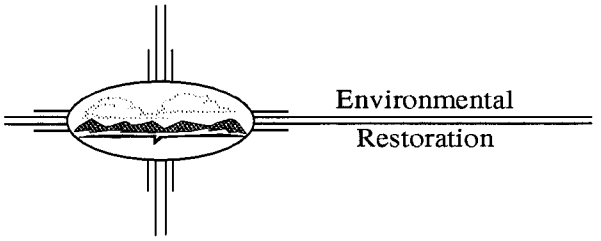
Los Alamos National Laboratory
Environmental Restoration Project

EXPEDITED CLEANUP PLAN

for

SOLID WASTE MANAGEMENT UNIT 9-013

June 1995
Revision 0



ACRONYMS

ACM	asbestos-containing material
AP	Administrative Procedure
COC	contaminant of concern
CPOC	chemical(s) of potential concern
DOE	U. S. Department of Energy
DTSC	Department of Toxic Substances Control
EC	expedited cleanup
EPA	U. S. Environmental Protection Agency
ER	Environmental Restoration
ESH	Environment, Safety, and Health
FPL	Field Project Leader
FTL	Field Team Leader
HE	high explosive
HSWA	Hazardous and Solid Waste Amendments
IEUBK	Integrated Exposure Uptake Biokinetic Model
LANL	Los Alamos National Laboratory
MDA	material disposal area
NMED	New Mexico Environment Department
OU	operable unit
PCB	polychlorinated biphenyl
RCRA	Resource Conservation and Recovery Act
RFI	RCRA Facility Investigation
SAL	screening action level
SOP	Standard Operating Procedure
SSHASP	Site-Specific Health and Safety Plan
SVOC	semivolatile organic compound
SWMU	Solid Waste Management Unit
TA	Technical Area
TCLP	Toxicity Characteristic Leaching Procedure
TSD	treatment, storage, and disposal
UCL	upper confidence limit
UTL	upper tolerance limit
VOC	volatile organic compound
XRF	x-ray fluorescence

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1.0 INTRODUCTION

This Expedited Cleanup (EC) Plan addresses Solid Waste Management Unit (SWMU) 9-013, Material Disposal Area (MDA) M. MDA M is located southwest of Pajarito Canyon, within the western portion of the Los Alamos National Laboratory (LANL), Los Alamos, New Mexico (Figure 1-1). This EC Plan is being proposed as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) process described in the Operable Unit (OU) 1157 RFI Work Plan (LANL 1993, 1230).

SWMU 9-013 is included in Table A of the Hazardous and Solid Waste Amendments (HSWA) permit.

SWMU 9-013 consists of a former ground-surface disposal area and satellite area approximately 3.2 acres in size. A wide variety of materials including potentially hazardous waste, laboratory chemical waste, high explosive (HE) laboratory waste, organic waste, construction debris, and demolition debris was disposed at this site. The disposal area was used from 1948 until about 1965. Preliminary results from the RFI Phase I sampling effort indicate the presence of heavy metals, organics, and radionuclides (limited to one sample) above screening action levels (SALs). Additionally, asbestos was confirmed to be visually present at several locations in the disposal area.

This EC will be performed in two phases. Activities comprising Phase I of the EC include regrading the perimeter trench and diverting runoff, removal of all surface debris, segregation of waste streams, transportation and disposal of surface debris, "hot spot" excavation of contaminated soils, geophysical survey of cleared areas, and confirmatory sampling and analysis using Level III field analytical laboratories to confirm the nature and extent of soil contamination identified during the RFI sampling effort. After surface debris has been cleared and the area sampled, Phase II of the EC will commence. Phase II will consist of evaluating the confirmatory sampling results to determine if the cleanup levels developed from the RFI analytical results, and contained in this plan, are still appropriate. If this is the case, the contaminated soil exceeding cleanup levels will be excavated and transported to a landfill for disposal and final verification samples will be collected and analyzed on-site with 10% submitted off-site for analysis. However, if the confirmatory analytical results indicate the presence of different contaminants of concern (COC) or different concentrations of COCs then new cleanup levels may be calculated and the need for, and method of remediation will be evaluated at that time.

This EC Plan identifies the level of effort required from initial transmittal of the plan to the U. S. Environmental Protection Agency (EPA) for review, through implementation, to the completion of the final report as identified in the schedule. This plan may need to be modified to incorporate Phase II planning after analytical results from confirmatory sampling have been evaluated. A two phase approach is needed due to the uncertainty of contaminants in the surface and near-surface soils. In the development of this EC Plan, the following assumptions were made:

- The levels of COC and volumes of anticipated waste are consistent with preliminary RFI data;
- Based on current Laboratory land use planning, future land use at the location of this SWMU will continue to be for industrial purposes;
- Minimal delays in EC operations will be experienced as a result of inclement weather and site access problems. Delays that may result from the acquisition and scheduling of heavy equipment and from acceptance of waste at permitted disposal facilities cannot be anticipated and therefore are not considered in this plan;
- A Site-Specific Health and Safety Plan (SSHASP) and Waste Management Checklist will be developed specifically to address COCs identified in this EC Plan. Deviations from the anticipated concentrations and locations of contaminants of concern may necessitate adjustments to both plans, and;

- Any comments generated by agencies for public review may necessitate adjustments to the scope of this EC Plan.

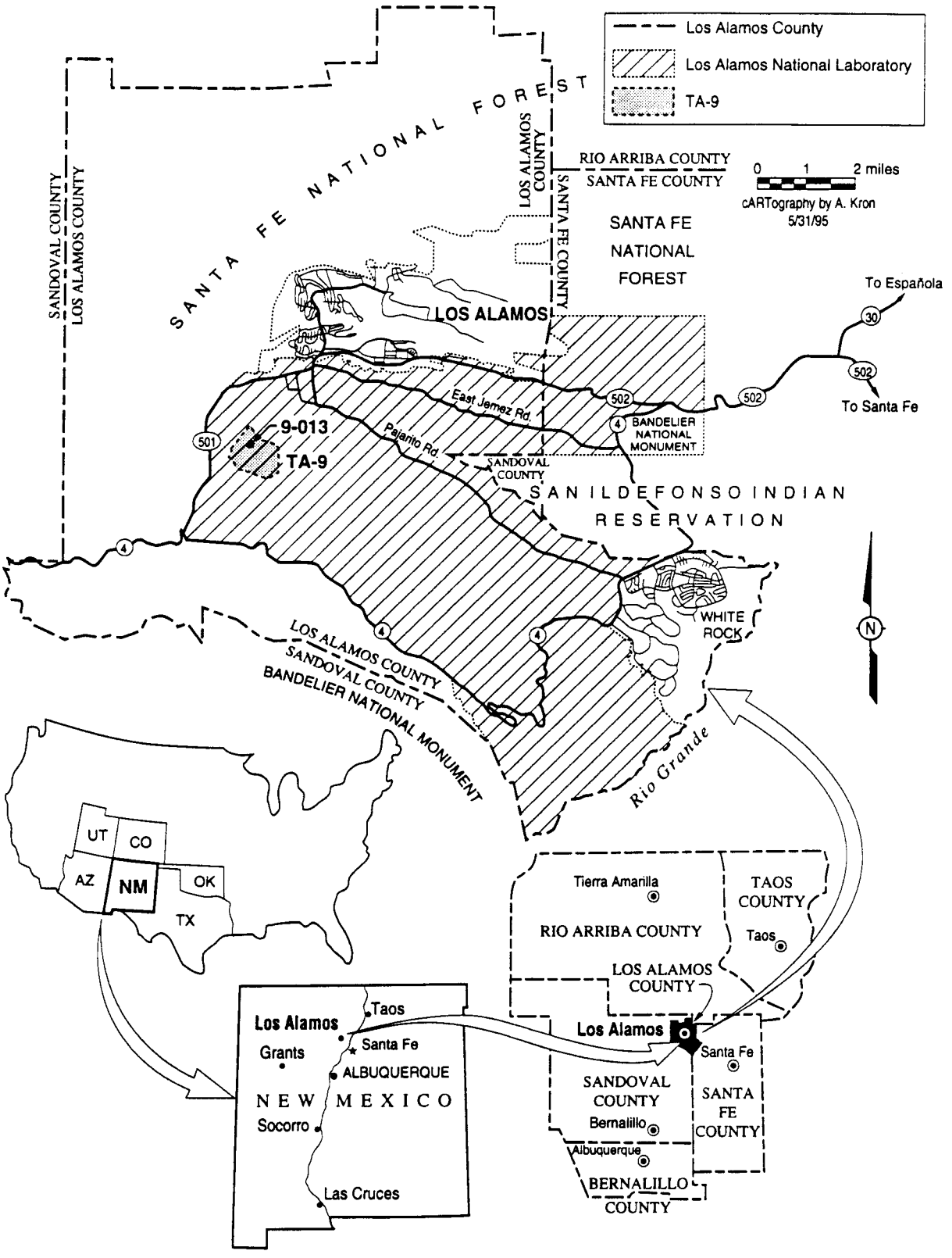


Figure 1-1. Regional location map.

2.0 SITE BACKGROUND AND ENVIRONMENTAL SETTING

2.1 Detailed Description of SWMU 9-013

SWMU 9-013 is a surface material disposal area located within a secured area of Technical Area (TA)-9, southeast of Guard Station 502 and northeast of Old Anchor East (Figure 2-1). MDA M occupies approximately 3.2 acres and is roughly circular in shape. This MDA also includes a satellite area located approximately 750 feet northwest of the main site which occupies an area approximately 40-ft by 60-ft (Figure 2-1). An earthen berm is present around the main disposal area. In some places, the berm has been eroded through by surface water run-off. There are runoff channels on the east and west sides of the site which lead to the mesa edge on the south side of the site.

2.1.1 Operational History

SWMU 9-013 was used as a surface dump for construction debris and other solid wastes. Metal and debris, generated during the removal of Old Anchor Sites East and West and the construction of the present TA-8 and -9 facilities (1948-65), have been flashed, to remove any high explosives, and deposited over the surface of this site. Nonhazardous waste from the construction of other sites within the Laboratory was also disposed at the site from 1960 to 1965. The disposal area has been inactive since 1965.

Aerial photographs of MDA M taken in 1958 were compared to those taken in 1974. These photographs showed that the area appears to have undergone some erosion and tree cutting, but the difference in the condition of the unimproved road in the two photos would indicate that traffic to the site is minimal. Also there was no evidence of any open pits or trenches used for disposal at the site in either of the photos.

2.1.2 Physical Setting

SWMU 9-013 is located in TA-9 at the western edge of the Pajarito Plateau in Los Alamos County. Los Alamos County has a semi-arid, temperate mountain climate. Rainfall at the site (approximate elevation is 7520 feet above mean sea level) averages about 22 inches per year. High extremes include 2.51 inches per day of precipitation and 153 inches per year of snowfall. Average snowfall is about 55 inches per year.

MDA M lies on a mesa between Canon de Valle on the south and Pajarito Canyon on the north located entirely on U. S. Department of Energy (DOE)-owned land. The surface of the mesa is partially dissected by tributary drainages to Pajarito Canyon. The canyons drain east-southeast to the Rio Grande approximately 10 miles east of the site. The area surrounding the site is heavily wooded.

The mesa top of this area overlies up to 1100 ft of unsaturated volcanic tuff and sediments of the Bandelier and Puye formations and Cerros del Rio basalts. This thick unsaturated zone is considered to inhibit groundwater recharge by surface water infiltration within the boundaries of the Laboratory. The regional aquifer, which lies beneath the Laboratory and serves as the municipal water supply for the Los Alamos area, is located in the lower Puye formation and Santa Fe group sediments. The depth to the regional aquifer is between 800 and 1100 ft at the site. Perched water may exist in the vicinity of, and perhaps beneath MDA M.

A soil map presented in the OU 1157 RFI Work Plan (LANL 1993,1230) defines the soil types present within the SWMU site. These comprise the Seaby, Carjo, and Tocal very fine sandy loam soil types.

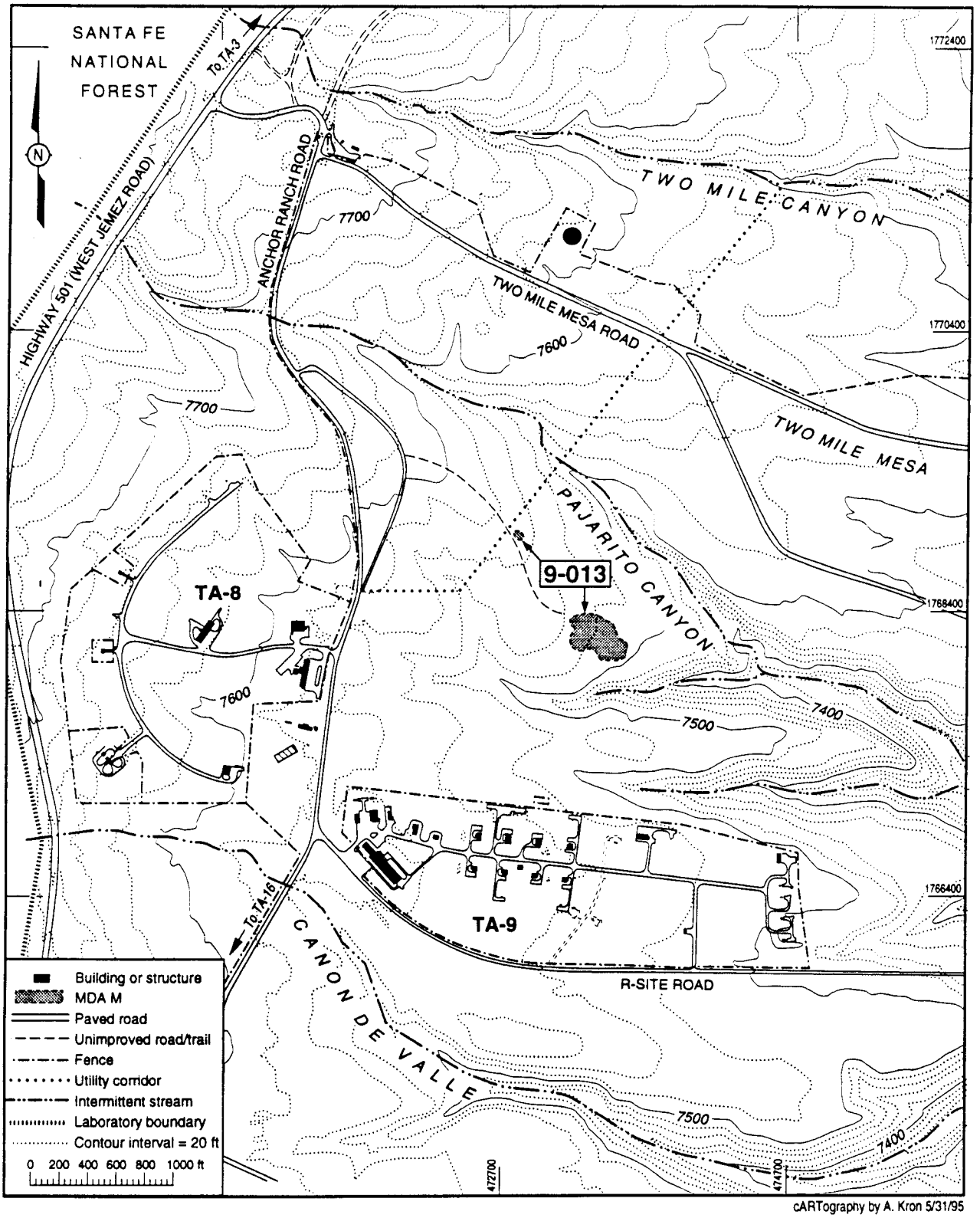


Figure 2-1. Location map for SWMU 9-013.

Access to MDA M is via State Road 501 to Anchor Ranch Road to an unimproved road which leads directly to both the main and satellite areas. Access is restricted by a security fence with entry limited to Laboratory employees with a security clearance. Visitors without a clearance must be escorted at all times.

2.2 Summary of Investigations

2.2.1 Investigations Prior to RFI

MDA M contains many noncombustibles and has been suspected of being contaminated with radioactive materials (LANL 1990, 0145). However, in an October 1992 general radiation survey, no areas registered above background.

During a site visit to MDA M in the spring of 1992, rusted metal cans ranging in size from 12 ounces to 55 gallons were observed. A white fibrous substance believed to be asbestos is visible on the ground in this area. A variety of glass containers and broken glass, some from camera lenses, has been identified at the site. Electrical wires and cables are scattered throughout the area. Other materials, including metal and wood objects, chemical and HE laboratory appliances and fixtures, bathroom appliances and fixtures, tree stumps, automobile parts, smudge pots, and construction and demolition debris, were disposed of at MDA M and the satellite area.

2.2.2 RCRA Facility Investigation

SWMU 9-013 and its satellite area were mapped and sampled as called for in the OU 1157 RFI Work Plan. In March 1994 the area was mapped into a grid of 167 cells (25-ft by 25-ft per cell) and a detailed inventory of each of the cells visible contents was documented. Additionally each cell was field screened for radionuclide contamination, volatile organic compounds (VOCs), and test kits were used to detect the presence of HE.

During May 1994, multimedia samples were collected from MDA M and the satellite area, as well as surrounding springs to ascertain the potential effect of the disposal area on public health and the environment (Figure 2-2). The sampling effort is described below and the analytical results are presented in Annex 6.9.

Judgmental Soil Samples

Eighteen judgmental soil samples (sample numbers 09-7300 through 09-7317) were collected at the main disposal site and one (sample number 09-7330) was collected at the satellite area. The judgmental sample locations were chosen based on the aforementioned cell inventory, as well as the results of field screening for HE, VOCs, and radionuclide contamination. The samples were analyzed for semivolatile organic compounds (SVOCs), VOCs, inorganic compounds, HE, organochlorine pesticides, and polychlorinated biphenyls (PCBs). A gross alpha/beta screening was also performed.

Random Soil Samples

Fourteen random soil samples (sample numbers 09-7006, -7014, -7018, -7037, -7054, -7058, -7061, -7085, -7093, -7104, -7126, -7130, -7142, and -7143) were collected from soils underlying the surface debris within the main disposal site and one random soil sample (sample number 09-7162) was collected from the satellite area. The random samples were collected to supplement the judgmental soil samples and analyzed for the same contaminants.

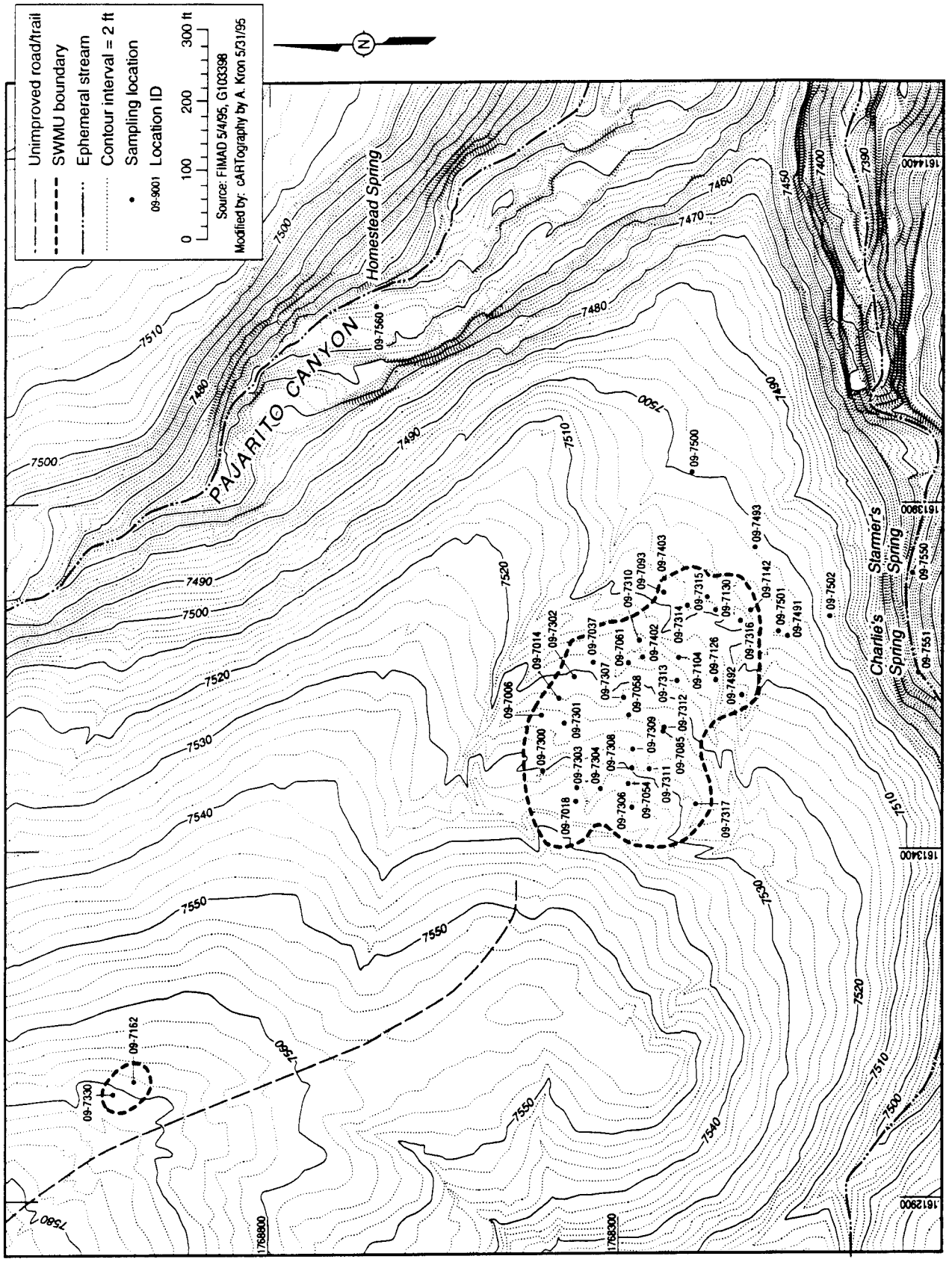


Figure 2-2. Site map for SWMU 9-013.

Judgmental Liquid Samples

Four samples (sample numbers 09-7400 through -7403) were collected from the residual liquid contained in reagent bottles disposed of at the main disposal site. These samples were analyzed for SVOCs, VOCs, inorganic compounds, organochlorine pesticides, and PCBs. A gross alpha/beta screening was also performed.

Judgmental Sampling of Downgradient Sediments

Three sediment samples (sample numbers 09-7500 through -7502) were collected of potentially contaminated surface sediments that appeared to have been eroded from the MDA M main disposal site and washed downgradient by surface runoff. The sample locations were in the runoff channels, two in the westernmost channel and one in the easternmost channel. With the exception of VOCs, these samples were analyzed for the same contaminants as the random and judgmental soil samples.

Judgmental Sampling of Surface Water Runoff

Three single stage surface water runoff samples (sample numbers 09-7491 through -7493) were collected and analyzed for the same contaminants as the downgradient sediments.

Spring and Creek Samples

Three samples (sample numbers 09-7550, -7551, and -7560) were collected from springs located in the canyons south and east of MDA M. The samples were analyzed for VOCs, SVOCs, inorganic compounds (filtered and unfiltered), organochlorine pesticides, PCBs, major ions, total dissolved solids, pH, alkalinity, conductivity, dissolved oxygen, hardness, fecal coliform, temperature, and HE. A gross alpha, beta, and gamma screen, as well as tritium analysis were also performed. Sampling was conducted for the dual purposes of chemically characterizing the water to help determine its source and to determine whether the water is contaminated.

For comparative purposes, one sample (sample number 09-7561) was obtained from Pajarito Creek west of State Road 501 and analyzed for the same parameters as samples collected from the springs.

2.2.2.1 Summary of RFI Analytical Results

Annex 6.9 presents a summary of the RFI analytical sampling results reported above detection limits for all RFI samples collected at the site. The detected concentrations, screening action levels (SALs), and upper tolerance limits (UTLs) for background concentrations in soil and water are also presented for comparison. Based on a preliminary review of the sampling data, the results are summarized as follows:

Soil Samples (random and judgmental)

- SVOC concentrations were detected above LANL SALs (or UTLs where SALs were not available) in three samples (09-7037, -7303, and -7316) with maximum values of the following constituents: benzo[a]anthracene (160 ppm), benzo[a]pyrene (130 ppm), benzo[b]fluoranthene (200 ppm), benzo[g,h,i]perylene (64 ppm), benzo[k]fluoranthene (77 ppm), chrysene (190 ppm), dibenzo[a,h]anthracene (23 ppm), indeno[1,2,3-cd]pyrene (80 ppm), and phenanthrene (150 ppm).

- Metal concentrations were detected above LANL SALs (or UTLs where SALs were not available) in thirty-one samples with maximum values of the following constituents: arsenic (113 ppm), calcium (122000 ppm), chromium (51.6 ppm), copper (42762 ppm), iron (88600 ppm), lead (11600 ppm), and mercury (29 ppm).

- Organochlorine pesticides were detected above LANL SALs in one sample (09-7037) with a maximum value of dieldrin (0.048 ppm).
- PCB concentrations were detected above LANL SALs in two samples (09-7303 and -7312) with a maximum value of Aroclor 1254 (2.6 ppm).
- Uranium-234 and -238 were detected above LANL SALs in one sample (09-7310) with maximum values of 150.622 pCi/g and 149.741 pCi/g respectively.
- No VOCs were detected above SALs or UTLs.
- No identifiable compounds were detected in the HE analyses.

Residual Liquids in Containers

- Metal concentrations were detected above LANL SALs in all four samples with maximum values of the following constituents: arsenic (200 µg/L), barium (2580 µg/L), beryllium (23.8 µg/L), cadmium (16.3 µg/L), chromium (225 µg/L), lead (168 µg/L), manganese (884 µg/L), mercury (10.5 µg/L), nickel (276 µg/L), and selenium (620 µg/L).
- No identifiable compounds were detected in the SVOC analyses.
- No identifiable compounds were detected in the VOC analyses.
- No identifiable compounds were detected in the organochlorine pesticide and PCB analyses.

Downgradient Sediments

- No metals were detected above SALs.
- No identifiable compounds were detected in the SVOC analyses.
- No identifiable compounds were detected in the VOC analyses.
- No identifiable compounds were detected in the organochlorine pesticide and PCB analyses.
- No identifiable compounds were detected in the HE analyses.

Surface Water Runoff

- Metal concentrations were detected above LANL SALs in all three samples with maximum values of the following constituents: antimony (94.8 µg/L), barium (2740 µg/L), beryllium (19.3 µg/L), cadmium (40.2 µg/L), chromium (144 µg/L), lead (147 µg/L), manganese (2770 µg/L), nickel (112 µg/L), and vanadium (370 µg/L).
- VOC concentrations were detected above LANL SALs in one sample (09-7493) with a maximum value of methylene chloride (6 µg/L).
- No identifiable compounds were detected in the SVOC analyses.
- No identifiable compounds were detected in the organochlorine pesticide and PCB analyses.
- No identifiable compounds were detected in the HE analyses.

Spring and Creek Samples

- HE concentrations were detected above LANL SALs for one spring sample (09-7550) with 2,4-DNT at 1.52 µg/L and the creek sample (09-7561) with 2,4-DNT at 0.9 µg/L.

- Low levels of radioactivity were detected but the concentrations did not exceed the LANL SAL values.
- No identifiable compounds were detected in the SVOC analyses.
- No identifiable compounds were detected in the organochlorine pesticide and PCB analyses.
- No identifiable compounds were detected in the VOC analyses.

2.2.3 Evaluation of the RFI Results

Based upon review of the preliminary data, the following conclusions were made:

- Soil samples indicate that surface soils throughout the site have elevated concentrations of metals. However, the elevated concentrations of VOCs, PCBs, and uranium seem to be limited to a small number of samples and would be amenable to "hot spot" excavation of the contaminated areas.
- Residual liquids sampled in various reagent bottles indicated only metal contaminants. These contaminants varied from bottle to bottle, but the analysis indicate that the residual liquids sampled were compatible with one another for disposal purposes.
- Downgradient sediments indicate there is no contamination above SALs in the soils downgradient of the main disposal site.
- Surface water runoff samples indicate that metals are being transported from the site through this mechanism.
- Spring and creek samples indicate that MDA M may not be the cause of the HE contamination found in the water because HE was detected upgradient as well as downgradient of the disposal site.

2.3 Types and Volumes of Waste Present

The nature of the wastes expected to be generated by the proposed cleanup is presented in Table 2-1.

The majority of the waste from Phase I of this EC is expected to be construction debris and scrap metal. Other wastes generated from Phase I of this EC include asbestos, radionuclide-contaminated soil, asbestos-contaminated soil, hazardous waste, decontamination liquid, personal protective equipment (PPE), and sampling waste. Phase II waste is expected to be metal-contaminated soils (assumed to be nonhazardous). These materials will be handled in accordance with the site-specific Waste Management Checklist and segregated for appropriate treatment, storage, and disposal.

TABLE 2-1
ANTICIPATED WASTE VOLUMES

Item	Type	Anticipated Volume
Sampling waste/PPE	solid - potential hazardous	250 cu. ft.
Sampling waste/PPE	solid - potential low-level rad	15 cu. ft.
Decontamination waste	liquid - potential hazardous	500 gal.
Decontamination waste	liquid - potential low-level rad	500 gal.
Debris	solid - clean	5000 cu. yds.
Debris	solid & liquid - potential hazardous	150 cu. yds.
Bulk Soil	solid - potential low-level rad	20 cu. yds.
Bulk Soil	solid - potential hazardous	1000 cu. yds.
Bulk Soil Containing Asbestos	solid - asbestos contaminated	500 cu. yds.
Asbestos	solid	500 cu. yds.

2.4 Potential Impacts on Public Health and the Environment

Receptors of possible contaminants include animals and humans. Potential exposure routes of receptors include the following:

- Inhalation (especially if the SWMU is disturbed);
- Ingestion; and
- Skin contact with contaminated soil, sediment, or debris.

2.4.1 Potential Pathways

2.4.1.1 SWMU - In Place

If the contaminated soil remains in place, several mechanisms are available to transport contaminants from their current location. These mechanisms include:

- surface water runoff (across the contaminated area);
- erosion of soil and sediments; and
- wind dispersion.

The only probable shallow water-bearing zone beneath MDA M is associated with small springs located near the site. The springs or consequent stream flow, if derived from this water-bearing zone, could be impacted through downward migration of contaminants with infiltrating precipitation. Once in the water-bearing zone, lateral movement with the perched groundwater to the point of discharge into the springs is possible.

2.4.1.2 SWMU - Remediation

Possible exposure pathways to workers of contaminants and hazardous materials, including radionuclides, asbestos, and SVOCs, are generally the same as those described in Section 2.4.1.1. While excavation activities will increase the potential for sediment transport and wind dispersion, precautions will be taken to minimize these pathways during remediation or excavation activities. Appropriate dust suppression techniques will be utilized to prevent contaminants from becoming

airborne. Covered storage containers for excavated materials and plastic sheeting covering the excavated area will prohibit rainwater and/or runoff from contacting potentially contaminated material.

2.4.2 Future Land Use

SWMU 9-013 lies entirely on DOE-owned land. The area is removed from public access roads. In the foreseeable future, the land is anticipated to be used exclusively for LANL (industrial) operations, as stated in the Site Development Plan Annual Update 1994 (LANL 1994, 1171).

2.4.3 Cleanup Levels

Identification of the chemicals of potential concern (COPCs) considered for this EC was based on simple comparisons of SWMU 9-013 RFI analytical results to background and SAL concentrations. As presented in Annex 6.9, analytical results from the Phase I RFI sampling indicate that lead is the primary contaminant of concern for soil contamination at the site.

A soil lead cleanup level of 3,000 ppm is proposed for LANL industrial sites undergoing Expedited Cleanups. This cleanup level was derived for an adult under an industrial exposure scenario and is considered conservative. The soil lead cleanup level was calculated using a computer spreadsheet algorithm for estimating blood lead concentrations in adults based on the multi-pathway analysis developed by the California Department of Toxic Substances Control (DTSC 19920). The DTSC algorithm is similar to the EPA's Integrated Exposure Uptake Biokinetic Model (IEUBK) for children. However, unlike the IEUBK model which addresses children only, the DTSC computer spreadsheet can calculate blood levels for an adult.

A blood lead concentration of 10µg/dl is the target blood lead level for exposure to lead in the environment, regardless of the source. Sources include drinking water, grocery store food products, soil (incidental soil ingestion and dermal contact), and the air. Therefore, the calculation of a soil lead cleanup level for an industrial exposure scenario includes the contribution to blood levels from non-site sources.

The soil lead cleanup level includes the contribution to blood lead levels from non-site sources as well as on-site soil contact, soil ingestion, and inhalation pathways and was calculated not to exceed the target level of 10 µg/dl at 95th percentile concentration. The contact rate for soil ingestion was changed form 0.03 g soil/day to 0.05 g soil/day to reflect on-site industrial exposure pathway. The lead concentrations used in the water and food ingestion pathways are default values and represent background lead levels that may be encountered in tap water and grocery store food products. All other exposure input parameters are default values based on a residential exposure scenario. A model input description and assumptions are presented in Annex 6.10.

Cleanup levels for other potential contaminants of concern for this EC effort are presented in Table 2-2 below. Typically, the Laboratory derives cleanup levels assuming an acceptable level of risk of 1E-06 for carcinogens, and a hazard index of 0.1 for noncarcinogens. This conservative approach is adopted to account for the presence of multiple constituents. With this approach, the residual risk remaining at the site following remediation will be within the EPA acceptable risk range of 1E-04 to 1E-06 for carcinogens, and less than a hazard index of 1 for noncarcinogens. The equations and assumptions used for the calculation of cleanup levels in this Plan are provided in Annex 6.10.

TABLE 2-2
CLEANUP LEVELS FOR SWMU 9-013

Chemical	Cleanup Level (mg/kg)	Rationale
Arsenic	25	Carcinogen. Based on a risk level of 10^{-5}, a risk level of 10^{-6} creates a cleanup level lower than background.
Chromium III	204,400	Noncarcinogenic. Based on a hazard index of 0.1.
Chromium VI	38	Carcinogenic Chromium VI. Based on a risk level of 10^{-5}, a risk level of 10^{-6} creates a cleanup level lower than background.
Copper	7,500	Noncarcinogenic. Based on a hazard index of 0.1.
Mercury	54	Noncarcinogenic. Based on a hazard index of 0.1.
PAH	10	Carcinogenic. Based on a risk level of 10^{-5} for benzo[a]pyrene.
PCB	10	Carcinogenic. Based on a risk level of 10^{-5}.

Results from the RFI sampling indicate that leaching of metals from soils and sediments at this SWMU did not contribute concentrations of metals downgradient of the site which would pose an unacceptable risk to human health or the environment. When ecological screening thresholds (currently under development) are completed the downgradient sample results will be evaluated to determine if further action is required. If assessment results indicate that leaving these soils in place may pose an unacceptable risk, they will be excavated and disposed of during the EC. Results of the ecological assessment will be provided in the final report for this EC.

3.0 EXPEDITED CLEANUP

3.1 Overview and Rationale

Phase I RFI sampling results indicate heavy metals, organics, and uranium are present above SALs in surface and near-surface soils at the site. Additionally, asbestos was visually confirmed to be present at several locations in the disposal area. Residual liquids sampled in various bottles indicate the presence of heavy metals in the liquid. The potential for erosion and off-site transport of contaminants exists at the site and was partially confirmed by the metal contaminants found in the surface water runoff samples. The proposed EC Plan (described in Section 3.3) will be implemented to remove the surface debris, asbestos, and "hot spots" of radionuclide and organic contamination as part of Phase I. Phase II will address the contaminated soil beneath the surface debris.

3.2 Permitting, Approval, and Notification Requirements

An excavation permit will be prepared and submitted for approval before execution of this plan.

An asbestos permit issued by the New Mexico Environment Department (NMED) through Environment, Safety, and Health (ESH)-17 will be prepared and submitted for approval before execution of this plan.

Documentation will be prepared in accordance with LANL Environmental Restoration (ER) Administrative Procedure (AP) LANL-ER-AP-05.1, Rev. 0, Readiness Review for Environmental Restoration Program Field Activities. Key documents to be prepared include a SSHASP, and site-specific waste management checklist. Personnel training requirements will be specified and will require completion prior to implementation of this EC Plan. Site workers must have received all training for this project as specified in the SSHASP.

3.2.1 Regulatory Notification/Permit Modifications

SWMU 9-013 is included in Table A of the HSWA Module. Implementation of this EC will require a Class III modification to the HSWA Module. EPA and NMED have been notified of this project, and a request for a permit modification have been submitted. Implementation of this EC will proceed upon receipt of EPA approval.

3.2.2 DOE Approval

If the Laboratory intends to implement this EC prior to receiving EPA approval, DOE approval is documented through receipt of the signed Field Work Approval Form (Annex 6.7).

3.3 Cleanup Activities

The cleanup of this SWMU will be performed in two phases. The first phase is designed to remove all surface debris. The site has been divided into 167 cells measuring 25-ft by 25-ft. In each cell, all surface debris will be removed and segregated. This will facilitate the verification sampling of soil beneath the debris. The second phase will address surface and near-surface soil contamination currently beneath the surface debris.

3.3.1 Phase I

The following activities will be performed as part of Phase I:

- The road to the site will be graded to allow for heavy equipment traffic.
- The trench and berm surrounding the main site will be regraded to close existing breaches and route surface water runoff around the site.
- Staging areas for waste segregation and exclusion zones will be established.
- An asbestos subcontractor will mobilize to the site and remove, segregate, transport, and dispose of all asbestos and asbestos-containing material (ACM).
- A cell-by-cell cleanup will be performed. In each cell the debris will be segregated by waste stream, e.g., metal, glass, wood, concrete. The waste streams will be field screened for radionuclide-contamination before transport and disposal.
- When a cell has been cleared of surface debris it will be field screened for radionuclide and organic contamination. If the cell is found to be contaminated, that area will be roped off and marked.
- Any contaminated cells will undergo "hot spot" excavation to remove the contaminated soils. The excavated soil will be containerized and analyzed by the field laboratory to determine appropriate disposal requirements.
- A geophysical survey will be performed on the cleared site to identify any buried objects. If anything is found buried in the subsurface, further excavation will be required and will be performed as part of Phase II.
- Confirmatory sampling will be performed (see Section 3.5).

It is important to note that these activities may not occur in the order written and that, whenever possible, will occur simultaneously to expedite the cleanup process.

3.3.2 Phase II

At the completion of Phase I confirmatory sampling Phase II will be initiated. The first activity will be to evaluate the sampling results and compare them to the data contained in Annex 6.9 from the RFI. If the new data are consistent will the RFI data then cleanup will proceed with the following activities identified as part of Phase II:

- Establish staging areas and exclusion zones.
- Collect Toxicity Characteristic Leaching Procedure (TCLP) samples for metals to ascertain if the contaminated soil will be considered a hazardous waste upon excavation.
- Identify and flag sites for excavation based on the analytical results and cleanup levels.
- Excavate areas exceeding cleanup levels and bulk soils into containers for transport and disposal.
- Collect verification samples (see Section 3.5).
- Backfill excavation with clean fill and perform site restoration (see Section 3.6).

If the EC Phase I data differ from the data contained in Annex 6.9, new cleanup levels will be established and the remediation plans reevaluated.

3.4 Waste Management Issues

As indicated in Section 2.3 wastes to be generated during this EC include asbestos, scrap metal and other debris, potentially contaminated soils, and decontamination waste. All waste will be disposed of in accordance with the site-specific Waste Management Checklist.

3.4.1 Characterization of Materials for Disposal

Field screening for radioactivity and organic vapors will be conducted on the segregated waste streams generated during the EC. Additionally, liquids and soils will be analyzed by a field laboratory, as well as a representative sample sent to an off-site laboratory for TCLP, to determine appropriate disposal requirements.

3.4.2 Treatment, Storage, and Disposal Plans for Waste

The majority of the waste generated from this EC will be nonhazardous debris/scrap metal which will either be salvaged or sent to a local landfill. The asbestos and ACM will be transported to a permitted asbestos landfill for final disposal. Hazardous waste will be transported to a permitted treatment, storage, and disposal (TSD) facility for final disposal. Low-level radionuclide-contaminated waste will be sent to TA-54 for final disposal. All waste streams will be segregated and disposed of in accordance with the Waste Management Checklist.

3.5 Verification Plan

Confirmatory/verification samples will be collected during each phase of the EC as identified in Table 3-1.

Phase I

Confirmatory sampling will be performed to confirm and supplement the results from the RFI sampling effort which were used to calculate the cleanup levels.

Based on available analytical data, lead is the primary contaminant of concern in the soils at MDA M. Therefore, this Phase I sampling plan design is based on the observed distribution of lead contamination in the available data.

The number of samples to be collected to determine whether an exposure unit requires remediation is dictated by the sampling frequency needed to achieve statistically defensible data. In this case, the areas that may require excavation in Phase II, correspond to the default industrial scenario exposure unit of 500 m^2 (24 units are located on the 3.2 acre site). Therefore, the 500 m^2 areas will be sampled, as required, to determine if remediation is warranted because an area exceeds cleanup levels. *Methods for Evaluating the Attainment of Cleanup Standards, Volume 1, Solid Media* (EPA 1988) provides the formulae for calculating the number of random samples needed to determine if the mean concentration in the area exceeds the cleanup goals at a specified level of confidence.

The equations and calculations used to determine the sampling frequency are contained in Annex 6.11. Application of this approach with the assumptions outlined (see Annex 6.11) results in a confirmatory sample size of 7 random samples within each 500 m^2 exposure unit, for a total of 168 samples. All 7 soil samples within each unit (or 168 total) will be field screened with an x-ray fluorescence (XRF) instrument to measure metal concentrations, two of the seven samples within each unit (or 48 total) will be submitted to the field laboratory for metals, SVOC, and PCB analyses, and 10% of those analyzed in the field laboratory (or 5 total) will be sent off-site for fixed laboratory analysis to verify field laboratory results. This sampling design is driven by the data requirements to determine if lead concentrations in the soil are greater than the cleanup goals. The other analytes,

SVOCs and PCBs, were observed at lower concentrations in the RFI data, and therefore fewer samples are required to determine if remediation is warranted based on their cleanup goals.

Results from the XRF samples will be used to calculate the 95% upper confidence limit (UCL) to compare to the cleanup levels established for the metal constituents. Results from the laboratory analyses will be used to calculate the 95% UCL to compare to the cleanup levels established for the non-metal constituents. Site remediation will be required if the calculated UCLs are greater than the established cleanup goals.

Phase II

Verification samples will be collected from the excavation, if any, and from the soil surrounding the excavation. Samples collected from the soil beneath the excavated soil will be analyzed to verify that total metals do not exceed the cleanup levels that were defined by the risk assessment. If Phase I confirmatory sampling should indicate that SVOCs and PCBs need to be remediated, then the samples will be analyzed for those constituents as well. A composite sample will be collected from each grid that was excavated, as well as random samples obtained from soil surrounding the excavations. A combination of field screening, field laboratory analytical techniques, and off-site, fixed laboratory analysis will be used to verify results.

Results from the laboratory verification samples will be used to calculate the 95% UCL to compare to the cleanup level established for each contaminant. The site cleanup objectives will be obtained when the calculated UCL is less than the established cleanup levels (USEPA, 1989).

3.6 Site Restoration Plan

Any excavation that was necessary during cleanup will be backfilled with clean fill. The site will then be graded and compacted to prevent any undue or unnatural erosion and contoured to harmonize with the surroundings. Erosion protection such as flow diversions, berms, and revegetation will be used to minimize erosion. The area will be seeded with native grasses to return the site to its pre-Laboratory condition.

3.7 Acceptance Inspection

The Laboratory proposes an Acceptance Inspection as the mechanism for DOE and EPA to assess the implementation and effectiveness of the EC. A minimum of 10 days' notification will be provided to the agencies before the start of field activities. At this time, a tentative date for the inspection will be agreed upon.

An inspection checklist will be used to document the scope of the inspection and will become part of the EC Final Report. The checklist and timing of the inspection will be developed by the Laboratory and agreed to by the other agencies. The inspection checklist will contain specific items, criteria, and requirements to be inspected that will constitute acceptance of remediation activities.

The Acceptance Inspection will be conducted by an independent professional skilled in the appropriate technical discipline. During the Acceptance Inspection, written resolution and an anticipated schedule for completion will be identified for any outstanding items, and documented on the inspection checklist. The

TABLE 3-1
SUMMARY OF VERIFICATION SAMPLES AND ANALYSES
FOR SWMU 9-013

Sample Description	Field Screening					Field Laboratory Analysis					Fixed Laboratory Analysis					
	Beta-Gamma	Alpha	Organic Vapor (head space)	Radiological Smear & Swipe Techniques	XRF	PCBs	VOCs (SW 8260)*	SVOCs (SW 8270)*	Metals (ICPES)	Gross Gamma, Alpha, Beta	PCBs	VOCs (SW 8260)*	Metals (SW 6010/7000)*	SVOCs (SW8270)*	Total Uranium	Gamma Spectrometry
Phase I Surface Soil Samples	168	168	168		168	48		48	48	48	5		5	5	5	
Phase II Surface Soil Samples	15	15	15		15	2		2	2	2	1		1	1	1	
Duplicate						3		3	3	3	1		1	1	1	
Decontamination Water						2		2	2	2						
Excavation Equipment				6												

Note: Additional samples may be taken based on field surveys and observations.
*: Applicable EPA SW 846 methods.

Laboratory FPL, or designee, will be responsible for completing outstanding inspection items and documenting their resolution in the EC Final Report.

Upon completion of remediation activities, the Laboratory will submit a written certification to EPA Region 6, stating that the remedy has been completed in accordance with the EC Plan and Acceptance Inspection Checklist. The certification will be signed by the permitee and by the independent professional conducting the inspection. The certification will accompany the EC Final Report.

3.8 Final Report

Following the return of analytical data from the verification sampling and completion of all field activities, a final report will be prepared. A proposed outline for this report is presented as Annex 6.8.

4.0 PROJECT MANAGEMENT

Overall implementation of this expedited cleanup will be managed by Cheryl Rofer, the Field Project Leader (FPL). Luan Walker will serve as the Field Team Leader (FTL) for the EC activities.

4.1 Staff and Resource Requirements

Total anticipated costs for the EC are $487,050, as detailed below.

Pre-Field Activities	
Preparation of Waste Management Plan	$2,000
Preparation of Site-Specific Health and Safety Plan	2,500
Field Work Preparation (including subcontracting)	7,000
Subtotal	$11,500
Field Activities	
Regrade Road & Trench:	
2 Laborers @ $50/hr x 5 days	$4,000
Heavy Equipment (JCI)	
Grader @ $85/day	425
Truck @ $75/day	375
Surface Debris Cleanup:	
167 cells total, assume 5 cells/day = 34 days of field work for surface debris	
FTL @ $70/hr x 34 days	19,040
SSO/RCT @ $70/hr x 34 days	19,040
3 Laborers @ $50/hour x 34 days	40,800
Heavy Equipment (JCI)	
Backhoe @ $75/day	2,550
Forklift @ $75/day	2,550
Crane @ $75/day	2,550
3 Equipment Operators @ $50/hr	40,800
Geophysical Subcontractor	6,000
Asbestos Subcontractor	91,400
Subtotal	$229,530
Waste Disposal	
Scrap Metal/Debris:	
Cost assumes JCI hauls materials to salvage or county landfill	
250 loads @ 4 loads/day/truck (assume 2 trucks) = 32 days	
4 Operators @ $50/hr x 32 days	$51,200
2 Trucks @ $75/day	4,800
Disposal of 5,000 cu. yds. (assume $100/load)	25,000
Metal Contaminated Soil (assumes nonhazardous):	
Disposal of 1000 cu. yds. @ $25/cu. yd.	25,000
Hazardous Waste:	
Disposal of 150 cu. yds. @ $500/cu yd	75,000
Low-Level Waste:	
Disposal of 20 cu. yds. @ $1150/cu yd	23,000
Subtotal	$181,500

Phase I Sampling/Analytical	
Assume 168 XRF samples to be field screened, 48 of those sent to on-site lab for metals, SVOC, and PCBs, and 10% (and 2 duplicates) sent off-site for metals, SVOCs, and PCBs.	
Assume 2 sampling teams for 5 days	
4 Sampling Technicians @ $60/hr	$9.600
7 Samples sent off-site @ $1250/sample	8,750
Rad Van @ $2000/day	10,000
Chem Van @ $2000/day	10,000
Subtotal	38,350
Phase II Sampling/Analytical	
Assume 15 grids @ 1 sample/grid with 10% (and 1 duplicate) sent off-site	
Assume 1 sampling team for 2 days	
2 Sampling Technicians @ $60/hr	1,920
3 samples sent off-site @ $1250/sample	3,750
Rad Van @ $2000/day	4,000
Chem Van @ $2000/day	4,000
Subtotal	$13,670
Post-Field Activities	
Acceptance Inspection (including checklist)	$2,500
Final Report	10,000
Subtotal	$12,500
TOTAL ESTIMATED COST	**$487,050**

4.2 Schedule

The proposed EC schedule is shown in Table 4-1. The submittal of this plan to EPA in May 1995 will initiate the 60-day public review/comment period. No sooner than 15 days after the start of this period, a public meeting will be held. Preparation for field work will be conducted concurrent to the public review period. Field work will be initiated within 10 days of agency and public approval or receipt of EPA temporary authorization to proceed. The final report will be submitted to EPA within 14 days of receipt of final verification sample results.

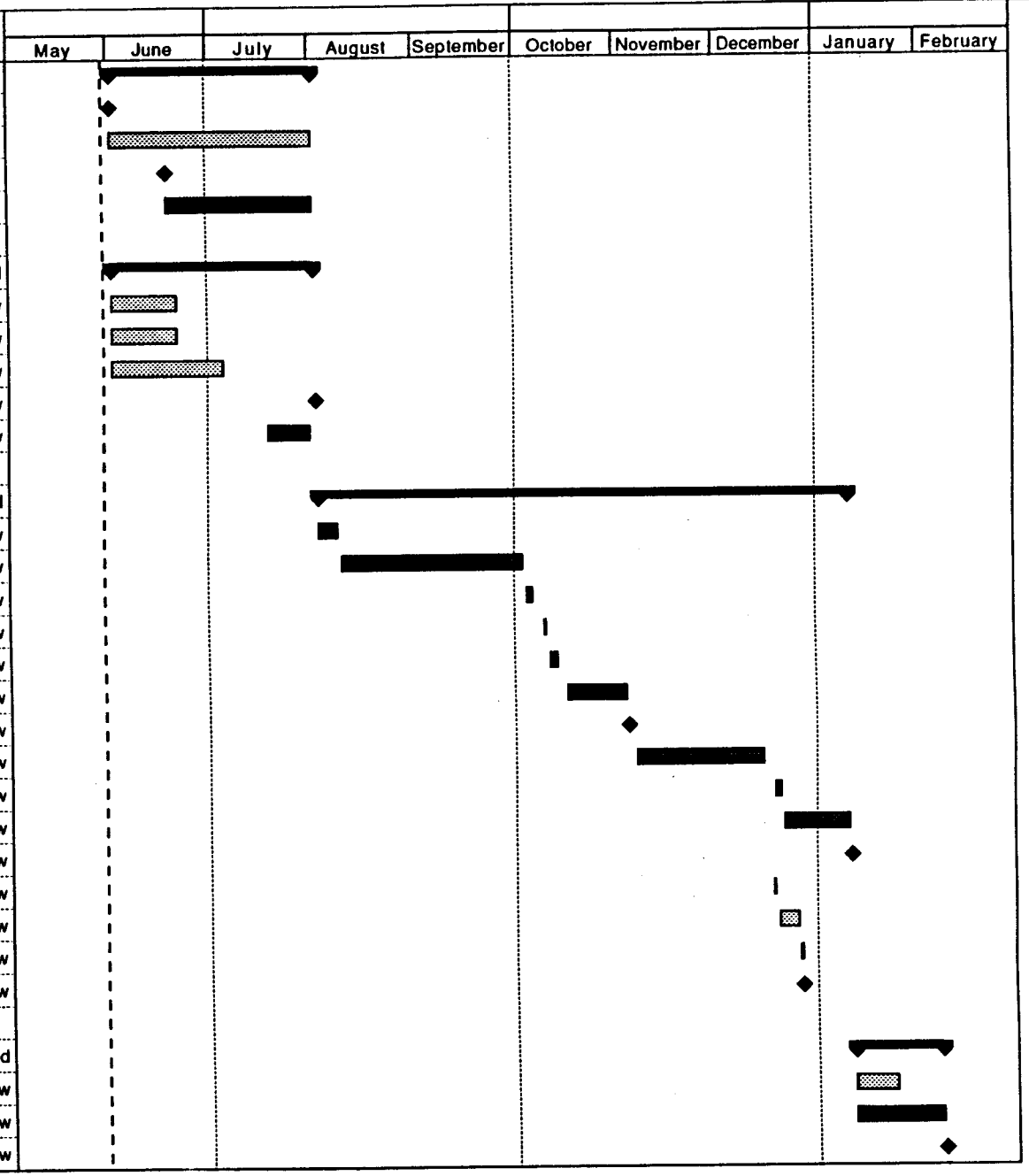
4.3 Stakeholder Notifications

Stakeholder notifications are an integral part of the procedure for conducting ECs. The ER Project will notify state and local governments, external and internal stakeholders and individuals on the ER Project mailing list of the availability of the EC Plan. The EC Plan will be available to the stakeholders at the LANL Community reading Room in Los Alamos, at the document repositories in the Los Alamos, Espanola, and Santa Fe public libraries and at the Governor's office at San Ildefonso Pueblo.

The submission of this EC Plan to EPA will trigger publication of a public notice indicating the start of the 60-day comment period.

TABLE 4-1 PROPOSED SCHEDULE - SWMU 9-013

ID	Name	Duration
1	1.0 PUBLIC ACCEPTANCE	61.38ed
2	1.1 SUBMIT EC PLAN TO EPA	0w
3	1.2 PUBLIC COMMENTS	44d
4	1.3 PUBLIC MEETING	0ew
5	1.4 RESPOND TO PUBLIC COMMENT	6.4w
6		
7	2.0 PLANNING	61.38ed
8	2.1 PREPARE/REVISE HEALTH AND SAFETY PLAN	3w
9	2.2 PREPARE/REVISE WASTE MANAGEMENT PLAN	3w
10	2.3 FIELD WORK PLANNING	5w
11	2.4 FIELD WORK APPROVAL FORM SIGNED	0w
12	2.5 10-DAY NOTIFICATION OF FIELD WORK	2w
13		
14	3.0 IMPLEMENT EXPEDITED CLEANUP	161.38ed
15	3.1 MOBILIZATION	1w
16	3.2 PERFORM SURFACE DEBRIS REMOVAL	8w
17	3.3 HOT SPOT EXCAVATION	0.6w
18	3.4 GEOPHYSICAL SURVEY	0.4w
19	3.5 VERIFICATION SAMPLING	0.6w
20	3.6 VERFICATION ANALYSIS	3w
21	3.7 ANALYSIS COMPLETE	0w
22	3.8 PHASE II EC	6w
23	3.5 VERIFICATION SAMPLING	0.6w
24	3.6 VERFICATION ANALYSIS	3w
25	3.7 ANALYSIS COMPLETE	0w
26	3.9 ACCEPTANCE INSPECTION	0.2w
27	3.10 SITE RESTORATION	1w
28	3.11 DEMOBILIZATION	0.2w
29	3.12 COMPLETE EC	0w
30		
31	4.0 REPORT PREPARATION	27.38ed
32	4.1 VALIDATE SAMPLE DATA	2w
33	4.2 PREPARE FINAL REPORT	4w
34	4.3 SUBMIT REPORT	0w



Project:
Date: 5/30/95

Critical Noncritical Progress Milestone Summary

Los Alamos National Laboratory

5.0 REFERENCES

DOE (US Department of Energy), October 1987. "Phase I: Installation Assessment, Los Alamos National Laboratory," Volumes 1 and 2 (draft), Comprehensive Environmental Assessment and Response Program, Albuquerque Operations Office, Albuquerque, New Mexico. (DOE 1987, 0264)

EPA (US Environmental Protection Agency), July 27, 1990. "Corrective Action for Solid Waste Management Units (SWMUs) at Hazardous Waste Management Facilities," proposed rule, Title 40 Parts 264, 265, 270, and 271, Federal Register, Vol. 55, pp. 30798-30884. (EPA 1990, 0432)

EPA (US Environmental Protection Agency), February 1989. "Methods for Evaluating the Attainment of Cleanup Standards," Volume 1: Soils and Solid Media, EPA 230/02-89-042, National Technical Information Service, Springfield, Virginia. (EPA 1989, 0794)

ICF Kaiser, July 1992. "Supplemental Guidance for Human Health Multimedia Risk Assessments of Hazardous Waste Sites and Permitted Facilities." Prepared by The Office of the Science Advisor, State of California Environmental Protection Agency, Department of Toxic Substances Control

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Volumes I through IV, Los Alamos National Laboratory Report LA-UR-90-3400, prepared by International Technology Corporation, Los Alamos, New Mexico. (LANL 1990, 0145)

LANL (Los Alamos National Laboratory), January 1993. "Los Alamos National Laboratory Environmental Restoration Program Standard Operating Procedures," prepared by Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1993, 0875)

LANL (Los Alamos National Laboratory) April 1993. "Administrative and Quality Procedures for Environmental Restoration," prepared by Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1993, 0951)

LANL (Los Alamos National Laboratory), June 1993. "RFI Work Plan for Operable Unit 1157," Los Alamos National Laboratory Report LA-UR-93-1230, Los Alamos, New Mexico. (LANL 1993, 1088)

LANL (Los Alamos National Laboratory), November 1993. "Installation Work Plan for Environmental Restoration," Revision 3, Los Alamos National Laboratory Report LA-UR-93-3987, Los Alamos, New Mexico. (LANL 1993, 1017)

LANL (Los Alamos National Laboratory), 1994. "Site Development Plan Annual Update 1994," prepared by Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1994, 1171)

6.0 ANNEXES

6.1 Implementation SOPs

See Environmental Restoration Standard Operating Procedures, Volumes I and II, November 17, 1993, Los Alamos National Laboratory.

6.2 Quality Assurance Plan

See Quality Program Plan and Quality Assurance Project Plan for Environmental restoration, February 1995 revision, Los Alamos National Laboratory.

6.3 Site-Specific Health and Safety Plan

See Los Alamos National Laboratory Environmental Restoration Project Health and Safety Plan (HASP) (LANL, February 11, 1995).

6.4 Records Management Plan

See Installation Work Plan for Environmental Restoration, Revision 4, Chapter IV, Records Management Program Plan.

6.5 Public Involvement Plan

See Installation Work Plan for Environmental restoration, Revision 4, Chapter V, Public Involvement Program Plan.

6.6 Waste Management Plan

6.7 Field Work Approval Form

6.8 Proposed Outline for Expedited Cleanup Final Report

6.9 RFI Analytical Results

6.10 Risk-Based Cleanup Level Calculations

6.11 Phase I Sampling Calculations

ANNEX 6.7

FIELD WORK APPROVAL FORM

This form must be completed prior to starting remediation field work for Expedited Cleanups that do not have an EPA-approved work plan.

I, _____, DOE-LAAO, APPROVE the field work as proposed in the accompanying Expedited Cleanup Plan for SWMU 9-013, TA-9.

I, _____, DOE-LAAO, DO NOT APPROVE the field work as proposed in the accompanying Expedited Cleanup Plan for SWMU 9-013, TA-9.

The following reasons reflect the decision for disapproval:

Signed: _____ Date:_____

ANNEX 6.8

PROPOSED OUTLINE FOR EXPEDITED CLEANUP REPORT

1.0 SUMMARY OF EXPEDITED CLEANUP

- 1.1 Overview
- 1.2 Expedited Cleanup

2.0 DISCUSSION OF SAMPLING AND ANALYSIS

- 2.1 Verification Sampling and Analysis
  - 2.1.1 Sampling Objectives
  - 2.1.2 QA/QC
  - 2.1.3 Sampling Activities
- 2.2 Site Restoration

3.0 MODIFICATIONS TO THE EC PLAN

4.0 QUANTITIES AND TYPES OF WASTE GENERATED

5.0 OUTSTANDING PROBLEMS FROM THE ACCEPTANCE INSPECTION

6.0 PROBLEMS ENCOUNTERED AND LESSONS LEARNED

APPENDICES

A ANALYTICAL DATA
B ACCEPTANCE INSPECTION CHECKLIST
C WASTE STREAM INVENTORY
D PHOTOGRAPHS
E CERTIFICATION OF COMPLETION

ANNEX 6.9

RFI ANALYTICAL RESULTS

MDA-M Soil Detects above UTL and/or SAL

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
09-7018	0 - 1 ft.	AAB0922	Cadmium	10.1	MG/KG	80	2.7
			Copper	1620	MG/KG	3000	15.7
			Iron	37300	MG/KG	n/a	35586
			Lead	347	MG/KG	400	39
			Mercury	0.25	MG/KG	24	0.1
			Nickel	43.8	MG/KG	1600	26.7
			Silver	26.4 (J)	MG/KG	400	1.61
			Zinc	1650	MG/KG	24000	101
09-7037	0 - 1 ft.	AAB0924	Anthracene	32	MG/KG	24000	4.29
			Arsenic	113	MG/KG	n/a	11.6
			Benzo[a]anthracene	160	MG/KG	1	12.4
			Benzo[a]pyrene	130	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	200	MG/KG	1	12.2
			Benzo[g,h,i]perylene	64	MG/KG	n/a	5.9
			Benzo[k]fluoranthene	77	MG/KG	1	19.4
			Calcium	57700	MG/KG	n/a	54362
			Chrysene	190	MG/KG	96	19.5
			Copper	25.1	MG/KG	3000	15.7
			Dibenzo[a,h]anthracene	23	MG/KG	0.1	2.9
			Dieldrin	0.048 (J)	MG/KG	0.044	n/a
			Fluoranthene	310	MG/KG	3200	32.5
			Indeno[1,2,3-cd]pyrene	80	MG/KG	1	6
			Lead	41.6	MG/KG	400	39
			Phenanthrene	150	MG/KG	n/a	24.2
			Pyrene	280	MG/KG	2400	12.8
			Zinc	105	MG/KG	24000	101
09-7054	0 - 1 ft.	AAB0926	Cadmium	4.6	MG/KG	80	2.7
			Copper	188	MG/KG	3000	15.7
			Lead	201	MG/KG	400	39
			Mercury	0.26	MG/KG	24	0.1
			Nickel	32	MG/KG	1600	26.7
			Silver	9.6 (J)	MG/KG	400	1.61
			Zinc	516	MG/KG	24000	101
09-7058	0 - 1 ft.	AAB0928	Copper	48.3	MG/KG	3000	15.7
			Lead	40.6	MG/KG	400	39
			Mercury	0.34	MG/KG	24	0.1
			Zinc	1660	MG/KG	24000	101
09-7061	0 - 1 ft.	AAB0930	Calcium	103000	MG/KG	n/a	54362
			Copper	24.2	MG/KG	3000	15.7
			Lead	119	MG/KG	400	39
			Zinc	185	MG/KG	24000	101
09-7085	0 - 1 ft.	AAB0932	Barium	1470	MG/KG	5600	1143
			Cadmium	25.6	MG/KG	80	2.7
			Chromium	43.1	MG/KG	n/a	34.2
			Copper	1190	MG/KG	3000	15.7
			Lead	882	MG/KG	400	39
			Mercury	0.58	MG/KG	24	0.1
			Nickel	62.9	MG/KG	1600	26.7
			Silver	107 (J)	MG/KG	400	1.61
			Zinc	2790	MG/KG	24000	101
09-7093	0 - 1 ft.	AAB0934	Antimony	22.2	MG/KG	32	2.5
			Arsenic	13	MG/KG	n/a	11.6

MDA-M Soil Detects above UTL and/or SAL

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Barium	2090	MG/KG	5600	1143
			Cadmium	13.7	MG/KG	80	2.7
			Chromium	38.6	MG/KG	n/a	34.2
			Copper	2820	MG/KG	3000	15.7
			Iron	42800	MG/KG	n/a	35586
			Lead	4930	MG/KG	400	39
			Nickel	85.9	MG/KG	1600	26.7
			Silver	102 (J)	MG/KG	400	1.61
			Zinc	4550	MG/KG	24000	101
09-7104	0 - 1 ft.	AAB0936	Cadmium	3.4	MG/KG	80	2.7
			Copper	73.5	MG/KG	3000	15.7
			Lead	9850	MG/KG	400	39
			Zinc	109	MG/KG	24000	101
09-7104	0 - 1 ft.	AAB0938	Copper	34	MG/KG	3000	15.7
			Lead	60.6	MG/KG	400	39
09-7130	0 - 1 ft.	AAB0942	Copper	21.4	MG/KG	3000	15.7
			Lead	40.8	MG/KG	400	39
			Mercury	0.33	MG/KG	24	0.1
09-7142	0 - 1 ft.	AAB0944	Cadmium	3.1	MG/KG	80	2.7
09-7143	0 - 1 ft.	AAB0946	Manganese	1250	MG/KG	11000	1030
09-7162	0 - 1 ft.	AAB2786	Cadmium	3.5	MG/KG	80	2.7
09-7301	0 - 1 ft.	AAB2738	Cadmium	6.7	MG/KG	80	2.7
			Copper	829	MG/KG	3000	15.7
			Lead	10200 (J)	MG/KG	400	39
			Manganese	1240	MG/KG	11000	1030
			Mercury	0.67	MG/KG	24	0.1
			Nickel	30.4	MG/KG	1600	26.7
			Silver	41.6	MG/KG	400	1.61
			Zinc	604	MG/KG	24000	101
09-7303	0 - 1 ft.	AAB2742	Antimony	18.4	MG/KG	32	2.5
			Aroclor 1254	2.6	MG/KG	1	n/a
			Barium	1300	MG/KG	5600	1143
			Benzo[a]pyrene	1	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	1.3	MG/KG	1	12.2
			Cadmium	13.4	MG/KG	80	2.7
			Copper	592	MG/KG	3000	15.7
			Dibenzo[a,h]anthracene	0.7	MG/KG	0.1	2.9
			Lead	695 (J)	MG/KG	400	39
			Mercury	0.78	MG/KG	24	0.1
			Nickel	52.4	MG/KG	1600	26.7
			Silver	61.4	MG/KG	400	1.61
			Zinc	1620	MG/KG	24000	101
09-7304	0 - 1 ft.	AAB2744	Antimony	271	MG/KG	32	2.5
			Cadmium	5.4	MG/KG	80	2.7
			Copper	95.5	MG/KG	3000	15.7
			Lead	11600 (J)	MG/KG	400	39
			Mercury	29	MG/KG	24	0.1
			Zinc	1820	MG/KG	24000	101
09-7306	0 - 1 ft.	AAB2748	Copper	27.3	MG/KG	3000	15.7
09-7307	0 - 1 ft.	AAB2750	Cadmium	3.8	MG/KG	80	2.7
			Copper	101	MG/KG	3000	15.7

MDA-M Soil Detects above UTL and/or SAL

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Lead	2310 (J)	MG/KG	400	39
			Silver	3.1	MG/KG	400	1.61
			Zinc	499	MG/KG	24000	101
09-7308	0 - 1 ft.	AAB2752	Barium	2130	MG/KG	5600	1143
			Cadmium	10	MG/KG	80	2.7
			Cadmium	10.7	MG/KG	80	2.7
			Copper	725	MG/KG	3000	15.7
			Copper	4770	MG/KG	3000	15.7
			Lead	497 (J)	MG/KG	400	39
			Lead	1075	MG/KG	400	39
			Mercury	0.12	MG/KG	24	0.1
			Nickel	53.6	MG/KG	1600	26.7
			Nickel	66.6	MG/KG	1600	26.7
			Silver	71.4	MG/KG	400	1.61
			Silver	85.3	MG/KG	400	1.61
			Zinc	1120	MG/KG	24000	101
			Zinc	1039	MG/KG	24000	101
09-7308	0 - 1 ft.	AAB2754	Barium	1160	MG/KG	5600	1143
			Cadmium	24.4	MG/KG	80	2.7
			Copper	2110	MG/KG	3000	15.7
			Iron	64600	MG/KG	n/a	35586
			Lead	422 (J)	MG/KG	400	39
			Mercury	0.13	MG/KG	24	0.1
			Nickel	57.7	MG/KG	1600	26.7
			Silver	83.7	MG/KG	400	1.61
			Zinc	900	MG/KG	24000	101
09-7309	0 - 1 ft.	AAB2756	Cadmium	4.4	MG/KG	80	2.7
			Cadmium	2.8	MG/KG	80	2.7
			Copper	81	MG/KG	3000	15.7
			Copper	131	MG/KG	3000	15.7
			Lead	49.6	MG/KG	400	39
			Lead	42.5	MG/KG	400	39
			Zinc	399	MG/KG	24000	101
			Zinc	486	MG/KG	24000	101
09-7310	0 - 1 ft.	AAB2758	Copper	42762	MG/KG	3000	15.7
			Copper	10100	MG/KG	3000	15.7
			Lead	145	MG/KG	400	39
			Lead	162	MG/KG	400	39
			Mercury	0.25	MG/KG	24	0.1
			Mercury	0.28	MG/KG	24	0.1
			Silver	2.44	MG/KG	400	1.61
			Uranium-234	150.622	PCI/G	86	2.03
			Uranium-234	140.527	PCI/G	86	2.03
			Uranium-235	7.027	PCI/G	18	0.088
			Uranium-235	6.718	PCI/G	18	0.088
			Uranium-238	144.503	PCI/G	59	1.9
			Uranium-238	149.741	PCI/G	59	1.9
			Zinc	720.58	MG/KG	24000	101
			Zinc	3790	MG/KG	24000	101
09-7311	0 - 1 ft.	AAB2760	Copper	76.8	MG/KG	3000	15.7
			Lead	65.7	MG/KG	400	39
			Silver	5.9	MG/KG	400	1.61

MDA-M Soil Detects above UTL and/or SAL

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Zinc	151	MG/KG	24000	101
09-7312	0 - 1 ft.	AAB2762	Aroclor 1254	1.6	MG/KG	1	n/a
			Barium	1290	MG/KG	5600	1143
			Cadmium	12.4	MG/KG	80	2.7
			Copper	770	MG/KG	3000	15.7
			Lead	528	MG/KG	400	39
			Mercury	1.4	MG/KG	24	0.1
			Nickel	37.9	MG/KG	1600	26.7
			Silver	109	MG/KG	400	1.61
			Zinc	1680	MG/KG	24000	101
09-7313	0 - 1 ft.	AAB2764	Cadmium	4.4	MG/KG	80	2.7
			Copper	73.7	MG/KG	3000	15.7
			Lead	43.3	MG/KG	400	39
			Silver	10.6	MG/KG	400	1.61
			Zinc	137	MG/KG	24000	101
09-731●	0 - 1 ft.	AAB2766	Cadmium	5.5	MG/KG	80	2.7
			Calcium	122000	MG/KG	n/a	54362
			Copper	66.1	MG/KG	3000	15.7
			Lead	52	MG/KG	400	39
			Silver	6.8	MG/KG	400	1.61
			Zinc	185	MG/KG	24000	101
09-7315	0 - 1 ft.	AAB2770	Cadmium	13.2	MG/KG	80	2.7
			Copper	56.3	MG/KG	3000	15.7
			Iron	88600	MG/KG	n/a	35586
09-7316	0 - 1 ft.	AAB2772	Arsenic	14.4	MG/KG	n/a	11.6
			Benzo[a]anthracene	4.7	MG/KG	1	12.4
			Benzo[a]pyrene	3.1	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	4.9	MG/KG	1	12.2
			Benzo[k]fluoranthene	1.5	MG/KG	1	19.4
			Cadmium	13.3	MG/KG	80	2.7
			Chromium	51.6	MG/KG	n/a	34.2
			Copper	262	MG/KG	3000	15.7
			Dibenzo[a,h]anthracene	0.58	MG/KG	0.1	2.9
			Indeno[1,2,3-cd]pyrene	1.8	MG/KG	1	6
			Iron	76400	MG/KG	n/a	35586
			Lead	472	MG/KG	400	39
			Mercury	0.24	MG/KG	24	0.1
			Nickel	53.1	MG/KG	1600	26.7
			Silver	10	MG/KG	400	1.61
			Zinc	1200	MG/KG	24000	101
09-7317	0 - 1 ft.	AAB2774	Cadmium	3.6	MG/KG	80	2.7
			Zinc	115	MG/KG	24000	101
09-7330	0 - 1 ft.	AAB2776	Cadmium	4.4	MG/KG	80	2.7
			Lead	212	MG/KG	400	39
	downgradient sediments		Zinc	173	MG/KG	24000	101
09-7502	0 - 1 ft.	AAB2782	Lead	165	MG/KG	400	39
09-7502	0 - 1 ft.	AAB2784	Copper	49.3	MG/KG	3000	15.7

n/a Not available.

J - The associated numerical value is an estimated quantity.

R - The data are unusable (compound may or may not be present).

MDA-M Water Detects above SAL

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
09-7400	NA	AAB2787	Arsenic	200	UG/L	50
			Beryllium	23.8	UG/L	4
			Cadmium	7.2	UG/L	5
			Cadmium	16.3	UG/L	5
			Chromium	225	UG/L	100
			Manganese	884	UG/L	180
			Mercury	6.6	UG/L	2
			Mercury	10.5	UG/L	2
			Nickel	276	UG/L	100
09-7401	NA	AAB2788	Arsenic	120	UG/L	50
			Barium	2580	UG/L	2000
09-7402	NA	AAB2789	Arsenic	91.9	UG/L	50
			Lead	57.5	UG/L	50
			Manganese	336	UG/L	180
09-7403	NA	AAB2790	Lead	168	UG/L	50
			Selenium	620	UG/L	50
09-7491	NA	AAB6101	Antimony	23.5	UG/L	6
			Beryllium	13	UG/L	4
			Beryllium	13.9	UG/L	4
			Cadmium	26.3	UG/L	5
			Cadmium	29.3	UG/L	5
			Chromium	111	UG/L	100
			Lead	123	UG/L	50
			Lead	123	UG/L	50
			Manganese	1937	UG/L	180
			Manganese	2000	UG/L	180
			Vanadium	266	UG/L	240
09-7492	NA	AAB6102	Antimony	94.8	UG/L	6
			Barium	2740	UG/L	2000
			Beryllium	19.3	UG/L	4
			Cadmium	40.2	UG/L	5
			Chromium	144	UG/L	100
			Lead	147	UG/L	50
			Manganese	2770	UG/L	180
			Nickel	112	UG/L	100
			Vanadium	370	UG/L	240
09-7493	NA	AAB5557	Antimony	24.6	UG/L	6
			Lead	119	UG/L	50
			Lead	121	UG/L	50
			Manganese	991	UG/L	180
			Manganese	794	UG/L	180
			Methylene chloride	6	UG/L	5
09-7550	0 - 0.5 ft.	AAC0206	Dinitrotoluene [2,4-]	1.52	UG/L	0.05
09-7561	0 - 0.5 ft.	AAC0209	Dinitrotoluene [2,4-]	0.9	UG/L	0.05
n/a Not available.						
NA Not applicable.						

Soil from MDA

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
09-7006	0 - 1 ft.	AAB0918	Aluminium	3040	MG/KG	n/a	123000
			Arsenic	7.3	MG/KG	n/a	11.6
			Barium	63.7	MG/KG	5600	1143
			Calcium	3160	MG/KG	n/a	54362
			Chromium	3.1	MG/KG	n/a	34.2
			Cyanide	0.53 (R)	MG/KG	1600	n/a
			Iron	3560	MG/KG	n/a	35586
			Lead	10.7	MG/KG	400	39
			Manganese	125	MG/KG	11000	1030
			Zinc	17.1	MG/KG	24000	101
09-7014	0 - 1 ft.	AAB0920	Aluminium	6303	MG/KG	n/a	123000
			Aluminium	8090	MG/KG	n/a	123000
			Arsenic	2.3	MG/KG	n/a	11.6
			Arsenic	2.3	MG/KG	n/a	11.6
			Barium	157	MG/KG	5600	1143
			Barium	117	MG/KG	5600	1143
			Beryllium	0.52	MG/KG	n/a	3.31
			Cadmium	1.5	MG/KG	80	2.7
			Cadmium	1.8	MG/KG	80	2.7
			Calcium	1041	MG/KG	n/a	54362
			Calcium	1090	MG/KG	n/a	54362
			Chromium	4.2	MG/KG	n/a	34.2
			Chromium	6.5	MG/KG	n/a	34.2
			Cobalt	11.8	MG/KG	n/a	51.1
			Cobalt	11.2	MG/KG	n/a	51.1
			Copper	13.7	MG/KG	3000	15.7
			Copper	13.3	MG/KG	3000	15.7
			Cyanide	0.54 (R)	MG/KG	1600	n/a
			Diethyl phthalate	0.46	MG/KG	64000	n/a
			Iron	7421	MG/KG	n/a	35586
			Iron	8740	MG/KG	n/a	35586
			Lead	19	MG/KG	400	39
			Lead	26.2	MG/KG	400	39
			Magnesium	1077	MG/KG	n/a	16147
			Magnesium	1650	MG/KG	n/a	16147
			Manganese	587	MG/KG	11000	1030
			Manganese	602	MG/KG	11000	1030
			Nickel	5.6	MG/KG	1600	26.7
			Potassium	1230	MG/KG	n/a	6179
			Potassium	927	MG/KG	n/a	6179
			Sodium	195	MG/KG	n/a	1884
			Vanadium	16.9	MG/KG	560	66
			Vanadium	14.7	MG/KG	560	66
			Zinc	22.3	MG/KG	24000	101
			Zinc	16.6	MG/KG	24000	101
09-7018	0 - 1 ft.	AAB0922	Aluminium	21900	MG/KG	n/a	123000
			Arsenic	6.3	MG/KG	n/a	11.6
			Barium	957	MG/KG	5600	1143
			Cadmium	10.1	MG/KG	80	2.7
			Calcium	25500	MG/KG	n/a	54362
			Chromium	33.5	MG/KG	n/a	34.2
			Copper	1620	MG/KG	3000	15.7

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Cyanide	0.62 (R)	MG/KG	1600	n/a
			Iron	37300	MG/KG	n/a	35586
			Lead	347	MG/KG	400	39
			Magnesium	8550	MG/KG	n/a	16147
			Manganese	920	MG/KG	11000	1030
			Mercury	0.25	MG/KG	24	0.1
			Nickel	43.8	MG/KG	1600	26.7
			Potassium	2690	MG/KG	n/a	6179
			Silver	26.4 (J)	MG/KG	400	1.61
			Vanadium	17	MG/KG	560	66
			Zinc	1650	MG/KG	24000	101
09-7037	0 - 1 ft.	AAB0924	Aluminium	8590	MG/KG	n/a	123000
			Anthracene	32	MG/KG	24000	4.29
			Arsenic	113	MG/KG	n/a	11.6
			Barium	128	MG/KG	5600	1143
			Benzo[a]anthracene	160	MG/KG	1	12.4
			Benzo[a]pyrene	130	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	200	MG/KG	1	12.2
			Benzo[g,h,i]perylene	64	MG/KG	n/a	5.9
			Benzo[k]fluoranthene	77	MG/KG	1	19.4
			Cadmium	1.9	MG/KG	80	2.7
			Calcium	57700	MG/KG	n/a	54362
			Chlordane [alpha-]	0.016 (J)	MG/KG	n/a	n/a
			Chromium	7.9	MG/KG	n/a	34.2
			Chrysene	190	MG/KG	96	19.5
			Copper	25.1	MG/KG	3000	15.7
			DDE [p,p'-]	0.0099 (J)	MG/KG	2.1	n/a
			Dibenzo[a,h]anthracene	23	MG/KG	0.1	2.9
			Dieldrin	0.048 (J)	MG/KG	0.044	n/a
			Endosulfan I	0.017 (J)	MG/KG	n/a	n/a
			Endosulfan II	0.024 (J)	MG/KG	n/a	n/a
			Endrin	0.082 (J)	MG/KG	24	n/a
			Fluoranthene	310	MG/KG	3200	32.5
			Heptachlor	0.0061 (J)	MG/KG	0.16	n/a
			Indeno[1,2,3-cd]pyrene	80	MG/KG	1	6
			Iron	7570	MG/KG	n/a	35586
			Lead	41.6	MG/KG	400	39
			Lindane	0.0041 (J)	MG/KG	0.54	n/a
			Magnesium	2100	MG/KG	n/a	16147
			Manganese	330	MG/KG	11000	1030
			Methoxychlor	0.052 (J)	MG/KG	400	n/a
			Phenanthrene	150	MG/KG	n/a	24.2
			Pyrene	280	MG/KG	2400	12.8
			Vanadium	14.1	MG/KG	560	66
			Zinc	105	MG/KG	24000	101
09-7054	0 - 1 ft.	AAB0926	Aluminium	10600	MG/KG	n/a	123000
			Arsenic	5.5	MG/KG	n/a	11.6
			Barium	701	MG/KG	5600	1143
			Cadmium	4.6	MG/KG	80	2.7
			Calcium	9190	MG/KG	n/a	54362
			Chromium	15.6	MG/KG	n/a	34.2
			Copper	188	MG/KG	3000	15.7

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			DDE [p,p'-]	0.0048	MG/KG	2.1	n/a
			DDT [p,p'-]	0.0046	MG/KG	2.1	n/a
			Endosulfan I	0.0064	MG/KG	n/a	n/a
			Iron	15800	MG/KG	n/a	35586
			Lead	201	MG/KG	400	39
			Magnesium	3290	MG/KG	n/a	16147
			Manganese	532	MG/KG	11000	1030
			Mercury	0.26	MG/KG	24	0.1
			Nickel	32	MG/KG	1600	26.7
			Potassium	2020	MG/KG	n/a	6179
			Silver	9.6 (J)	MG/KG	400	1.61
			Vanadium	18.5	MG/KG	560	66
			Zinc	516	MG/KG	24000	101
09-7058	0 - 1 ft.	AAB0928	Aluminium	6120	MG/KG	n/a	123000
			Barium	126	MG/KG	5600	1143
			Cadmium	1.8	MG/KG	80	2.7
			Calcium	1580	MG/KG	n/a	54362
			Chromium	8	MG/KG	n/a	34.2
			Copper	48.3	MG/KG	3000	15.7
			Iron	6350	MG/KG	n/a	35586
			Lead	40.6	MG/KG	400	39
			Manganese	347	MG/KG	11000	1030
			Mercury	0.34	MG/KG	24	0.1
			Potassium	1470	MG/KG	n/a	6179
			Zinc	1660	MG/KG	24000	101
09-7061	0 - 1 ft.	AAB0930	Aluminium	6740	MG/KG	n/a	123000
			Arsenic	10.6	MG/KG	n/a	11.6
			Barium	112	MG/KG	5600	1143
			Cadmium	2.5	MG/KG	80	2.7
			Calcium	103000	MG/KG	n/a	54362
			Chromium	7.8	MG/KG	n/a	34.2
			Copper	24.2	MG/KG	3000	15.7
			Iron	11000	MG/KG	n/a	35586
			Lead	119	MG/KG	400	39
			Magnesium	2610	MG/KG	n/a	16147
			Manganese	175	MG/KG	11000	1030
			Zinc	185	MG/KG	24000	101
09-7085	0 - 1 ft.	AAB0932	Aluminium	12800	MG/KG	n/a	123000
			Arsenic	9.1	MG/KG	n/a	11.6
			Barium	1470	MG/KG	5600	1143
			Cadmium	25.6	MG/KG	80	2.7
			Calcium	38800	MG/KG	n/a	54362
			Chromium	43.1	MG/KG	n/a	34.2
			Copper	1190	MG/KG	3000	15.7
			Iron	30800	MG/KG	n/a	35586
			Lead	882	MG/KG	400	39
			Magnesium	9990	MG/KG	n/a	16147
			Manganese	785	MG/KG	11000	1030
			Mercury	0.58	MG/KG	24	0.1
			Nickel	62.9	MG/KG	1600	26.7
			Potassium	3010	MG/KG	n/a	6179
			Silver	107 (J)	MG/KG	400	1.61

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Vanadium	21.5	MG/KG	560	66
			Zinc	2790	MG/KG	24000	101
09-7093	0 - 1 ft.	AAB0934	Aluminium	16600	MG/KG	n/a	123000
			Antimony	22.2	MG/KG	32	2.5
			Arsenic	13	MG/KG	n/a	11.6
			Barium	2090	MG/KG	5600	1143
			Cadmium	13.7	MG/KG	80	2.7
			Calcium	39800	MG/KG	n/a	54362
			Chromium	38.6	MG/KG	n/a	34.2
			Cobalt	21.1	MG/KG	n/a	51.1
			Copper	2820	MG/KG	3000	15.7
			Iron	42800	MG/KG	n/a	35586
			Lead	4930	MG/KG	400	39
			Magnesium	7530	MG/KG	n/a	16147
			Manganese	924	MG/KG	11000	1030
			Nickel	85.9	MG/KG	1600	26.7
			Potassium	3200	MG/KG	n/a	6179
			Silver	102 (J)	MG/KG	400	1.61
			Sodium	1540 (J)	MG/KG	n/a	1884
			Vanadium	24.2	MG/KG	560	66
			Zinc	4550	MG/KG	24000	101
09-7104	0 - 1 ft.	AAB0936	Aluminium	6680	MG/KG	n/a	123000
			Barium	133	MG/KG	5600	1143
			Cadmium	3.4	MG/KG	80	2.7
			Calcium	1570	MG/KG	n/a	54362
			Chromium	6.9	MG/KG	n/a	34.2
			Copper	73.5	MG/KG	3000	15.7
			Iron	492	MG/KG	n/a	35586
			Lead	9850	MG/KG	400	39
			Magnesium	1380	MG/KG	n/a	16147
			Manganese	573	MG/KG	11000	1030
			Potassium	1450	MG/KG	n/a	6179
			Vanadium	17.6	MG/KG	560	66
			Zinc	109	MG/KG	24000	101
09-7104	0 - 1 ft.	AAB0938	Aluminium	7100	MG/KG	n/a	123000
			Barium	124	MG/KG	5600	1143
			Cadmium	2.3	MG/KG	80	2.7
			Calcium	1420	MG/KG	n/a	54362
			Chromium	6.6	MG/KG	n/a	34.2
			Copper	34	MG/KG	3000	15.7
			Cyanide	0.64 (R)	MG/KG	1600	n/a
			Iron	8780	MG/KG	n/a	35586
			Lead	60.6	MG/KG	400	39
			Magnesium	1440	MG/KG	n/a	16147
			Manganese	463	MG/KG	11000	1030
			Potassium	1510	MG/KG	n/a	6179
			Vanadium	16.8	MG/KG	560	66
			Zinc	59.6	MG/KG	24000	101
09-7104	0 - 1 ft.	AAB0939	Carbon disulfide	0.0098	MG/KG	7.4	n/a
09-7126	0 - 1 ft.	AAB0940	Aluminium	17400	MG/KG	n/a	123000
			Arsenic	3.3	MG/KG	n/a	11.6
			Barium	192	MG/KG	5600	1143

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Beryllium	1.2	MG/KG	n/a	3.31
			Cadmium	2.3	MG/KG	80	2.7
			Calcium	2310	MG/KG	n/a	54362
			Chromium	8.4	MG/KG	n/a	34.2
			Copper	9.3	MG/KG	3000	15.7
			Cyanide	0.62 (R)	MG/KG	1600	n/a
			Iron	14200	MG/KG	n/a	35586
			Lead	16.5	MG/KG	400	39
			Magnesium	2590	MG/KG	n/a	16147
			Manganese	348	MG/KG	11000	1030
			Potassium	2010	MG/KG	n/a	6179
			Vanadium	22.8	MG/KG	560	66
			Zinc	28.4	MG/KG	24000	101
09-7126	0 - 1 ft.	AAB0941	Carbon disulfide	0.012	MG/KG	7.4	n/a
09-7130	0 - 1 ft.	AAB0942	Aluminium	5980	MG/KG	n/a	123000
			Arsenic	2.7	MG/KG	n/a	11.6
			Barium	178	MG/KG	5600	1143
			Benzo[b]fluoranthene	0.39	MG/KG	1	12.2
			Cadmium	1.5	MG/KG	80	2.7
			Calcium	31700	MG/KG	n/a	54362
			Chromium	4.6	MG/KG	n/a	34.2
			Copper	21.4	MG/KG	3000	15.7
			Cyanide	0.58 (R)	MG/KG	1600	n/a
			Fluoranthene	0.87	MG/KG	3200	32.5
			Iron	7300	MG/KG	n/a	35586
			Lead	40.8	MG/KG	400	39
			Magnesium	1500	MG/KG	n/a	16147
			Manganese	194	MG/KG	11000	1030
			Mercury	0.33	MG/KG	24	0.1
			Phenanthrene	0.73	MG/KG	n/a	24.2
			Potassium	1240	MG/KG	n/a	6179
			Pyrene	0.72	MG/KG	2400	12.8
			Zinc	67	MG/KG	24000	101
09-7130	0 - 1 ft.	AAB0943	Carbon disulfide	0.007	MG/KG	7.4	n/a
09-7142	0 - 1 ft.	AAB0944	Aluminium	19600	MG/KG	n/a	123000
			Arsenic	3.7	MG/KG	n/a	11.6
			Barium	127	MG/KG	5600	1143
			Beryllium	1.2	MG/KG	n/a	3.31
			Cadmium	3.1	MG/KG	80	2.7
			Calcium	2600	MG/KG	n/a	54362
			Chromium	9.9	MG/KG	n/a	34.2
			Copper	14.6	MG/KG	3000	15.7
			Cyanide	0.62 (R)	MG/KG	1600	n/a
			Iron	16400	MG/KG	n/a	35586
			Lead	19.1	MG/KG	400	39
			Magnesium	2770	MG/KG	n/a	16147
			Manganese	359	MG/KG	11000	1030
			Potassium	2030	MG/KG	n/a	6179
			Vanadium	26.7	MG/KG	560	66
			Zinc	32.7	MG/KG	24000	101
09-7143	0 - 1 ft.	AAB0946	Aluminium	6920	MG/KG	n/a	123000
			Arsenic	2.7	MG/KG	n/a	11.6

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Barium	116	MG/KG	5600	1143
			Cadmium	2.2	MG/KG	80	2.7
			Calcium	1570	MG/KG	n/a	54362
			Chromium	7.5	MG/KG	n/a	34.2
			Cobalt	16.8	MG/KG	n/a	51.1
			Copper	6.2	MG/KG	3000	15.7
			Cyanide	0.59 (R)	MG/KG	1600	n/a
			Iron	10500	MG/KG	n/a	35586
			Lead	12.6	MG/KG	400	39
			Magnesium	1320	MG/KG	n/a	16147
			Manganese	1250	MG/KG	11000	1030
			Nickel	12.6	MG/KG	1600	26.7
			Potassium	1170	MG/KG	n/a	6179
			Vanadium	23.7	MG/KG	560	66
			Zinc	18.3	MG/KG	24000	101
09-7162	0 - 1 ft.	AAB2786	Aluminium	4720	MG/KG	n/a	123000
			Arsenic	4	MG/KG	n/a	11.6
			Barium	136	MG/KG	5600	1143
			Cadmium	3.5	MG/KG	80	2.7
			Chromium	6.7	MG/KG	n/a	34.2
			Iron	9410	MG/KG	n/a	35586
			Lead	28	MG/KG	400	39
			Manganese	243	MG/KG	11000	1030
			Methylene chloride	0.014	MG/KG	5.6	n/a
			Vanadium	20.6	MG/KG	560	66
			Zinc	69.2	MG/KG	24000	101
09-7300	0 - 1 ft.	AAB0948	Aluminium	11700	MG/KG	n/a	123000
			Barium	171	MG/KG	5600	1143
			Cadmium	2.3	MG/KG	80	2.7
			Calcium	1750	MG/KG	n/a	54362
			Chromium	6.6	MG/KG	n/a	34.2
			Copper	8.4	MG/KG	3000	15.7
			Iron	10900	MG/KG	n/a	35586
			Lead	13 (J)	MG/KG	400	39
			Magnesium	1920	MG/KG	n/a	16147
			Manganese	411	MG/KG	11000	1030
			Potassium	1650	MG/KG	n/a	6179
			Vanadium	21.4	MG/KG	560	66
			Zinc	27.4	MG/KG	24000	101
09-7300	0 - 1 ft.	AAB2737	Methylene chloride	0.033	MG/KG	5.6	n/a
09-7301	0 - 1 ft.	AAB2738	Aluminium	7480	MG/KG	n/a	123000
			Barium	479	MG/KG	5600	1143
			Cadmium	6.7	MG/KG	80	2.7
			Calcium	8500	MG/KG	n/a	54362
			Chromium	13.6	MG/KG	n/a	34.2
			Cobalt	14.2	MG/KG	n/a	51.1
			Copper	829	MG/KG	3000	15.7
			DDT [p,p'-]	0.0096	MG/KG	2.1	n/a
			Iron	21600	MG/KG	n/a	35586
			Lead	10200 (J)	MG/KG	400	39
			Magnesium	1980	MG/KG	n/a	16147
			Manganese	1240	MG/KG	11000	1030

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Mercury	0.67	MG/KG	24	0.1
			Nickel	30.4	MG/KG	1600	26.7
			Potassium	1640	MG/KG	n/a	6179
			Silver	41.6	MG/KG	400	1.61
			Vanadium	16.9	MG/KG	560	66
			Zinc	604	MG/KG	24000	101
09-7302	0 - 1 ft.	AAB2740	Aluminium	7640	MG/KG	n/a	123000
			Barium	122	MG/KG	5600	1143
			Cadmium	1.6	MG/KG	80	2.7
			Calcium	2440	MG/KG	n/a	54362
			Chromium	5.3	MG/KG	n/a	34.2
			DDT [p,p'-]	0.0072	MG/KG	2.1	n/a
			Iron	7790	MG/KG	n/a	35586
			Lead	12.4 (J)	MG/KG	400	39
			Manganese	353	MG/KG	11000	1030
			Zinc	24.6	MG/KG	24000	101
09-7303	0 - 1 ft.	AAB2742	Aluminium	11500	MG/KG	n/a	123000
			Antimony	18.4	MG/KG	32	2.5
			Arocior 1254	2.6	MG/KG	1	n/a
			Arsenic	8.3	MG/KG	n/a	11.6
			Barium	1300	MG/KG	5600	1143
			Benzo[a]anthracene	0.95	MG/KG	1	12.4
			Benzo[a]pyrene	1	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	1.3	MG/KG	1	12.2
			Benzo[g,h,i]perylene	0.54	MG/KG	n/a	5.9
			Cadmium	13.4	MG/KG	80	2.7
			Calcium	36200	MG/KG	n/a	54362
			Chromium	29.6	MG/KG	n/a	34.2
			Chrysene	0.97	MG/KG	96	19.5
			Cobalt	24.9	MG/KG	n/a	51.1
			Copper	592	MG/KG	3000	15.7
			DDT [p,p'-]	0.032	MG/KG	2.1	n/a
			Dibenzo[a,h]anthracene	0.7	MG/KG	0.1	2.9
			Fluoranthene	1	MG/KG	3200	32.5
			Indeno[1,2,3-cd]pyrene	0.64	MG/KG	1	6
			Iron	30700	MG/KG	n/a	35586
			Lead	695 (J)	MG/KG	400	39
			Magnesium	4770	MG/KG	n/a	16147
			Manganese	643	MG/KG	11000	1030
			Mercury	0.78	MG/KG	24	0.1
			Nickel	52.4	MG/KG	1600	26.7
			Potassium	2710	MG/KG	n/a	6179
			Pyrene	1.1	MG/KG	2400	12.8
			Silver	61.4	MG/KG	400	1.61
			Vanadium	18.1	MG/KG	560	66
			Zinc	1620	MG/KG	24000	101
09-7303	0 - 1 ft.	AAB2743	Methylene chloride	0.011 (J)	MG/KG	5.6	n/a
09-7304	0 - 1 ft.	AAB2744	Aluminium	6950	MG/KG	n/a	123000
			Antimony	271	MG/KG	32	2.5
			Arsenic	11.5	MG/KG	n/a	11.6
			Barium	917	MG/KG	5600	1143
			Benzo[b]fluoranthene	0.88	MG/KG	1	12.2

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Benzo[b]fluoranthene	0.88	MG/KG	1	12.2
			Cadmium	5.4	MG/KG	80	2.7
			Calcium	7660	MG/KG	n/a	54362
			Chromium	31.4	MG/KG	n/a	34.2
			Chrysene	0.57	MG/KG	96	19.5
			Chrysene	0.57	MG/KG	96	19.5
			Copper	95.5	MG/KG	3000	15.7
			Cyanide	4.2 (R)	MG/KG	1600	n/a
			Endrin	0.13 (J)	MG/KG	24	n/a
			Fluoranthene	1.6	MG/KG	3200	32.5
			Fluoranthene	1.6	MG/KG	3200	32.5
			Iron	25200	MG/KG	n/a	35586
			Lead	11600 (J)	MG/KG	400	39
			Magnesium	3870	MG/KG	n/a	16147
			Manganese	432	MG/KG	11000	1030
			Mercury	29	MG/KG	24	0.1
			Nickel	12.2	MG/KG	1600	26.7
			Phenanthrene	1.5	MG/KG	n/a	24.2
			Phenanthrene	1.5	MG/KG	n/a	24.2
			Pyrene	1.2	MG/KG	2400	12.8
			Pyrene	1.2	MG/KG	2400	12.8
			Vanadium	13.8	MG/KG	560	66
			Zinc	1820	MG/KG	24000	101
09-7306	0 - 1 ft.	AAB2748	Aluminium	6230	MG/KG	n/a	123000
			Barium	273	MG/KG	5600	1143
			Cadmium	1.7	MG/KG	80	2.7
			Chromium	4.4	MG/KG	n/a	34.2
			Copper	27.3	MG/KG	3000	15.7
			Iron	7850	MG/KG	n/a	35586
			Lead	36 (J)	MG/KG	400	39
			Manganese	259	MG/KG	11000	1030
			Potassium	1280	MG/KG	n/a	6179
			Vanadium	14.3	MG/KG	560	66
			Zinc	54.3	MG/KG	24000	101
09-7306	0 - 1 ft.	AAB2749	Methylene chloride	0.03	MG/KG	5.6	n/a
09-7307	0 - 1 ft.	AAB2750	Aluminium	8690	MG/KG	n/a	123000
			Arsenic	3.8	MG/KG	n/a	11.6
			Barium	231	MG/KG	5600	1143
			Cadmium	3.8	MG/KG	80	2.7
			Calcium	7190	MG/KG	n/a	54362
			Chromium	10.4	MG/KG	n/a	34.2
			Copper	101	MG/KG	3000	15.7
			Iron	14900	MG/KG	n/a	35586
			Lead	2310 (J)	MG/KG	400	39
			Magnesium	2480	MG/KG	n/a	16147
			Manganese	481	MG/KG	11000	1030
			Potassium	1710	MG/KG	n/a	6179
			Silver	3.1	MG/KG	400	1.61
			Vanadium	20.2	MG/KG	560	66
			Zinc	499	MG/KG	24000	101
09-7308	0 - 1 ft.	AAB2752	Aluminium	11100	MG/KG	n/a	123000
			Aluminium	11425	MG/KG	n/a	123000

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Arsenic	7.2	MG/KG	n/a	11.6
			Arsenic	8.1	MG/KG	n/a	11.6
			Barium	2130	MG/KG	5600	1143
			Barium	965	MG/KG	5600	1143
			Beryllium	0.63	MG/KG	n/a	3.31
			Cadmium	10	MG/KG	80	2.7
			Cadmium	10.7	MG/KG	80	2.7
			Calcium	15000	MG/KG	n/a	54362
			Calcium	14800	MG/KG	n/a	54362
			Chromium	28.2	MG/KG	n/a	34.2
			Chromium	21.2	MG/KG	n/a	34.2
			Cobalt	10.3	MG/KG	n/a	51.1
			Copper	725	MG/KG	3000	15.7
			Copper	4770	MG/KG	3000	15.7
			DDT [p,p'-]	0.0066	MG/KG	2.1	n/a
			Di-n-butyl phthalate	0.85	MG/KG	8000	n/a
			Iron	33700	MG/KG	n/a	35586
			Iron	29891	MG/KG	n/a	35586
			Lead	497 (J)	MG/KG	400	39
			Lead	1075	MG/KG	400	39
			Magnesium	4660	MG/KG	n/a	16147
			Magnesium	4093	MG/KG	n/a	16147
			Manganese	560	MG/KG	11000	1030
			Manganese	496	MG/KG	11000	1030
			Mercury	0.12	MG/KG	24	0.1
			Nickel	53.6	MG/KG	1600	26.7
			Nickel	66.6	MG/KG	1600	26.7
			Potassium	3170	MG/KG	n/a	6179
			Potassium	3302	MG/KG	n/a	6179
			Selenium	0.83	MG/KG	400	1.7
			Silver	71.4	MG/KG	400	1.61
			Silver	85.3	MG/KG	400	1.61
			Sodium	589	MG/KG	n/a	1884
			Vanadium	19	MG/KG	560	66
			Vanadium	17.7	MG/KG	560	66
			Zinc	1120	MG/KG	24000	101
			Zinc	1039	MG/KG	24000	101
09-7308	0 - 1 ft.	AAB2754	Aldrin	0.0024	MG/KG	0.04	n/a
			Aluminium	17000	MG/KG	n/a	123000
			Arsenic	7.5	MG/KG	n/a	11.6
			Barium	1160	MG/KG	5600	1143
			Cadmium	24.4	MG/KG	80	2.7
			Calcium	15800	MG/KG	n/a	54362
			Chromium	29.8	MG/KG	n/a	34.2
			Copper	2110	MG/KG	3000	15.7
			DDT [p,p'-]	0.0043	MG/KG	2.1	n/a
			Iron	64600	MG/KG	n/a	35586
			Lead	422 (J)	MG/KG	400	39
			Magnesium	4100	MG/KG	n/a	16147
			Manganese	630	MG/KG	11000	1030
			Mercury	0.13	MG/KG	24	0.1
			Nickel	57.7	MG/KG	1600	26.7

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Potassium	3000	MG/KG	n/a	6179
			Silver	83.7	MG/KG	400	1.61
			Vanadium	19.4	MG/KG	560	66
			Zinc	900	MG/KG	24000	101
09-7308	0 - 1 ft.	AAB2755	Acetone	0.053 (J)	MG/KG	8000	n/a
			Methylene chloride	0.064 (J)	MG/KG	5.6	n/a
09-7309	0 - 1 ft.	AAB2756	Aluminium	6560	MG/KG	n/a	123000
			Aluminium	6977	MG/KG	n/a	123000
			Arsenic	2.9	MG/KG	n/a	11.6
			Arsenic	2.8	MG/KG	n/a	11.6
			Barium	285	MG/KG	5600	1143
			Barium	282	MG/KG	5600	1143
			Beryllium	0.62	MG/KG	n/a	3.31
			Cadmium	4.4	MG/KG	80	2.7
			Cadmium	2.8	MG/KG	80	2.7
			Calcium	2273	MG/KG	n/a	54362
			Calcium	2190	MG/KG	n/a	54362
			Chromium	8.3	MG/KG	n/a	34.2
			Chromium	8.3	MG/KG	n/a	34.2
			Cobalt	8.9	MG/KG	n/a	51.1
			Copper	81	MG/KG	3000	15.7
			Copper	131	MG/KG	3000	15.7
			Iron	27200	MG/KG	n/a	35586
			Iron	16943	MG/KG	n/a	35586
			Lead	49.6	MG/KG	400	39
			Lead	42.5	MG/KG	400	39
			Magnesium	1456	MG/KG	n/a	16147
			Manganese	710	MG/KG	11000	1030
			Manganese	516	MG/KG	11000	1030
			Nickel	15.1	MG/KG	1600	26.7
			Nickel	11	MG/KG	1600	26.7
			Potassium	1300	MG/KG	n/a	6179
			Potassium	1341	MG/KG	n/a	6179
			Sodium	134	MG/KG	n/a	1884
			Vanadium	19.3	MG/KG	560	66
			Vanadium	20.8	MG/KG	560	66
			Zinc	399	MG/KG	24000	101
			Zinc	486	MG/KG	24000	101
09-7309	0 - 1 ft.	AAB2757	Methylene chloride	0.015	MG/KG	5.6	n/a
09-7310	0 - 1 ft.	AAB2758	Aluminium	5520	MG/KG	n/a	123000
			Aluminium	5094	MG/KG	n/a	123000
			Arsenic	1.6	MG/KG	n/a	11.6
			Barium	1009	MG/KG	5600	1143
			Barium	800	MG/KG	5600	1143
			Beryllium	0.28	MG/KG	n/a	3.31
			Bis(2-ethylhexyl)phthalate	2.9 (J)	MG/KG	50	n/a
			Cadmium	1.2	MG/KG	80	2.7
			Cadmium	1.4	MG/KG	80	2.7
			Calcium	1470	MG/KG	n/a	54362
			Calcium	1692	MG/KG	n/a	54362
			Chromium	5.7	MG/KG	n/a	34.2
			Chromium	6.5	MG/KG	n/a	34.2

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Cobalt	1.3	MG/KG	n/a	51.1
			Copper	42762	MG/KG	3000	15.7
			Copper	10100	MG/KG	3000	15.7
			Cyanide	0.23	MG/KG	1600	n/a
			DDT [p,p'-]	0.0038 (J)	MG/KG	2.1	n/a
			Di-n-butyl phthalate	92 (J)	MG/KG	8000	n/a
			Iron	5350	MG/KG	n/a	35586
			Iron	6527	MG/KG	n/a	35586
			Lead	145	MG/KG	400	39
			Lead	162	MG/KG	400	39
			Magnesium	816	MG/KG	n/a	16147
			Manganese	203	MG/KG	11000	1030
			Manganese	188	MG/KG	11000	1030
			Mercury	0.25	MG/KG	24	0.1
			Mercury	0.28	MG/KG	24	0.1
			Nickel	10.3	MG/KG	1600	26.7
			Nickel	7.5	MG/KG	1600	26.7
			Potassium	460	MG/KG	n/a	6179
			Silver	2.44	MG/KG	400	1.61
			Sodium	107	MG/KG	n/a	1884
			Uranium-234	150.622	PCI/G	86	2.03
			Uranium-234	140.527	PCI/G	86	2.03
			Uranium-235	7.027	PCI/G	18	0.088
			Uranium-235	6.718	PCI/G	18	0.088
			Uranium-238	144.503	PCI/G	59	1.9
			Uranium-238	149.741	PCI/G	59	1.9
			Vanadium	9	MG/KG	560	66
			Zinc	720.58	MG/KG	24000	101
			Zinc	3790	MG/KG	24000	101
09-7311	0 - 1 ft.	AAB2760	Aluminium	9420	MG/KG	n/a	123000
			Arsenic	3.3	MG/KG	n/a	11.6
			Barium	209	MG/KG	5600	1143
			Cadmium	2.6	MG/KG	80	2.7
			Calcium	3590	MG/KG	n/a	54362
			Chromium	8.4	MG/KG	n/a	34.2
			Copper	76.8	MG/KG	3000	15.7
			DDT [p,p'-]	0.0097	MG/KG	2.1	n/a
			Iron	11100	MG/KG	n/a	35586
			Lead	65.7	MG/KG	400	39
			Magnesium	2030	MG/KG	n/a	16147
			Manganese	416	MG/KG	11000	1030
			Methoxychlor	0.027	MG/KG	400	n/a
			Potassium	1680	MG/KG	n/a	6179
			Silver	5.9	MG/KG	400	1.61
			Vanadium	21	MG/KG	560	66
			Zinc	151	MG/KG	24000	101
09-7312	0 - 1 ft.	AAB2762	Aluminium	12600	MG/KG	n/a	123000
			Aroclor 1254	1.6	MG/KG	1	n/a
			Arsenic	7.3	MG/KG	n/a	11.6
			Barium	1290	MG/KG	5600	1143
			Cadmium	12.4	MG/KG	80	2.7
			Calcium	21300	MG/KG	n/a	54362

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Chromium	27.3	MG/KG	n/a	34.2
			Copper	770	MG/KG	3000	15.7
			DDE [p,p'-]	0.039	MG/KG	2.1	n/a
			DDT [p,p'-]	0.051	MG/KG	2.1	n/a
			Iron	26600	MG/KG	n/a	35586
			Lead	528	MG/KG	400	39
			Magnesium	4970	MG/KG	n/a	16147
			Manganese	704	MG/KG	11000	1030
			Mercury	1.4	MG/KG	24	0.1
			Nickel	37.9	MG/KG	1600	26.7
			Potassium	2970	MG/KG	n/a	6179
			Silver	109	MG/KG	400	1.61
			Vanadium	21.4	MG/KG	560	66
			Zinc	1680	MG/KG	24000	101
09-7312	0 - 1 ft.	AAB2763	Methylene chloride	0.042 (J)	MG/KG	5.6	n/a
09-7313	0 - 1 ft.	AAB2764	Aluminium	14600	MG/KG	n/a	123000
			Arsenic	3.9	MG/KG	n/a	11.6
			Barium	232	MG/KG	5600	1143
			Cadmium	4.4	MG/KG	80	2.7
			Calcium	3380	MG/KG	n/a	54362
			Chromium	9	MG/KG	n/a	34.2
			Copper	73.7	MG/KG	3000	15.7
			DDE [p,p'-]	0.0045	MG/KG	2.1	n/a
			DDT [p,p'-]	0.0058	MG/KG	2.1	n/a
			Iron	16100	MG/KG	n/a	35586
			Lead	43.3	MG/KG	400	39
			Magnesium	1970	MG/KG	n/a	16147
			Manganese	463	MG/KG	11000	1030
			Nickel	11.3	MG/KG	1600	26.7
			Potassium	1770	MG/KG	n/a	6179
			Silver	10.6	MG/KG	400	1.61
			Vanadium	23.6	MG/KG	560	66
			Zinc	137	MG/KG	24000	101
09-7313	0 - 1 ft.	AAB2765	Methylene chloride	0.014	MG/KG	5.6	n/a
09-7314	0 - 1 ft.	AAB2766	Aluminium	25500	MG/KG	n/a	123000
			Arsenic	10.3	MG/KG	n/a	11.6
			Barium	360	MG/KG	5600	1143
			Cadmium	5.5	MG/KG	80	2.7
			Calcium	122000	MG/KG	n/a	54362
			Chromium	14.8	MG/KG	n/a	34.2
			Copper	66.1	MG/KG	3000	15.7
			Iron	23900	MG/KG	n/a	35586
			Lead	52	MG/KG	400	39
			Magnesium	8040	MG/KG	n/a	16147
			Manganese	481	MG/KG	11000	1030
			Nickel	22.6	MG/KG	1600	26.7
			Potassium	2520	MG/KG	n/a	6179
			Silver	6.8	MG/KG	400	1.61
			Vanadium	33.6	MG/KG	560	66
			Zinc	185	MG/KG	24000	101
09-7314	0 - 1 ft.	AAB2767	Methylene chloride	0.012	MG/KG	5.6	n/a
			Toluene	0.005	MG/KG	910	n/a

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
09-7315	0 - 1 ft.	AAB2768	Aluminium	6510	MG/KG	n/a	123000
			Barium	119	MG/KG	5600	1143
			Cadmium	2	MG/KG	80	2.7
			Chromium	6.4	MG/KG	n/a	34.2
			Copper	7.3	MG/KG	3000	15.7
			Iron	9710	MG/KG	n/a	35586
			Lead	14.9	MG/KG	400	39
			Magnesium	1680	MG/KG	n/a	16147
			Manganese	426	MG/KG	11000	1030
			Potassium	1330	MG/KG	n/a	6179
			Vanadium	18.5	MG/KG	560	66
			Zinc	21	MG/KG	24000	101
09-7315	0 - 1 ft.	AAB2769	Methylene chloride	0.012	MG/KG	5.6	n/a
			Toluene	0.008	MG/KG	910	n/a
09-7315	0 - 1 ft.	AAB2770	Acenaphthene	0.51	MG/KG	4800	n/a
			Aluminium	5990	MG/KG	n/a	123000
			Arsenic	2.7	MG/KG	n/a	11.6
			Barium	133	MG/KG	5600	1143
			Cadmium	13.2	MG/KG	80	2.7
			Calcium	2140	MG/KG	n/a	54362
			Chromium	29.2	MG/KG	n/a	34.2
			Copper	56.3	MG/KG	3000	15.7
			Iron	88600	MG/KG	n/a	35586
			Lead	23	MG/KG	400	39
			Magnesium	2150	MG/KG	n/a	16147
			Manganese	637	MG/KG	11000	1030
			Nickel	20.7	MG/KG	1600	26.7
			Vanadium	18.5	MG/KG	560	66
			Zinc	61.2	MG/KG	24000	101
09-7315	0 - 1 ft.	AAB2771	Methylene chloride	0.016	MG/KG	5.6	n/a
09-7316	0 - 1 ft.	AAB2772	Aluminium	20200	MG/KG	n/a	123000
			Anthracene	1.2	MG/KG	24000	4.29
			Arsenic	14.4	MG/KG	n/a	11.6
			Barium	691	MG/KG	5600	1143
			Benzo[a]anthracene	4.7	MG/KG	1	12.4
			Benzo[a]pyrene	3.1	MG/KG	0.1	12.1
			Benzo[b]fluoranthene	4.9	MG/KG	1	12.2
			Benzo[g,h,i]perylene	0.95	MG/KG	n/a	5.9
			Benzo[k]fluoranthene	1.5	MG/KG	1	19.4
			Beryllium	1.3	MG/KG	n/a	3.31
			Cadmium	13.3	MG/KG	80	2.7
			Calcium	9380	MG/KG	n/a	54362
			Chromium	51.6	MG/KG	n/a	34.2
			Chrysene	3.2	MG/KG	96	19.5
			Cobalt	17.4	MG/KG	n/a	51.1
			Copper	262	MG/KG	3000	15.7
			Dibenzo[a,h]anthracene	0.58	MG/KG	0.1	2.9
			Fluoranthene	6.6	MG/KG	3200	32.5
			Indeno[1,2,3-cd]pyrene	1.8	MG/KG	1	6
			Iron	76400	MG/KG	n/a	35586
			Lead	472	MG/KG	400	39
			Magnesium	4100	MG/KG	n/a	16147

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Manganese	615	MG/KG	11000	1030
			Mercury	0.24	MG/KG	24	0.1
			Nickel	53.1	MG/KG	1600	26.7
			Phenanthrene	4.3	MG/KG	n/a	24.2
			Potassium	2560	MG/KG	n/a	6179
			Silver	10	MG/KG	400	1.61
			Vanadium	34.1	MG/KG	560	66
			Zinc	1200	MG/KG	24000	101
09-7317	0 - 1 ft.	AAB2774	Aluminium	11100	MG/KG	n/a	123000
			Arsenic	2.7	MG/KG	n/a	11.6
			Barium	140	MG/KG	5600	1143
			Cadmium	3.6	MG/KG	80	2.7
			Calcium	1910	MG/KG	n/a	54362
			Chromium	12	MG/KG	n/a	34.2
			Copper	11.6	MG/KG	3000	15.7
			Iron	23300	MG/KG	n/a	35586
			Lead	17.3	MG/KG	400	39
			Magnesium	2570	MG/KG	n/a	16147
			Manganese	309	MG/KG	11000	1030
			Potassium	2060	MG/KG	n/a	6179
			Vanadium	22.7	MG/KG	560	66
			Zinc	115	MG/KG	24000	101
09-7317	0 - 1 ft.	AAB2775	Methylene chloride	0.014	MG/KG	5.6	n/a
09-7330	0 - 1 ft.	AAB2776	Aluminium	5880	MG/KG	n/a	123000
			Arsenic	4.3	MG/KG	n/a	11.6
			Barium	105	MG/KG	5600	1143
			Benzo[b]fluoranthene	0.39	MG/KG	1	12.2
			Bis(2-ethylhexyl)phthalate	0.38	MG/KG	50	n/a
			Cadmium	4.4	MG/KG	80	2.7
			Calcium	2560	MG/KG	n/a	54362
			Chromium	13.2	MG/KG	n/a	34.2
			Copper	15.1	MG/KG	3000	15.7
			DDT [p,p'-]	0.015	MG/KG	2.1	n/a
			Fluoranthene	0.44	MG/KG	3200	32.5
			Iron	27900	MG/KG	n/a	35586
			Lead	212	MG/KG	400	39
			Manganese	373	MG/KG	11000	1030
			Nickel	10.2	MG/KG	1600	26.7
			Pyrene	0.51	MG/KG	2400	12.8
			Vanadium	27.1	MG/KG	560	66
			Zinc	173	MG/KG	24000	101
09-7330	0 - 1 ft.	AAB2777	Methylene chloride	0.012	MG/KG	5.6	n/a
09-7500	0 - 1 ft.	AAB2778	Aluminium	6180	MG/KG	n/a	123000
			Aluminium	6809	MG/KG	n/a	123000
			Arsenic	3.2	MG/KG	n/a	11.6
			Arsenic	2.6	MG/KG	n/a	11.6
			Barium	68.4	MG/KG	5600	1143
			Barium	77.7	MG/KG	5600	1143
			Beryllium	0.69	MG/KG	n/a	3.31
			Cadmium	2.3	MG/KG	80	2.7
			Cadmium	2.2	MG/KG	80	2.7
			Calcium	936	MG/KG	n/a	54362

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Chromium	5.2	MG/KG	n/a	34.2
			Chromium	5.5	MG/KG	n/a	34.2
			Cobalt	8.3	MG/KG	n/a	51.1
			Copper	3.2	MG/KG	3000	15.7
			Iron	11317	MG/KG	n/a	35586
			Iron	9290	MG/KG	n/a	35586
			Lead	19.5	MG/KG	400	39
			Lead	13.7	MG/KG	400	39
			Magnesium	1250	MG/KG	n/a	16147
			Magnesium	1180	MG/KG	n/a	16147
			Manganese	570	MG/KG	11000	1030
			Manganese	473	MG/KG	11000	1030
			Nickel	4.5	MG/KG	1600	26.7
			Potassium	1110	MG/KG	n/a	6179
			Potassium	1073	MG/KG	n/a	6179
			Selenium	0.54	MG/KG	400	1.7
			Sodium	130	MG/KG	n/a	1884
			Vanadium	24.8	MG/KG	560	66
			Vanadium	22.2	MG/KG	560	66
			Zinc	16.9	MG/KG	24000	101
			Zinc	17.4	MG/KG	24000	101
09-7501	0 - 1 ft.	AAB2780	Aluminium	7790	MG/KG	n/a	123000
			Barium	162	MG/KG	5600	1143
			Cadmium	1.8	MG/KG	80	2.7
			Calcium	1320	MG/KG	n/a	54362
			Chromium	5	MG/KG	n/a	34.2
			Cobalt	16.5	MG/KG	n/a	51.1
			Copper	13.1	MG/KG	3000	15.7
			Iron	9710	MG/KG	n/a	35586
			Lead	31.7	MG/KG	400	39
			Magnesium	1290	MG/KG	n/a	16147
			Manganese	941	MG/KG	11000	1030
			Vanadium	19.1	MG/KG	560	66
			Zinc	22.3	MG/KG	24000	101
09-7501	1 - 2 ft.	AAB2807	Aluminium	9510	MG/KG	n/a	123000
			Barium	56.9	MG/KG	5600	1143
			Calcium	1760	MG/KG	n/a	54362
			Chromium	3.9	MG/KG	n/a	34.2
			Iron	8570	MG/KG	n/a	35586
			Lead	7	MG/KG	400	39
			Magnesium	1310	MG/KG	n/a	16147
			Manganese	133	MG/KG	11000	1030
			Zinc	19.1	MG/KG	24000	101
09-7502	0 - 1 ft.	AAB2782	Aluminium	7540	MG/KG	n/a	123000
			Barium	131	MG/KG	5600	1143
			Cadmium	1.6	MG/KG	80	2.7
			Calcium	6970	MG/KG	n/a	54362
			Chromium	6.9	MG/KG	n/a	34.2
			Copper	8.3	MG/KG	3000	15.7
			Iron	7790	MG/KG	n/a	35586
			Lead	165	MG/KG	400	39
			Magnesium	1340	MG/KG	n/a	16147

MDA-M Soil Detects

Location ID	Depth of sample	Sample ID	Analyte	Results	Units	SAL	UTL
			Manganese	481	MG/KG	11000	1030
			Potassium	1460	MG/KG	n/a	6179
			Vanadium	15.9	MG/KG	560	66
			Zinc	35.9	MG/KG	24000	101
09-7502	0 - 1 ft.	AAB2784	Aluminium	7490	MG/KG	n/a	123000
			Barium	162	MG/KG	5600	1143
			Cadmium	1.6	MG/KG	80	2.7
			Calcium	1350	MG/KG	n/a	54362
			Chromium	4.5	MG/KG	n/a	34.2
			Cobalt	16.1	MG/KG	n/a	51.1
			Copper	49.3	MG/KG	3000	15.7
			Iron	9160	MG/KG	n/a	35586
			Lead	16.8	MG/KG	400	39
			Magnesium	1240	MG/KG	n/a	16147
			Manganese	994	MG/KG	11000	1030
			Vanadium	17.6	MG/KG	560	66
			Zinc	22.8	MG/KG	24000	101

n/a Not available.

J - The associated numerical value is an estimated quantity.

R - The data are unusable (compound may or may not be present).

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
09-0000	NA	AAB0746	Butanone [2-]	15	UG/L	1700
09-7400	NA	AAB2787	Aluminium	2.3	UG/L	n/a
			Aluminium	9360	UG/L	n/a
			Arsenic	200	UG/L	50
			Barium	1.9	UG/L	2000
			Barium	698	UG/L	2000
			Beryllium	23.8	UG/L	4
			Cadmium	7.2	UG/L	5
			Cadmium	16.3	UG/L	5
			Calcium	18600	UG/L	n/a
			Calcium	1.7	UG/L	n/a
			Chromium	225	UG/L	100
			Chromium	1.9	UG/L	100
			Cobalt	4	UG/L	n/a
			Copper	2	UG/L	1300
			Copper	371	UG/L	1300
			Iron	40100	UG/L	n/a
			Iron	1.6	UG/L	n/a
			Lead	16.3	UG/L	50
			Lead	15.9	UG/L	50
			Magnesium	3	UG/L	n/a
			Manganese	884	UG/L	180
			Manganese	1.5	UG/L	180
			Mercury	6.6	UG/L	2
			Mercury	10.5	UG/L	2
			Nickel	0.8	UG/L	100
			Nickel	276	UG/L	100
			Potassium	1	UG/L	n/a
			Silver	18	UG/L	170
			Silver	6.9	UG/L	170
			Sodium	8300	UG/L	n/a
			Sodium	2.2	UG/L	n/a
			Vanadium	7.5	UG/L	240
			Zinc	1050	UG/L	10000
			Zinc	2.5	UG/L	10000
09-7401	NA	AAB2788	Aluminium	2860	UG/L	n/a
			Arsenic	120	UG/L	50
			Barium	2580	UG/L	2000
			Calcium	68500	UG/L	n/a
			Iron	237	UG/L	n/a
			Lead	16.3	UG/L	50
			Manganese	22.2	UG/L	180
			Potassium	6340	UG/L	n/a
			Sodium	107000	UG/L	n/a
09-7402	NA	AAB2789	Aluminium	2460	UG/L	n/a
			Arsenic	91.9	UG/L	50

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Barium	275	UG/L	2000
			Calcium	34000	UG/L	n/a
			Copper	56.4	UG/L	1300
			Iron	2270	UG/L	n/a
			Lead	57.5	UG/L	50
			Magnesium	5800	UG/L	n/a
			Manganese	336	UG/L	180
			Potassium	54000	UG/L	n/a
			Sodium	145000	UG/L	n/a
			Zinc	75.8	UG/L	10000
09-7403	NA	AAB2790	Aluminium	787	UG/L	n/a
			Calcium	7510	UG/L	n/a
			Chromium	22.8	UG/L	100
			Iron	166	UG/L	n/a
			Lead	168	UG/L	50
			Manganese	102	UG/L	180
			Potassium	6880	UG/L	n/a
			Selenium	620	UG/L	50
			Sodium	916000	UG/L	n/a
			Zinc	170	UG/L	10000
09-7491	NA	AAB6101	Aluminium	227000	UG/L	n/a
			Aluminium	189363	UG/L	n/a
			Antimony	23.5	UG/L	6
			Arsenic	8.6	UG/L	50
			Barium	1808	UG/L	2000
			Barium	1930	UG/L	2000
			Beryllium	13	UG/L	4
			Beryllium	13.9	UG/L	4
			Cadmium	26.3	UG/L	5
			Cadmium	29.3	UG/L	5
			Calcium	28124	UG/L	n/a
			Calcium	28700	UG/L	n/a
			Chromium	93	UG/L	100
			Chromium	111	UG/L	100
			Cobalt	38.7	UG/L	n/a
			Copper	319	UG/L	1300
			Copper	332	UG/L	1300
			Iron	155799	UG/L	n/a
			Iron	167000	UG/L	n/a
			Lead	123	UG/L	50
			Lead	123	UG/L	50
			Magnesium	32630	UG/L	n/a
			Magnesium	35400	UG/L	n/a
			Manganese	1937	UG/L	180
			Manganese	2000	UG/L	180
			Mercury	0.44	UG/L	2

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Mercury	0.45	UG/L	2
			Nickel	82.2	UG/L	100
			Nickel	79.7	UG/L	100
			Potassium	30100	UG/L	n/a
			Potassium	24525	UG/L	n/a
			Sodium	6496	UG/L	n/a
			Sodium	7760	UG/L	n/a
			Total Suspended Solids	4645000	UG/L	n/a
			Uranium	11	UG/L	n/a
			Uranium	10.98	UG/L	n/a
			Vanadium	240	UG/L	240
			Vanadium	266	UG/L	240
			Zinc	340	UG/L	10000
			Zinc	368	UG/L	10000
09-7492	NA	AAB6102	Aluminium	317000	UG/L	n/a
			Antimony	94.8	UG/L	6
			Barium	2740	UG/L	2000
			Beryllium	19.3	UG/L	4
			Cadmium	40.2	UG/L	5
			Calcium	37300	UG/L	n/a
			Chromium	144	UG/L	100
			Cobalt	64.1	UG/L	n/a
			Copper	126	UG/L	1300
			Iron	223000	UG/L	n/a
			Lead	147	UG/L	50
			Magnesium	46300	UG/L	n/a
			Manganese	2770	UG/L	180
			Nickel	112	UG/L	100
			Potassium	38700	UG/L	n/a
			Sodium	9420	UG/L	n/a
			Total Suspended Solids	5965000	UG/L	n/a
			Uranium	13.4	UG/L	n/a
			Vanadium	370	UG/L	240
			Zinc	446	UG/L	10000
09-7492	NA	AAB8395	Acetone	23	UG/L	3500
09-7493	NA	AAB5557	Acetone	23	UG/L	3500
			Aluminium	39238	UG/L	n/a
			Aluminium	36000	UG/L	n/a
			Antimony	24.6	UG/L	6
			Arsenic	3.5	UG/L	50
			Barium	348	UG/L	2000
			Barium	410	UG/L	2000
			Beryllium	1.5	UG/L	4
			Cadmium	4.6	UG/L	5
			Calcium	7300	UG/L	n/a
			Calcium	9084	UG/L	n/a

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Chromium	24.4	UG/L	100
			Chromium	26.5	UG/L	100
			Cobalt	19.2	UG/L	n/a
			Copper	700	UG/L	1300
			Copper	560	UG/L	1300
			Iron	34150	UG/L	n/a
			Iron	28600	UG/L	n/a
			Lead	119	UG/L	50
			Lead	121	UG/L	50
			Magnesium	7410	UG/L	n/a
			Magnesium	6210	UG/L	n/a
			Manganese	991	UG/L	180
			Manganese	794	UG/L	180
			Methylene chloride	6	UG/L	5
			Nickel	30.9	UG/L	100
			Potassium	8620	UG/L	n/a
			Potassium	9488	UG/L	n/a
			Selenium	2.2	UG/L	50
			Sodium	1605	UG/L	n/a
			Total Suspended Solids	1600000	UG/L	n/a
			Total Suspended Solids	1600000	UG/L	n/a
			Uranium	2.31	UG/L	n/a
			Vanadium	67	UG/L	240
			Vanadium	57.3	UG/L	240
			Zinc	1224	UG/L	10000
			Zinc	990	UG/L	10000
09-7550	0 - 0.5 ft.	AAB0741	Alpha	1.44 (J)	PCI/L	15
			Aluminium	1560	UG/L	n/a
			Barium-140	24.437	PCI/L	n/a
			Beta	2.65 (J)	PCI/L	n/a
			Calcium	12600	UG/L	n/a
			Cesium-137	0.368	PCI/L	110
			Chlorine	26000	UG/L	n/a
			Iron	838	UG/L	n/a
			Nitrate Nitrogen	300	UG/L	n/a
			Sodium	15100	UG/L	n/a
			Total Alkalinity	34000	UG/L	n/a
			Uranium	0.949 (R)	UG/L	n/a
09-7550	0 - 0.5 ft.	AAB5550	Aluminium	512.9	UG/L	n/a
			Aluminium	420	UG/L	n/a
			Arsenic	2.8	UG/L	50
			Barium	35.3	UG/L	2000
			Beryllium	0.7	UG/L	4
			Beta	2.64	PCI/L	n/a
			Calcium	6930	UG/L	n/a
			Calcium	8054.4	UG/L	n/a

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Chlorine	6500	UG/L	n/a
			Gamma	0	PCI/L	n/a
			Iron	456.2	UG/L	n/a
			Magnesium	2590.1	UG/L	n/a
			Nitrate Nitrogen	240	UG/L	n/a
			Potassium	1667.7	UG/L	n/a
			Sodium	7500	UG/L	n/a
			Sodium	8683.7	UG/L	n/a
			Sulfate	5000	UG/L	n/a
			Total Alkalinity	44000	UG/L	n/a
			Total Dissolved Solids	113000	UG/L	n/a
			Uranium	0.111	UG/L	n/a
			Vanadium	14	UG/L	240
			Zinc	27.4	UG/L	10000
			Zinc	20.2	UG/L	10000
09-7550	0 - 0.5 ft.	AAC0205	HMX	1.99	UG/L	1800
09-7550	0 - 0.5 ft.	AAC0206	Dinitrotoluene [2,4-]	1.52	UG/L	0.05
09-7551	0 - 0.5 ft.	AAB0742	Alpha	0.992 (J)	PCI/L	15
			Alpha	0.992 (J)	PCI/L	15
			Aluminium	2225	UG/L	n/a
			Aluminium	2380	UG/L	n/a
			Americium-241	0.296	PCI/L	15
			Barium	58.9	UG/L	2000
			Barium-140	9.841	PCI/L	n/a
			Beta	4.38 (J)	PCI/L	n/a
			Calcium	11743	UG/L	n/a
			Calcium	11800	UG/L	n/a
			Cerium-144	0.992	PCI/L	n/a
			Chlorine	24000	UG/L	n/a
			Cobalt-60	0.856	PCI/L	200
			Europium-152	1.04	PCI/L	n/a
			Iron	983	UG/L	n/a
			Iron	1050	UG/L	n/a
			Magnesium	3509	UG/L	n/a
			Nitrate Nitrogen	240	UG/L	n/a
			Potassium	2689	UG/L	n/a
			Ruthenium-106	10.389	PCI/L	200
			Sodium	13900	UG/L	n/a
			Sodium	13826	UG/L	n/a
			Sodium-22	1.505	PCI/L	480
			Total Alkalinity	27000	UG/L	n/a
			Uranium	0.801 (R)	UG/L	n/a
09-7551	0 - 0.5 ft.	AAB5551	Alpha	0.25	PCI/L	15
			Aluminium	694	UG/L	n/a
			Americium-241	7	PCI/L	15

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Americium-241	7.294	PCI/L	15
			Beta	1.92	PCI/L	n/a
			Calcium	6980	UG/L	n/a
			Cesium-137	0.736	PCI/L	110
			Chlorine	5200	UG/L	n/a
			Cobalt-60	0.518	PCI/L	200
			Cobalt-60	2.803	PCI/L	200
			Gamma	0	PCI/L	n/a
			Gamma	0	PCI/L	n/a
			Iron	403	UG/L	n/a
			Nitrate Nitrogen	470	UG/L	n/a
			Sodium	6930	UG/L	n/a
			Sulfate	5200	UG/L	n/a
			Total Alkalinity	40000	UG/L	n/a
			Total Dissolved Solids	108000	UG/L	n/a
			Uranium	0.018	UG/L	n/a
09-7560	0 - 0.5 ft.	AAB0743	Alpha	1.81 (J)	PCI/L	15
			Aluminium	1950	UG/L	n/a
			Americium-241	2.774	PCI/L	15
			Beta	4.32 (J)	PCI/L	n/a
			Calcium	13500	UG/L	n/a
			Cerium-144	15.124	PCI/L	n/a
			Cesium-137	2.291	PCI/L	110
			Chlorine	39000	UG/L	n/a
			Cobalt-60	0.736	PCI/L	200
			Iron	908	UG/L	n/a
			Nitrate Nitrogen	250	UG/L	n/a
			Ruthenium-106	3.287	PCI/L	200
			Selenium	11	UG/L	50
			Sodium	15700	UG/L	n/a
			Total Alkalinity	26000	UG/L	n/a
			Total Alkalinity	21000	UG/L	n/a
			Uranium	0.446 (R)	UG/L	n/a
			Uranium	0.634 (R)	UG/L	n/a
09-7560	0 - 0.5 ft.	AAB5552	Alpha	1.18	PCI/L	15
			Alpha	2.1	PCI/L	15
			Aluminium	874	UG/L	n/a
			Americium-241	3.044	PCI/L	15
			Beta	4.46	PCI/L	n/a
			Beta	4.14	PCI/L	n/a
			Chlorine	8000	UG/L	n/a
			Cobalt-60	1.096	PCI/L	200
			Gamma	0	PCI/L	n/a
			Iron	426	UG/L	n/a
			Nitrate Nitrogen	140	UG/L	n/a
			Sodium	5350	UG/L	n/a

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Sulfate	4900	UG/L	n/a
			Total Alkalinity	34000	UG/L	n/a
			Total Dissolved Solids	111000	UG/L	n/a
			Uranium	0.22	UG/L	n/a
09-7560	0 - 0.5 ft.	AAB5554	Alpha	0.09	PCI/L	15
			Aluminium	846	UG/L	n/a
			Americium-241	3.17	PCI/L	15
			Beta	2.55	PCI/L	n/a
			Calcium	5230	UG/L	n/a
			Cesium-137	0.58	PCI/L	110
			Chlorine	8000	UG/L	n/a
			Cobalt-60	0.024	PCI/L	200
			Gamma	0	PCI/L	n/a
			Iron	439	UG/L	n/a
			Nitrate Nitrogen	180	UG/L	n/a
			Ruthenium-106	2.634	PCI/L	200
			Sodium	6100	UG/L	n/a
			Sulfate	4700	UG/L	n/a
			Total Alkalinity	32000	UG/L	n/a
			Total Dissolved Solids	113000	UG/L	n/a
			Uranium	0.138	UG/L	n/a
09-7560	0 - 0.5 ft.	AAC0208	HMX	1.48	UG/L	1800
09-7561	0 - 0.5 ft.	AAB0744	Alpha	0.44 (J)	PCI/L	15
			Aluminium	869	UG/L	n/a
			Americium-241	2.315	PCI/L	15
			Barium-140	11.464	PCI/L	n/a
			Barium-140	12.393	PCI/L	n/a
			Beta	2.44 (J)	PCI/L	n/a
			Calcium	7580	UG/L	n/a
			Cerium-144	1.13	PCI/L	n/a
			Cesium-137	0.889	PCI/L	110
			Cesium-137	0.25	PCI/L	110
			Chlorine	5000	UG/L	n/a
			Europium-152	0.503	PCI/L	n/a
			Europium-152	4.776	PCI/L	n/a
			Iron	342	UG/L	n/a
			Nitrate Nitrogen	120	UG/L	n/a
			Nitrate Nitrogen	140	UG/L	n/a
			Ruthenium-106	1.992	PCI/L	200
			Ruthenium-106	5.165	PCI/L	200
			Sodium	5100	UG/L	n/a
			Sodium-22	1.108	PCI/L	480
			Sodium-22	1.853	PCI/L	480
			Total Alkalinity	27000	UG/L	n/a
			Total Alkalinity	30000	UG/L	n/a

MDA-M Water Detects

Location ID	Depth of Sample	Sample ID	ANALYTE	Results	Units	SAL
			Uranium	0.15 (R)	UG/L	n/a
09-7561	0 - 0.5 ft.	AAB0745	Alpha	0.65 (J)	PCI/L	15
			Aluminium	961	UG/L	n/a
			Americium-241	7.126	PCI/L	15
			Barium-140	9.525	PCI/L	n/a
			Beta	2.32 (J)	PCI/L	n/a
			Calcium	7730	UG/L	n/a
			Cerium-144	3.02	PCI/L	n/a
			Chlorine	5000	UG/L	n/a
			Cobalt-60	0.654	PCI/L	200
			Europium-152	0.88	PCI/L	n/a
			Iron	362	UG/L	n/a
			Nitrate Nitrogen	130	UG/L	n/a
			Ruthenium-106	14.305	PCI/L	200
			Sodium	5090	UG/L	n/a
			Total Alkalinity	30000	UG/L	n/a
			Uranium	0.161 (R)	UG/L	n/a
09-7561	0 - 0.5 ft.	AAB5553	Alpha	0.09	PCI/L	15
			Aluminium	247	UG/L	n/a
			Americium-241	3.546	PCI/L	15
			Beta	1.45	PCI/L	n/a
			Cesium-137	1.326	PCI/L	110
			Chlorine	620	UG/L	n/a
			Cobalt-60	0.993	PCI/L	200
			Gamma	0	PCI/L	n/a
			Iron	120	UG/L	n/a
			Nitrate Nitrogen	220	UG/L	n/a
			Ruthenium-106	13.079	PCI/L	200
			Sodium-22	1.767	PCI/L	480
			Sulfate	3600	UG/L	n/a
			Total Alkalinity	28000	UG/L	n/a
			Total Dissolved Solids	83000	UG/L	n/a
09-7561	0 - 0.5 ft.	AAC0209	Dinitrotoluene [2,4-]	0.9	UG/L	0.05
n/a Not available.						
NA Not applicable.						

J - The associated numerical value is an estimated quantity.

R - The data are unusable (compound may or may not be present).

ANNEX 6.10

RISK-BASED CLEANUP LEVEL CALCULATIONS

Methodology for Establishing Cleanup Levels for Lead In Soil

LEAD EXPOSURES

EPA has not derived CSFs or RfDs for evaluating the toxicity of lead or lead compounds. Previously, EPA had considered the concentration range of 500 to 1,000 mg/kg lead in soil to be acceptable as an interim cleanup level for residential Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) sites (EPA 1992). This interim cleanup level was proposed in a Centers for Disease Control document (CDC 1985) on lead poisoning in children, as children and fetuses are considered the most sensitive receptors for lead's toxic end points. Even more current EPA (1994) guidance has suggested a lead concentration in soil of 400 mg/kg as the threshold level. However, more recently for residential CERCLA and RCRA sites, EPA has recommended replacing the 500 to 1,000 mg/kg cleanup range and the 400 mg/kg threshold level with levels derived by its Integrated Exposure Uptake Biokinetic (IEUBK) Model (Version 0.99d).

Because of the anticipated future use of the Laboratory site for industrial/commercial purposes, the residential exposures are not considered relevant for the site. The California Environmental Protection Agency (Cal/EPA) has developed its own model (1993) to predict blood lead (PbB) levels in adults as well as children. The Cal/EPA model was employed in this assessment to evaluate potential adverse health effects to adults from lead in soil at the Laboratory site (see attached table).

Cal/EPA Lead Model

Similar to the EPA IEUBK model, the Cal/EPA model is used to estimate blood lead concentrations resulting from exposures via several pathways (inhalation of particulates, ingestion of food, dust, soil, water, and plant uptake). The contribution from the pathways are added to derive an estimate median PbB concentration resulting from multipathway exposure. In addition, the model calculates the 90th, 95th, 98th and 99th percentile concentrations by assuming a lognormal distribution with a standard deviation of 1.42 mg/dl.

A PbB concentration of 10 mg/dl is the target PbB level for exposure to lead in the environment, regardless of the source. Sources include drinking water, grocery story food products, soil (incidental soil ingestion and dermal contact), and the air. Therefore, the calculation of a soil lead cleanup level for an industrial exposure scenario includes the contribution to blood lead levels from non-site sources.

The soil lead cleanup level includes the contribution to PbB levels from non-site sources as well as on-site soil contact, soil ingestion, and inhalation pathways and was calculated not to exceed the target level of 10 mg/dl at the 95 percentile concentration. The contact rate for soil ingestion was changed from 0.03 g soil/day to 0.05 g soil/day to reflect the on-site industrial exposure pathway. The lead concentrations used in the water and food ingestion pathways are default values and represent background lead levels that may be encountered in tap water and grocery store food products. All other exposure input parameters are default values based on a residential exposure scenario.

REFERENCES

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

EPA (U.S. Environmental Protection Agency). 1992. Revised Guidance on Establishing Soil Lead Cleanup Levels at CERCLA/RCRA Sites. OSWER Directive 9355, 4-08.

EPA (U.S. Environmental Protection Agency). 1994. Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. OSWER Directive No. 9355.4-12. July 14, 1994.

LEAD RISK ASSESSMENT SPREADSHEET
CALIFORNIA DEPARTMENT OF TOXIC SUBSTANCES CONTROL

INPUT		OUTPUT					
MEDIUM	LEVEL		------ percentiles ------				
			50th	90th	95th	98th	99th
LEAD IN AIR (ug/m^3)	0.01	BLOOD Pb, ADULT (ug/dl)	5.7	8.9	10.0	11.6	12.8
LEAD IN SOIL (ug/g)	3385						
LEAD IN WATER (ug/l)	15						
PLANT UPTAKE? 1=YES 0=NO	0						
AIRBORNE DUST (ug/m^3)	50						

EQUATIONS, ADULTS

Pathway	Blood Pb ug/dl		Route-specific constant		concentration in medium		contact rate	percent of total
SOIL CONTACT:	0.66	=	1E-04 (ug/dl)/(ug/day)	*	3385 ug/g	*	1.85 g soil/day (5 g/m^2 * 0.37 m^2)	12%
SOIL INGESTION:	2.98	=	0.018 (ug/dl)/(ug/day)	*	3385 ug/g	*	0.05 g soil/day	53%
INHALATION:	0.29	=	1.64 (ug/dl)/(ug/m^3)	*	0.18 ug/m^3			5%
WATER INGESTION:	0.84	=	0.04 (ug/dl)/(ug/day)	*	15 ug/l	*	1.4 l water/day	15%
FOOD INGESTION:	0.88	=	0.04 (ug/dl)/(ug/day)	*	10.0 ug Pb/kg diet	*	2.2 kg diet/day	16%

EQUATIONS, DIETARY LEAD
TOTAL DIETARY LEAD = 0.945 * 10 + 0.055 * Pb in produce (ug/kg) = 10.0 ug/kg
LEAD IN PRODUCE = 10 ug/kg or 0.00045 * soil lead = 10.0 ug/kg

The following equation was used to derive cleanup levels for carcinogenic compounds in commercial/industrial soil:

$$C\ (mg/kg) = \frac{TR \times BW \times AT \times 365\,d/yr}{EF \times ED \times \left[\left(SF_o \times 10^{-6}\ kg/mg \times IR_{soil}\right) + \left(SF_i \times IR_{air} \times (1/Y)\right)\right]}$$

Where:

Parameter	Definition	Units	Default
C	cleanup level - chemical concentration in soil	mg/kg	---
TR	target excess individual lifetime cancer risk	unitless	10^{-6} or 10^{-5}
BW	adult body weight	kg	70
AT	carcinogenic averaging time	yr	70
EF	exposure frequency	days/yr	250
ED	exposure duration	yr	25
SF_o	oral cancer slope factor	$(mg/kg\text{-}day)^{-1}$	chemical-specific
IR_{soil}	soil ingestion rate	mg/day	50
SF_i	inhalation cancer slope factor	$(mg/kg\text{-}day)^{-1}$	chemical-specific
IR_{air}	workday inhalation rate	m^3/day	20
Y	volatilization factor (VF) for volatiles particulate emission factor (PEF) for non-volatiles	m^3/kg m^3/kg	chemical-specific 1.11×10^7

The following equation was used to derive cleanup levels for noncarcinogenic contaminants in commercial/industrial soil:

$$Action\,Level\,(mg/kg) = \frac{THI \times BW \times AT \times 365\,d/yr}{EF \times ED \times \left[\left((1/RfD_o) \times 10^{-6}\,kg/mg \times IR_{soil}\right) + \left((1/RfD_i) \times IR_{air} \times 1/Y\right)\right]}$$

Where:

Parameter	Definition	Units	Default
THI	target hazard index	unitless	0.1
BW	adult body weight	kg	70
AT	noncarcinogenic averaging time	yr	25 (always equal to ED)
EF	exposure frequency	days/yr	250
ED	exposure duration	yr	25
RfD_o	oral chronic reference dose	mg/kg-day	chemical-specific
IR_{soil}	soil ingestion rate	mg/day	50
SF_i	inhalation chronic reference dose	mg/kg-day	chemical-specific
IR_{air}	workday inhalation rate	m^3/day	20
Y	volatilization factor (VF) for volatiles particulate emission factor (PEF) for non-volatiles	m^3/kg m^3/kg	chemical-specific 1.11×10^7 (LANL)

ANNEX 6.11

PHASE I SAMPLING CALCULATIONS

Phase I Sampling Calculations

The required number of samples is computed using the following equation:

$$n_d = \frac{\left(z_{1-\beta} + z_{1-\alpha}\right)^2}{\tau^2} \quad where \quad \tau = \frac{\left(C_s - \mu_1\right)}{\sigma}$$

The required number of samples is computed using the following parameters and assumptions:

Parameter	Assumption	Value
α	alpha - the desired false positive rate	0.05
β	beta - the desired false negative rate	0.2
$z_{1-\alpha}$	critical value for the normal distribution with a probability of 1 - α	1.645
$z_{1-\beta}$	critical value for the normal distribution with a probability of 1 - β	0.842
τ	tau - an expression of relative difference	calculated
C_s	cleanup standard for the sample area	3000 mg/kg for lead
μ_1	the mean concentration where the site should be declared clean with a high probability	assume 50% of C_s
σ	the estimate of the standard deviation of the individual contaminant concentrations within the CU	assume a coefficient of variation of 1.08 as measured in the existing RFI data, therefore, σ = 108% of μ_1.