to a depth of approximately 0.5 ft. The remedial activity removed the area with the highest concentrations of COPCs, but did not remediate areas down gradient from the outfall area. The remaining RFI samples had detected concentrations of copper, mercury, and zinc above background and a detected concentration of bis(2-ethylhexyl)phthalate. Because the concentrations of COPCs were much lower than the concentrations detected in the remediated area, the extent of contamination is considered to be defined for this PRS.

The VCA confirmatory samples were collected within the remediated area immediately adjacent to (within 4-6 in) the 1994 sample with the highest detected concentrations of COPCs. The other confirmatory sample was collected down gradient from and adjacent to the remediated area. The confirmatory sample results reported copper, cyanide, mercury, and zinc at concentrations above their BVs and outside of the range of background values. Silver was also found to have detection limits greater than the soil background value of 1.0 mg/kg and there was a reported concentration of methylene chloride. Therefore, copper, cyanide, mercury, silver, zinc, methylene chloride, and bis(2-ethylhexyl)phthalate were subjected to an ecological screening evaluation.

The purpose of the ecological screening evaluation is to identify chemicals of potential ecological concern (COPECs) and not to calculate risk. The evaluation involves the calculation of hazard quotients (HQs) and hazard indices (HIs) for all chemicals of potential concern (COPCs) identified in the data review for all appropriate screening receptors as described in LANL (1999, 64783). The HQ analysis is based on the exposure concentration (i.e., maximum detected concentration, maximum detection limit, or 95% upper confidence limit of the arithmetic mean) for each COPC and is calculated by dividing these values by the soil ESLs for nine screening receptors. The screening receptors for which ESLs have been derived include a plant, the earthworm, deer mouse, vagrant shrew, desert cottontail, American robin (herbivore, omnivore, insectivore), American kestrel (with and without an all meat diet), and the fox. The ESLs for these receptors were based on similar species and derived from an experimentally determined no observed

adverse effect levels (NOAELs), lowest observed adverse effect levels (LOAELs), or lethal doses to 50% of the population (LD50s). The rationale for these receptors and the derivation of ESLs are based on the approach presented in LANL (1999, 64783) and LANL (2002, 72802).

The screening evaluation involves an initial comparison of the exposure concentration for a chemical to the minimum ecological screening level (ESL) to obtain a maximum HQ for the chemical. If the maximum HQ resulting from this comparison is 0.1 or greater, a more detailed HI analysis is conducted for that chemical to determine if the potential for adverse ecological impacts exists and the overall contribution of the chemical to the HI for each receptor. A HI is the sum of HQs across contaminants with like effects for a given screening receptor. The chemicals resulting in a HQ greater than 1.0 or contribute more than 0.1 to a HI greater than 1.0 are identified as COPECs. HQs or HIs greater than 1.0 are considered to be indicators of potential adverse impacts. The analysis is designed to be conservative (i.e., some assumptions may not represent actual conditions) in order to minimize the possibility of eliminating an analyte that may pose a potential ecological risk.

Table 1 presents a comparison of the maximum detected values to the minimum terrestrial ESL for each COPC. Because the maximum HQs for the inorganic COPCs are greater than 1.0 and maximum HQ for bis(2-ethylhexyl)phthalate is greater than 0.3, these contaminants are considered to be COPECs and are further evaluated using a HI analysis (Table 2). The maximum HQ for methylene chloride is less than 0.3 is not evaluated further.

The HI is the sum of HQs for chemicals with common toxicological endpoints for a given receptor. For the purposes of ecological screening, it is assumed nonradionuclides could have a common toxicological effect. Although it is likely that this assumption is incorrect, the COPCs are grouped together in the comparison to ESLs. The HIs are greater than 1.0 for all receptors except the fox. The HIs greater than 1.0 are driven by mercury for the earthworm, by silver and zinc for the plant, by silver for the mammalian receptors, and by cyanide for the avian receptors.

The samples collected at this PRS were from the outfall area beneath the pipe as well as down gradient from the outfall. The site conceptual model for releases assumed that the area under the pipe would contain the maximum concentrations of contaminants and that concentrations would decrease as the distance from the outfall increased. The sampling results supported this assumption in that the concentrations of inorganics, and semivolatile organics were highest at the outfall and markedly decreased in the down gradient samples. Therefore, the extent of the contamination from releases at this PRS is defined.

Table 1
Maximum Detected Soil Concentration and ESLs for PRS 46-003(h)

Analyte	Maximum Value	BV	Minimum ESL	Receptor	HQ
Copper	37	14.7	10	Plant	3.7
Cyanide	1.2	0.5	0.1	Robin	12
Mercury	0.75(J)	0.1	0.05	Earthworm	15
Silver	2.2(U)	1.0	0.05	Plant	44
Zinc	186	48.8	10	Plant	18.6
Methylene chloride	0.0095	NA	7.1	Deer mouse	0.001
Bis(2-ethylhexyl)phthalate	0.41	NA	1.0	Robin (100% invert diet)	0.4

Table 2
Hazard Index Analysis for PRS 46-003(h)

Analyte	HQ Plant	HQ Earthworm	HQ Mouse	HQ Shrew	HQ Cottontail	HQ Robin (herbivore)	HQ Robin (omnivore)	HQ Robin (100% invert diet)	HQ Kestrel	HQ Kestrel (100% meat diet)	HQ Fox
Copper	3.7	2.8	0.2	0.2	0.1	0.1	0.09	0.1	0.01	0.002	0.004
Cyanide	-	-	0.004	0.004	0.002	12	12	12	2.0	0.9	0.0002
Mercury	0.02	15	0.002	0.004	0.0003	0.08	0.1	0.2	0.02	0.01	0.0002
Silver	44	-	15.7	24.2	4.2	0.07	0.2	0.1	0.02	0.0009	0.2
Zinc	18.6	0.5	0.6	0.8	0.2	1.0	1.4	1.9	0.3	0.04	0.01
Bis(2-ethylhexyl)-phthalate	-	-	0.007	0.01	0.0001	0.02	0.2	0.4	0.2	0.2	0.006
HI	**66.3**	**18.3**	**16.5**	**25.2**	**4.5**	**13.3**	**14**	**14.7**	**2.6**	**1.2**	**0.2**

The HQ and HI analyses presented in Tables 1 and 2 are based on assumptions that each receptor will be exposed to the contamination 100 percent of the time, which overestimates the actual exposure to the receptors. If home ranges are considered for those wildlife receptors with HI values greater than one (all except the fox) then the potential risks decreases. The home ranges are: for the deer mouse 0.075 hectares (ha); for the vagrant shrew 0.39 ha; for the desert cottontail 1.5 hectare (ha); for the robin 0.42 ha; for the kestrel 13.1 ha (EPA 1993, 59384). These areas are considerably larger than the footprint of SWMU 46-003(h) (approximated to be 0.004 ha). The ratio of the site footprint to the home range of a receptor is termed the Area Use Factor (AUF) and is used to adjust HQ and/or HI values for more realistic receptor exposures (EPA 2000, 73306). The AUFs for SWMU 46-003(h) are 0.05, 0.01, 0.01, 0.0003 for the deer mouse, shrew, robin, and kestrel, respectively. Thus, the original HIs in Table 2.4-4 are adjusted by multiplying each value by the appropriate AUF resulting in adjusted HIs of 0.9, 0.3, 0.1, 0.0008, respectively. Based on this analysis, there is no potential risk to the wildlife receptors.

Although the plant- and soil-dwelling invertebrates (of which the earthworm is a surrogate receptor) may be largely or entirely contained within the SWMU, the site currently has vegetation growing on and around it and appeared healthy, as assessed visually during the site visit. There are two large Chinese elms growing approximately 10 to 15 ft away from the site and various grasses that are typical of disturbed areas. Earthworms are likely not present at this site because of the rocky and sandy nature of the soil (i.e., low organic matter content) and relatively thin layer of soil (0-6 in. or less). Therefore, there is no potential for adverse ecological impacts to the plant and soil invertebrate populations.

References

EPA (Environmental Protection Agency) December 1993. "Wildlife Exposure Factors Handbook," Washington, D.C. (EPA 1993, 59109)

EPA (Environmental Protection Agency) July 2000. "Ecological Soil Screening Level Guidance," Washington, D.C. (EPA 2000, 73306)

LANL (Los Alamos National Laboratory) December 1999. "Screening Level Ecological Risk Assessment Methods," LA-UR-99-1405, Rev. 1," Los Alamos National Laboratory, Los Alamos, New Mexico. LANL (1999, 64783)

LANL (Los Alamos National Laboratory) March 2002. "Los Alamos National Laboratory Environmental Restoration Project ECORISK Database, R1.4" Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2002, 72802)

ECOLOGICAL SCOPING CHECKLIST

Part A—Scoping Meeting Documentation

Site ID	PRS 46-003(h)
Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.	This PRS is an inactive outfall that served a sink in building TA-46-77, which was a warehouse for general storage and now serves as a welding and machine shop facility. The PRS is a small area of soil beneath the outfall of a 1-in. diameter pipe that once protruded about 1-ft above the ground and 6-in. beyond the east all of the building. Discharges were directly onto a piece of concrete beneath the pipe. The pipe was cut and plugged in 1994. No erosion or visible runoff channels are evident from the outfall. It appears that the release from the pipe were confined to the general area in back of TA-46-77.
List of Primary Impacted Media (Indicate all that apply.)	Surface soil – X – Release were surface discharges at the outfall from building TA-46-77. Surface water/sediment – Subsurface – Groundwater – Other, explain –
FIMAD vegetation class based on Arcview vegetation coverage (Indicate all that apply.)	Water – Bare Ground/Unvegetated – Spruce/fir/aspen/mixed conifer – Ponderosa pine – The area outside of the fence to the northeast of the outfall is Canada del Buey, which is defined by ponderosa pine. Piñon juniper/juniper savannah – Grassland/shrubland – Developed – The PRS is within the developed area of TA-46. The back of Ta-46-77 is open with grasses, weeds, and bareground. There are also two large Chinese elm trees in back of the building.
Is T&E Habitat Present? If applicable, list species known or suspected to use the site for breeding or foraging.	The PRS is approximately 1300 ft from potential Mexican spotted owl nesting habitat and is within an in which the spotted owl is conservatively assumed to forage at a relatively medium frequency. It is also in the vicinity of potential peregrine falcon nesting habitat, approximately 10,500 ft away and within an area in which the falcon can conservatively be assumed to forage at a relatively high frequency. The PRS is within an area in which the bald eagle is conservatively assumed to forage at a relatively low frequency.
Provide list, of Neighboring/ Contiguous/ Up-gradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate. (Use this information to evaluate the need to aggregate sites for screening.)	There are no other PRS in the vicinity of 46-003(h). The closest PRSs are 46-006(d), a storage, disposal, and spill area along the north rim of Canada del Buey, located approximately 300 ft northwest of 46-003(h), and PRS 46-008(f), a drum storage area adjacent to TA-46-31, located approximately 500 ft west of 46-003(h). None of these PRSs are connected or influence each other in any way.

Surface Water Erosion Potential Information Summarize information from SOP 2.01, including the run-off subscore (maximum of 46); terminal point of surface water transport; slope; and surface water runon sources.	The Erosion Matrix score for this PRS is 8.8, with 0.0 for runoff and run-on scores. The score also reflects it is a mesa top site (1.0), ground cover is 25-75% (6.5), and slope is 0-10% (1.3). No potential exists for soil erosion at this site. The terminal point of any runoff is the Canada del Buey drainage.

Part B—Site Visit Documentation

Site ID	PRS 46-003(h)
Date of Site Visit	7/6/99
Site Visit Conducted by	Richard Mirenda, Dave Bradbury

Receptor Information:

Estimate cover	Relative vegetative cover (high, medium, low, none) = medium; the area inside the fence has sparse vegetative cover in the form of grass and weeds with two large Chinese elm trees as canopy cover. Relative wetland cover (high, medium, low, none) = none Relative structures/asphalt, etc. cover (high, medium, low, none) = high; PRS next to building TA-46-77 and is in a developed area of TA-46.
Field notes on the FIMAD vegetation class to assist in ground-truthing the Arcview information	FIMAD classifies the area as developed because of TA-46. The area outside of the fence in Canada del Buey is classified as ponderosa pine. This was confirmed by the site visit.
Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.	The area behind building TA-46-77 provides minimal nesting or foraging habitat the spotted owl. Nesting and foraging habitat may be available for the peregrine falcon along Canada del Buey, which is outside of the fence area. There is also no foraging habitat for the bald eagle.
Are ecological receptors present at the site? (yes/no/uncertain) Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.	There some terrestrial receptors present around the site. These probably include the mouse (a dead mouse was observed in a trap in front of TA-46-77) or the robin and other small birds. These receptors may traverse the area but there is little habitat to utilize. There was also evidence of burrowing activity by gophers in the area in back of TA-46-77. Outside of the fence in Canada del Buey, there are probably a variety of terrestrial receptors, including small mammals, and birds as well as plants and other receptors. The habitat in this area is good to excellent for the terrestrial receptors. There is no aquatic habitat on the mesa top, while aquatic habitat in the bottom of Canada del Buey is uncertain.

Contaminant Transport Information:

Surface water transport Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).	There does not appear to be much surface water runoff from this site. The area is flat (<10% sloe) and there is no visible evidence of runoff or erosion. The land gently slopes to the northeast towards Canada del Buey. However, just outside of the fence in the general area where surface water runoff would flow is a large mound of dirt that effectively blocks any runoff into the canyon.
Are there any off-site transport pathways (surface water, air, or groundwater)? (yes/no/uncertain) Provide explanation	Uncertain. Surface water runoff would appear to be the primary off-site transport pathway, but no evidence of runoff or erosion is present. The large mound of dirt near the fence and the rim of the canyon effectively prevents any runoff from reaching the canyon drainage from this site. Other off-site transport pathways do not appear viable for this PRS.

Interim action needed to limit off-site transport? (yes/no/uncertain) Provide explanation/ recommendation to project lead for IA SMDP.	No. The source has been plugged and a VCA conducted in 1996 to remove contaminated soil at the outfall. There is also no evidence of runoff or erosion. The large mound of dirt acts as an effective BMP for any surface water runoff.

Ecological Effects Information:

Physical Disturbance (Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)	The area inside of the fence is developed and actively used by the Laboratory. Outside of the fence there is no obvious physical disturbance of the area except for the large mound of dirt between the facility and the canyon.
Are there obvious ecological effects? (yes/no/uncertain) Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).	The only obvious ecological effects are related to the developed area inside of the fence. No erosion into Canada del Buey is apparent.
Interim action needed to limit apparent ecological effects? (yes/no/uncertain) Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.	No. No ecological effects are apparent outside of the fence. A VCA was conducted in 1996 to remove contaminated soil at the outfall area.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include likelihood that future construction activities could make contamination more available for exposure or transport.

Not applicable.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature, rate and extent of contamination? (yes/no/uncertain) Provide explanation (Consider if the maximum value was captured by existing sample data.)	Yes. Samples were collected from the surface soil at the outfall as well as several feet down gradient from the outfall. The data demonstrates a decrease in concentrations near the outfall to 15 ft from the outfall. The area at the outfall was remediated and contaminated soil removed as part of a VCA in 1996.
Do existing or proposed data for the site address potential transport pathways of site contamination? (yes/no/uncertain) Provide explanation (Consider if other sites should aggregated to characterize potential ecological risk.)	Yes. The primary off-site pathway would have been surface water runoff. The samples were collected from the area where runoff would have flowed and shows a decrease in concentrations from as the distance from the outfall increases.

Additional Field Notes:

Provide additional field notes on the site setting and potential ecological receptors.

Part C—Ecological Pathways Conceptual Exposure Model

Question A:

Could soil contaminants reach receptors via vapors?

Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant $>10^{-5}$ atm-me/mol and molecular weight <200 g/mol).

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Toluene was detected at the outfall at a very low concentration (0.005 mg/jkg), but not 15-ft from the outfall. No other volatile organic compounds were detected.

Question B:

Could the soil contaminants reach receptors through fugitive dust carried in air?

Soil contamination would have to be on the actual surface of the soil to become available for dust.

In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.

Answer (likely/unlikely/uncertain): Likely

Provide explanation: The release from the outfall area is to the surface soil. This contamination may be available to receptors via fugitive dust. There was some burrowing activity (gophers) in this area of the PRS.

Question C:

Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?

If the SOP 2.01 run-off score* for each PRS included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* Note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).

If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: No erosion or runoff was evident. There are also no aquatic communities present in or around the PRS.

Question D:

Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?

Known or suspected presence of contaminants in groundwater.

The potential for contaminants to migrate via groundwater and discharge into habitats and/or surface waters.

Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).

Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: There are no seeps or springs on the mesa top within TA-46.

Question E:

Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?

Suspected ability of contaminants to migrate to groundwater.

The potential for contaminants to migrate via groundwater and discharge into habitats and/or surface waters.

Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone (~1 m depth).

Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: The release was to surface soil and infiltration/percolation to ground water is unlikely. The mesa top is approximately 1000 ft above the regional aquifer and no evidence is available that indicates perched or alluvial aquifers beneath TA-46.

Question F:

Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?

This question is only applicable to release sites located on or near the mesa edge.

Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: PRS 46-003(h) is not on the mesa edge so mass wasting is not relevant. In addition, there is no erosion from this PRS.

Question G:

Could airborne contaminants interact with receptors through respiration of vapors?

Contaminants must be present as volatiles in the air.

Consider the importance of inhalation of vapors for burrowing animals.

Foliar uptake of organic vapors is typically not a significant exposure pathway.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Although toluene was detected in one sample, this area has been remediated and no other volatile organic compounds were detected.

Question H:

Could airborne contaminants interact with plants through deposition of particulates or with animals through inhalation of fugitive dust?

Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.

Exposure via inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Terrestrial Animals: 2

Provide explanation: Releases were to the surface soil and may be available to plants from deposition of particulates or to animals via fugitive dust from the site. Concentrations of contaminants outside of the remediated area are above background. There is also burrowing activity by gophers at this PRS.

Question I:

Could contaminants interact with plants through root uptake or rain splash from surficial soils?

Contaminants in bulk soil may partition into soil solution, making them available to roots.

Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 2

Provide explanation: Releases were to the surface soil and may be available to plants via root uptake or rain splash. Concentrations of contaminants outside of the remediated area are above background.

Question J:

Could contaminants interact with receptors through food web transport from surficial soils?

The chemicals may bioaccumulate in animals.

Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Copper, lead, and mercury were detected above background and bis(2-ethyhexyl)phthalate was detected in the surface soil outside of the remediated area. These chemicals are potential bioaccumulators.

Question K:

Could contaminants interact with receptors via incidental ingestion of surficial soils?

Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil or while grooming themselves clean of soil.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 2

Provide explanation: Releases were to the surface soil and may be available through incidental ingestion.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

Significant exposure via dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: Contaminants detected are not lipophilic.

Question M:

Could contaminants interact with plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

Question N:

Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?

Contaminants may be taken-up by terrestrial plants whose roots are in contact with surface waters.

Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.

Contaminants in sediment may partition into soil solution, making them available to roots.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Provide explanation: There is no surface water runoff from this PRS into the canyon and no sediment accumulation.

Question O:

Could contaminants interact with receptors through food web transport from water and sediment?

The chemicals may bioconcentrate in food items.

Animals may ingest contaminated food items.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There is no surface water runoff from this PRS into the canyon and no sediment accumulation.

Question P:

Could contaminants interact with receptors via ingestion of water and suspended sediments?

If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.

Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There is no surface water runoff from this PRS into the canyon and no sediment accumulation.

Question Q:

Could contaminants interact with receptors through dermal contact with water and sediment?

If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.

Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Animals: 0

Provide explanation: There is no surface water runoff from this PRS into the canyon and no sediment accumulation.

Question R:

Could contaminants interact with plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

Burial of contamination attenuates radiological exposure.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Terrestrial Plants: 0

Terrestrial Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

Question S:

Could contaminants bioconcentrate in free floating aquatic, attached aquatic plants, or emergent vegetation?

Aquatic plants are in direct contact with water.

Contaminants in sediment may partition into pore water, making them available to submerged roots.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Plants/Emergent Vegetation: 0

Provide explanation: No aquatic communities are present in or around this PRS.

Question T:

Could contaminants bioconcentrate in sedimentary or water column organisms?

Aquatic receptors may actively or incidentally ingest sediment while foraging.

Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.

Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: No aquatic communities are present in or around this PRS.

Question U:

Could contaminants bioaccumulate in sedimentary or water column organisms?

Lipophillic organic contaminants and some metals may concentrate in an organism's tissues

Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

Aquatic Animals: 0

Provide explanation: No aquatic communities are present in or around this PRS.

Question V:

Could contaminants interact with aquatic plants or animals through external irradiation?

External irradiation effects are most relevant for gamma emitting radionuclides.

The water column acts to absorb radiation, thus external irradiation is typically more important for sediment dwelling organisms.

Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):

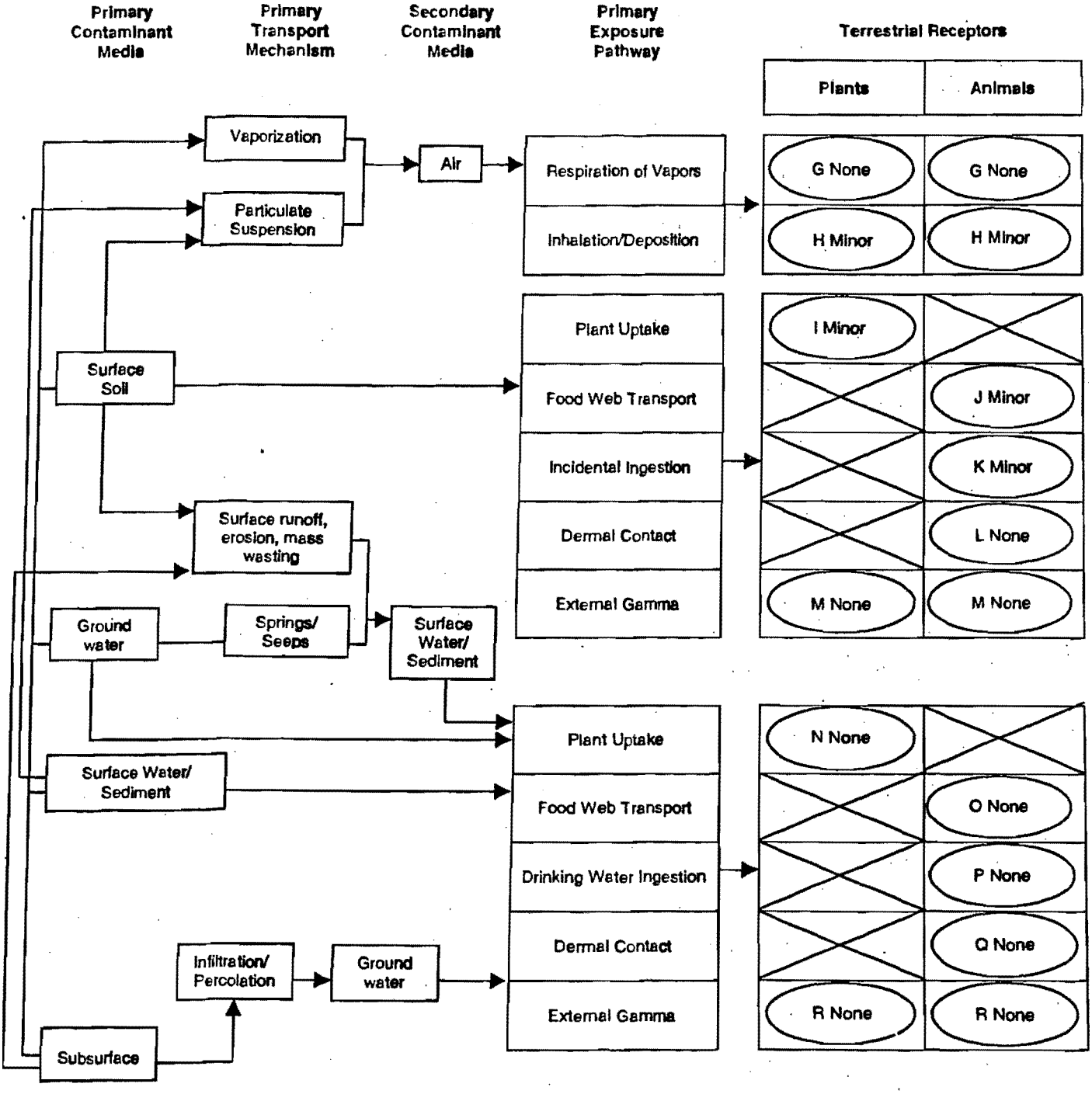
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: Radionuclides were not COPCs at this PRS.

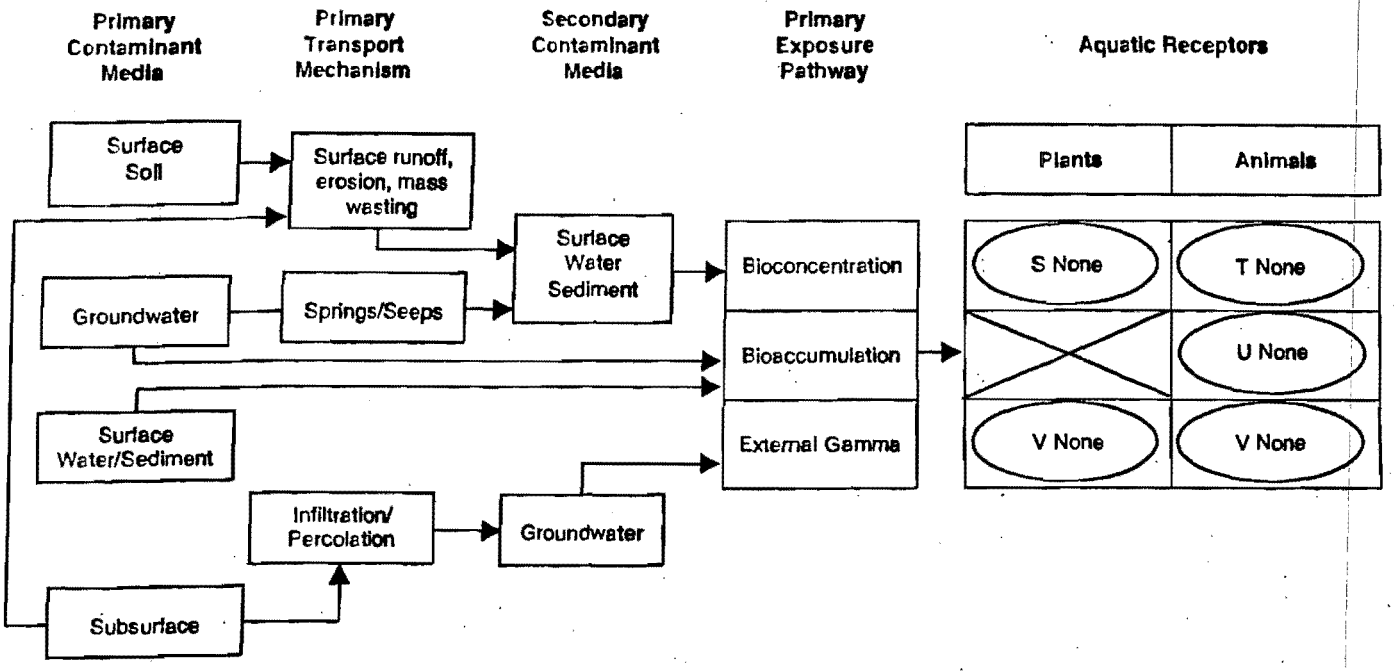
NOTE: Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model



Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model

NOTE: Letters in circles refer to questions on the Scoping Checklist



Signatures and certifications:

Checklist completed by (provide name, organization and phone number):

Name (printed):	Richard Mirenda, Ph.D.
Name (signature):	Richard Mirenda
Organization:	MK/PMC
Phone number:	(505)662-1329
Date Completed:	7/8/99

Verification by a member of ER Project Ecological Risk Task Team (provide name, organization and phone number):

Name (printed):	Lars F. Soholt, Ph.D.
Name (signature):	Lars F. Soholt
Organization:	E/ER
Phone number:	(505)667-2256

Los Alamos
NATIONAL LABORATORY

memorandum
Environmental, Safety, & Health Division
Ecology Group, ESH-20, MS M887

To/Ms: Dr. David Bradbury, EM-ER, MS M992
From/Ms: Gil Gonzales, ESH-20/MS M887
Phone/FAX: *5-6630/7-0731*
Symbol: *ESH-20/Ecol-99-0204*
Date: June 1, 1999

SUBJECT: Review of PRS #46-003(h) for Threatened and Endangered Species Habitat for The Purpose of Ecological Screening/Risk Assessment.

Resulting from your request, the purpose of this memo is to communicate whether threatened and endangered (T&E) species may be present in Environmental Restoration Potential Release Sites (PRS's) that are under consideration for ecological screening and/or risk assessment. This information will help:

(1) to establish whether contaminant pathways might exist to T&E species nesting within or in the vicinity of a PRS,
(2) to notify, when necessary, risk assessors to pay particular attention to relevant contaminant Toxicity Reference Values primarily for birds,
(3) to notify, when necessary, risk assessors to pay particular attention to PRS aggregation issues relative to foraging patterns of T&E species.

Information about PRS 46-003(h) was reviewed to determine whether or not this site is in or near nesting habitat of federally-listed T&E species, whether it is in a foraging area and, if so, the relative amount of potential foraging at or in the vicinity of the specific PRS.

PRS location information maintained by the Facility for Information Management and Display was intersected with T&E species habitat using GIS databases maintained by the Ecology Group, ESH-20. PRS 46-003(h) is approximately 1,300 feet away from potential Mexican spotted owl nesting habitat and is within an area in which the spotted owl is conservatively assumed to forage at a relatively medium frequency. The PRS is in the vicinity of potential American peregrine falcon nesting habitat, which is approximately 10,500 ft.away. PRS 46-003(h) is entirely within an area in which the falcon can be conservatively assumed to forage at a relatively high frequency. The PRS is within an area in which the bald eagle is conservatively assumed to forage at a relatively low frequency.

If you need more detailed or more extensive information please do not hesitate to contact me.

GG:rm

Cy: Elizabeth Kelly, TSA-11, MS ~~K557~~ F600

Appendix D

Surface Water Assessment Erosion Matrix for SWMU 46-003(h)

Los Alamos National Laboratory

Environment, Safety & Health Division
ESH-18 Water Quality & Hydrology Group

Surface Water Assessment
Erosion Matrix for PRS 46-003(h)

CRITERIA EVALUATED	Value	Erosion/Sediment Transport Potential Low 0.1	Medium 0.5	High 1.0	Calculated Score
Site Setting (43)					
On mesa top	1	Defined based on topographic setting			1.0
Within bench of canyon	4				
Within the canyon floodplain but not watercourse	13				
Within bottom of canyon channel in watercourse	17				
Estimated % ground and canopy cover	13	>75%	25-75%	<25%	6.5
Slope	13	0-10%	10-30%	>30%	1.3
Surface Water Factors-Run-off (46)					
Visible evidence of runoff discharging? (Yes/No)	5	If no, score of 0 for runoff section.			0.0
		If yes, score 5 and proceed with section.			
Where does runoff terminate?	19	Other	Bench Setting	Drainage/Wetland	0.0
Has runoff caused visible erosion? (Yes/No)	22	Sheet	Rill	Gully	0.0
		If no, score as 0. If yes, calculate as appropriate.			
Surface Water Factors-Run-on (11)					
Structures adversely affecting run-on (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
Current operations adversely impacting (Yes/No)	4	If yes, score as 4. If no, score as 0.			0.0
Natural drainages onto site (Yes/No)	7*	If yes, score as 7. If no, score as 0.			0.0
**Select either structures or natural drainages.*					
MAX. POSSIBLE EROSION MATRIX SCORE:	**100**			**Total Score**	8.8

Report Printed 5/7/2002 11:01:03 AM.

Los Alamos National Laboratory
SURFACE WATER
SITE ASSESSMENT

SITE INFORMATION

1a) PRS Number: 46-003(h) | 1b) Structure Number: | 1c) FMU Number: 70

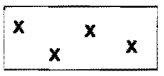
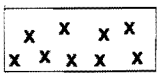
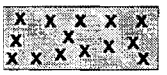
2. Date/Time (M/D/Y H:M am/pm): 7/12/1999

SITE SETTING (check all that apply)

3. (●) On mesa top (a). ( ) In the canyon floor, but not in an established channel (c)
( ) Within a bench of a canyon (b). ( ) Within established channel in the canyon floor (d).

Explanation: Former outfall east end of TA-46

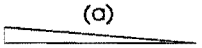
4. Estimated ground and/or canopy cover at site: (deciduous leaves, pine needles, rocks, vegetation, trees,

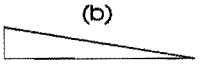
(illustration) (a)  (b)  (c) 

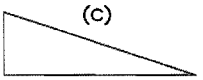
Estimated % of ground/canopy cov ( ) 0% to 25% (●) 25% to 75% ( ) 75% to 100%

Explanation: Rocky area with sparse grasses. Large tree provides good canopy coverage.

5. Steepest slope at the area impacted:

(a)  (●) Less than 10%

(b)  ( ) 10% to 30%

(c)  ( ) 30% and greater

Explanation: Flat area near building.

RUNOFF FACTORS

Y / N

☐ ☑ **6. Is there visible evidence of runoff discharging from site? If yes, answer a) - c) below:**

☐ ☑ 6a) Is runoff channelized? If yes, describ ( ) Man-made channel. ( ) Natural channel.

Explanation: No evidence of runoff

RUNOFF FACTORS, CONT'D

6b) Where does evidence of runoff terminate?

- ○ **Drainage or wetland (name)** Canada Del Buey
- ○ **Within bench of canyon setting (name)**
- ○ **Other (i.e., retention pond, meadow, mesa top)**

Explanation:

Y / N

☐ ☑ 6c) Has runoff caused visible erosion at the site? If yes, explain below: ○ Sheet ○ Rill ○ Gully

Explanation: None observed.

RUN-ON FACTORS

Please rate the potential for storm water to run on to this site: (Check EITHER #7 or #9)

☐ ☑ **7.** Are structures (i.e., buildings, roof drains, parking lots, storm drains) creating run-on to the site?

Explanation: No roof drains from nearby building.

☐ ☑ **8.** Are current operations (i.e., fire hydrants, NPDES outfalls) adversely impacting run-on to the site?

Explanation: No operations

☐ ☑ **9.** Are natural drainage patterns directing stormwater onto site?

Explanation: None

ASSESSMENT FINDING:

☐ ☑ **10. Based on the above criteria and the assessment of this site, does soil erosion potential exist? (REFER TO EROSION POTENTIAL MATRIX.)**

Veenis, Steve

11. Signature of Water Quality/Hydrology Representative

_____ Initials of independent reviewer.

Check here when information is entered in database: ☑

This page is for ESH-18 notes, recommendations, and photos.

	Y	N	
12. a)	○	◉	Is there visible trash/debris on the site?
b)	○	◉	Is there visible trash/debris in a watercourse?

Description of existing BMPs:

○	○	Are BMPs being properly maintained? If no, describe in "Other Internal Notes."
○	○	Are BMPs effectively keeping sediment in place and reducing erosion potential?

OTHER INTERNAL NOTES: