LOS ALAMOS NATIONAL LABORATORY

VOLUNTARY CORRECTIVE PLAN
for Potential Release Sites
Group 7

Field Unit 5

PRS C-09-001, Stained Soil
PRS 69-001, Two-Mile Mesa Incinerator Pond Bed

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Table of Contents

1.0 INTRODUCTION 1
- 1.1 PRS C-09-001, Outfall From a Chemical Storage Area 1
- 1.2 PRS 69-001, Incinerator Pond Bed 1

2.0 SITE TYPE AND DESCRIPTION 2

3.0 PROPOSED REMEDY 7
- 3.1 PRS C-09-001, Stained Soil 8
- 3.2 PRS 69-001, Incinerator Pond Bed 8

4.0 JUSTIFICATION/RATIONALE 9
- 4.1 PRS C-09-001 9
- 4.2 PRS 69-001 9

5.0 ESTIMATED WASTE VOLUMES BY TYPE .....

6.0 CLEANUP LEVELS 11

7.0 DESCRIPTION OF CONFIRMATORY SAMPLING 13
- 4.1 PRS C-09-001 13
- 4.2 PRS 69-001 13

8.0 ESTIMATED SCHEDULE AND COST TO COMPLETE EACH VCA 14

9.0 REFERENCES 15

FIGURES

Figure 1-1 Locations of PRSs in TA-9 and TA-69 3
Figure 1-2 Sampling Location for PRS C-09-001 4
Figure 1-3 Sampling Location for PRS 69-001, Two-Mile Mesa Incinerator 5

TABLES

Table 2-1 PRS Location, Type, and Potential Waste Description 6
Table 5-1 Estimated Waste Volumes 10
Table 5-2 Description of Waste Characterization Sampling 10
Table 6-1 Cleanup Goal for PRS C-09-001 11
Table 6-2 Cleanup Goal for PRS 69-001 12
Table 7-1 Description of Confirmatory Sampling 11
Table 8-1 Estimated Cost and Schedule for Each VCA 14

TABLES

Table B-1 Screening Action Levels for Field Screening Methods 31
Table E-1 Chemicals of Concern for PRSs C-09-001 and 69-001 47
Table E-2 Spreadsheet for Calculating Carcinogenic Site-Specific Cleanup Goals for Industrial Exposure (Nonintrusive Work) 51
Table E-3 Spreadsheet for Calculating Noncarcinogenic Site-Specific Cleanup Goals for Industrial Exposure (Nonintrusive Work) 51
Table E-4 Cleanup Goals Based on Cancer Risk of 10^{-4} to 10^{-6} or Hazard Index of 1 (Nonintrusive Work) 51

APPENDIXES

Appendix A Sample Results 16
Appendix B Field Sampling Plan 29
Appendix C Characterization Strategy Forms 32
Appendix D Framework for Reconsidering or Stopping Work on ECs and VCAs 42
Appendix E Methodologies for Developing Site-Specific Cleanup Goals 46
Appendix F Approach to Using Site-Specific Chemical PRGs 53
Appendix H Cost Estimate 56

1.0 Introduction

Two potential release sites (PRSs) at Los Alamos National Laboratory (LANL) are addressed in this voluntary corrective action (VCA) plan. These sites have been designated Group 7 on the basis of their similarity, locale, and ease of implementation (Figure 1-1). The Group 7 sites fall within two technical areas (TAs), both within field unit (FU) 5 under Field Unit Project Leader, Cheryl Rofer. The tasks for the Group 7 sites are of a housekeeping nature; however, remediation at PRS 69-001 will consist of removal and disposal of potentially hazardous waste.

1.1 PRS C-09-001, Outfall from a Chemical Storage Area

This PRS is located within TA-9, also referred to as Old Anchor Site East. TA-9 was a collection of temporary and semi-permanent buildings that comprised the east part of the Anchor Ranch facility. These buildings housed research and development of explosion systems as well as casting, characterization, formulation, pressing, and machining of explosives. The structures in this area were built in the early 1940s and used until the 1950s. This VCA site consists of the area of concern (AOC) where stained soil, associated with the outfall from a chemical storage area (TA-9-31), was observed. The AOC is approximately 3 ft by 2 ft and is located beneath the drainpipe at the southeast corner of the building. The Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for OU 1157 indicates that the chemical storage area may have contained organic compounds and solvents. Another drainpipe is located on the southwest corner of the building, but no staining was evident at this location.

During the July 1994 RFI, soil samples were collected at two locations: below the southeast drainpipe, and adjacent to the building foundation 3 ft west of the first sampling location (Figure 1-2). These samples were analyzed for volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs). The samples that were analyzed for SVOCs were taken from the top 6 in. of soil; the samples analyzed for VOCs were taken from a depth of about 12 in. No VOCs were detected. Based on the SVOC analysis, the following polycyclic aromatic hydrocarbons (PAHs) were present above screening action levels (SALs): benzo[a]anthracene 1.6 mg/kg (SAL = 1 mg/kg), benzo[a]pyrene 1.6 mg/kg (SAL = 0.1 mg/kg), benzo[b]fluoranthene 2.2 mg/kg (SAL= 1 mg/kg), and indeno[1,2,3-cd]pyrene 2.2 mg/kg (SAL= 1 mg/kg). These contaminants are within the upper 6 in. of soil and are the chemicals of concern (COCs). The PRS was not sampled for metals. There is no reason to assume the presence of radiation or metal contamination, nor were F- or K-listed wastes managed at this site, based on site knowledge. Samples were not taken at the southwest drainpipe. Waste material removed from this VCA is assumed to be nonhazardous, pending characterization analysis.

1.2 PRS 69-001, Two-Mile Mesa Incinerator Pond Bed

This PRS is located within TA-69, which consists of structures located at the intersection of Anchor Ranch Road and Two-Mile Mesa Road and structures in the northwest section of TA-6. This area was designated as TA-69 in September 1989. This VCA consists of a dry, unlined pond bed located northeast of the Two-Mile Mesa incinerator building (TA-69-3), which houses two inactive incinerator units. The incinerators were used to destroy classified documents and viewgraphs from 1959 until the late 1970s. There is no reason to assume that radioactive or hazardous wastes were incinerated there, according to the RFI Work Plan for OU 1157. The ash and all of the noncombustible materials removed from the incinerator were transferred to an ash pond located on the northeast side of TA-69-3. The ash from the secondary combustion chamber was periodically flushed with water directly into the pond. The berm that once contained the pond has been breached by erosion, and no standing water remains. Characterization of the Two-Mile Mesa incinerator will be deferred until decommissioning.

During the July 1994 RFI, judgmental samples were collected at those locations most likely to contain contaminants (Figure 1-3). Two soil samples were collected from the berm area along the west side of the pond where the debris was concentrated. These two samples were sent to an analytical laboratory for total metals analysis. An additional two samples were collected in the pond sediments where the ash was concentrated. The first pond sediment sample was collected approximately 3 ft north of the end of the secondary chamber drainpipe and was sent to an analytical laboratory for total metal analyses. The second pond sediment sampled was collected further downgradient in the center of the pond and sent to an analytical laboratory for metals, VOC and SVOC analyses. The metals analysis indicated that barium (Ba) and lead (Pb) exceeded the SALs, and cadmium (Cd), copper (Cu), mercury (Hg), manganese (Mn), nickel (Ni), and antimony (Sb) exceeded upper tolerance limit (UTL) background levels. These are the COCs. All the COCs, except antimony, were within the upper 6 in. of soil; antimony was found to a depth of 2 ft. The analytical results of the samples from the berm area on the west side of the pond bed exceeded the toxicity characteristic (TC) screening levels for the following metals: lead (7,330 mg/kg, barium (16,200 mg/kg), and silver (103 mg/kg). The total metal analyses of the first sediment sample were elevated, but below the TC screening levels.

No VOCs or SVOCs were detected, except for one tentatively identified SVOC, carene (3-), and an unknown organic compound. No F- or K-listed wastes were managed at this site. During a July 1995 walkover survey, all radioactivity was found to be at or below background. Waste material removed from this VCA is assumed to be hazardous, pending characterization analysis.

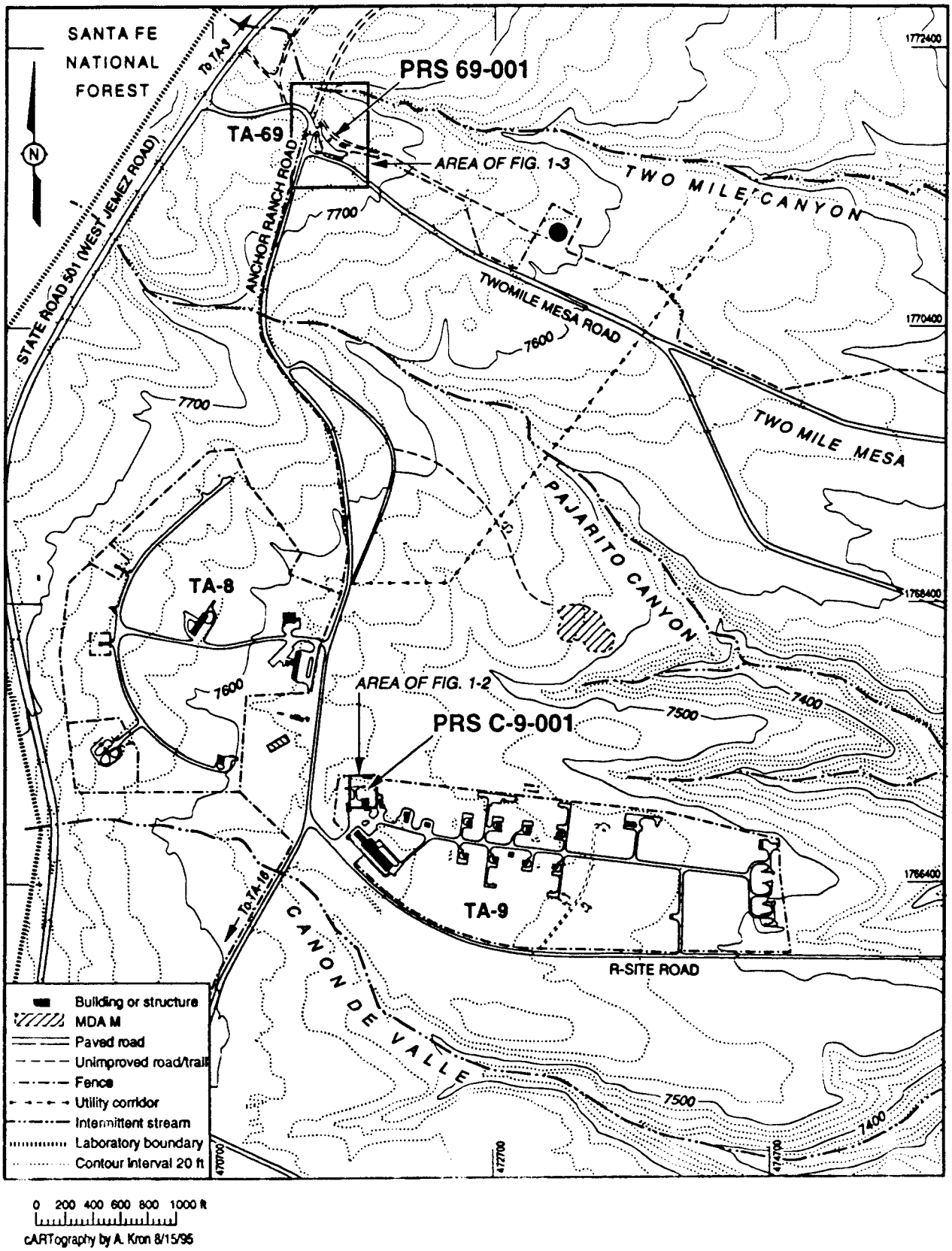

Figure 1.1, Locations of PRSs in TA-9 and TA-69

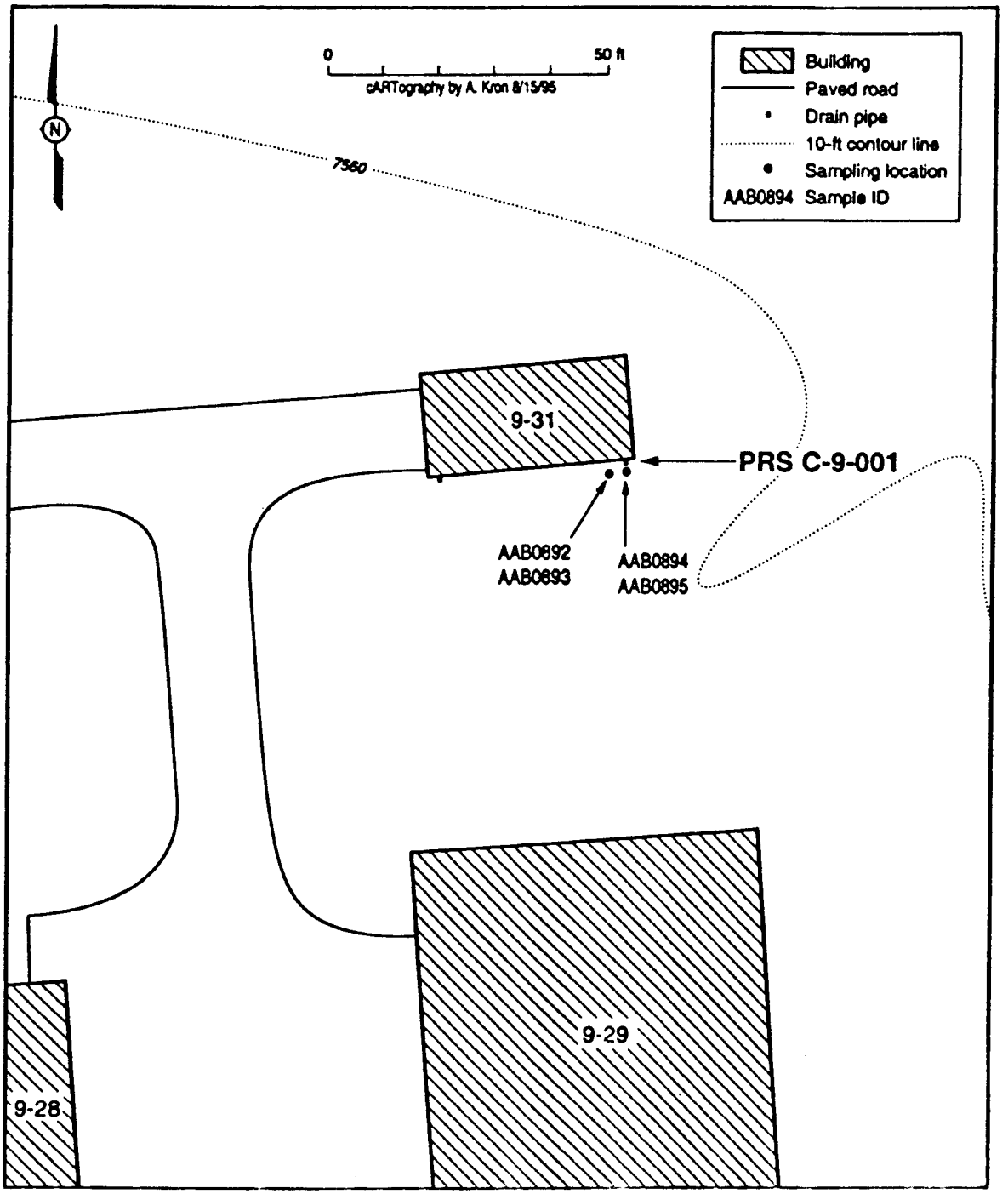

Figure 1-2, Sample Locations for PRS C-9-001

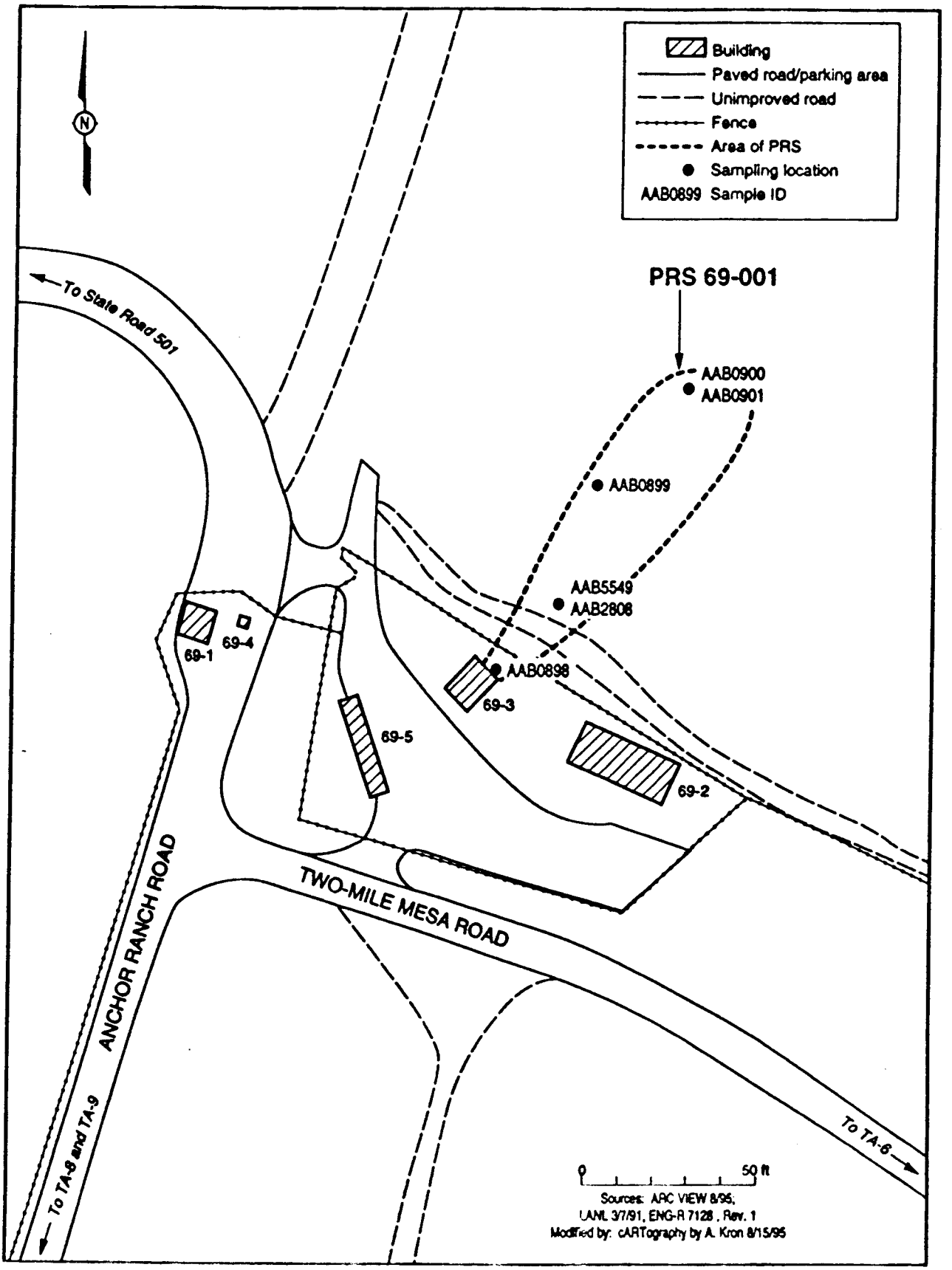

Figure 1-3, Sample Locations for PRS 69-001

2.0 SITE TYPE and DESCRIPTION

Table 2-1 identifies each PRS along with corresponding location, type, and potential waste type.

Table 2-1, PRS Location, Type, and Potential Waste Description

PRS No.	PRS Location	PRS Type/Description	Waste Type/ Description
C-09-001	SE corner of TA-9-31	Stained soil at outfall from a chemical storage area; approximately 3 ft x 2 ft	Soil contaminated with PAHs
69-001	NE of TA-69-3	Incinerator Pond Bed; approximately 45 ft x 75 ft	Soil contaminated with metals (barium, lead, and silver)

3.0 PROPOSED REMEDY

Site characterization of these PRSs has been conducted. Site characterization included geomorphic surveys, HE screening, field screening for radioactivity, and sampling. For PRS C-09-001, sampling for VOCs and SVOCs was conducted at the outfall. For PRS 69-001, sampling for metals, VOCs, and SVOCs was conducted at the incinerator pond area. The results of site characterization are included as Appendix A. Background information is recorded in the OU 1157 RFI Work Plan, which reported the history and use of the PRS sites. Using all available information, remedies have been proposed for housekeeping and cleanup of these PRSs.

Before the start of cleanup operations, a site reconnaissance will be conducted to delineate areas of potential contamination and to locate and identify the known wastes to be removed. The areas and materials will be clearly identified in the field, and all remediation personnel will be familiarized with each specific site.

A field screening plan is described in Appendix B.

In lieu of a detailed Waste Management Plan (WMP), each PRS in this VCA plan has been detailed on a Characterization Strategy Form (CSF) included in Appendix C. The CSFs include a site description, an investigation or remediation waste description and excavated volume estimate, a characterization strategy, a preliminary RCRA determination, and a listing of analyte suites to be characterized. When the cleanup waste is ready for transfer to TA-54 (Waste Disposal), and waste characterization analyses have been received, Waste Profile Forms (WPFs) and Chemical Waste Disposal Requests (CWDRs) will be prepared.

All waste removed from the PRSs will be segregated, sampled, analyzed, containerized, labeled, stored, handled, prepared for transportation and disposal, and managed in compliance with the suspected waste type presented in the CSF. Once the waste type has been confirmed by waste characterization analyses, the waste will be managed in accordance with LANL-ER-AP-05.3, Management of Environmental Restoration Project Waste. Waste materials confirmed not to be contaminated with hazardous or radioactive materials, nor governed by the Toxic Substances Control Act (TSCA), will be disposed of in the proper manner at an industrial waste landfill.

Excavation, material removal, and recontouring are expected to be performed using a backhoe/loader and hand-held tools. The depth at which excavation will terminate will be determined by field screening and/or use of a mobile chemistry van and/or a mobile radiological van for the COCs, under the guidelines established by "Reconsidering or Stopping Work on Voluntary Corrective Actions" by Brad Martin, June 2, 1995 (see Appendix D). Confirmatory (verification) sampling will be performed as required to ensure that the COCs are at or below established cleanup levels.

The LANL Biological Resource Evaluation Team (BRET) conducted a survey at TA-9 and TA-69 in the summer of 1991. While the mesa top on which this site is located is disturbed, it could contain sensitive habitats. BRET will be contacted before any habitat-sensitive activities are begun. Disturbance of existing vegetation will be minimized. Excavated soil materials found to be uncontaminated may be used for backfill and recontouring. Clean soil materials (with contaminants equal to or below adjacent background levels) may be brought on site to complete backfilling. All disturbed areas at each site will be regraded to match existing contours, and reseeded.

3.1 PRS C-09-001, Stained Soil

Stained soil was identified at this PRS near an outfall located at the southeast corner of Building TA-09-31. This building was a chemical storage area that may have contained organic compounds and solvents. Two drainpipes, located at the southeast and southwest corners of the building, discharged from spill containment trays within the building. Both drainpipes are currently plugged.

The site is below the southeast drainpipe and measures approximately 3 ft by 2 ft; however, the contaminants might have penetrated to the underlying tuff. The pipe drains onto a grassy area where there is no evidence of a runoff channel, indicating that discharges from the pipes have been low volume. The concrete wall of the building also has evidence of staining above this drainpipe; the building is not part of this VCA. There is a bent pipe protruding from the ground approximately 2 ft from the building, the purpose of which is unknown. No staining was evident at the southwest drainpipe.

The proposed remedy for this site is to excavate and remove the soil until site-specific preliminary remediation goals (PRGs) are met. Based upon the 1994 RFI sampling, the contamination is within the upper 6 in. of soil, but excavation could extend 2 ft below grade. Upon confirmation that the PRGs have been met, the area will be backfilled with clean soil (with contaminants equal to or below adjacent background levels). Clean fill may be brought on site to complete backfilling. All disturbed areas at each site will be regraded to match existing contours, and reseeded.

3.2 PRS 69-001, Two-Mile Mesa Incinerator Pond Bed

The Two-Mile Mesa Incinerator pond bed is bisected by a fence and a dirt (access) road. The southern portion of the pond bed is directly below the incinerator outfall and measures approximately 15 ft by 15 ft. The northern portion is approximately 30 ft by 60 ft and is surrounded on the east and north by a 3-ft earthen berm; the western boundary of the pond is defined by surface debris. The berm has eroded on the northern end, so the pond no longer holds water. The berm and pond bed have been revegetated.

During a November investigation, pieces of glass from viewgraphs, metal paper fasteners, and other noncombustible debris were found in the pond berm area. In addition, a single lead brick was found on the ground surface at the downstream end of the pond bed. According to Carol LaDelfe, this lead brick has been removed. Fire bricks, a tarp, and lumber debris were seen during a July 1995 visit.

The proposed remedy for this site is to excavate and remove the soil and debris in the pond area, including the access road, until site-specific PRGs are met. Based upon the RFI sampling, most of the contamination is within the upper 6 in. of soil, so excavation will concentrate on this region. In addition, most of the metals exceeding the TC screening levels are located in the berm area on the west side of the pond where the debris is concentrated. Efforts will be made to segregate the waste material excavated in the berm area from the pond sediments in the southern portion of the pond bed. Depending upon substrate contamination, vacuum removal may be used for surface debris. Upon confirmation that the PRGs have been met, the area will be backfilled with clean soil (with contaminants equal to or below adjacent background levels). Clean fill may be brought on site to complete backfilling. All disturbed areas at each site will be regraded to match existing contours, and reseeded.

4.0 JUSTIFICATION/RATIONALE

4.1 PRS C-9-001

Two drainpipes, located at the southeast and southwest corners of TA-9-31, discharged from spill containment trays within the building to outfalls located at the southeast and southwest corners of the building. Both drainpipes are currently plugged. No staining is evident at the southwest outfall. Stained soil is evident at the outfall beneath the southeast drainpipe and COCs were identified for this AOC. This site will be remediated by removing the stained soil, and excavated until site-specific PRGs are met.

This site poses minimum health hazards and is not accessible to the general public. The waste materials associated with this site could be spread by foot traffic, rainfall runoff, and wind. Remediation will eliminate further human health risks and any further degradation of the environment. The remediation requirements of this site are obvious and straightforward to implement.

4.2 PRS 69-001

A dry, unlined pond bed is located northeast of the Two-Mile Mesa incinerator building, TA-69-3. Ash, debris, and cleanout waste from the incinerators were disposed of in the pond. Pieces of glass from old classified viewgraphs, metal paper fasteners, and other small noncombustible debris have been found in the former pond area and COCs were identified for this PRS. This site will be remediated by removing the soil and debris, and excavated until site-specific PRGs are met.

While this site poses a potential health hazard to those who work in the area, it is not readily accessible to the general public. The waste materials associated with this site could be spread by foot traffic, rainfall runoff, and wind. Remediation will eliminate any human health or ecological risks. The remediation requirements of this site are obvious and straightforward to implement. While the mesa top on which this site is located is disturbed, it could contain sensitive habitats.

5.0 ESTIMATED WASTE VOLUMES

Table 5-1 describes each PRS, the waste types, the waste description, an estimated excavated volume (estimated in-situ volume with a 30% expansion factor), proposed disposal containers, and the anticipated disposal destination.

In-situ volume estimates are calculated from PRS surface measurements and contaminant depth based upon field sampling; if sample data is not available, then contaminant depth is based upon surface size, waste/site description, and depth of underlying tuff.

Table 5-1, Estimated Waste Volumes

PRS Number	Waste Type	Waste Description	Estimated Excavated Volume	Disposal Container Type/Description	Anticipated Disposal
C-9-001	Industrial	Soil contaminated with PAHs	4 yd^3	5 - 55-gal. drums	Industrial landfill
69-001	Hazardous; Possible Industrial (southern portion of pond bed)	Soil and debris contaminated with hazardous levels of metals; Non-hazardous soil	69 yd^3	5 - 15 yd^3 roll-off containers	RCRA hazardous waste treatment, storage, and disposal facility and industrial landfill

6.0 CLEANUP LEVELS

Site-specific cleanup levels were calculated for PRSs C-09-001 (TA-9), an outfall, and 69-001 (TA-69), an inactive incinerator pond. Surface contamination is suspected at both of these PRSs. Based on the data from the Phase I investigation and the proposed cleanup strategy for both sites, only surficial soil work is required (nonintrusive work).

With the exception of lead, site-specific cleanup goals/levels were calculated using the equations presented in Appendix E. The toxicity values used in these equations were obtained from the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Table (HEAST), both updated through March 1995. The equations are used to calculate the site-specific cleanup levels for carcinogenic and noncarcinogenic contaminants using a nonintrusive industrial soil exposure scenario. The methodologies are consistent with US EPA Risk Assessment Guidance for Superfund, Part B, using LANL-specific exposure scenario parameters. The methodology calculates a soil concentration for carcinogens (nonradionuclides) from a target cancer risk range of 10^{-4} to 10^{-6}, and for noncarcinogens from a target hazard quotient of 1. The equations combine across exposure pathways to include ingestion and inhalation exposures.

Lead soil cleanup levels of 1000 mg/kg are based upon preliminary comments received from EPA Region 6 on expedited cleanup and VCA Plans. The lead soil cleanup level is based on an industrial exposure scenario and considers fetal effects when a pregnant worker is exposed.

Site-specific cleanup goals and maximum chemical concentrations for nonradionuclides for PRS C-09-001 are presented in Table 6-1. The concentrations of benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene are below the lowest determined cleanup goal (i.e.,10^{-6}). Benzo(a)pyrene is a factor of two greater than the cleanup goal based on 10^{-6}, and it will be addressed in the confirmatory sampling, in addition to the other PAHs, to ensure the site is clean. Multiple Chemical Risk Analysis (Appendix E) results for all PAHs [benzo(a)pyrene, benzo(a)anthracene, benzo(b)fluoranthene, and indeno(1,2,3-cd)pyrene] are well within the risk range of 10^{-4} to 10^{-6} (i.e., 2.67×10^{-6}).

Site-specific cleanup goals and maximum chemical concentrations for nonradionuclides for PRS 69-001 are presented in Table 6-2. Barium exceeded its cleanup goal of 7680 mg/kg by a factor of 2, and lead exceeded its cleanup level of 1000 mg/kg by a factor of 7. These two constituents will be addressed in confirmatory sampling.

The approach to using site-specific cleanup goals with confirmatory sample data is presented in Appendix F.

Table 6-1
Cleanup Goals for PRS C-09-001

Cleanup Goals (mg/kg)					
Chemicals of Concern	**Based on Cancer Risk Of...**			**Based On Hazard Index Of 1**	**Maximum Concentration of Chemical of Concern (mg/kg)**
Carcinogens	**1×10^{-4}**	**1×10^{-5}**	**1×10^{-6}**		**PRS C-09-001**
Benzo(a)anthracene	784	78.4	7.84	-	1.6
Benzo(a)pyrene	78.4	7.84	0.784	-	1.6
Benzo(b)fluoranthene	784	78.4	7.84	-	2.2
Indeno(1,2,3-cd)pyrene	784	78.4	7.84	-	1.1

Table 6-2
Cleanup Goals for PRS 69-001

Cleanup Goals (mg/kg)					
Chemical of Concern	**Based on Cancer Risk Of...**			**Based On Hazard Index of 1**	**Maximum Concentration of Chemical of Concern (mg/kg)**
Noncarcinogens					**PRS 69-001**
Barium	-	-	-	7680	16,600
Lead	-	-		1000	7330

7.0 DESCRIPTION OF CONFIRMATORY SAMPLING

Table 7-1 describes each PRS and the proposed confirmatory sampling. Confirmatory analyses will be done either in the field, using the mobile chemistry van, or by a fixed laboratory, depending upon the analysis to be performed and the capabilities of the mobile lab.

7.1 PRS C-09-001

This site consists of stained soil below a drainpipe at the southeast corner of building TA-9-31, a chemical storage area that may have contained organic compounds and solvents. The stained area measures approximately 2 ft x 3 ft and could extend 2 ft below grade. During the July 1994 RFI, soil samples that were collected at the southeast drainpipe, and adjacent to the building foundation 3 ft west of the first sampling location, indicated the presence of several PAHs in the SVOC analysis. Benz(a)pyrene was above the site-specific cleanup level and will be the focus of the confirmatory sampling.

A statistical analysis was conducted to determine the required sample size for confirmatory sampling. (EPA 1989). Two samples will be collected in the 6 ft. square area. One sample location will be selected at random and the second location will be at least 1.5 ft from the first location. These samples will be analyzed for VOCs and SVOCs, with laboratory detection limits lower than the cleanup level

7.2 PRS 69-001

This site is a dry, unlined pond located northeast of the Two-Mile Mesa incinerator building TA-69-3, which houses two inactive incinerator units. There is no reason to assume that radioactive or hazardous waste was incinerated at TA-69-3. During the July 1994 RFI, soil samples collected along the west side of the pond and in the sediments at the bottom of the pond indicated that lead and barium were detected above cleanup levels.

A statistical analysis was conducted to determine the required sample size for confirmatory sampling (EPA 1989). Four samples will be collected and analyzed for total metals. Barium and lead will be the focus of the confirmatory sampling (Table 7-1).

Table 7-1, Description of Confirmatory Sampling

PRS Number	No. of Samples	Sampling Location Description	Analysis (Method)
C-9-001	2	Soil samples collected at a distance of at least 1.5 ft between locations.	VOCs (SW8240) and SVOCs (SW8270)
69-001	4	Soil samples will be collected with bias on the west side of the pond bed. At least one sample will be collected from the southern portion of the pond bed.	Total metals (SW6010)

In addition to confirmatory sampling, waste characterization sampling will be performed as detailed in the characterization strategy forms. Excavated material will be analyzed for waste characterization through direct sampling of containerized waste; one analysis is planned for homogenous material. Contaminated materials will be handled and prepared for disposal, storage, or shipment as provided on the CSFs in Appendix C.

8.0 ESTIMATED SCHEDULE AND COST TO COMPLETE EACH VCA

Table 8-1 shows estimated scheduling and costs to be incurred in the implementation of the VCA for each PRS in Group 7. Cost estimates include the cost of characterization and confirmatory sampling and analysis. Detailed cost estimate summaries for each PRS are included in Appendix G.

Table 8-1 VCA Plan - Estimated Schedule and Cost to Complete

PRS Number	Date to Start Remediation	Date to Complete Remediation	Estimated Total Cost
C-9-001	August 29, 1995	August 29, 1995	$14,851.00
69-001	August 30, 1995	September 8, 1995	$55,023.00
		TOTAL	$69,874.00

9.0 REFERENCES

Cal/EPA (California Environmental Protection Agency, Department of Toxic Substance Control), June 1993. "Cal-Tox, a Multimedia Total Exposure Model for Hazardous Waste Sites." Office of Science Affairs, Department of Toxic Substances Control.

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EPA, 1992. "Revised Guidance on Establishing Soil Lead Cleanup Levels at Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA)/RCRA Sites." OSWER Directive 9355, 4-0B.

EPA, 1992. "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods," EPA-SW-846, Third Edition, Final Update II, Office of Solid Waste and Emergency Response, US Government Printing Office, Washington, D.C.

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ER Assessment Council, February 6, 1995. "Guidance for Evaluation and Cleanup of PCBs in Soil for the Los Alamos National Laboratory Environmental Restoration Project," final draft, Los Alamos, New Mexico.

LANL, July 1993. "RFI Work Plan for Operable Unit 1157 Environmental Restoration Program," LANL Report LA-UR-93-1230, Los Alamos, New Mexico.

LANL, November 1990. "Solid Waste Management Units (SWMU) Report," LA-UR-90-3400, Los Alamos, NM.

APPENDIX A

Sampling Information

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0892	C-9-001	100016	Nitroaniline [4-]	<	1800	UG/KG
	C-9-001	100027	Nitrophenol [4-]	<	3600	UG/KG
	C-9-001	101553	Bromophenylphenyl ether [4-]	<	720	UG/KG
	C-9-001	105679	Dimethylphenol [2,4-]	<	720	UG/KG
	C-9-001	106478	Chloroaniline [4-]	<	1400	UG/KG
	C-9-001	108952	Phenol	<	720	UG/KG
	C-9-001	111911	Bis(2-chloroethoxy)methane	<	720	UG/KG
	C-9-001	117840	Di-n-octyl phthalate	<	720	UG/KG
	C-9-001	120127	Anthracene	<	720	UG/KG
	C-9-001	118741	Hexachlorobenzene	<	720	UG/KG
	C-9-001	191242	Benzo[g,h,i]perylene	<	720	UG/KG
	C-9-001	173	Unknown Polynuclear Aromatic H ydrocarbon	TI	800	UG/KG
	C-9-001	169	Unknown Alcohol	TI	920	UG/KG
	C-9-001	132649	Dibenzofuran	<	720	UG/KG
	C-9-001	131113	Dimethyl phthalate	<	720	UG/KG
	C-9-001	129000	Pyrene		3300	UG/KG
	C-9-001	121142	Dinitrotoluene [2,4-]	<	720	UG/KG
	C-9-001	120832	Dichlorophenol [2,4-]	<	720	UG/KG
	C-9-001	51285	Dinitrophenol [2,4-]	<	3600	UG/KG
	C-9-001	50328	Benzo[a]pyrene		1600	UG/KG
	C-9-001	218019	Chrysene		1900	UG/KG
	C-9-001	208968	Acenaphthylene	<	720	UG/KG
	C-9-001	207089	Benzo[k]fluoranthene	<	720	UG/KG
	C-9-001	206440	Fluoranthene		4700	UG/KG
	C-9-001	205992	Benzo[b]fluoranthene		2200	UG/KG
	C-9-001	193395	Indeno[1,2,3-cd]pyrene		1100	UG/KG
	C-9-001	91203	Naphthalene	<	720	UG/KG
	C-9-001	88755	Nitrophenol [2-]	<	720	UG/KG
	C-9-001	88744	Nitroaniline [2-]	<	3600	UG/KG
	C-9-001	88062	Trichlorophenol [2,4,6-]	<	720	UG/KG
	C-9-001	87865	Pentachlorophenol	<	3600	UG/KG
	C-9-001	87683	Hexachlorobutadiene	<	720	UG/KG
	C-9-001	86748	Carbazole	TI	1100	UG/KG
	C-9-001	86737	Fluorene	<	720	UG/KG
	C-9-001	95954	Trichlorophenol [2,4,5-]	<	720	UG/KG
	C-9-001	95578	Chlorophenol [o-]	<	720	UG/KG
	C-9-001	95501	Dichlorobenzene (1,2) [o-]	<	720	UG/KG
	C-9-001	95487	Methylphenol [2-]	<	720	UG/KG
	C-9-001	92875	Benzidine [m-]	<	3600	UG/KG
	C-9-001	91941	Dichlorobenzidine [3,3'-]	<	1400	UG/KG
	C-9-001	91587	Chloronaphthalene [2-]	<	720	UG/KG
	C-9-001	91576	Methylnaphthalene [2-]	<	720	UG/KG
	C-9-001	86306	Nitrosodiphenylamine [N-]	<	720	UG/KG
	C-9-001	85687	Butyl benzyl phthalate	<	720	UG/KG
	C-9-001	85018	Phenanthrene		3300	UG/KG
	C-9-001	84742	Di-n-butyl phthalate	<	720	UG/KG
	C-9-001	84662	Diethyl phthalate	<	720	UG/KG
	C-9-001	83329	Acenaphthene	<	720	UG/KG
	C-9-001	78591	Isophorone	<	720	UG/KG
	C-9-001	77474	Hexachlorocyclopentadiene	<	720	UG/KG
	C-9-001	62533	Aniline	<	720	UG/KG
	C-9-001	621647	Nitrosodi-n-propylamine [N-]	<	720	UG/KG
	C-9-001	606202	Dinitrotoluene [2,6-]	<	720	UG/KG
	C-9-001	59507	Chloro-3-methylphenol [4-]	<	1400	UG/KG
	C-9-001	56553	Benzo[a]anthracene		1600	UG/KG
	C-9-001	541731	Dichlorobenzene (1,3) [m-]	<	720	UG/KG
	C-9-001	53703	Dibenzo[a,h]anthracene	<	720	UG/KG
	C-9-001	534521	Methyl-4,6-dinitrophenol [2-]	<	3700	UG/KG
	C-9-001	99092	Nitroaniline [3-]	<	3600	UG/KG
	C-9-001	98953	Nitrobenzene	<	720	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0892	C-9-001	7005723	Chlorophenylphenyl ether [4-]	<	720	UG/KG
	C-9-001	67721	Hexachloroethane	<	720	UG/KG
	C-9-001	65850	Benzoic acid	<	3600	UG/KG
	C-9-001	62759	Nitrosodimethylamine [N-]	<	720	UG/KG
	C-9-001	120821	Trichlorobenzene [1,2,4-]	<	720	UG/KG
	C-9-001	117817	Bis(2-ethylhexyl)phthalate	<	720	UG/KG
	C-9-001	111444	Bis(2-chloroethyl)ether	<	720	UG/KG
	C-9-001	108601	Bis(2-chloroisopropyl)ether	<	720	UG/KG
	C-9-001	106467	Dichlorobenzene (1,4) [p-]	<	720	UG/KG
	C-9-001	106445	Methylphenol [4-]	<	720	UG/KG
	C-9-001	100516	Benzyl alcohol	<	1400	UG/KG
AAB0893	C-9-001	100414	Ethylbenzene	<	5	UG/KG
	C-9-001	95636	Trimethylbenzene [1,2,4-]	<	5	UG/KG
	C-9-001	95501	Dichlorobenzene (1,2) [o-]	<	5	UG/KG
	C-9-001	95498	Chlorotoluene [o-]	<	5	UG/KG
	C-9-001	76131	Trichloro-1,2,2-trifluoroethan e [1,1,2-]	<	5	UG/KG
	C-9-001	75718	Dichlorodifluoromethane	<	10	UG/KG
	C-9-001	75694	Trichlorofluoromethane	<	5	UG/KG
	C-9-001	75354	Dichloroethene [1,1-]	<	5	UG/KG
	C-9-001	75343	Dichloroethane [1,1-]	<	5	UG/KG
	C-9-001	75274	Bromodichloromethane	<	5	UG/KG
	C-9-001	75252	Bromoform	<	5	UG/KG
	C-9-001	75150	Carbon disulfide	<	5	UG/KG
	C-9-001	79345	Tetrachloroethane [1,1,2,2-]	<	5	UG/KG
	C-9-001	79016	Trichloroethene	<	5	UG/KG
	C-9-001	79005	Trichloroethane [1,1,2-]	<	5	UG/KG
	C-9-001	78933	Butanone [2-]	<	20	UG/KG
	C-9-001	78875	Dichloropropane [1,2-]	<	5	UG/KG
	C-9-001	75092	Methylene chloride	<	5	UG/KG
	C-9-001	75014	Vinyl chloride	<	10	UG/KG
	C-9-001	156605	Dichloroethene [trans-1,2-]	<	5	UG/KG
	C-9-001	156592	Dichloroethylene [cis-1,2-]	<	5	UG/KG
	C-9-001	142289	Dichloropropane [1,3-]	<	5	UG/KG
	C-9-001	135988	Butylbenzene [sec-]	<	5	UG/KG
	C-9-001	1330207	Xylenes (o + m + p) [Mixed-]	<	5	UG/KG
	C-9-001	127184	Tetrachloroethylene	<	5	UG/KG
	C-9-001	124481	Chlorodibromomethane	<	5	UG/KG
	C-9-001	108907	Chlorobenzene	<	5	UG/KG
	C-9-001	108883	Toluene	<	5	UG/KG
	C-9-001	108861	Bromobenzene	<	5	UG/KG
	C-9-001	108678	Trimethylbenzene [1,3,5-]	<	5	UG/KG
	C-9-001	108101	Methyl-2-pentanone [4-]	<	20	UG/KG
	C-9-001	107062	Dichloroethane [1,2-]	<	5	UG/KG
	C-9-001	106934	Dibromoethane [1,2-]	<	5	UG/KG
	C-9-001	99876	Isopropyltoluene [4-]	<	5	UG/KG
	C-9-001	98828	Isopropylbenzene	<	5	UG/KG
	C-9-001	98066	Butylbenzene [tert-]	<	5	UG/KG
	C-9-001	96184	Trichloropropane [1,2,3-]	<	5	UG/KG
	C-9-001	96128	Dibromo-3-chloropropane [1,2-]	<	10	UG/KG
	C-9-001	75003	Chloroethane	<	10	UG/KG
	C-9-001	74975	Bromochloromethane	<	5	UG/KG
	C-9-001	74953	Dibromomethane	<	5	UG/KG
	C-9-001	74884	Methyl iodide	<	5	UG/KG
	C-9-001	74873	Chloromethane	<	10	UG/KG
	C-9-001	74839	Bromomethane	<	10	UG/KG
	C-9-001	71556	Trichloroethane [1,1,1-]	<	5	UG/KG
	C-9-001	71432	Benzene	<	5	UG/KG
	C-9-001	67663	Chloroform	<	5	UG/KG
	C-9-001	67641	Acetone	<	20	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0893	C-9-001	630206	Tetrachloroethane [1,1,1,2-]	<	5	UG/KG
	C-9-001	594207	Dichloropropane [2,2-]	<	5	UG/KG
	C-9-001	591786	Hexanone [2-]	<	20	UG/KG
	C-9-001	563586	Dichloropropene [1,1-]	<	5	UG/KG
	C-9-001	56235	Carbon tetrachloride	<	5	UG/KG
	C-9-001	541731	Dichlorobenzene (1,3) [m-]	<	5	UG/KG
	C-9-001	106467	Dichlorobenzene (1,4) [p-]	<	5	UG/KG
	C-9-001	106434	Chlorotoluene [p-]	<	5	UG/KG
	C-9-001	104518	Butylbenzene [n-]	<	5	UG/KG
	C-9-001	103651	Propylbenzene	<	5	UG/KG
	C-9-001	10061026	Dichloropropene [trans-1,3-]	<	5	UG/KG
	C-9-001	100425	Styrene	<	5	UG/KG
	C-9-001	10061015	Dichloropropene [cis-1,3-]	<	5	UG/KG
AAB0894	C-9-001	100016	Nitroaniline [4-]	<	97000	UG/KG
	C-9-001	99092	Nitroaniline [3-]	<	190000	UG/KG
	C-9-001	98953	Nitrobenzene	<	38000	UG/KG
	C-9-001	95954	Trichlorophenol [2,4,5-]	<	38000	UG/KG
	C-9-001	95578	Chlorophenol [o-]	<	38000	UG/KG
	C-9-001	95501	Dichlorobenzene (1,2) [o-]	<	38000	UG/KG
	C-9-001	95487	Methylphenol [2-]	<	38000	UG/KG
	C-9-001	92875	Benzidine [m-]	<	190000	UG/KG
	C-9-001	91941	Dichlorobenzidine [3,3'-]	<	74000	UG/KG
	C-9-001	91587	Chloronaphthalene [2-]	<	38000	UG/KG
	C-9-001	91576	Methylnaphthalene [2-]	<	38000	UG/KG
	C-9-001	91203	Naphthalene	<	38000	UG/KG
	C-9-001	88755	Nitrophenol [2-]	<	38000	UG/KG
	C-9-001	88744	Nitroaniline [2-]	<	190000	UG/KG
	C-9-001	88062	Trichlorophenol [2,4,6-]	<	38000	UG/KG
	C-9-001	87865	Pentachlorophenol	<	190000	UG/KG
	C-9-001	87683	Hexachlorobutadiene	<	38000	UG/KG
	C-9-001	86737	Fluorene	<	38000	UG/KG
	C-9-001	86306	Nitrosodiphenylamine [N-]	<	38000	UG/KG
	C-9-001	85687	Butyl benzyl phthalate	<	38000	UG/KG
	C-9-001	85018	Phenanthrene	<	38000	UG/KG
	C-9-001	84742	Di-n-butyl phthalate	<	38000	UG/KG
	C-9-001	84662	Diethyl phthalate	<	38000	UG/KG
	C-9-001	83329	Acenaphthene	<	38000	UG/KG
	C-9-001	78591	Isophorone	<	38000	UG/KG
	C-9-001	77474	Hexachlorocyclopentadiene	<	38000	UG/KG
	C-9-001	7005723	Chlorophenylphenyl ether [4-]	<	38000	UG/KG
	C-9-001	67721	Hexachloroethane	<	38000	UG/KG
	C-9-001	65850	Benzoic acid	<	190000	UG/KG
	C-9-001	62759	Nitrosodimethylamine [N-]	<	38000	UG/KG
	C-9-001	62533	Aniline	<	38000	UG/KG
	C-9-001	621647	Nitrosodi-n-propylamine [N-]	<	38000	UG/KG
	C-9-001	606202	Dinitrotoluene [2,6-]	<	38000	UG/KG
	C-9-001	59507	Chloro-3-methylphenol [4-]	<	74000	UG/KG
	C-9-001	56553	Benzo[a]anthracene	<	38000	UG/KG
	C-9-001	541731	Dichlorobenzene (1,3) [m-]	<	38000	UG/KG
	C-9-001	53703	Dibenzo[a,h]anthracene	<	38000	UG/KG
	C-9-001	534521	Methyl-4,6-dinitrophenol [2-]	<	190000	UG/KG
	C-9-001	51285	Dinitrophenol [2,4-]	<	190000	UG/KG
	C-9-001	50328	Benzo[a]pyrene	<	38000	UG/KG
	C-9-001	218019	Chrysene	<	38000	UG/KG
	C-9-001	208968	Acenaphthylene	<	38000	UG/KG
	C-9-001	207089	Benzo[k]fluoranthene	<	38000	UG/KG
	C-9-001	206440	Fluoranthene	<	38000	UG/KG
	C-9-001	205992	Benzo[b]fluoranthene	<	38000	UG/KG
	C-9-001	193395	Indeno[1,2,3-cd]pyrene	<	38000	UG/KG
	C-9-001	191242	Benzo[g,h,i]perylene	<	38000	UG/KG
	C-9-001	132649	Dibenzofuran	<	38000	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0894	C-9-001	131113	Dimethyl phthalate	<	38000	UG/KG
	C-9-001	129000	Pyrene	<	38000	UG/KG
	C-9-001	121142	Dinitrotoluene [2,4-]	<	38000	UG/KG
	C-9-001	120832	Dichlorophenol [2,4-]	<	38000	UG/KG
	C-9-001	120821	Trichlorobenzene [1,2,4-]	<	38000	UG/KG
	C-9-001	120127	Anthracene	<	38000	UG/KG
	C-9-001	118741	Hexachlorobenzene	<	38000	UG/KG
	C-9-001	117840	Di-n-octyl phthalate	<	38000	UG/KG
	C-9-001	117817	Bis(2-ethylhexyl)phthalate	<	38000	UG/KG
	C-9-001	111911	Bis(2-chloroethoxy)methane	<	38000	UG/KG
	C-9-001	111444	Bis(2-chloroethyl)ether	<	38000	UG/KG
	C-9-001	108952	Phenol	<	38000	UG/KG
	C-9-001	108601	Bis(2-chloroisopropyl)ether	<	38000	UG/KG
	C-9-001	106478	Chloroaniline [4-]	<	74000	UG/KG
	C-9-001	106467	Dichlorobenzene (1,4) [p-]	<	38000	UG/KG
	C-9-001	106445	Methylphenol [4-]	<	38000	UG/KG
	C-9-001	105679	Dimethylphenol [2,4-]	<	38000	UG/KG
	C-9-001	100027	Nitrophenol [4-]	<	190000	UG/KG
	C-9-001	101553	Bromophenylphenyl ether [4-]	<	38000	UG/KG
	C-9-001	100516	Benzyl alcohol	<	74000	UG/KG
AAB0895	C-9-001	100414	Ethylbenzene	<	5	UG/KG
	C-9-001	95498	Chlorotoluene [o-]	<	5	UG/KG
	C-9-001	76131	Trichloro-1,2,2-trifluoroethan e [1,1,2-]	<	5	UG/KG
	C-9-001	75718	Dichlorodifluoromethane	<	10	UG/KG
	C-9-001	75694	Trichlorofluoromethane	<	5	UG/KG
	C-9-001	75354	Dichloroethene [1,1-]	<	5	UG/KG
	C-9-001	75343	Dichloroethane [1,1-]	<	5	UG/KG
	C-9-001	75274	Bromodichloromethane	<	5	UG/KG
	C-9-001	75252	Bromoform	<	5	UG/KG
	C-9-001	75150	Carbon disulfide	<	5	UG/KG
	C-9-001	79345	Tetrachloroethane [1,1,2,2-]	<	5	UG/KG
	C-9-001	79016	Trichloroethene	<	5	UG/KG
	C-9-001	79005	Trichloroethane [1,1,2-]	<	5	UG/KG
	C-9-001	78933	Butanone [2-]	<	20	UG/KG
	C-9-001	78875	Dichloropropane [1,2-]	<	5	UG/KG
	C-9-001	75092	Methylene chloride	<	5	UG/KG
	C-9-001	75014	Vinyl chloride	<	10	UG/KG
	C-9-001	156605	Dichloroethene [trans-1,2-]	<	5	UG/KG
	C-9-001	156592	Dichloroethylene [cis-1,2-]	<	5	UG/KG
	C-9-001	142289	Dichloropropane [1,3-]	<	5	UG/KG
	C-9-001	135988	Butylbenzene [sec-]	<	5	UG/KG
	C-9-001	1330207	Xylenes (o + m + p) [Mixed-]	<	5	UG/KG
	C-9-001	127184	Tetrachloroethylene	<	5	UG/KG
	C-9-001	124481	Chlorodibromomethane	<	5	UG/KG
	C-9-001	108907	Chlorobenzene	<	5	UG/KG
	C-9-001	108883	Toluene	<	5	UG/KG
	C-9-001	108861	Bromobenzene	<	5	UG/KG
	C-9-001	108678	Trimethylbenzene [1,3,5-]	<	5	UG/KG
	C-9-001	108101	Methyl-2-pentanone [4-]	<	20	UG/KG
	C-9-001	107062	Dichloroethane [1,2-]	<	5	UG/KG
	C-9-001	106934	Dibromoethane [1,2-]	<	5	UG/KG
	C-9-001	99876	Isopropyltoluene [4-]	<	5	UG/KG
	C-9-001	98828	Isopropylbenzene	<	5	UG/KG
	C-9-001	98066	Butylbenzene [tert-]	<	5	UG/KG
	C-9-001	96184	Trichloropropane [1,2,3-]	<	5	UG/KG
	C-9-001	96128	Dibromo-3-chloropropane [1,2-]	<	10	UG/KG
	C-9-001	95636	Trimethylbenzene [1,2,4-]	<	5	UG/KG
	C-9-001	95501	Dichlorobenzene (1,2) [o-]	<	5	UG/KG
	C-9-001	75003	Chloroethane	<	10	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0895	C-9-001	74975	Bromochloromethane	<	5	UG/KG
	C-9-001	74953	Dibromomethane	<	5	UG/KG
	C-9-001	74884	Methyl iodide	<	5	UG/KG
	C-9-001	74873	Chloromethane	<	10	UG/KG
	C-9-001	74839	Bromomethane	<	10	UG/KG
	C-9-001	71556	Trichloroethane [1,1,1-]	<	5	UG/KG
	C-9-001	71432	Benzene	<	5	UG/KG
	C-9-001	67663	Chloroform	<	5	UG/KG
	C-9-001	67641	Acetone	<	20	UG/KG
	C-9-001	630206	Tetrachloroethane [1,1,1,2-]	<	5	UG/KG
	C-9-001	594207	Dichloropropane [2,2-]	<	5	UG/KG
	C-9-001	591786	Hexanone [2-]	<	20	UG/KG
	C-9-001	563586	Dichloropropene [1,1-]	<	5	UG/KG
	C-9-001	56235	Carbon tetrachloride	<	5	UG/KG
	C-9-001	541731	Dichlorobenzene (1,3) [m-]	<	5	UG/KG
	C-9-001	106467	Dichlorobenzene (1,4) [p-]	<	5	UG/KG
	C-9-001	106434	Chlorotoluene [p-]	<	5	UG/KG
	C-9-001	104518	Butylbenzene [n-]	<	5	UG/KG
	C-9-001	103651	Propylbenzene	<	5	UG/KG
	C-9-001	10061026	Dichloropropene [trans-1,3-]	<	5	UG/KG
	C-9-001	100425	Styrene	<	5	UG/KG
	C-9-001	10061015	Dichloropropene [cis-1,3-]	<	5	UG/KG

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SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0898	69-001	AG	Silver		36.1	MG/KG
	69-001	AL	Aluminium		15800	MG/KG
	69-001	BA	Barium		703	MG/KG
	69-001	BE	Beryllium	<	.81	MG/KG
	69-001	CD	Cadmium	<	1.5	MG/KG
	69-001	CN	Cyanide		.81	MG/KG
	69-001	CR	Chromium		5.6	MG/KG
	69-001	FE	Iron		4510	MG/KG
	69-001	K	Potassium	<	1060	MG/KG
	69-001	HG	Mercury	<	.04	MG/KG
	69-001	V	Vanadium	<	7.7	MG/KG
	69-001	TL	Thallium	<	.65	MG/KG
	69-001	SE	Selenium	<	.65	MG/KG
	69-001	SB	Antimony	<	6.9	MG/KG
	69-001	PB	Lead		63.9	MG/KG
	69-001	NI	Nickel	<	5.1	MG/KG
	69-001	NA	Sodium	<	274	MG/KG
	69-001	MN	Manganese		897	MG/KG
	69-001	ZN	Zinc		432	MG/KG
	69-001	MG	Magnesium	<	944	MG/KG
	69-001	CU	Copper	<	7.4	MG/KG
	69-001	CO	Cobalt	<	1.9	MG/KG
	69-001	CA	Calcium	<	1560	MG/KG
	69-001	AS	Arsenic	<	1.6	MG/KG
AAB0899	69-001	AG	Silver		95	MG/KG
	69-001	CD	Cadmium		2.7	MG/KG
	69-001	CA	Calcium		1600	MG/KG
	69-001	TL	Thallium	<	.51	MG/KG
	69-001	SE	Selenium	<	.51	MG/KG
	69-001	SB	Antimony	<	5.4	MG/KG
	69-001	PB	Lead		311	MG/KG
	69-001	NI	Nickel	<	6	MG/KG
	69-001	NA	Sodium	<	374	MG/KG
	69-001	MN	Manganese		125	MG/KG
	69-001	MG	Magnesium		1590	MG/KG
	69-001	K	Potassium		1360	MG/KG
	69-001	HG	Mercury	<	.03	MG/KG
	69-001	FE	Iron		6740	MG/KG
	69-001	CU	Copper		15.3	MG/KG
	69-001	CR	Chromium		7.8	MG/KG
	69-001	CO	Cobalt	<	3.9	MG/KG
	69-001	ZN	Zinc		515	MG/KG
	69-001	V	Vanadium	<	9.7	MG/KG
	69-001	CN	Cyanide		.63	MG/KG
	69-001	BE	Beryllium	<	.89	MG/KG
	69-001	BA	Barium		5230	MG/KG
	69-001	AS	Arsenic	<	2.2	MG/KG
	69-001	AL	Aluminium		11700	MG/KG
AAB0900	69-001	AG	Silver		103	MG/KG
	69-001	BA	Barium		16200	MG/KG
	69-001	AS	Arsenic		2.9	MG/KG
	69-001	TL	Thallium	<	.54	MG/KG
	69-001	SE	Selenium	<	.54	MG/KG
	69-001	SB	Antimony		23.4	MG/KG
	69-001	PB	Lead		7330	MG/KG
	69-001	NI	Nickel		44.5	MG/KG
	69-001	NA	Sodium	<	617	MG/KG
	69-001	MN	Manganese		264	MG/KG
	69-001	MG	Magnesium		1550	MG/KG
	69-001	K	Potassium	<	1010	MG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB0900	69-001	HG	Mercury		.16	MG/KG
	69-001	FE	Iron		25400	MG/KG
	69-001	CU	Copper		62.5	MG/KG
	69-001	CR	Chromium		27.1	MG/KG
	69-001	ZN	Zinc		2380	MG/KG
	69-001	V	Vanadium		15.7	MG/KG
	69-001	CO	Cobalt	<	9.6	MG/KG
	69-001	CN	Cyanide		.68	MG/KG
	69-001	CD	Cadmium		12	MG/KG
	69-001	CA	Calcium		3170	MG/KG
	69-001	BE	Beryllium	<	.92	MG/KG
	69-001	AL	Aluminium		16500	MG/KG
AAB0901	69-001	AG	Silver		99.8	MG/KG
	69-001	AL	Aluminium		15200	MG/KG
	69-001	TL	Thallium	<	.53	MG/KG
	69-001	SE	Selenium	<	.53	MG/KG
	69-001	SB	Antimony		20.8	MG/KG
	69-001	PB	Lead		6450	MG/KG
	69-001	NI	Nickel		20.4	MG/KG
	69-001	NA	Sodium	<	502	MG/KG
	69-001	MN	Manganese		1420	MG/KG
	69-001	MG	Magnesium		1450	MG/KG
	69-001	K	Potassium	<	901	MG/KG
	69-001	HG	Mercury	<	.04	MG/KG
	69-001	FE	Iron		11100	MG/KG
	69-001	CU	Copper		48.6	MG/KG
	69-001	CR	Chromium		28.1	MG/KG
	69-001	CO	Cobalt	<	8.4	MG/KG
	69-001	ZN	Zinc		2460	MG/KG
	69-001	V	Vanadium		13.6	MG/KG
	69-001	CN	Cyanide		.66	MG/KG
	69-001	CD	Cadmium		9.5	MG/KG
	69-001	CA	Calcium		2710	MG/KG
	69-001	BE	Beryllium	<	.77	MG/KG
	69-001	BA	Barium		15600	MG/KG
	69-001	AS	Arsenic		2.7	MG/KG
AAB2808	69-001	100016	Nitroaniline [4-]	<	2000	UG/KG
	69-001	100027	Nitrophenol [4-]	<	3800	UG/KG
	69-001	100425	Styrene	<	6	UG/KG
	69-001	10061026	Dichloropropene [trans-1,3-]	<	6	UG/KG
	69-001	103651	Propylbenzene	<	6	UG/KG
	69-001	105679	Dimethylphenol [2,4-]	<	760	UG/KG
	69-001	106445	Methylphenol [4-]	<	760	UG/KG
	69-001	106467	Dichlorobenzene (1,4) [p-]	<	6	UG/KG
	69-001	107062	Dichloroethane [1,2-]	<	6	UG/KG
	69-001	106934	Dibromoethane [1,2-]	<	6	UG/KG
	69-001	111911	Bis(2-chloroethoxy)methane	<	760	UG/KG
	69-001	111444	Bis(2-chloroethyl)ether	<	760	UG/KG
	69-001	108952	Phenol	<	760	UG/KG
	69-001	108907	Chlorobenzene	<	6	UG/KG
	69-001	108883	Toluene	<	6	UG/KG
	69-001	108861	Bromobenzene	<	6	UG/KG
	69-001	108678	Trimethylbenzene [1,3,5-]	<	6	UG/KG
	69-001	108601	Bis(2-chloroisopropyl)ether	<	760	UG/KG
	69-001	135988	Butylbenzene [sec-]	<	6	UG/KG
	69-001	1330207	Xylenes (o + m + p) [Mixed-]	<	6	UG/KG
	69-001	132649	Dibenzofuran	<	760	UG/KG
	69-001	131113	Dimethyl phthalate	<	760	UG/KG
	69-001	129000	Pyrene	<	760	UG/KG
	69-001	127184	Tetrachloroethylene	<	6	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB2808	69-001	124481	Chlorodibromomethane	<	6	UG/KG
	69-001	121142	Dinitrotoluene [2,4-]	<	760	UG/KG
	69-001	120832	Dichlorophenol [2,4-]	<	760	UG/KG
	69-001	120821	Trichlorobenzene [1,2,4-]	<	760	UG/KG
	69-001	120127	Anthracene	<	760	UG/KG
	69-001	118741	Hexachlorobenzene	<	760	UG/KG
	69-001	117840	Di-n-octyl phthalate	<	760	UG/KG
	69-001	117817	Bis(2-ethylhexyl)phthalate	<	760	UG/KG
	69-001	56235	Carbon tetrachloride	<	6	UG/KG
	69-001	541731	Dichlorobenzene [1,3] [m-]	<	6	UG/KG
	69-001	541731	Dichlorobenzene [1,3] [m-]	<	760	UG/KG
	69-001	53703	Dibenzo[a,h]anthracene	<	760	UG/KG
	69-001	534521	Methyl-4,6-dinitrophenol [2-]	<	3900	UG/KG
	69-001	51285	Dinitrophenol [2,4-]	<	3800	UG/KG
	69-001	50328	Benzo[a]pyrene	<	760	UG/KG
	69-001	208968	Acenaphthylene	<	760	UG/KG
	69-001	74873	Chloromethane	<	11	UG/KG
	69-001	74839	Bromomethane	<	11	UG/KG
	69-001	71556	Trichloroethane [1,1,1-]	<	6	UG/KG
	69-001	71432	Benzene	<	6	UG/KG
	69-001	7005723	Chlorophenylphenyl ether [4-]	<	760	UG/KG
	69-001	67721	Hexachloroethane	<	760	UG/KG
	69-001	67663	Chloroform	<	6	UG/KG
	69-001	67641	Acetone	<	22	UG/KG
	69-001	78591	Isophorone	<	760	UG/KG
	69-001	77474	Hexachlorocyclopentadiene	<	760	UG/KG
	69-001	76131	Trichloro-1,2,2-trifluoroethane [1,1,2-]	<	6	UG/KG
	69-001	75718	Dichlorodifluoromethane	<	11	UG/KG
	69-001	75694	Trichlorofluoromethane	<	6	UG/KG
	69-001	75354	Dichloroethene [1,1-]	<	6	UG/KG
	69-001	75343	Dichloroethane [1,1-]	<	6	UG/KG
	69-001	75274	Bromodichloromethane	<	6	UG/KG
	69-001	88062	Trichlorophenol [2,4,6-]	<	760	UG/KG
	69-001	87865	Pentachlorophenol	<	3800	UG/KG
	69-001	87683	Hexachlorobutadiene	<	760	UG/KG
	69-001	86748	Carbazole	<	760	UG/KG
	69-001	86737	Fluorene	<	760	UG/KG
	69-001	86306	Nitrosodiphenylamine [N-]	<	760	UG/KG
	69-001	85687	Butyl benzyl phthalate	<	760	UG/KG
	69-001	85018	Phenanthrene	<	760	UG/KG
	69-001	ZN	Zinc		173	MG/KG
	69-001	V	Vanadium	<	10.5	MG/KG
	69-001	TL	Thallium	<	.48	MG/KG
	69-001	SE	Selenium	<	1.1	MG/KG
	69-001	SB	Antimony	<	5.1	MG/KG
	69-001	PB	Lead		32	MG/KG
	69-001	NI	Nickel	<	7.1	MG/KG
	69-001	NA	Sodium		149	MG/KG
	69-001	MN	Manganese		192	MG/KG
	69-001	MG	Magnesium		2500	MG/KG
	69-001	K	Potassium		1790	MG/KG
	69-001	HG	Mercury	<	.08	MG/KG
	69-001	FE	Iron		9480	MG/KG
	69-001	CU	Copper	<	4.1	MG/KG
	69-001	CR	Chromium		3.5	MG/KG
	69-001	CO	Cobalt	<	2.9	MG/KG
	69-001	CN	Cyanide	<	.45	MG/KG
	69-001	CD	Cadmium	<	.41	MG/KG
	69-001	CA	Calcium		2560	MG/KG
	69-001	BE	Beryllium		1.4	MG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB2808	69-001	BA	Barium		246	MG/KG
	69-001	AS	Arsenic	<	.58	MG/KG
	69-001	98066	Butylbenzene [tert-]	<	6	UG/KG
	69-001	96184	Trichloropropane [1,2,3-]	<	6	UG/KG
	69-001	96128	Dibromo-3-chloropropane [1,2-]	<	11	UG/KG
	69-001	95954	Trichlorophenol [2,4,5-]	<	760	UG/KG
	69-001	95636	Trimethylbenzene [1,2,4-]	<	6	UG/KG
	69-001	95578	Chlorophenol [o-]	<	760	UG/KG
	69-001	95501	Dichlorobenzene (1,2) [o-]	<	6	UG/KG
	69-001	95501	Dichlorobenzene (1,2) [o-]	<	760	UG/KG
	69-001	AL	Aluminium		12200	MG/KG
	69-001	AG	Silver		3.3	MG/KG
	69-001	99876	Isopropyltoluene [4-]	<	6	UG/KG
	69-001	99092	Nitroaniline [3-]	<	3800	UG/KG
	69-001	98953	Nitrobenzene	<	760	UG/KG
	69-001	98828	Isopropylbenzene	<	6	UG/KG
	69-001	95498	Chlorotoluene [o-]	<	6	UG/KG
	69-001	95487	Methylphenol [2-]	<	760	UG/KG
	69-001	91941	Dichlorobenzidine [3,3'-]	<	2000	UG/KG
	69-001	91587	Chloronaphthalene [2-]	<	760	UG/KG
	69-001	91576	Methylnaphthalene [2-]	<	760	UG/KG
	69-001	91203	Naphthalene	<	760	UG/KG
	69-001	88755	Nitrophenol [2-]	<	760	UG/KG
	69-001	88744	Nitroaniline [2-]	<	3800	UG/KG
	69-001	84742	Di-n-butyl phthalate	<	760	UG/KG
	69-001	84662	Diethyl phthalate	<	760	UG/KG
	69-001	83329	Acenaphthene	<	760	UG/KG
	69-001	79345	Tetrachloroethane [1,1,2,2-]	<	6	UG/KG
	69-001	79016	Trichloroethene	<	6	UG/KG
	69-001	79005	Trichloroethane [1,1,2-]	<	6	UG/KG
	69-001	78933	Butanone [2-]	<	22	UG/KG
	69-001	78875	Dichloropropane [1,2-]	<	6	UG/KG
	69-001	75252	Bromoform	<	6	UG/KG
	69-001	75150	Carbon disulfide	<	6	UG/KG
	69-001	75092	Methylene chloride	<	10	UG/KG
	69-001	75014	Vinyl chloride	<	11	UG/KG
	69-001	75003	Chloroethane	<	11	UG/KG
	69-001	74975	Bromochloromethane	<	6	UG/KG
	69-001	74953	Dibromomethane	<	6	UG/KG
	69-001	74884	Methyl iodide	<	6	UG/KG
	69-001	630206	Tetrachloroethane [1,1,1,2-]	<	6	UG/KG
	69-001	621647	Nitrosodi-n-propylamine [N-]	<	760	UG/KG
	69-001	606202	Dinitrotoluene [2,6-]	<	760	UG/KG
	69-001	59507	Chloro-3-methylphenol [4-]	<	2000	UG/KG
	69-001	594207	Dichloropropane [2,2-]	<	6	UG/KG
	69-001	591786	Hexanone [2-]	<	22	UG/KG
	69-001	56553	Benzo[a]anthracene	<	760	UG/KG
	69-001	563586	Dichloropropene [1,1-]	<	6	UG/KG
	69-001	207089	Benzo[k]fluoranthene	<	760	UG/KG
	69-001	206440	Fluoranthene	<	760	UG/KG
	69-001	205992	Benzo[b]fluoranthene	<	760	UG/KG
	69-001	193395	Indeno[1,2,3-cd]pyrene	<	760	UG/KG
	69-001	191242	Benzo[g,h,i]perylene	<	760	UG/KG
	69-001	156605	Dichloroethene [trans-1,2-]	<	6	UG/KG
	69-001	156592	Dichloroethylene [cis-1,2-]	<	6	UG/KG
	69-001	142289	Dichloropropane [1,3-]	<	6	UG/KG
	69-001	108101	Methyl-2-pentanone [4-]	<	22	UG/KG
	69-001	106467	Dichlorobenzene (1,4) [p-]	<	760	UG/KG
	69-001	106434	Chlorotoluene [p-]	<	6	UG/KG
	69-001	104518	Butylbenzene [n-]	<	6	UG/KG
	69-001	101553	Bromophenylphenyl ether [4-]	<	760	UG/KG
	69-001	10061015	Dichloropropene [cis-1,3-]	<	6	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB2808	69-001	100414	Ethylbenzene	<	6	UG/KG
AAB5549	69-001	100	Unknown organic compound	TI	880	UG/KG
	69-001	135988	Butylbenzene [sec-]	<	7	UG/KG
	69-001	13466789	Carene [3-]	TI	77	UG/KG
	69-001	1330207	Xylenes (o + m + p) [Mixed-]	<	7	UG/KG
	69-001	132649	Dibenzofuran	<	870	UG/KG
	69-001	131113	Dimethyl phthalate	<	870	UG/KG
	69-001	129000	Pyrene	<	870	UG/KG
	69-001	127184	Tetrachloroethylene	<	7	UG/KG
	69-001	124481	Chlorodibromomethane	<	7	UG/KG
	69-001	ZN	Zinc		224	MG/KG
	69-001	V	Vanadium	<	8.4	MG/KG
	69-001	TL	Thallium	<	.53	MG/KG
	69-001	SE	Selenium	<	.53	MG/KG
	69-001	SB	Antimony	<	5.6	MG/KG
	69-001	PB	Lead		14.7	MG/KG
	69-001	NI	Nickel	<	6.2	MG/KG
	69-001	NA	Sodium	<	213	MG/KG
	69-001	MN	Manganese		167	MG/KG
	69-001	MG	Magnesium		2670	MG/KG
	69-001	K	Potassium		1960	MG/KG
	69-001	HG	Mercury	<	.09	MG/KG
	69-001	FE	Iron		8640	MG/KG
	69-001	CU	Copper	<	4.1	MG/KG
	69-001	CR	Chromium		4	MG/KG
	69-001	CO	Cobalt	<	2.5	MG/KG
	69-001	CN	Cyanide	<	.5	MG/KG
	69-001	CD	Cadmium	<	.45	MG/KG
	69-001	CA	Calcium		3450	MG/KG
	69-001	BE	Beryllium		1.8	MG/KG
	69-001	BA	Barium		363	MG/KG
	69-001	AS	Arsenic	<	1.5	MG/KG
	69-001	AL	Aluminium		11500	MG/KG
	69-001	AG	Silver	<	1.9	MG/KG
	69-001	99876	Isopropyltoluene [4-]	<	7	UG/KG
	69-001	99092	Nitroaniline [3-]	<	4300	UG/KG
	69-001	98953	Nitrobenzene	<	870	UG/KG
	69-001	98828	Isopropylbenzene	<	7	UG/KG
	69-001	98066	Butylbenzene [tert-]	<	7	UG/KG
	69-001	96184	Trichloropropane [1,2,3-]	<	7	UG/KG
	69-001	96128	Dibromo-3-chloropropane [1,2-]	<	13	UG/KG
	69-001	95954	Trichlorophenol [2,4,5-]	<	870	UG/KG
	69-001	95636	Trimethylbenzene [1,2,4-]	<	7	UG/KG
	69-001	95578	Chlorophenol [o-]	<	870	UG/KG
	69-001	95501	Dichlorobenzene (1,2) [o-]	<	7	UG/KG
	69-001	95501	Dichlorobenzene (1,2) [o-]	<	870	UG/KG
	69-001	95498	Chlorotoluene [o-]	<	7	UG/KG
	69-001	95487	Methylphenol [2-]	<	870	UG/KG
	69-001	91941	Dichlorobenzidine [3,3'-]	<	2200	UG/KG
	69-001	91587	Chloronaphthalene [2-]	<	870	UG/KG
	69-001	91576	Methylnaphthalene [2-]	<	870	UG/KG
	69-001	91203	Naphthalene	<	870	UG/KG
	69-001	88755	Nitrophenol [2-]	<	870	UG/KG
	69-001	88744	Nitroaniline [2-]	<	4300	UG/KG
	69-001	88062	Trichlorophenol [2,4,6-]	<	870	UG/KG
	69-001	87865	Pentachlorophenol	<	4300	UG/KG
	69-001	87683	Hexachlorobutadiene	<	870	UG/KG
	69-001	86748	Carbazole	<	870	UG/KG
	69-001	86737	Fluorene	<	870	UG/KG
	69-001	86306	Nitrosodiphenylamine [N-]	<	870	UG/KG
	69-001	85687	Butyl benzyl phthalate	<	870	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB5549	69-001	85018	Phenanthrene	<	870	UG/KG
	69-001	84742	Di-n-butyl phthalate	<	870	UG/KG
	69-001	84662	Diethyl phthalate	<	870	UG/KG
	69-001	83329	Acenaphthene	<	870	UG/KG
	69-001	80568	Pinene [alpha-]	TI	69	UG/KG
	69-001	79345	Tetrachloroethane [1,1,2,2-]	<	7	UG/KG
	69-001	79016	Trichloroethene	<	7	UG/KG
	69-001	79005	Trichloroethane [1,1,2-]	<	7	UG/KG
	69-001	78933	Butanone [2-]	<	26	UG/KG
	69-001	78875	Dichloropropane [1,2-]	<	7	UG/KG
	69-001	78591	Isophorone	<	870	UG/KG
	69-001	77474	Hexachlorocyclopentadiene	<	870	UG/KG
	69-001	76131	Trichloro-1,2,2-trifluoroethan e [1,1,2-]	<	7	UG/KG
	69-001	75718	Dichlorodifluoromethane	<	13	UG/KG
	69-001	75694	Trichlorofluoromethane	<	7	UG/KG
	69-001	75354	Dichloroethene [1,1-]	<	7	UG/KG
	69-001	75343	Dichloroethane [1,1-]	<	7	UG/KG
	69-001	75274	Bromodichloromethane	<	7	UG/KG
	69-001	75252	Bromoform	<	7	UG/KG
	69-001	75150	Carbon disulfide	<	7	UG/KG
	69-001	75092	Methylene chloride	<	11	UG/KG
	69-001	75014	Vinyl chloride	<	13	UG/KG
	69-001	75003	Chloroethane	<	13	UG/KG
	69-001	74975	Bromochloromethane	<	7	UG/KG
	69-001	74953	Dibromomethane	<	7	UG/KG
	69-001	74884	Methyl iodide	<	7	UG/KG
	69-001	74873	Chloromethane	<	13	UG/KG
	69-001	74839	Bromomethane	<	13	UG/KG
	69-001	71556	Trichloroethane [1,1,1-]	<	7	UG/KG
	69-001	71432	Benzene	<	7	UG/KG
	69-001	7005723	Chlorophenylphenyl ether [4-]	<	870	UG/KG
	69-001	67721	Hexachloroethane	<	870	UG/KG
	69-001	67663	Chloroform	<	7	UG/KG
	69-001	67641	Acetone	<	26	UG/KG
	69-001	630206	Tetrachloroethane [1,1,1,2-]	<	7	UG/KG
	69-001	621647	Nitrosodi-n-propylamine [N-]	<	870	UG/KG
	69-001	606202	Dinitrotoluene [2,6-]	<	870	UG/KG
	69-001	59507	Chloro-3-methylphenol [4-]	<	2200	UG/KG
	69-001	594207	Dichloropropane [2,2-]	<	7	UG/KG
	69-001	591786	Hexanone [2-]	<	26	UG/KG
	69-001	56553	Benzo[a]anthracene	<	870	UG/KG
	69-001	563586	Dichloropropene [1,1-]	<	7	UG/KG
	69-001	56235	Carbon tetrachloride	<	7	UG/KG
	69-001	541731	Dichlorobenzene (1,3) [m-]	<	7	UG/KG
	69-001	541731	Dichlorobenzene (1,3) [m-]	<	870	UG/KG
	69-001	53703	Dibenzo[a,h]anthracene	<	870	UG/KG
	69-001	534521	Methyl-4,6-dinitrophenol [2-]	<	4400	UG/KG
	69-001	51285	Dinitrophenol [2,4-]	<	4300	UG/KG
	69-001	50328	Benzo[a]pyrene	<	870	UG/KG
	69-001	208968	Acenaphthylene	<	870	UG/KG
	69-001	207089	Benzo[k]fluoranthene	<	870	UG/KG
	69-001	206440	Fluoranthene	<	870	UG/KG
	69-001	205992	Benzo[b]fluoranthene	<	870	UG/KG
	69-001	193395	Indeno[1,2,3-cd]pyrene	<	870	UG/KG
	69-001	191242	Benzo[g,h,i]perylene	<	870	UG/KG
	69-001	165	Saturated Hydrocarbons	TI	41	UG/KG
	69-001	156605	Dichloroethene [trans-1,2-]	<	7	UG/KG
	69-001	156592	Dichloroethylene [cis-1,2-]	<	7	UG/KG
	69-001	142289	Dichloropropane [1,3-]	<	7	UG/KG
	69-001	121142	Dinitrotoluene [2,4-]	<	870	UG/KG

SAMPLE_ID	PRS_ID	ANALYTE_CO	ANALYTE	SY	SAMPLE_VALUE	ANALYSIS_U
AAB5549	69-001	120832	Dichlorophenol [2,4-]	<	870	UG/KG
	69-001	120821	Trichlorobenzene [1,2,4-]	<	870	UG/KG
	69-001	120127	Anthracene	<	870	UG/KG
	69-001	118741	Hexachlorobenzene	<	870	UG/KG
	69-001	117840	Di-n-octyl phthalate	<	870	UG/KG
	69-001	117817	Bis(2-ethylhexyl)phthalate	<	870	UG/KG
	69-001	111911	Bis(2-chloroethoxy)methane	<	870	UG/KG
	69-001	108952	Phenol	<	870	UG/KG
	69-001	108907	Chlorobenzene	<	7	UG/KG
	69-001	108883	Toluene	<	7	UG/KG
	69-001	108861	Bromobenzene	<	7	UG/KG
	69-001	108678	Trimethylbenzene [1,3,5-]	<	7	UG/KG
	69-001	108601	Bis(2-chloroisopropyl)ether	<	870	UG/KG
	69-001	108101	Methyl-2-pentanone [4-]	<	26	UG/KG
	69-001	107062	Dichloroethane [1,2-]	<	7	UG/KG
	69-001	111444	Bis(2-chloroethyl)ether	<	870	UG/KG
	69-001	106934	Dibromoethane [1,2-]	<	7	UG/KG
	69-001	106467	Dichlorobenzene (1,4) [p-]	<	870	UG/KG
	69-001	106467	Dichlorobenzene (1,4) [p-]	<	7	UG/KG
	69-001	106445	Methylphenol [4-]	<	870	UG/KG
	69-001	106434	Chlorotoluene [p-]	<	7	UG/KG
	69-001	105679	Dimethylphenol [2,4-]	<	870	UG/KG
	69-001	104518	Butylbenzene [n-]	<	7	UG/KG
	69-001	103651	Propylbenzene	<	7	UG/KG
	69-001	101553	Bromophenylphenyl ether [4-]	<	870	UG/KG
	69-001	10061026	Dichloropropene [trans-1,3-]	<	7	UG/KG
	69-001	10061015	Dichloropropene [cis-1,3-]	<	7	UG/KG
	69-001	100425	Styrene	<	7	UG/KG
	69-001	100414	Ethylbenzene	<	7	UG/KG
	69-001	100027	Nitrophenol [4-]	<	4300	UG/KG
	69-001	100016	Nitroaniline [4-]	<	2200	UG/KG

APPENDIX B

Field Screening Plan

Field Screening Plan

This plan outlines the steps to be taken for field screening of soil and debris during VCAs at LANL at PRS C-09-001 and PRS 69-001. Field screening will determine the extent of contamination, and, as a result, the extent of excavation or material removal. In addition, field screening will be used to determine if contaminants pose a threat to worker health and safety. Details not explicitly stated will be developed in the field and implemented as appropriate. All screening will be done by field personnel assigned to the VCA task.

In the field screening process, these steps will be followed, in order, where the COC is suspected:

1. Visual Survey
2. Radiation Screening
3. HE Field Test
4. VOC Screening
5. PAH Field Test (if petroleum products or solvents are suspected)
6. Heavy Metals Screening

The visual survey of each PRS involves a walkaround of the site before and during debris and soil removal. The purpose of visually surveying the site before the start of work is to identify the work area perimeter and the specific material(s) to be removed. Personnel performing this visual survey will be looking for surface debris, stained soil, evidence of mounds or piles, flags or stakes from previous surveys or investigations, and any other evidence delineating the site. Conditions that may hamper this activity include rain; regrading, recontouring, or revegetation of the site; discovery of archaeological artifacts; active Laboratory work; vegetation covering the site; and anything else that may inhibit the visual survey.

In addition to the visual survey, radiation screening will be done before the start of work activities. This will be done at each site, regardless of whether radioactive materials are suspected to be present. Screening equipment to be used will be approved by the LANL Health Physics Measurements Group (ESH-4) prior to their utilization. The soil at each site will be screened for gross alpha, beta, and gamma, in accordance with LANL-ER-SOP-10.7, Field Monitoring for Surface and Volume Radioactivity Levels. Gross alpha will be analyzed using an alpha probe, gross beta/gamma will be analyzed using a beta/gamma probe, and gross gamma will be analyzed using a micro-R. The frequency of debris or soil screening will be at the discretion of the on-site health protection technician (HPT). Personnel will be screened only if radiation is found above background. Contamination will be confirmed using a mobile radiological van from LANL (if available) or from a contractor. This will provide real-time analyses of potential radioactive contaminants prior to or during the actual excavation and/or removal.

In areas where VOCs are identified as COCs, soil or debris will be collected, placed in jars, and allowed to volatilize in a warm area for approximately 5 minutes. A photo ionization detector (PID) will then be used to check the headspace for VOCs. The only compounds that would be detected, if present, are those that have an ionization potential (IP) of less than 11.7 eV. The most probable instrument to be used for this is an HNu PI-101. The data collected will help determine the extent of contamination, whether any VOCs are present that the instrument can detect, and whether any of these contaminants may become airborne and affect the health and safety of site workers. The screening frequency will be determined in the field, based on whether any VOCs are identified as contaminants and whether any detections are registered during excavation and removal activities. Confirmatory samples will be sent to an off-site laboratory.

A field test for HE will be performed at the incinerator pond area. The field test will be performed prior to start of work activities. The field test will evaluate the presence or absence of HE at this site.

Petroleum products or solvents have been identified as COCs at C-09-001, a field test kit for PAH will be used. The field test will be performed prior to the start of work activities to delineate the work area, and at the end of excavation and removal to ensure that the contamination has been removed. Confirmatory samples will be sent to an off-site laboratory.

XRF or the LANL mobile chemistry van (if available) will be used to screen for metals in the field at PRS 69-001. The field test will be performed to help segregate wastestreams and to help determine the extent of contamination. Confirmatory samples will be sent to an off-site laboratory, as applicable.

Additional field screening will be conducted to indicate whether any contamination from hazardous materials is present. Potential contamination of any materials to be removed or excavated may be determined by field screening with field test kits and hand-held instruments. Contamination will be confirmed using a mobile chemistry van from LANL (if available) or from a contractor. This will provide real-time analyses of potential hazardous contaminants prior to or during the actual excavation and/or removal

As field work progresses, decisions may be made by the Field Team Leader in conjunction with the Field Team Manager to reduce or increase the frequency of field screening. Field testing is for internal purposes only, and therefore will not be validated. The field screening identified herein is expected to provide adequate information regarding the extent of cleanup and whether the cleanup goals were achieved. Other screening measures may be implemented if additional information is obtained concerning previously unidentified contaminants, or if more appropriate field screening measures are identified.

Samples collected for waste characterization will be shipped to an offsite laboratory for analysis. In addition, samples for waste characterization will be analyzed by an onsite mobile radiation screening laboratory to provide data for safe handling and transportation.

Table B-1, Screening Action Levels for Field Screening Methods

PRS	Analyte/COC	SAL	Screening Method	RSD*	Adjusted SAL
C-09-001	Benzo[a]anthracene	1mg/kg	DTECH PAH Test kit	12%	.88 mg/kg
C-09-001	Benzo[a]pyrene	0.1 mg/kg	"	12%	.09 mg/kg
C-09-001	Benzo[b]fluoranthene	1 mg/kg	"	12%	.88 mg/kg
C-09-001	Indeno[1,2,3cd]pyrene	1 mg/kg	"	12%	.88 mg/kg
69-001	Barium (Ba)	5600 mg/kg	9000 XRF	**	
69-001	Lead (Pb)	400 mg/kg	Spectrace 9000 XRF	**	

* Relative Standard Deviation
**RSD is dependent upon analyte concentration

APPENDIX C

Characterization Strategy Forms

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1157/FU5	PRS C-09-001	Stained Soil

Name: Julie Wanslow	**Date:** 8-18-95
FPL: Cheryl Rofer	**WMC:** Ted Norris
Type of Activity: Voluntary Corrective Action (VCA)	

Site Description: This VCA consists of stained soil below a drainage pipe at the southeast corner of Building TA-09-31, a chemical storage area that contained organic compounds and solvents. According to Betty Harris, who is a chemist familiar with the site, this building was used to store bulk (e.g., 55-gal drums), unused liquid chemicals, lubricants, oils, and solvents (phone communication 8-17-95). The dates of operation of the drainage pipe are unknown, but the structures in this area were built in the early 1940's and were in use until the 1950's. The stained area measures approximately 3 ft by 2 ft and it is estimated that it could extend 2 ft below grade. During the July 1994 RFI, soil samples were collected at two locations: below the southeast drainpipe, and adjacent to the building foundation 3 ft west of the first sampling location. These samples were analyzed for volatile organic compounds (VOC) and semivolatile organic compounds (SVOC). The samples that were analyzed for SVOCs were taken from the top 6 in. of soil. The samples that were analyzed for volatile organic compounds (VOC) were taken from a depth of about 12 in. No VOCs were detected. Based on the SVOC analysis, several polycyclic aromatic hydrocarbons (PAH) were detected: pyrene was detected at 3300 ug/kg; benzo[a]pyrene was detected at 1600 ug/kg; chrysene was detected at 1900 ug/kg; fluoranthene was detected at 4700 ug/kg; benzo[b]fluoranthene was detected at 2200 ug/kg; indeno[1,2,3-cd]pyrene was detected at 1100 ug/kg; phenanthrene was detected at 3300 ug/kg; and benzo[a]anthracene was detected at 1600 ug/kg. Chrysene, fluoranthene, benzo[a]pyrene, and indeno[1,2,3-cd]pyrene are U-listed constituents, however, Betty Harris said that these constituents are solid chemicals at room temperature and would not have been stored in this building because only bulk liquids were stored there. She knew where the stained soil was located and she thought the stained soil and the PAHs were the result of an oil spill. Based on process knowledge, the stained area is not expected to be contaminated with asbestos, HE, cyanide, organic pesticides, herbicides, PCBs, or radionuclides including tritium. In addition, based on process knowledge, no F- or K-listed wastes were managed at this site.

Investigation or Remediation Waste Description and Volume Estimate:

Waste Types: Soil = 4 yd^3 of industrial waste
Decontamination water = 20 gal. of industrial waste
PPE (visibly contaminated) = 0

Waste Packaging: 55-gal. drums

OU Number/FU	PRS/SWMU Number	Title
1157/FU5	PRS C-09-001	Stained Soil

Characterization Strategy: The soil will be removed and placed in 55-gal. drums. The soil will be characterized based on the analytical results of one sample from each container of waste. In addition, even though radioactive contamination and HE are not expected at the site, the waste will be field screened for these contaminants for waste characterization purposes. The excavated soil will be field screened for gross alpha, gross beta, and gross gamma in accordance with LANL-ER-SOP-10.07, Field Monitoring for Surface and Volume Radioactivity Levels. Gross alpha will be analyzed using an alpha probe, gross beta will be analyzed using a beta/gamma probe, and gross gamma will be analyzed using a micro-R. An HE field spot test will be used to determine the presence of HE. During excavation, a field test kit for PAH may be used to delineate the soil to be excavated. After the soil is removed, confirmatory, grab samples will be taken of the soil (see VCA plan). Because the process knowledge for this site is not very specific, the waste will be analyzed for the following constituents for waste characterization purposes, even though they are not expected to be present: organic pesticides, PCBs, and TCLP metals.

The decontamination liquids will be characterized based on the results of the soil samples described above. The PPE will be decontaminated and visually inspected afterward to determine if there is any visible contamination. If the PPE is not visibly contaminated, it will be placed in plastic bags and disposed as non-hazardous waste. If the PPE is visibly contaminated, it will be placed in 55-gal. drums and will be characterized based on the analytical results of the soil samples.

CHARACTERIZATION STRATEGY FORM (Continued)

OU Number	PRS/SWMU Number	Title
1157/FU5	PRS C-09-001	Stained Soil

Preliminary RCRA Determination: (place "X" in front of "Non-RCRA" or "RCRA" below)

X	Non-RCRA: (No 90-Day Storage Requirement) Describe how waste will be stored/handled:
	RCRA: (90-Day Storage Requirement) Waste will be stored/handled in accordance with 20 NMAC 4.1 Generator Requirements

Analyte Suite:

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge	
			Existing Information Present Absent	Data from Site Characterization
Volatile Organic Compounds	SW-846 8240	X		
Semi-Volatile Organic Compounds	SW-846 8270	X		
Organic Pesticides and PCBs	SW-846 8080	X		
Inorganic Compounds (i.e., cyanide)			X	
High Explosive Compounds	field screen			X
Gross Alpha	field screen			X
Gross Beta	field screen			X
Gross Gamma	field screen			X
Tritium*	**		X	
Asbestos			X	
TCLP	SW-846 1311	X		
Metals	6010, and 7471 for mercury	X		
Organics			X	
Pesticides, herbicides			X	

*If Absent is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.
**See attached tritium statement.

Signatures: **ER Project Representative** [illegible] 8/18/95

Waste Management Representative [illegible] for RG 8/18/95

Form Author Julie Wanslow 8-18-95

K95034.FRM

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Name: Julie Wanslow	**Date:** 8-18-95
FPL: Cheryl Rofer	**WMC:** Ted Norris
Type of Activity: Voluntary Corrective Action (VCA)	

Site Description: The VCA consists of a dry, unlined, pond located northeast of the Two-Mile Mesa incinerator Building, TA-69-3, which houses two inactive incineration units. Ash, debris, and cleanout water from the incinerators were disposed of in the pond. The incinerators were used to destroy large quantities of classified documents and viewgraphs from 1959 until the late 1970's. According to Carol LaDelfe, the incinerator was fueled by natural gas and was a high temperature furnace. The soil dike that once contained the pond has been breached by erosion, and the pond is now dry. Only protective force security personnel used this building while it was in use as an incinerator. There is no reason to assume that radioactive or hazardous waste was incinerated. Pieces of glass from old classified viewgraphs, metal paper fasteners, and other small noncombustible debris have been found in the pond area. During a visual inspection of the pond in November 1992, a single lead brick was found on the ground surface at the downstream end of the pond area. The brick has been removed. Fire bricks, a tarp, and lumber debris were seen during a July 1995 visit. Based on process knowledge, hazardous metals from inks from the documents and photographs are expected to be present in the waste. Based on process knowledge, no F-or K-listed wastes were managed or disposed of at this site. The pond area is bisected by a fence and a dirt road. The southern portion of the pond area is directly below the incinerator outfall and measures approximately 15 ft by 15 ft. The northern portion is approximately 30 ft by 60 ft and is surrounded on the east and north by a 3-ft earthen berm.

During the July 1994 RFI, judgmental samples were collected at those locations most likely to contain contaminants. Two samples were collected from the berm area on the west side of the pond where the debris was concentrated. These two samples and one duplicate sample were sent to an analytical laboratory for total metal analyses. All analytical results of the samples collected from the berm were above the TC screening levels. The maximum concentration for lead was 7,330 mg/kg; the maximum concentration for barium was 16,200 mg/kg; and the maximum concentration for silver was 103 mg/kg. Because the TC screening levels were exceeded, the waste could potentially exceed the TC regulatory levels for these metals. Two pond sediment samples were collected from the bottom of the pond where the ash was concentrated. The first pond sediment sample was collected approximately 3 ft north of the end of the secondary chamber drainpipe and sent to an analytical laboratory for total metal analyses. The analytical results of the pond sediment sample were elevated, but were not above the TC screening levels. The second pond sediment sample and one duplicate were collected further downgradient in the center of the pond and sent to an analytical laboratory for total metals, volatile organic compound (VOC) and semivolatile organic compound (SVOC) analyses. The total metal analyses were elevated, but were not above the TC screening levels. No VOCs or SVOCs were detected except for one tentatively identified SVOC: carene[3-] and an unknown organic compound. Because the waste was burned in a high temperature furnace, VOCs and SVOCs were not expected to be present in the waste. Low levels of cyanide were present at concentrations ranging from .63 mg/kg to .81 mg/kg. These values were just above detection limits. Based on a comparison of these values with the current EPA guidance level for reactive cyanide (250 mg HCN/kg waste), it is highly unlikely that the waste would exhibit the reactivity characteristic due to reactive cyanide. ~~Cyanide is commonly associated with inks~~ Based on process knowledge, the pond area is not expected to be contaminated with tritium, asbestos, HE, organic pesticides, herbicides, PCBs, or radionuclides.

CHARACTERIZATION STRATEGY FORM (Continued)

OU Number	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Investigation or Remediation Waste Description and Volume Estimate:
Waste Types: Soil mixed with debris (worst case estimate): 69 yd^3 of hazardous waste
PPE (visibly contaminated): 0
Decontamination water is described on a separate Characterization Strategy Form.
Waste Packaging: Soil: roll-off containers. A 20-yd^3 roll-off container can hold 15 yd^3 of waste.

Characterization Strategy: The soils and debris are expected to be hazardous waste, however, the decontamination liquid is not expected to be hazardous. Therefore, separate Characterization Strategy Forms were completed for these wastes.

The soil mixed with debris will be removed and placed in roll-off containers. Both soil and debris will be characterized based on direct sampling of the containerized soil. One, grab, soil sample will be collected from each container of waste and analyzed for metals using the TCLP. Even though radioactive contamination is not expected at the site, the waste will be field screened for radioactivity for waste characterization purposes. The excavated soil and debris will be field screened for gross alpha, gross beta, and gross gamma in accordance with LANL-ER-SOP-10.07, Field Monitoring for Surface and Volume Radioactivity Levels. Gross alpha will be analyzed using an alpha probe, gross beta will be analyzed using a beta/gamma probe, and gross gamma will be analyzed using a micro-R. Field screening (i.e., XRF or mobile chemistry van) will be used to help segregate hazardous soils from nonhazardous soils. After the soil is removed, confirmatory, grab samples will be taken of the soil (see VCA plan). HE SPOT TESTS WILL BE CONDUCTED.

The PPE will be decontaminated and visually inspected afterward to determine if there is any visible contamination. If the PPE is not visibly contaminated, it will be placed in plastic bags and disposed as non-hazardous waste. If the PPE is visibly contaminated, it will be placed in 55-gal. drums and will be characterized based on the direct sampling of the containerized soil.

CHARACTERIZATION STRATEGY FORM (Continued)

OU Number	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Preliminary RCRA Determination: (place "X" in front of "Non-RCRA" or "RCRA" below)

	Non-RCRA: (No 90-Day Storage Requirement) Describe how waste will be stored/handled:
X	RCRA: (90-Day Storage Requirement) Waste will be stored/handled in accordance with 20 NMAC 4.1 Generator Requirements

Analyte Suite:

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge	
			Existing Information Present Absent	Data from Site Characterization
Volatile Organic Compounds	X		X	
Semi-Volatile Organic Compounds	X		X	
Organic Pesticides and PCBs			X	
Inorganic Compounds (total cyanide)			X	
High Explosive Compounds			X	
Gross Alpha	field screen			X
Gross Beta	field screen			X
Gross Gamma	field screen			X
Tritium*	**		X	
Asbestos			X	
TCLP	SW-846 1311	X		
Metals	6010, and 7471 for mercury	X		
Organics			X	
Pesticides, herbicides			X	

*If Absent is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.
**See attached tritium statement.

Signatures: **ER Project Representative** MJW [illegible] 8/18/95

Waste Management Representative [illegible] 8/18/95

Form Author Julie Wanslow 8-18-95

CHARACTERIZATION STRATEGY FORM

OU Number/FU	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Name: Julie Wanslow	**Date:** 8-11-95
FPL: Cheryl Rofer	**WMC:** Ted Norris
Type of Activity: Voluntary Corrective Action (VCA)	

Site Description: The VCA consists of a dry, unlined, pond located northeast of the Two-Mile Mesa incinerator Building, TA-69-3, which houses two inactive incineration units. Ash, debris, and cleanout water from the incinerators were disposed of in the pond. The incinerators were used to destroy large quantities of classified documents and viewgraphs from 1959 until the late 1970's. According to Carol LaDelfe, the incinerator was fueled by natural gas and was a high temperature furnace. The soil dike that once contained the pond has been breached by erosion, and the pond is now dry. Only protective force security personnel used this building while it was in use as an incinerator. There is no reason to assume that radioactive or hazardous waste was incinerated. Pieces of glass from old classified viewgraphs, metal paper fasteners, and other small noncombustible debris have been found in the pond area. During a visual inspection of the pond in November 1992, a single lead brick was found on the ground surface at the downstream end of the pond area. The brick has been removed. Fire bricks, a tarp, and lumber debris were seen during a July 1995 visit. Based on process knowledge, hazardous metals from inks from the documents and photographs are expected to be present in the waste. Based on process knowledge, no F-or K-listed wastes were managed or disposed of at this site. The pond area is bisected by a fence and a dirt road. The southern portion of the pond area is directly below the incinerator outfall and measures approximately 15 ft by 15 ft. The northern portion is approximately 30 ft by 60 ft and is surrounded on the east and north by a 3-ft earthen berm.

During the July 1994 RFI, judgmental samples were collected at those locations most likely to contain contaminants. Two samples were collected from the berm area on the west side of the pond where the debris was concentrated. These two samples and one duplicate sample were sent to an analytical laboratory for total metal analyses. All analytical results of the samples collected from the berm were above the TC screening levels. The maximum concentration for lead was 7,330 mg/kg; the maximum concentration for barium was 16,200 mg/kg; and the maximum concentration for silver was 103 mg/kg. Because the TC screening levels were exceeded, the waste could potentially exceed the TC regulatory levels for these metals. Two pond sediment samples were collected from the bottom of the pond where the ash was concentrated. The first pond sediment sample was collected approximately 3 ft north of the end of the secondary chamber drainpipe and sent to an analytical laboratory for total metal analyses. The analytical results of the pond sediment sample were elevated, but were not above the TC screening levels. The second pond sediment sample and one duplicate were collected further downgradient in the center of the pond and sent to an analytical laboratory for total metals, volatile organic compound (VOC) and semivolatile organic compound (SVOC) analyses. The total metal analyses were elevated, but were not above the TC screening levels. No VOCs or SVOCs were detected except for one tentatively identified SVOC: carene[3-] and an unknown organic compound. Because the waste was burned in a high temperature furnace, VOCs and SVOCs were not expected to be present in the waste. Low levels of cyanide were present at concentrations ranging from .63 mg/kg to .81 mg/kg. These values were just above detection limits. Based on a comparison of these values with the current EPA guidance level for reactive cyanide (250 mg HCN/kg waste), it is highly unlikely that the waste would exhibit the reactivity characteristic due to reactive cyanide. ~~Cyanide is commonly associated with inks.~~ Based on process knowledge, the pond area is not expected to be contaminated with tritium, asbestos, HE, organic pesticides, herbicides, PCBs, or radionuclides.

CHARACTERIZATION STRATEGY FORM (Continued)

OU Number	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Investigation or Remediation Waste Description and Volume Estimate:
Waste Types: Decontamination water: 20 gal. of industrial (nonhazardous) waste
PPE (visibly contaminated): 0
Soil mixed with debris is described on a separate Characterization Strategy Form.
Waste Packaging: Decontamination liquids: 55-gal. drum with bung top.

Characterization Strategy: The decontamination liquid is not expected to be hazardous, however, the soils mixed with debris are expected to be hazardous waste, Therefore, separate Characterization Strategy Forms were completed for these wastes.

The decontamination liquids will be characterized based on acceptable knowledge and analytical results of one composite decontamination liquid sample. The sample will be analyzed for total metals because the concentrations are expected to be below the TC screening levels and the TC regulatory levels. The PPE will be decontaminated and visually inspected afterward to determine if there is any visible contamination. If the PPE is not visibly contaminated, it will be placed in plastic bags and disposed as non-hazardous waste. If the PPE is visibly contaminated, it will be placed in 55-gal. drums and will be characterized based on the direct sampling of the containerized soil (see Characterization Strategy Form for the soil and debris).

CHARACTERIZATION STRATEGY FORM (Continued)

OU Number	PRS/SWMU Number	Title
1157/FU5	PRS 69-001	Two-Mile Mesa Incinerator Pond Area

Preliminary RCRA Determination: (place "X" in front of "Non-RCRA" or "RCRA" below)

X	Non-RCRA: (No 90-Day Storage Requirement) Describe how waste will be stored/handled:
	RCRA: (90-Day Storage Requirement) Waste will be stored/handled in accordance with 20 NMAC 4.1 Generator Requirements

Analyte Suite:

Analyte Category	Analytical Method	Direct Sampling of Containerized Waste	Acceptable Knowledge	
			Existing Information Present	Existing Information Absent	Data from Site Characterization
Volatile Organic Compounds				X	
Semi-Volatile Organic Compounds				X	
Organic Pesticides and PCBs				X	
Inorganic Compounds (total cyanide)				X	
High Explosive Compounds				X	
Gross Alpha	field screen				X
Gross Beta	field screen				X
Gross Gamma	field screen				X
Tritium*	**			X	
Asbestos				X	
TCLP				X	
Metals (Total Metals)	6010, and 7471 for mercury	X			
Organics				X	
Pesticides, herbicides				X	

*If Absent is checked under existing information for tritium, you must specify (in the "Characterization Strategy" box) the existing information supporting your contention that elevated tritium levels are not present.
**See attached tritium statement.

Signatures: **ER Project Representative** [illegible] for RG 8/18/95

Waste Management Representative [illegible] 8/18/95

Form Author Julie Wanslow 8-18-95

Los Alamos

Los Alamos National Laboratory
Los Alamos, New Mexico 87545

memorandum

TO: Julie Wanslow, ICF Kaiser, MS M892

DATE: August 16, 1995

FROM: Cheryl Rofer

MAIL STOP/TELEPHONE: D462/7-2988

SYMBOL: EES-1

SUBJECT: **CHARACTERIZATION STRATEGY FORM**

Based on my review of available information and my professional judgement, it is not necessary to sample for tritium at PRSs C-09-001 (stained soil) and 69-001 (incinerator pond).

cy: EES-1 File

APPENDIX D

Framework for Reconsidering or Stopping Work on Expedited Cleanups and Voluntary Corrective Actions

FRAMEWORK FOR RECONSIDERING OR STOPPING WORK ON EXPEDITED CLEANUPS AND VOLUNTARY CORRECTIVE ACTIONS

During the conduct of expedited cleanups (ECs) or voluntary corrective actions (VCAs), it is important to **preplan** a framework for understanding when the potential release site (PRS) conceptual model is flawed to the extent that continuing an EC or VCA should be **reconsidered**. This determination may not be straight forward and may be complicated by factors that are not readily apparent. While pursuing the EC or VCA is important to the ER project success, we must be careful to ensure that the pursuit of a "bean" does not tempt us to ignore emerging problems during the field work. The Field Project Leader (FPL) should reconsider any time information becomes available that indicates the site conceptual model may be off target. Furthermore, if the additional information warrants, **work should be stopped**.

Several past examples demonstrate the need for reconsideration and stopping criteria:

- Waste type was thought to be solely hazardous, but was in reality "mixed waste".
- Volume of waste was thought to be small , but was, in fact, much larger.
- Spatial boundaries of the site were thought to be defined, but subsequently were found to be much larger.
- Waste was thought to be uncontaminated debris, but upon disposal was determined to be contaminated with radionuclides.

Have we just been unlucky? Probably not. These are classic examples of the old maxim that if something can go wrong, it will. We must, therefore, maximize the opportunity to reconsider or stop work before it becomes a safety hazard, a professional embarrassment, or a bottomless pit for scarce resources, such as budget dollars or site disposal capacity.

If one or more factors change the prevailing site conceptual model, then **reconsider** the consequences of the change(s) and **stop work** if the change warrants it. Consider the following as a framework, **not** as a prescriptive solution to this difficult problem. The examples provided below are **not** intended to be an exhaustive listing of all possible changes, only an indication of changes frequently encountered.

When stopping work is determined to be the appropriate action, it is crucial to have a plan that describes "safe" shutdown for the site EC or VCA operation. "Safe" in this context should consider such things as worker and trespasser safety, safe storage of wastes generated to date, and a shutdown configuration that ensures conditions at the site do not further mobilize contaminants or provide enhanced pathways for off site migration.

POSSIBLE CRITERIA FOR RECONSIDERING AND/OR STOPPING WORK ON ECs/VCAs

1) **WASTE** - Changes in type, volume, disposal capacity, disposal location, etc.

- If the composition of waste changes and there is limited capacity for the site waste, such as mixed wastes,

- If the volume of waste begins to grow by more than 50%[1] of the initial estimate, or

- If the disposal or treatment capacity for the site waste is not immediately available and would require waste storage for more than 90 days.

Reconsider the consequences of the change(s) and **Stop**, if the change warrants it.

2) **COST** - Changes in available budget, total cost of project, etc.

- If the budget for site EC or VCA grows by more than 50%[1] of the initial estimate, •

- If sites are prioritization similarly, those with increasing costs may go down in project priority due to added costs, as the project would accomplish fewer EC/VCAs, or

- If continuation will affect the program's ability to take action at sites of equal or greater urgency.

Reconsider the consequences of the change(s) and **Stop**, if the change warrants it.

3) **LEVEL OF PROBLEM UNDERSTANDING** - Changes in contamination type or level, job difficulty, etc.

- If the waste constituents change and impact the selected treatment/disposal alternatives,

- If the extent of contaminant movement or the contaminant transport mechanism affects the overall job difficulty, or

---

1 Initial estimates of engineering costs are typically only good within a range of + or - 50%. The relationship of waste management volume to waste management cost is usually linear, so that if volume increases 50% then so do costs.

- If the impact of continuing the action creates a greater problem (e.g., regulatory, public relations, ecological, etc.) than stopping work.

Reconsider the consequences of the change(s) and **Stop**, if the change warrants it.

4) RESOURCES - Changes in knowledge, expertise, equipment, services, etc.

- If new or additional site data causes the site problem to change from understood/ documented historical site data,

- If the remediation equipment needed for the changed site problem is unavailable,

- If the expertise of available staff does not match the changed site problem, or

- If the sensitivity or analytical detection limits of available analytical methods for the changed site problem does not meet the revised site cleanup requirements.

Reconsider the consequences of the change(s) and **Stop**, if the change warrants it.

5) SAFETY - Changes in engineering plan or risk to remedial site worker, LANL worker, or off-site citizen, etc.

- If additional site findings suggest a new or greatly increased risk of an acute or chronic nature to remedial site worker, LANL worker, or off-site citizen,

- If a change to the remedial engineering plan, such as the depth of excavation, differs from the site safety plan, or

- If getting a "bean" by end of the fiscal year appears to compromise safety.

Reconsider the consequences of the continued action(s) and **Stop**, if the finding warrants it.

6) "LAUGH" TEST - Question the appropriateness of what is being done.

- If you doubt that your actions are consistent with common sense, or

- If you think you are being asked to do something stupid, but in a smarter way.

Reconsider the consequences of the continued action(s) and **Stop**, if the finding warrants it.

APPENDIX E

Methodologies for Developing Site-Specific PRGs

METHODOLOGIES FOR DEVELOPING SITE-SPECIFIC CLEANUP GOALS TO DEMONSTRATE CLEAN CLOSURE

1.0 APPROACH

Site-specific risk-based cleanup levels were calculated for PRSs C-09-001 and 69-001. Results of sampling conducted at the two sites indicated that six analytes - benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, indeno(1,2,3,-cd)pyrene, barium, and lead failed the screening assessment [comparison to background UTLs and screening action levels (SALs)], and, therefore, have been identified as COCs. Chemicals of concern for these PRSs are presented in Table E-1.

Table E-1, Chemicals of Concern for PRSs C-09-001 and 69-001

PRS	Chemical of Concern
C-09-001	Benzo(a)anthracene
"	Benzo(a)pyrene
"	Benzo(b)fluoranthene
"	Indeno(1,2,3,-cd)pyrene
69-001	Barium
"	Lead

2.0 Cleanup Goals

2.1 Chemical Constituents

Site-specific cleanup goals were calculated using modified Environmental Protection Agency (EPA) equations and site-specific input parameters. Because of the location of these sites, cleanup goals are based on a reasonable maximum exposed individual (a healthy working adult) under a continued laboratory operations land use scenario.

Under the industrial land use scenario, risk from exposure to chemicals is assumed to be a result of direct ingestion and inhalation of particulates from the soil. EPA default parameters are based on nonintrusive work and the physical properties of the COCs.

Calculations of cleanup goals are consistent with Risk Assessment Guidance for Superfund (RAGS) Part B (EPA 1991a) and RAGs Supplemental Guidance (EPA 1991b) and consider updates to the RAGs Part B equations (EPA 1994).

The cleanup goals were developed using the most current sources of EPA-approved toxicity criteria found in the Integrated Risk Information System (IRIS) and the Health Effects Assessment Summary Table (HEAST). Equation 1 was used to calculate cleanup goals for nonintrusive industrial work for carcinogenic chemicals. The methodology calculates a soil cleanup range for carcinogens from a target cancer risk range of 10^{-4} (i.e., 1 in 10,000) to 10^{-6} (i.e., 1 in a million). Equation 2 was used to calculate goals for nonintrusive industrial work for noncarcinogenic inorganics. The equations for soil combine across pathways for direct exposure through ingestion and inhalation. Tables E-2 and E-3, Spreadsheet for Calculating Carcinogenic and Noncarcinogenic Cleanup Goals for Industrial Exposure (Nonintrusive Work), provides chemical and analyte-specific input parameters for use in the equations. Table E-4, Cleanup Goals Based on Cancer Risk of 10^{-4} to 10^{-6} or Hazard Index of 1 (Nonintrusive Work), provides calculated site-specific cleanup goals for the chemicals of concern.

2.2 Metals-Lead

Lead soil cleanup levels of 1000 mg/kg are based on preliminary comments received from Region VI EPA on expedited cleanup and voluntary corrective action plans. The lead soil cleanup level is based on an industrial exposure scenario and considers fetal effects when a pregnant worker is exposed.

Equation 1: Direct Exposures to Carcinogenic Constituents in Industrial Soil (Nonintrusive Work)

$$C(mg/kg) = \frac{TR \times BW_a \times AT_c \times 365 d/y}{EF_o \times ED_o [\frac{IRS_o \times CSF_o}{10^6\ mg/kg} + IRA_a \times CSF_i \times (\frac{1}{VF_s} + \frac{1}{PEF})]}$$

Where:

C(mg/kg) = Cleanup goal for soil based on exposure to carcinogenic constituents (mg/kg)

TR = Target cancer risk (unitless)
Considered to range from 1×10^{-4} to 1×10^{-6}

BW_a = Body weight, adult (kg)
Considered to be 70 kg (EPA 1991b)

AT_c = Averaging Time - cancer (years)
Considered to be 70 years (EPA 1991b)

EF_o = Exposure Frequency - occupational (d/y)
Considered to be 250 d/y (EPA 1991b)

ED_o = Exposure duration - occupational (years)
Considered to be 25 years (EPA 1991b)

IRS_o = Soil ingestion - occupational (mg/day)
Considered to be 50 mg/day (EPA 1991b)

CSF_o = Cancer slope factor-oral $(mg/kg\text{-}d)^{-1}$ (IRIS, HEAST, or ECAO)

IRA_a = Inhalation rate - adult (m^3/day)
Considered to be 20 m^3/day (EPA 1991b)

CSF_i = Cancer slope factor-inhalation $(mg/kg\text{-}d)^{-1}$ (IRIS, HEAST, or ECAO)

$1/VF_s$ = Volatilization factor for soil (m^3/kg)
Considered to be zero for all chemicals with a molecular weight > 200 g/mole and Henry's Law Constant $<1 \times 10^{-5}$ atm-m^3/mole

PEF = Particulate emission factor (m^3/kg)
Considered to be $1.11 \times 10^{+7}$ (m^3/kg) (LANL)

Equation 2: Direct Exposures to Noncarcinogenic Constituents in Industrial Soil

$$C(mg/kg) = \frac{THQ \times BW_a \times ED_o \times 365\ d/y}{EF_o \times ED_o [\frac{1}{RfD_o} \times \frac{IRS_o}{10^6 mg/kg} + \frac{1}{RfD_i} \times (\frac{IRA_a}{VF_s} + \frac{IRA_a}{PEF})]}$$

Where:

C(mg/kg) = Preliminary remedial goal for soil based on exposure to noncarcinogenic constituents (mg/kg)

THQ = Target hazard quotient (unitless)
Considered to be 1

BW_a = Body weight, adult (kg)
Considered to be 70 kg (EPA 1991a)

ED_o = Exposure duration - occupational (years)
Considered to be 25 years (EPA 1991a)

EF_o = Exposure Frequency - occupational (d/y)
Considered to be 250 d/y (EPA 1991b)

RfD_o = Reference dose-oral (mg/kg-d) (IRIS, HEAST, or ECAO)

IRS_o = Soil ingestion - occupational (mg/day)
Considered to be 50 mg/day (EPA 1991a)

RfD_i = Reference dose inhalation (mg/kg-d) (IRIS, HEAST, or ECAO)

IRA_a = Inhalation rate - adult (m^3/day)
Considered to be 20 m^3/day (EPA 1991a)

VF_s = Volatilization factor for soil (m^3/kg)
Considered to be zero for all chemicals with a molecular weight >200 g/mole and Henry's Law constant < 1 x 10^{-5} atm-m^3/mole

PEF = Particulate emission factor (m^3/kg)
Considered to be 1.11 x 10^{+7} (m^3/kg) (LANL)

Table E-2, Spreadsheet for Calculating Carcinogenic Site-Specific Cleanup Goals for Industrial Exposure (Nonintrusive Work)

Chemical	Oral Cancer Slope Factor (CSFo) 1/(mg/kg-day)	Inhalation Cancer Slope factor (CFSi) 1/(mg/kg-day)
Benzo(a)anthracene	7.3E-01	7.3E-01
Benzo(a)pyrene	7.3E+00	7.3E+00
Benzo(b)fluoranthene	7.3E-01	7.3E-01
Indeno(1,2,3-cd)pyrene	7.3E-01	7.3E-01

Table E-3, Spreadsheet for Noncarcinogenic Calculating Site-Specific Cleanup Goals for Industrial Exposure (Nonintrusive Work)

Analyte	Oral RfD* (mg/kg/day)	Inhalation RfD(mg/kg/day)
Barium	7E-02	1.43E-04
Lead	NA	NA

* RfD: Reference dose for noncarcinogens obtained from IRIS table.

Table E-4, Cleanup Goals Based on Cancer Risk of 10^{-4} to 10^{-6} or Hazard Index of 1 (Nonintrusive Work)

Chemical	10^{-4} Risk mg/kg	10^{-5} Risk mg/kg	10^{-6} Risk mg/kg	HI of 1 mg/kg
Benzo(a)anthracene	784	78.4	7.84	NA
Benzo(a)pyrene	78.4	7.84	0.784	NA
Benzo(b)fluoranthene	784	78.4	7.84	NA
Indeno(1,2,3-cd)pyrene	784	78.4	7.84	NA
Barium	NA	NA	NA	7680
Lead	NA	NA	NA	1000*

* Based on EPA established level.

REFERENCES:

EPA (US Environmental Protection Agency) 1991. "Risk Assessment Guidance for Superfund, Volume 1, Human Health Evaluation Manual (Part B: Development of Risk-Based Preliminary Remediation Goals)," Interim EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, DC. (EPA 1991a).

EPA (US Environmental Protection Agency) 1991. 'Risk Assessment Guidance for Superfund, Volume 1: Human Health Evaluation Manual, Supplemental Guidance,' "Standard Default Exposure Factors," Interim Final Report, OSWER Directive 9285.6-03, Office of Solid Waste and Emergency Response, Toxics Integration Branch, Washington, DC, 1989. (EPA 1991b).

EPA (US Environmental Protection Agency Region IX) August 1994. Region IX Preliminary Remediation Goals (PRGs), Second Half 1994. Memo from Standford J. Smucker, Ph.D., Regional Toxicologist (H-9-3), Technical Support Section to PRG Table Mailing List. (EPA 1994).

APPENDIX F

Approach to Using Site-Specific Chemical PRGs Approach to Using Site-Specific Chemical PRGS

1.0 Multiple Chemical Risk Analysis

Following cleanup operations, confirmatory sampling and analysis will be conducted for specific COCs (when identified) or suspected suites of chemicals, when indicator PRGs are used. For sites where analytical data are not available, cleanup will be based on indicator PRG levels. Site-specific indicator chemical PRGs are used when analytical data are not available for a site. Existing information on site activities is used to identify suspected chemicals of concern. Indicator PRGs are the most health conservative predictor of single-contaminant risk for each suite of chemicals (e.g., inorganics, organic high explosives, polycyclic aromatic hydrocarbons, semi-volatiles, and volatiles).

If confirmatory sample concentrations are below their indicator PRG levels for all chemicals within a suite, the site will be considered to meet cleanup criteria. If confirmatory sample concentrations within a suite of chemicals are above the indicator PRG level for that suite, sample concentrations will be compared to background UTLs. If sample concentrations are below their respective background UTLs, the site will be considered to meet cleanup criteria. Should sample concentrations exceed their respective background UTLs, chemical-specific PRGs will be developed for those chemicals.

A multiple chemical PRG risk analysis will be conducted for exposure to carcinogenic risk, and noncarcinogenic health hazard when two or more confirmatory chemical concentrations are at or below their respective PRGs within one or more or the aforementioned groups. Non-radioactive chemicals with both carcinogenic and noncarcinogenic toxicity criteria will be included in both the carcinogen and noncarcinogen groups. The multiple chemical PRG risk analysis will be estimated by summing the fractional contribution (i.e., site-specific concentration/PRG) of each chemical. The site-specific concentration will be based on the maximum or 95% upper confidence level (UCL) of the arithmetic mean.

For cancer risk estimates, the fractional contribution of each will be summed and multiplied by 10^{-4} target cancer risk:

$$\textit{Multiple PRG Risk} = [(conc_x/PRG_x) + (conc_y/PRG_y) + (conc_z/PRG_z)] \times 10^{-4}$$

If the multiple PRG risk is at or below the target value of 10^{-4}, then the site will be considered to meet cleanup criteria for carcinogenic risk.

For noncancer hazard estimates, the fractional contribution of each will be summed and compared with a target hazard index of 1:

$$\textit{PRG Hazard Index} = [(conc_x/PRG_x) + (conc_y/PRG_y) + (conc_z/PRG_z)]$$

If the PRG hazard index is at or below the target hazard index of 1, then the site will be considered to meet cleanup criteria for noncarcinogenic risk.

If the multiple PRG risk analysis for nonradioactive carcinogens or noncarcinogens exceeds target values, further cleanup or characterization of the site may be warranted.

1.1 The Concentration Term

The maximum detected concentration will be used in the initial multiple chemical risk analysis. Use of the maximum detected concentration provides the worst case analysis and is not considered to be representative of actual exposure concentrations. If maximum concentrations are at or below their respective cleanup levels and multiple chemical risk analysis target levels are not exceeded, the site will be considered to meet cleanup criteria. If, however, use of maximum concentrations results in exceeding the target levels, a 95% UCL of the arithmetic mean will be calculated and used in the evaluation of individual chemicals and in the multiple chemical risk analysis. The 95% UCL of the mean provides a conservative estimate of the mean concentration and accounts for uncertainties due to limited sampling. If possible, the 95% UCL of the mean will be calculated using sample concentration data gathered over the entire exposure unit for the industrial site. For exposure areas with limited data or extreme variability in the measured data, the 95% UCL of the mean may be greater than the maximum concentration. If this occurs, the maximum concentration will be used as the concentration term.

APPENDIX G

Cost Estimate Detailed Summary

Morrison Knudsen Corp.
Project: Los Alamos V C A Addition
Number: 93069-043A

Bid Item Summary
Sorted By: Potent.Release Sites
(Costs Adjusted to Bid Quantities)

07/31/95
9:39 am
Page: 1

Sheet No.	Description	Quantity	Manhours	Labor	Perm. Mat'ls	Equip.	Supplies	Sub-Contracts	Total Cost
Potent.Release Sites 69-001--: Two Mile Mesa Incinerator Pond									
69-101	EXCAVATION PERMITS	1 LS					530		530
69-102	HIGHWAY HAULING PERMIT	1 LS					265		265
69-103	UTILITY LOCATION/RELOCATION PERMIT	1 LS					265		265
69-201	SECURITY ESCORT FOR SITE WORK								
69-202	MEDICAL EXAMINATIONS OF WORKMEN	1 LS					375		375
69-203	HAZWOPER 40 HR. TRAINING	1 LS					1,500		1,500
69-204	RAD II TRAINING FOR EACH WORKMAN	1 LS					1,500		1,500
69-301	E S H Supplies and Expenses	1 LS					1,342		1,342
69-401	Waste Temporary Storage & Monitoring	1 LS	91	2,137		59	214		2,410
69-501	TECH. AREA 69 EXC. WASTE SOILS	69 CY	106	2,946	557	381	20,458		24,341
	Unit Costs:		1.534	42.689	8.070	5.521	296.486		352.766
69-502	SUBCONTRACTOR DECON OPERATION	1 LS	20	535	90	67	590		1,282
69-601	Characterization.Lab Analysis	1 LS					3,182		3,182
69-602	Confirmatory Lab Analysis	1 LS					12,728		12,728
69-603	ASBESTOS SAMPLES	1 LS							
69-604	FIELD SCREENING SAMPLES	1 LS					2,121		2,121
69-605	Decon Water Sample Analysis	1 LS					3,182		3,182
69-701	WORK REPORTS,DAILY,WEEKLY,MONTHLY	1 LS							
	Subtotal, Two Mile Mesa Incinerator Pond		217	5,618	647	507	48,251		55,023
	Takeoff Units:	69 CY	3.141	81.421	9.374	7.344	699.296		797.435
	Adjusted to Bid Quantity:	69 CY	217	5,618	647	507	48,251		55,023
	Unit Costs:		3.145	81.420	9.377	7.348	699.290		797.435

Morrison Knudsen Corp.
Project: Los Alamos V.C A Addition
Number: 93069-043A

Bid Item Summary
Sorted By: Potent.Release Sites
(Costs Adjusted to Bid Quantities)

07/31/95
9:39 am
Page: 2

Sheet No.	Description	Quantity	Manhours	Labor	Perm. Mat'ls	Equip.	Supplies	Sub-Contracts	Total Cost
Potent.Release Sites C09-001-: Strained Soil Field Unit 5									
C9-201	SECURITY ESCORT EACH DAY	2 DAY					1,061		1,061
	Unit Costs:						530.315		530.315
C9-202	MEDICAL EXAMINATIONS OF WORKMEN	1 LS					398		398
C9-203	HAZWOPER 40 HR. TRAINING	1 LS					1,591		1,591
C9-204	RAD II TRAINING FOR EACH WORKMAN	1 LS					1,591		1,591
C9-301	E S H Supplies and Expenses	1 LS					458		458
C9-501	Hand Exc.Stained Soil	3 CY	43	1,060	859	87	133		2,140
	Unit Costs:		14.280	353.492	286.370	29.111	44.258		713.230
C9-502	SUBCONTRACTOR DECON OPERATION	1 LS							
C9-601	Characterization Lab Analysis	1 LS					3,182		3,182
C9-602	Confirmatory Lab Analysis	1 LS					3,182		3,182
C9-603	ASBESTOS SAMPLES								
C9-604	FIELD SCREENING SAMPLES	1 LS					1,250		1,250
C9-605	Decon Water Sample Analysis	1 LS							
C9-701	WORK REPORTS,DAILY,WEEKLY,MONTHLY	1 LS							
	Subtotal, Strained Soil Field Unit 5		43	1,060	859	87	12,845		14,852
	Takeoff Units:	3 CY	14.280	353.492	286.370	29.111	4,281.587		4,950.559
	Adjusted to Bid Quantity:	3 CY	43	1,060	859	87	12,845		14,851
	Unit Costs:		14.333	353.333	286.333	29.000	4,281.667		4,950.333