Volume III

TA-21 Operable Unit RFI Work Plan for Environmental Restoration

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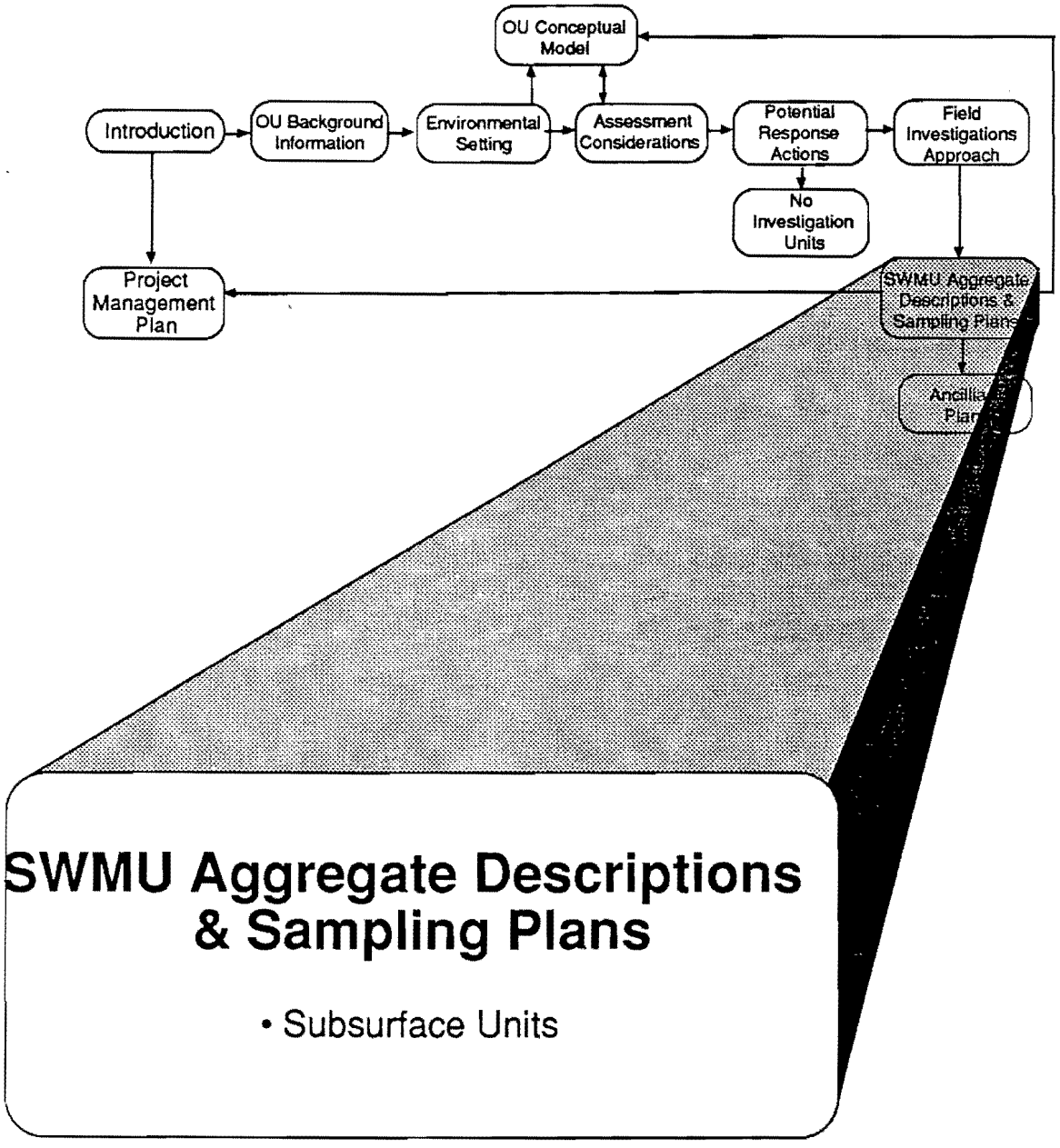


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Los Alamos
NATIONAL LABORATORY

LAUR-91-962

CHAPTER 17


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17. SUBSURFACE UNITS DESCRIPTION AND SAMPLING PLAN

17.1 Introduction

This chapter provides site descriptions, the objectives of the investigation, and field sampling plans for several SWMUs that have the potential for liquid releases that occurred in the past but were confined primarily to subsurface soils. The list below identifies the SWMUs addressed in this chapter and the section in which each is addressed.

- Section 17.2

  SWMU 21-006(b), Underground Seepage Pits

- Section 17.3

  SWMU 21-009, Waste Treatment Laboratory

- Section 17.4

  SWMU 21-012, Dry Wells

- Section 17.5

  SWMU 21-022 (a and f), Acid Waste Lines and Sumps

- Section 17.6

  SWMU 21-005, Acid Pit

For all of the SWMUs in this chapter, data are needed on the presence or absence of contaminants in subsurface soil. Identified potential contaminant migration pathways for all of the SWMUs include infiltration and vapor phase movement (see Chapter 5). Exposure routes and potential receptors for each environmental transport pathway are identified in Chapter 6.

The criteria for preliminary identification of potential response actions at TA-21 SWMUs are presented in Chapter 10. The no-action alternative is identified as a potential appropriate remedial alternative for all of the SWMUs in this chapter. The field investigations at three of the SWMUs (21-005, 21-009, and 21-012) may determine that none of these is a release site, in which case, SWMUs that are not release sites will be proposed for no further investigation. Other preliminary remedial alternatives that are identified for two SWMUs [21-006(b), 21-022(a) and (f)] in this chapter include institutional controls, treatment, removal and disposal, and removal and treatment (see Table 10-I).

The following paragraphs present a brief description of the SWMUS in this chapter and the proposed field investigations. For all SWMUs in this chapter, the field measurements and laboratory analyses for initial investigations are summarized by section in Tables 17.1-I and 17.1-II. The same information for subsequent investigations is presented in Tables 17.1-III and 17.1-IV. The strategy for field and laboratory analyses is presented for each SWMU in flow charts in Figs. 17.1-1 through 17.1-5.

Underground Seepage Pit, SWMU 21-006(b). The underground seepage pit (TA-21-118) may have been installed as early as 1945. The land surface above the inactive seepage pit was regraded after 1980, and the location of the pit is not accurately known. The pit design is 16-ft wide by 70-ft long, with a depth of 6 ft. No data exist regarding contamination in the area of the underground seepage pit. Assays for radionuclides and nonradionuclides were performed on soil at the outlet line from the seepage pit into the canyon. Toluene, aluminum, iron, lead, ^{137}Cs, $^{239/240}Pu$, and tritium were present at levels higher than background. The analytical results are an indication that the soil around the seepage pit structure and the tuff beneath it may be contaminated with organic, inorganic, and radiological constituents and that these contaminants may have migrated.

The strategy for the field investigation at the seepage pit is presented in Fig. 17.1-1. The initial investigation includes a field survey with geophysical instruments to locate three boreholes into the seepage pit. If contaminants are identified in the subsurface soil samples, a subsequent field investigation will include additional vertical boreholes to characterize the lateral and vertical extent of contamination. Tables 17.1-I through 17.1-IV summarize measurements and analyses for subsurface soil samples to be taken during the field investigation.

Waste Treatment Laboratory, SWMU 21-009. The waste treatment laboratory was constructed in 1948. The building, removed in 1965, was originally built on concrete pillars and measured 16-ft wide by 40-ft long. There is no physical evidence at the present time to mark the former location of the laboratory. During operations, the building was contaminated with plutonium dust. Perchloric acid is an additional likely contaminant.

In addition to the former location of the laboratory, this SWMU includes an inactive buried waste line that carried waste from the laboratory building to a septic tank and ultimately to

an outfall near the canyon rim. The septic tank was removed during demolition of the laboratory, but whether the buried waste line still exists is not known.

The objective of the field investigation at SWMU 21-009 is to confirm the absence or presence of contamination in subsurface soils. The strategy for the field investigation at SWMU 21-009 is presented in Fig. 17.1-2. The initial investigation includes trenching to evaluate contamination associated with the drain line, land surveys to stake the location of the former laboratory, and three vertical boreholes within the footprint of the building to determine whether contaminants are present in subsurface soil samples. If contaminants are found, then a subsequent investigation includes additional vertical boreholes to characterize the lateral and vertical extent of contamination. Tables 17.1-I through 17.1-IV present a summary of measurements and analyses for subsurface soil samples to be taken during the initial and subsequent field investigations.

Dry Wells, SWMU 21-012. The dry wells investigation includes four inactive structures that received boiler blowdown (pressurized discharge of gaseous steam) from the former steam plant. The structure includes two concrete blowdown pits, a seepage pit, and a 54-ft-deep dry well. The old steam plant was constructed in 1945 and removed in 1985. The area was regraded, and there is presently no visible evidence of the locations of the structures that received boiler blowdown. There is no documentation that the structures were removed.

The objective of the field investigation at SWMU 21-012 is to confirm the absence of contamination in the subsurface beneath the inactive structures. The strategy for the investigation is presented in Fig. 17.1-3. Tables 17.1-I and 17.1-II summarize the field measurements and analytical laboratory analyses that are part of the initial investigation.

Acid Waste Lines and Sumps, SWMU 21-022 (a) and (f). There are 10 subunits identified in SWMU 21-022. Eight of these subunits, which are now inaccessible, are discussed in Chapter 18, Units for Coordination with Building D&D. The two subunits that are included for characterization in this chapter are two sumps that are accessible. The sumps are no longer being used.

SWMU 21-022(a), Sump TA-21-74, is located north of Building TA-21-21. The sump was constructed of brick in 1946 and is of unknown depth. No previous sampling has been performed. However, the sump is believed to be contaminated with plutonium and uranium.

SWMU 21-022(f), Sump TA-21-173, is located off the northeast corner of TA-21-152. It is 5.5 ft in diameter and 6-ft deep. No previous sampling has been performed. The sump is located in the eastern portion of TA-21, where ^{210}Po and ^{227}Ac are associated with the waste from DP East. In addition to radionuclides, hazardous constituents may be present. It is not known whether environmental contamination is present.

The objective of the field investigation at SWMUs 21-022(a) and (f) is to confirm the presence or absence of contamination and to determine the lateral and vertical extent of contamination. The strategy for the investigation is presented in Fig. 17.1-4. Tables 17.1-I through 17.1-IV summarize the field measurements and laboratory analyses that are part of the initial and subsequent investigations.

Acid Pit, SWMU 21-005. The acid pit was installed in 1946 to use nitric acid to dispose of classified correspondence. The pit, removed in 1967, was a 3-ft^2 by 4-ft deep reinforced concrete structure covered with sheet iron. No data exist regarding contamination in the area of the former acid pit. No releases from the acid pit to the environment were documented.

The objective of the field investigation at SWMU 21-005 is to confirm the presence of contaminants in subsurface soils beneath the former location of the acid pit. The strategy for the field investigation at the acid pit is presented in Fig. 17.1-5. Field measurements and laboratory analyses for the initial investigation are summarized in Tables 17.1-I and 17.1-II.

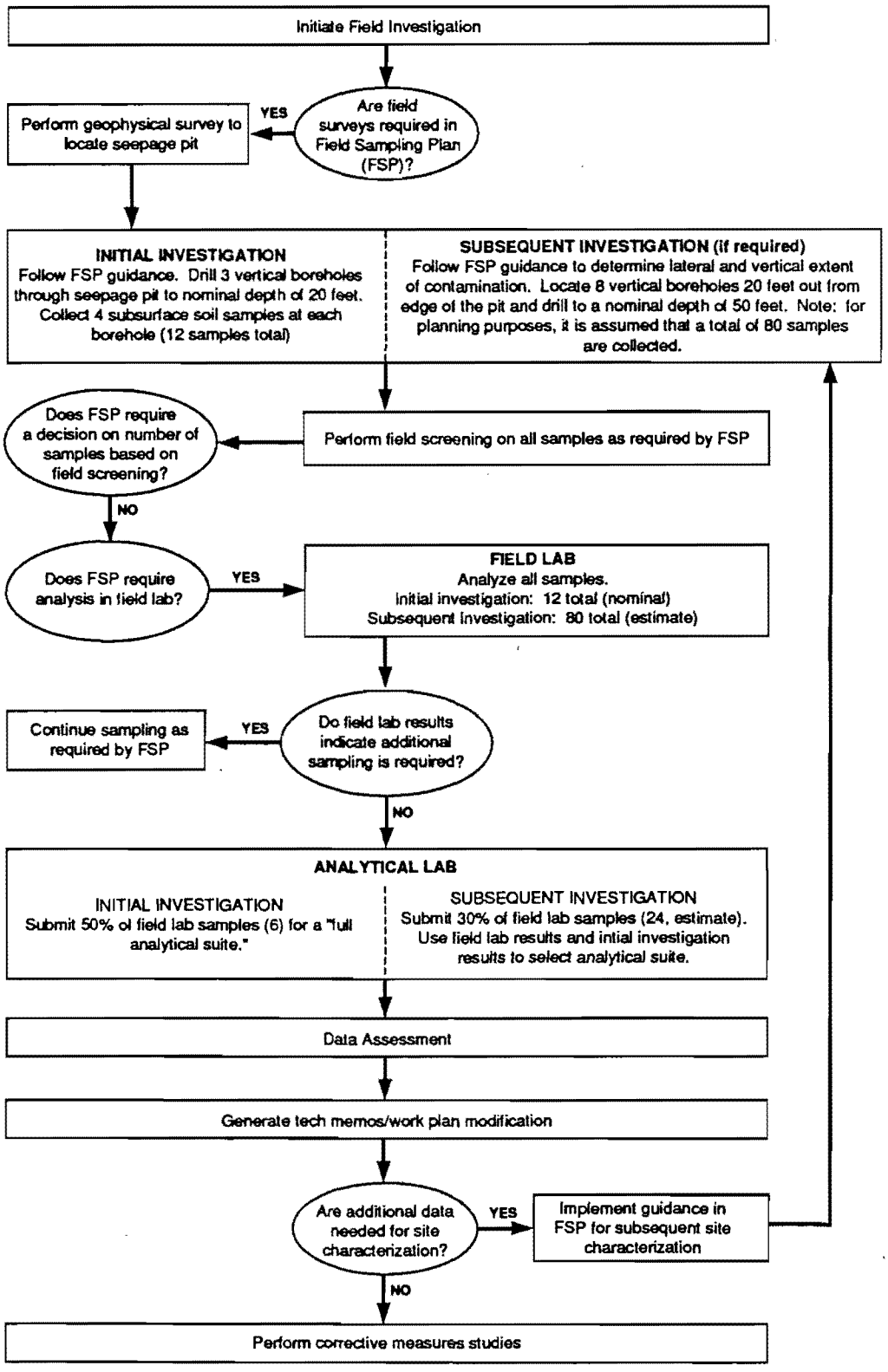


Fig. 17.1-1 Logic flow for the field investigation at SWMU 21-006(b) underground seepage pit.

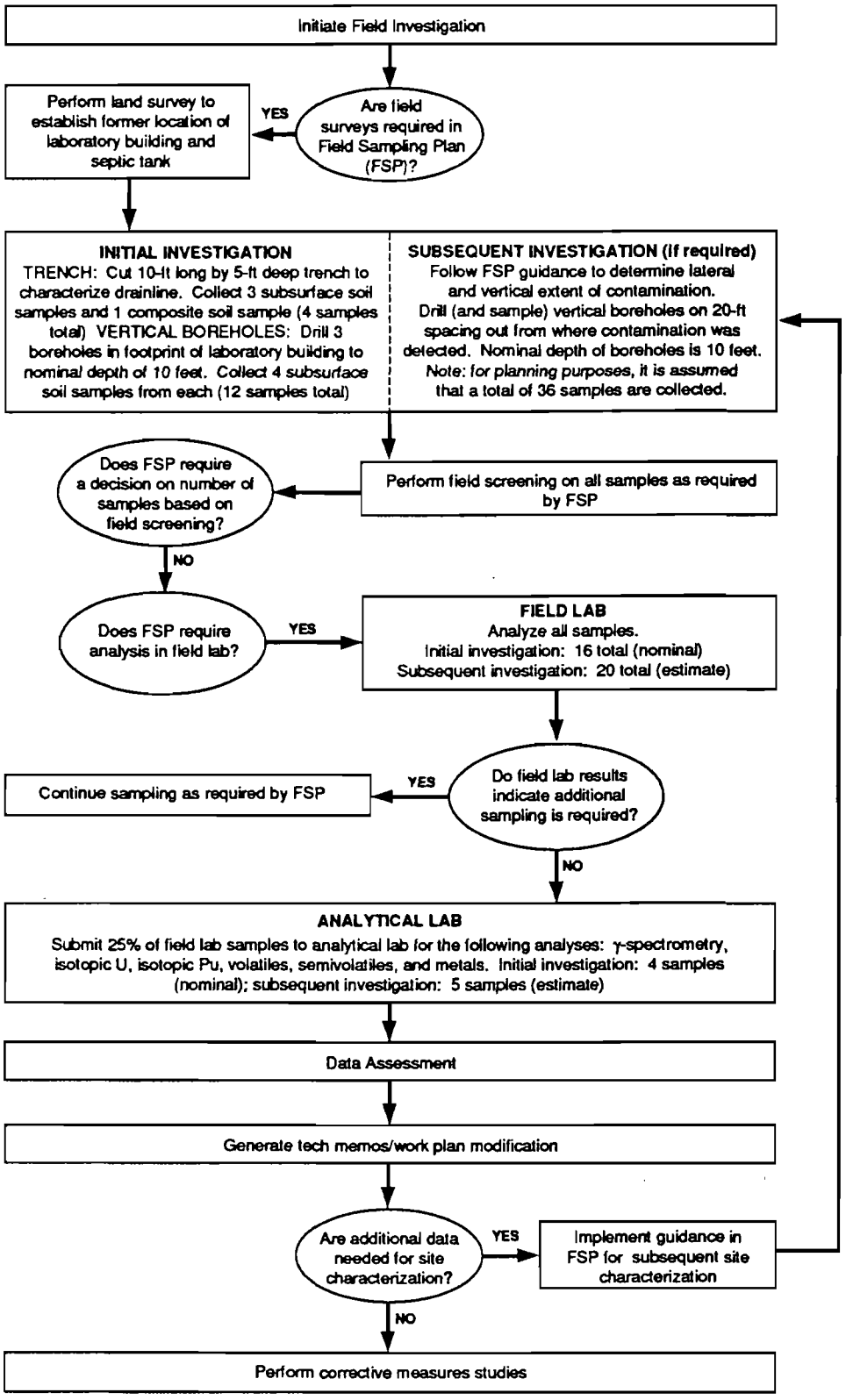


Fig. 17.1-2 Logic flow for the field investigation at SWMU 21-009 Waste Treatment Laboratory.

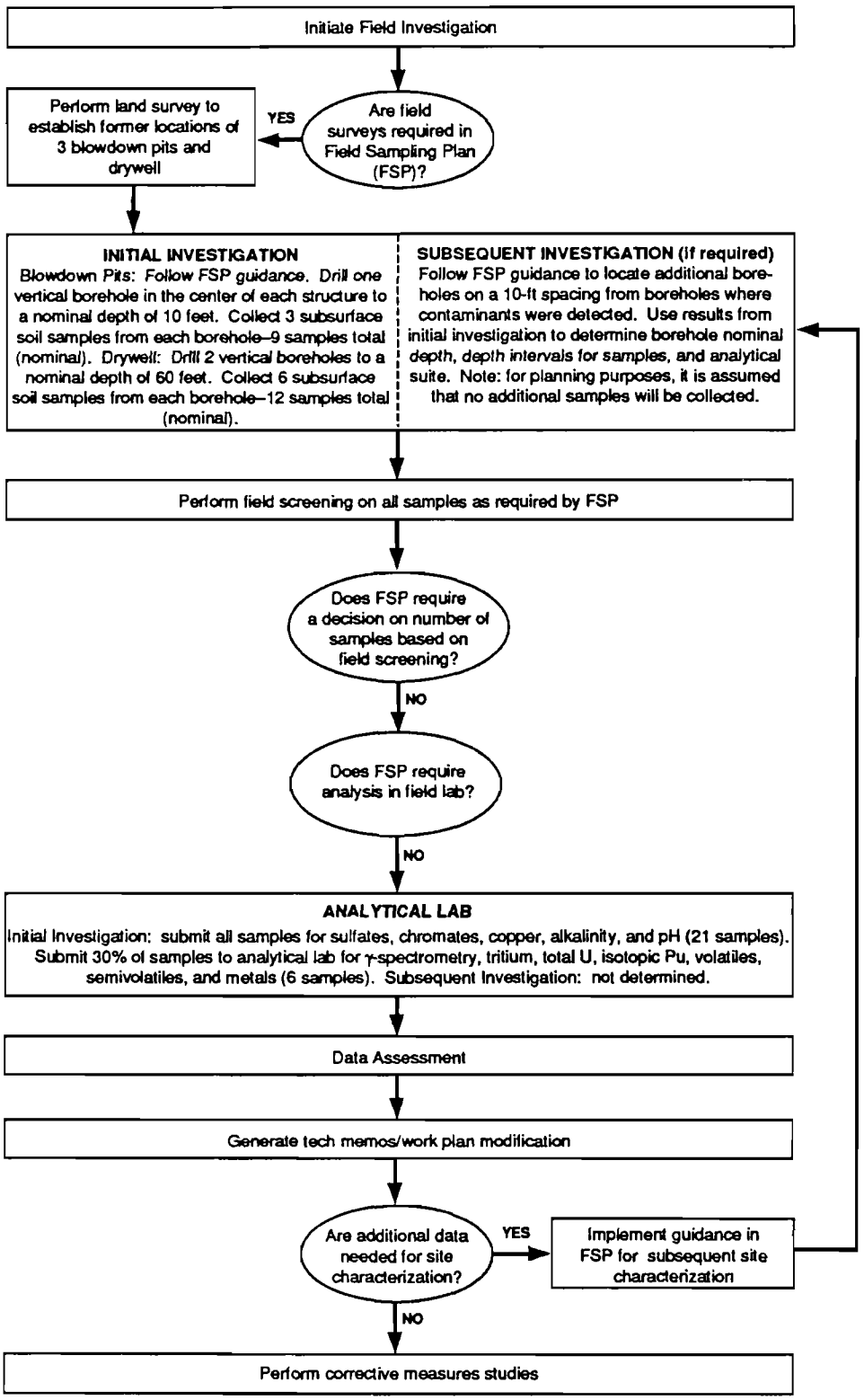


Fig. 17.1-3 Logic flow for the field investigation at SWMU 21-012 dry wells.

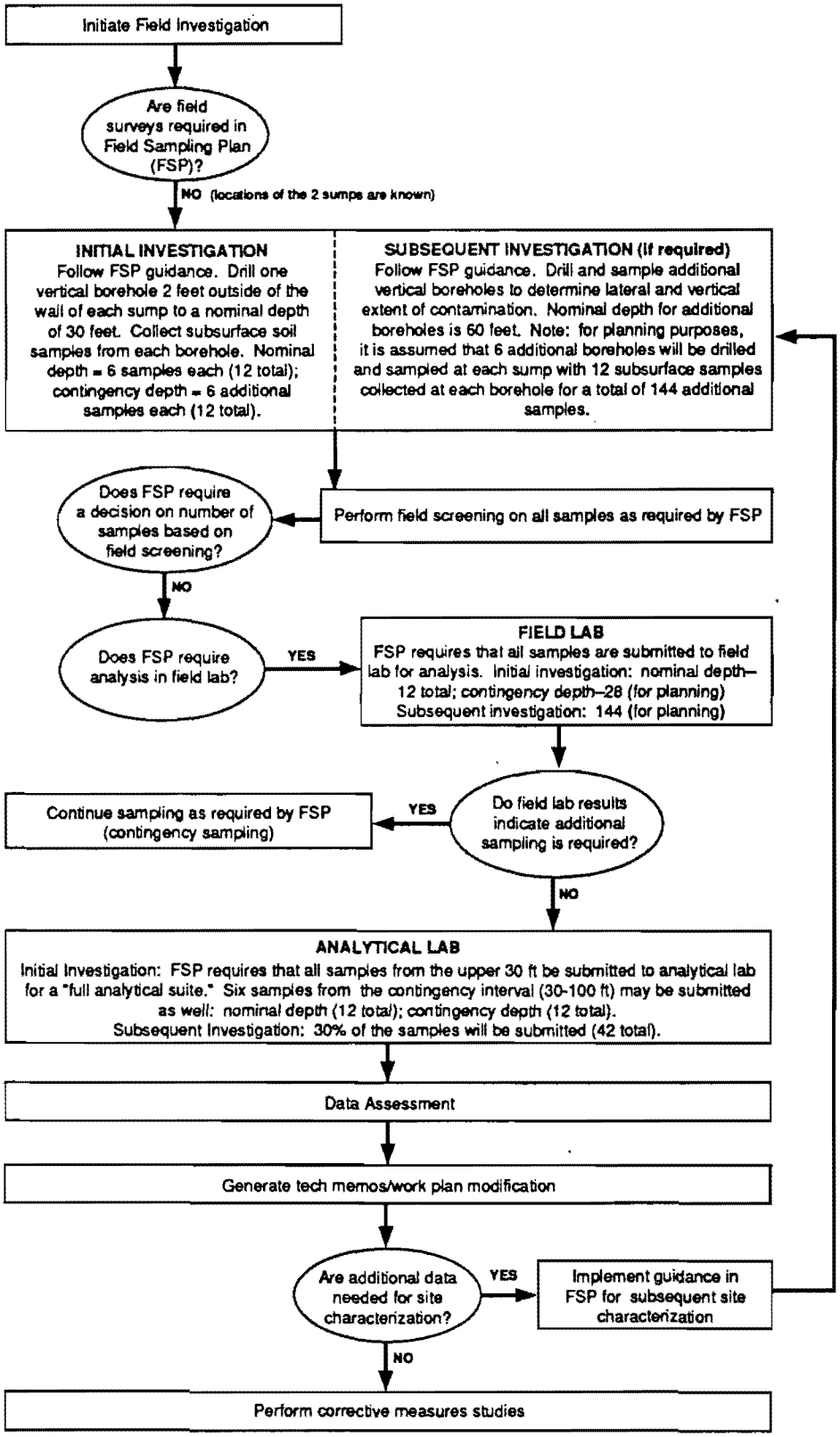


Fig. 17.1-4 Logic flow for the field investigation at SWMU 21-022(a), (f) sumps.

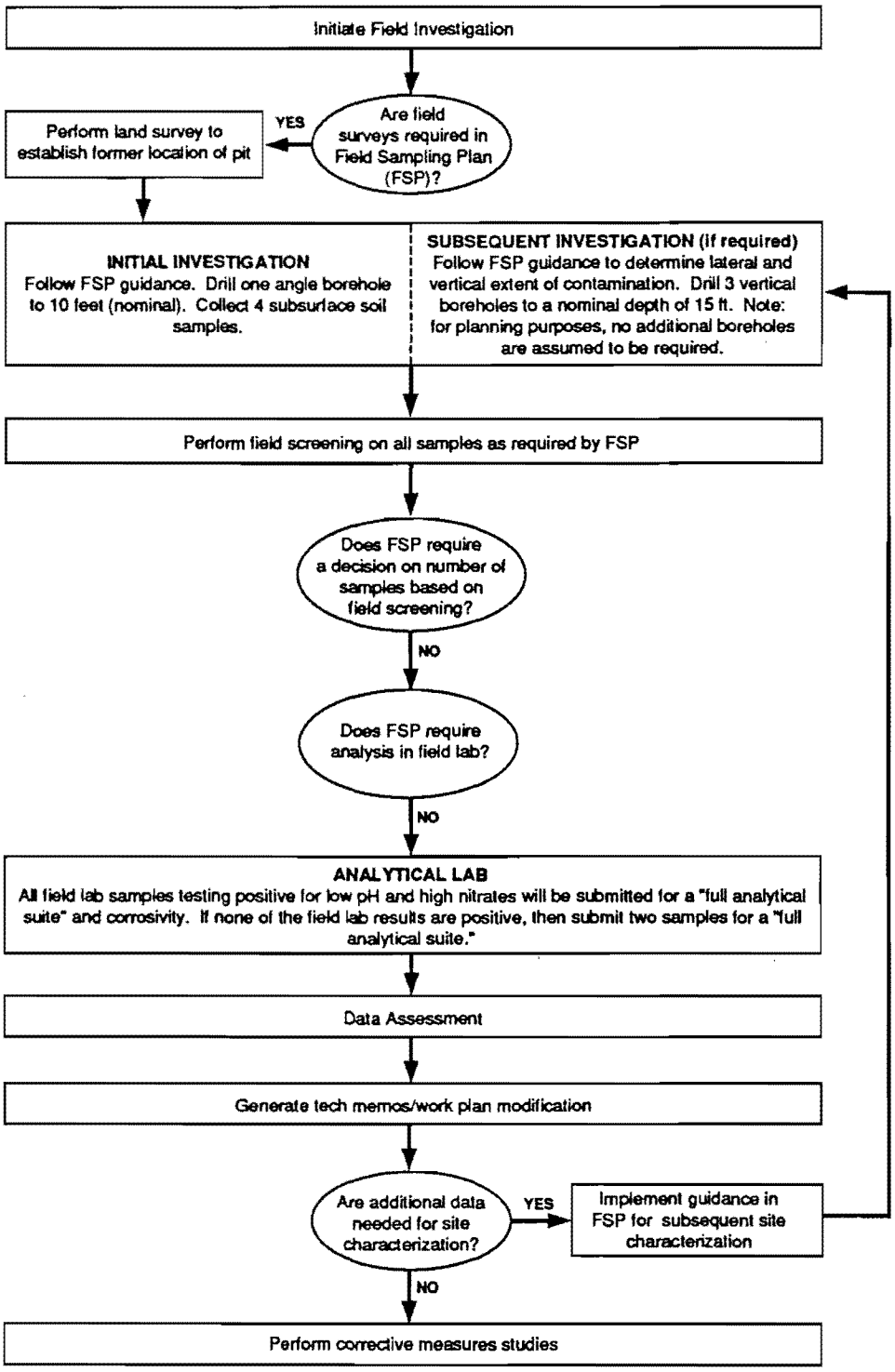


Fig. 17.1-5 Logic flow for the field investigation at the acid pit.

17.1-I SUMMARY OF INITIAL INVESTIGATIONS BY SECTION FOR CHAPTER 17.

Section	Description	Survey Areas			Trench	
		Land	Radiological	Geophysical	No. of Locations	No. of Samples
17.2	Underground Seepage Pit	1		1		
17.3	Waste Treatment Laboratory				1	4
17.4	Dry Wells	5				
17.5	Acid Lines and Sumps					
17.6	Acid Pit	1				
	Total	7		1	1	4

Section	Description	Boreholes									Q A
		Shallow			Vertical			Angled			
		Number	Total Footage	No. of Samples	Number	Total Footage	No. of Samples	Number	Total Footage	No. of Samples	
17.2	Underground Seepage Pit				3	45	12				
17.3	Waste Treatment Laboratory	3	30	12							4
17.4	Dry Wells	3	30	12	2	120	20				7
17.5	Acid Lines and Sumps				2	200	40				10
17.6	Acid Pit							1	10	4	4
	Total	6	60	24	7	365	72	1	10	4	25

17.1-II SUMMARY OF SAMPLE AND ANALYSIS FOR INITIAL INVESTIGATIONS BY SECTION FOR CHAPTER 17.

	17.2	17.3	17.4	17.5	17.6	Total
Field Sample Screening						
Gross Gamma	12	16	32	40	4	104
Gross Alpha	12	16	32	40	4	104
Organic Vapor	12	16	32	40	4	104
Combustible Gas/Oxygen	12	16			4	32
Lithological Logging	12	16	32	40	4	104
Field Laboratory Measurements						
Gross Alpha	12	16		40		68
Gamma Spectrometry	12	16		40		68
Tritium	12	16		40		68
Volatile Organics	12	16		40		68
PCB						
Soil Moisture						
Laboratory Analysis						
Gamma Spectrometry	8	9	9	30	4	60
Tritium	8	9	9	30	4	60
Total Uranium	8	9	9	30	4	60
Isotopic Plutonium	8	9	9	30	4	60
Isotopic Thorium				30		30
Strontium 90	8	9		30		47
VOA (SW 8240)	10	11	13	34	6	74
Semivolatiles (SW 8270)	9	10	11	32	5	67
Metals (SW 6010)	9	10	11	32	5	67
PCB (SW 8080)						
Sulfates/Chromates/Copper Salts			26			26
Alkalinity, pH			11			11
Nitrates, pH					4	4

17.1-III SUMMARY OF SUBSEQUENT INVESTIGATIONS BY SECTION FOR CHAPTER 17.

Section	Description	Boreholes						Q A
		Shallow			Vertical			
		Number	Total Footage	No. of Samples	Number	Total Footage	No. of Samples	
17.2	Underground Seepage Pit				8	400	80	18
17.3	Waste Treatment Laborator	5	50	20				4
17.4	Dry Wells							
17.5	Acid Lines and Sumps				12	720	144	32
17.6	Acid Pit							
	Total	5	50	20	20	1120	224	54

17.1-IV SUMMARY OF SAMPLE AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS BY SECTION FOR CH-17.

	17.2	17.3		17.5						Total
Field Sample Screening										
Gross Gamma		43	20		144					207
Gross Alpha		80	20		144					244
Organic Vapor		80	20		144					244
Combustible Gas/Oxygen		80	20							100
Lithological Logging		80	20		144					244
Field Laboratory Measurements										
Gross Alpha		80	20		144					244
Gamma Spectrometry		80	20		144					244
Tritium		80	20		144					244
Volatile Organics		80	20		144					244
PCB										
Soil Moisture										
Laboratory Analysis										
Gamma Spectrometry		42	7		54					103
Tritium		42	7		54					103
Total Uranium		42	7		54					103
Isotopic Plutonium		42	7		54					103
Isotopic Thorium					54					54
Strontium 90		42			54					96
VOA (SW 8240)		54	9		74					137
Semivolatiles (SW 8270)		46	8		62					116
Metals (SW 6010)		46	8		62					116
PCB (SW 8080)										
Sulfates/Chromates/Copper Salts										
Alkalinity, pH										
Nitrates, pH										

17.2 SWMU 21-006(b) Underground Seepage Pits

17.2.1 Site Description

This section describes the field activities for one underground seepage pit [SWMU 21-006(b)] located at TA-21 (Fig. 17.2-1). SWMUs 21-006(a) and (c)–(f) are discussed in Chapter 18, SWMUs for coordination with Building Decontamination and Decommissioning. SWMU 21-006(b) addresses a site that was used to dispose "ether waste" originating from Building TA-21-2 where a plutonium purification process used a double ether extraction (Merrill 1990). This process and system are no longer active. No releases from the underground seepage pit to the environment are documented.

17.2.1.1 Site History

The underground seepage pit (TA-21-118) may have been installed in 1945 as a part of new plutonium extraction facilities at TA-21-2 (Christensen and Maraman 1969) (Fig. 17.2-2). The inlet line, TA-21-134, originated from the east side of Building TA-21-2 and ran south to the pit. From the pit, the outlet line, TA-21-135, ran south and ended at an outfall above Los Alamos Canyon (LASL 1976a; LASL 1976b). This outfall [SWMU 21-006(b)] is addressed in Sec. 15.9.

The underground seepage pit consisted of a brick manhole placed within a trench. The manhole was approximately 5 ft by 12 ft, with a depth of 6 ft. The trench was 16 ft by 70 ft, with a depth of 6 ft. Although this seepage pit structure had a raised outlet line within the manhole, the brickwork of the manhole allowed liquid to flow readily into the surrounding pit. The pit was backfilled with 3 ft of boulders topped with 12 in. of gravel. This total design may have been used to facilitate evaporation and seepage of the majority of the waste and minimize discharges into the canyon. A photograph of the manhole taken in 1980 shows brickwork exposed at the ground surface (LANL 1980). Since this photograph was taken, the manhole and pit may have been paved over.

Inlet line TA-21-134 consists of a 200-ft length of 3-in.-diameter, jennite-coated cast iron pipe. Outlet line TA-21-135 consists of 90 ft of 2 in.-diameter, jennite-coated cast iron pipe, of which approximately 30 ft extend over the rim of Los Alamos Canyon (Fig. 17.2-2) (LASL 1976a; LASL 1976b). These lines are still in place (LANL 1987).

The operation producing the ether waste was the third of three processes that were used to purify plutonium. Improved processes and an increase in the purity of the incoming material eventually

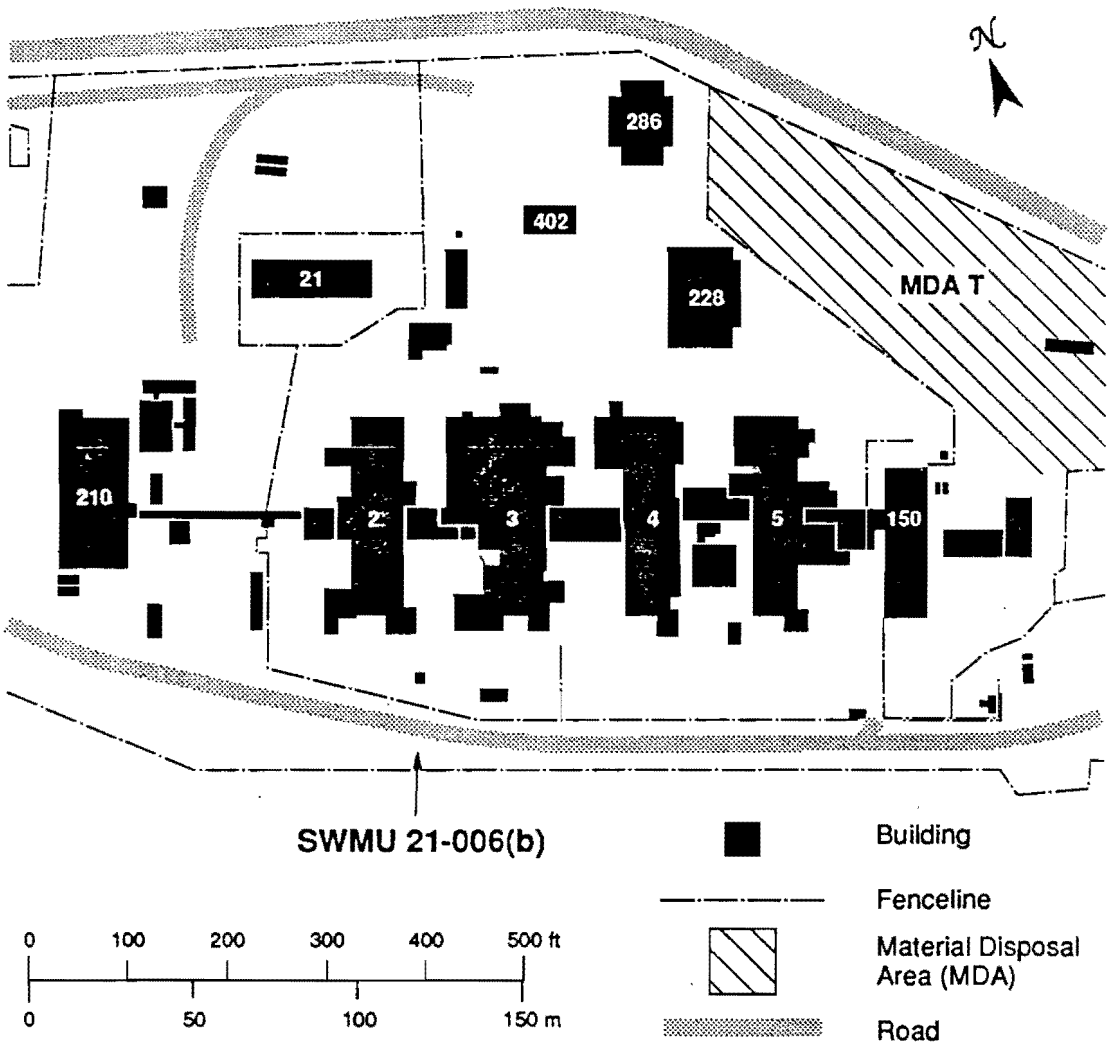


Fig. 17.2-1 General location of SWMU 21-006(b) at TA-21. (LANL 1990)

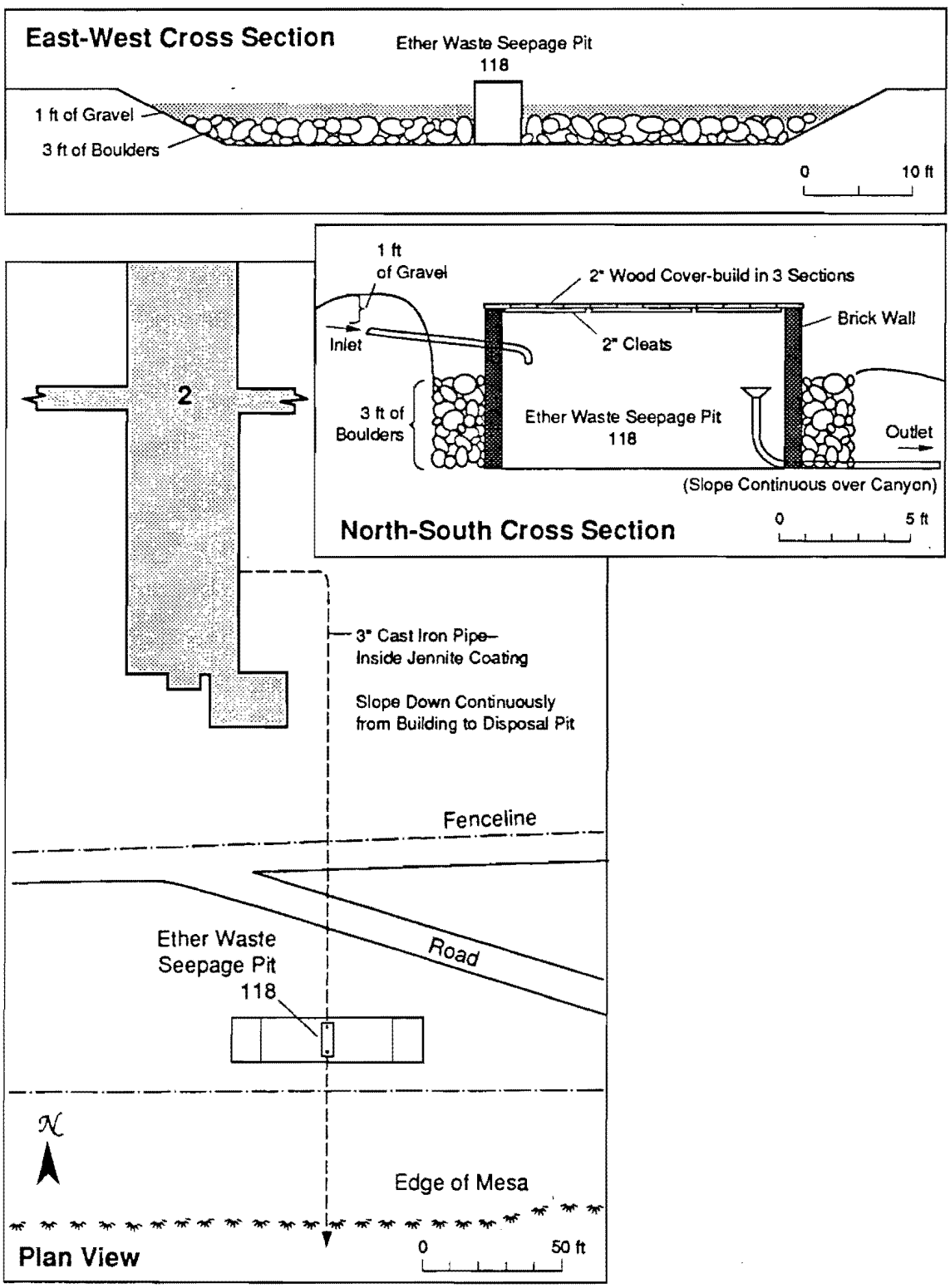


Fig. 17.2-2 Design specifications for TA-21 seepage pit SWMU 21-006(b). (LASL 1945)

allowed the chemist to eliminate the double ethyl ether extraction as well as some others (Merrill 1990). The ether extraction process was discontinued in September 1945 (Christensen 1969).

17.2.1.2 Existing Information

No data exist regarding contamination in the area of the underground seepage pits, TA-21-118. It is suspected that given the size of the seepage pit, and even though the inlet pipe was only 3 in. in diameter, the volume of ether waste fed into the seepage pit was quite large (LANL 1990).

A soil sample was collected below the outfall of line TA-21-135 on October 31, 1988. It was analyzed according to U.S. EPA Contract Laboratory Program (CLP) Statement of Work Organic protocols for Target Compound List volatile organic constituents, semivolatile organic constituents, pesticides/PCBs, and Target Analyte List metals. It was also analyzed for explosives, ^{241}Am, ^{137}Cs, ^{238}Pu, $^{239/240}Pu$, ^{226}Ra, ^{90}Sr, ^{232}Th, and isotopic uranium (DOE 1989).

Toluene was the only volatile organic compound detected in the surface soil. Toluene was present at 9.9 µg/kg. The detection limit of this analysis was 6.0 µg/kg. No semivolatile, pesticide/PCBs, or explosive compounds were present above the method detection or method reporting limits.

Table 17.2-I presents a summary of the results of metals analyses. Only lead was higher than the reported background level , at 191 mg/kg. The upper limit of background level is 54 mg/kg (Sec. 4.2.4). All other metals were within their respective background ranges.

Table 17.2-II presents a summary of the results of radionuclide analyses. The concentrations of ^{137}Cs, $^{239/240}Pu$, ^{234}U, and tritium were 1.5 pCi/g, 1.3 pCi/g, 1.8 pCi/g (in soil), and 31 pCi/ml (in soil moisture), respectively. For comparison, the upper limt background levels for ^{137}Cs, $^{239/240}Pu$, ^{234}U, and tritium of 0.44 pCi/g, 0.025 pCi/g, 1.7 pCi/g, and 0.0072 pCi/ml, respectively (Sec. 4.2.4). All other radionuclides were within their respective background ranges.

17.2.1.3 Source Term

No data exist regarding contamination in and around the underground seepage pit TA-21-118. The ether extraction process at TA-21-2 was designed for the separation and purification of plutonium. The specific composition of ether waste is unknown; it may have been contaminated with plutonium. Ether extraction at TA-21-2 was discontinued; however, material from oxalate extraction, material from cation-exchange processes, and material from other experimental

TABLE 17.2-I
METALS FROM SWMU 21-006(b) OUTFALL SOIL SAMPLES COMPARED TO BACKGROUND SOIL CONCENTRATIONS (AVERAGES) AT THE LOS ALAMOS SIGMA MESA SITE[a]

Metals	Value (mg/kg)	Detection Limit (mg/kg)	Mean $\bar{x}$	Standard Deviation (s)	Upper Limit[b] of Background $\bar{x} \pm 2s$ (mg/kg)
ALUMINUM, TOTAL	3990	37.0	58,000	3,500	65,000
BARIUM, TOTAL	48.8	37.0	410	220	850
CALCIUM, TOTAL	1340	932.0	—	—	—
CHROMIUM, TOTAL	6.2	2.0	27	24	75
COPPER, TOTAL	7.1	6.0	10	4.5	19
IRON, TOTAL	3560	19.0	17,000	4,800	26,600
LEAD, TOTAL	191	93.0	24	15	54
MANGANESE, TOTAL	137	4.0	510	130	770
NICKEL, TOTAL	9.1	8.0	8.9	4.8	18.5
ZINC, TOTAL	48.8	4.0	54	12	78

[a]Ferenbaugh et al. 1990.
[b]The upper limit of background was defined by Purtymun et al. (1987) as $\bar{x} \pm 2s$, as used in Table 4.2-XIII. For a consistent basis of comparison, the upper limit of background given here for metals is $\bar{x} \pm 2s$ as calculated from the data given in Table 4.2-XV.

TABLE 17.2-II
RADIONUCLIDE RESULTS FROM SWMU 21-006(b) OUTFALL SOIL SAMPLES COMPARED TO BACKGROUND SOIL CONCENTRATIONS (MEAN) FROM NORTHERN NEW MEXICO[a]

Metals	Value (mg/kg)	Detection Limit (mg/kg)	Mean $\bar{x}$	Standard Deviation (s)	Upper Limit[b] of Background $\bar{x} \pm 2s$ (pCi/g)
AMERICIUM-241	0.1	0.1	—	—	not reported
CESIUM-137	1.5	0.2	0.18	0.13	0.44
PLUTONIUM-238	0.0	0.1	0.001	0.002	0.005
PLUTONIUM-239	1.3	0.3	0.007	0.009	0.025
RADIUM-226	1.2	0.2	1.5	0.5	2.5
STRONTIUM-90	0.0	0.2	0.34	0.27	0.88
THORIUM-232	1.0	0.2	1.0	0.4	1.8
TRITIUM	31 (pCi/ml)	3.0 (pCi/ml)	0.0026	0.0023	0.0072 (pCi/ml)
URANIUM-234	1.8	0.3	1.1	0.5	1.7
URANIUM-235	0.1	0.2	—	—	not reported
URANIUM-238	1.0	0.2	1.1	0.5	1.7

[a]Purtymun et al. 1987.
[b]The upper limit of background was defined by Purtymun et al. (1987) as $\bar{x} \pm 2s$, as used in Table 4.2-XIII. For a consistent basis of comparison, the upper limit of background given here for metals is $\bar{x} \pm 2s$ as calculated from the data given in Table 4.2-XV.

processes may have been routed to the pit. These materials may have been contaminated with radionuclides, organic compounds, and inorganic compounds.

Assays for radionuclides and nonradionuclides were performed on soil at the outlet line into the canyon. These assays showed the presence of lead, ^{137}Cs, $^{239/240}Pu$, ^{234}U, and tritium at levels higher than background level. Because the outfall originates from the underground seepage pit, it may be assumed that this seepage pit structure, the soil around it, and the tuff beneath it may be contaminated with organic, inorganic, and radiological constituents, and these contaminants may have migrated.

17.2.2 Sample Objectives and Data Needs

The objective of this investigation is to confirm the presence and determine the extent of contamination at SWMU 21-006(b). Specific data required to assess contamination at SWMU 21-006(b) include the following:

1. Determine the location of the underground seepage pit (TA-21-118). The location of the pit may have been paved over. By determining the location of the influent line and the effluent line using a geophysical survey, the position of the underground seepage pit can be confirmed.

2. Identify the contaminants present using Level II and III data. The outfall from the pit showed the presence of organic and inorganic constituents as well as radionuclides.

3. If contaminants are identified in the underground seepage pits, determine the lateral and vertical extent of contaminant migration by subsurface sampling and Level III/IV analyses.

17.2.3 Sampling/Investigation Rationale

Two phases of investigation are expected for SWMU 21-006(b). The initial investigation will begin by identifying and marking the structures. In addition, contamination of the subsurface will be investigated by drilling three boreholes within and beneath the manhole and pit.

Additional investigation will be needed if contaminants are identified in borehole samples beneath the manhole and pit. Subsequent investigations may include additional boreholes and subsurface sampling over a wider area. The analytical suite may be focused more closely to specific analytes in these subsequent investigation phases, based on results from initial samples.

17.2.4 Sampling Plan

17.2.4.1 Initial Investigations

A land survey to locate the seepage pit TA-21-118 will be conducted, using engineering drawings (LASL 1976a; LASL 1976b) as a guide (for method see Sec. 11.3.2). To confirm the location of the manhole and pit, a geophysical survey will also be employed on an area approximately 100 by 200 ft (Fig. 17.2-3). The geophysical survey will qualitatively identify the cast iron lines TA-21-124 and TA-21-125 (for method see Sec. 11.4.2.1). Identification of the location of the lines will confirm the surveyed position of the manhole and pit.

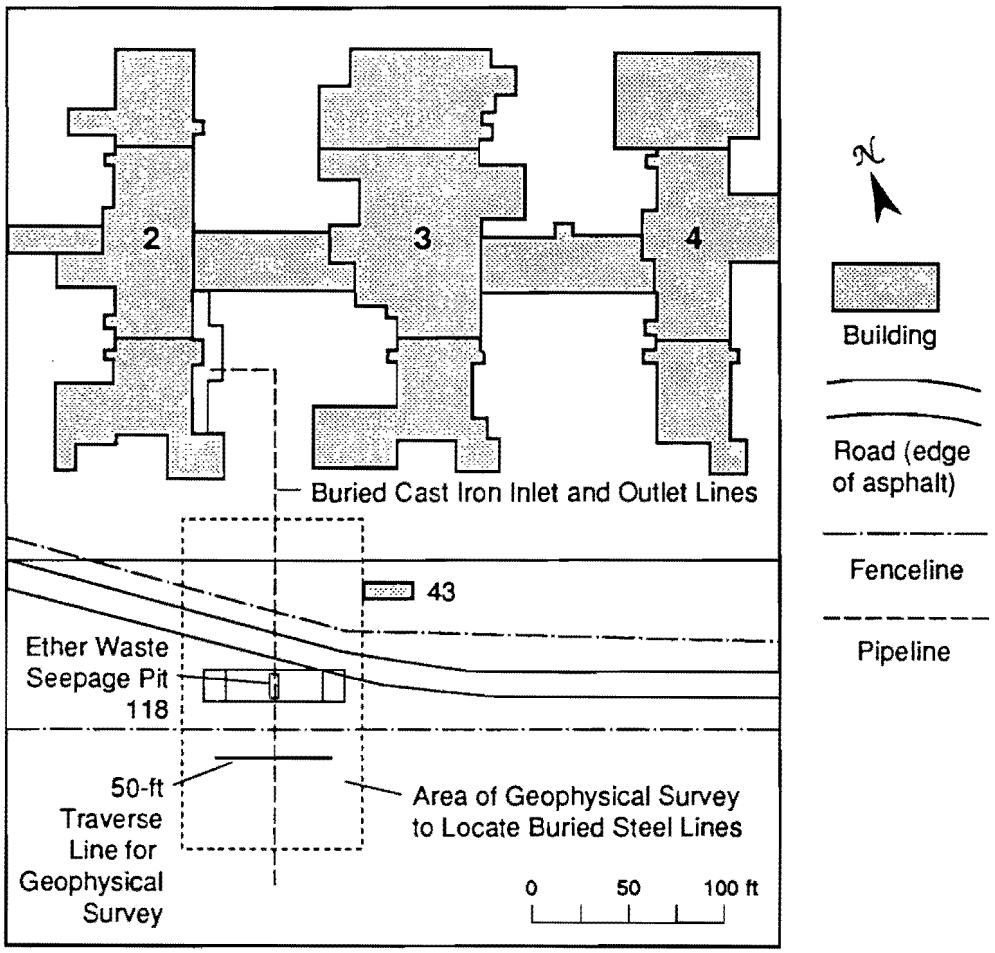


Fig. 17.2-3 Design of surface geophysical survey to locate ether waste seepage pit TA-21-118.

Three vertical boreholes will be drilled: one through the center of the pit and one each through the pit at 25 ft east and west of the initial borehole (Fig. 17.2-4) (for method see Sec. 11.5.3.2). The nominal depth for these boreholes is 20 ft. The screening and analysis requirements are shown in Table 17.2-III.

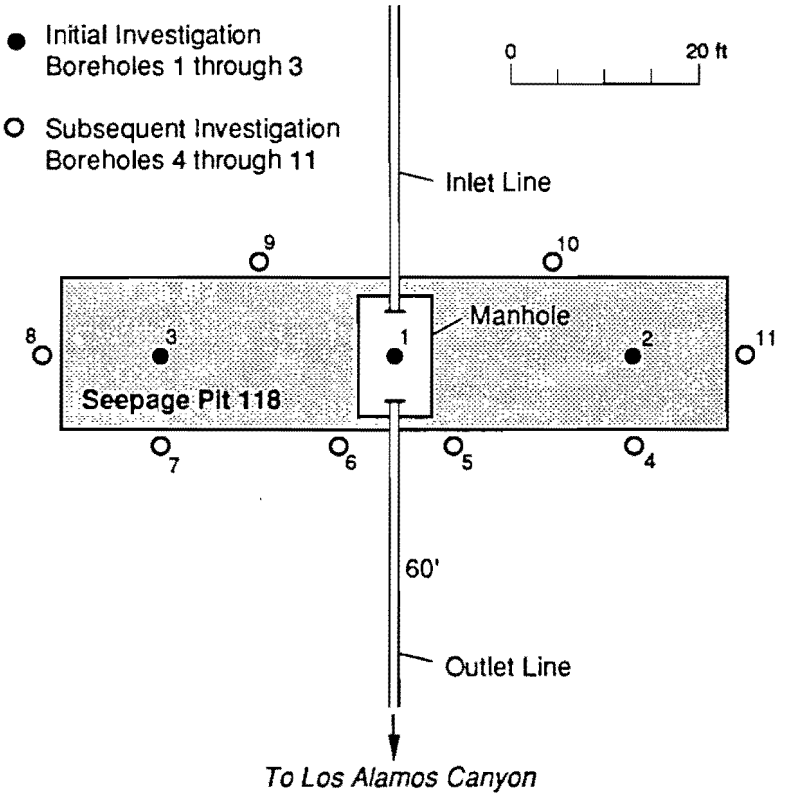


Fig. 17.2-4 Borehole locations to investigate seepage pit TA-21-118, SWMU 21-006(b).

All samples will be analyzed in the field laboratory. These analyses will be used to define whether the nominal borehole depth has reached the edge of the contaminant plume or whether each borehole needs to be deeper. Because this investigation presupposes the ether pit is contaminated, the purpose of samples sent to the analytical laboratory is twofold: first, to define the source term, and second, to define the edges of the contaminant plume. Therefore, samples sent to the analytical laboratory for confirmatory analysis will include "hot" samples for source term definition and samples from the edges of the plume to confirm absence of contamination. For planning purposes, it is assumed 12 samples will be analyzed in the field laboratory and six will be submitted to the analytical laboratory.

If no contamination is identified, no further action will be taken at SWMU 21-006(b).

Table 17.2-III

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-006(B), UNDERGROUND SEEPAGE PIT.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH					
TA-21-118																																						
Geophysical Survey						X	X																															
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X																					
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X																					
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X																					
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
Field Duplicate																						X	X	X	X		X	X	X	X								
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X																					
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
Vertical Borehole	3	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X																					
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X																					
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E								
Rinsate Blank																						X	X	X	X		X	X	X	X								
Field Blank																												X	X	X								
Trip Blank																												X										

17.2.4.2 Subsequent Investigations

If contaminants are identified in or beneath the underground seepage pits, it will be necessary to determine the lateral and vertical extent of contamination by additional subsurface sampling and Level III/IV analyses.

It is anticipated that no more than eight additional boreholes will be needed. These will be placed 20 ft out from the edges of the pit to define the lateral and vertical extent of contamination. Example locations are shown in Fig. 17.2-4. Four boreholes will be placed immediately south (downgradient), of the pit, one at each end, and two to the north. The nominal depth is assumed to be 50 ft but will be based on analysis of results from the initial investigation. For planning purposes, it is assumed that 80 additional samples from the 8 boreholes will be required. It is assumed that 30% of these will be submitted to the analytical laboratory. The screening and analysis requirements are shown in Table 17.2-IV. The analysis may be directed toward the contaminants identified in the initial investigation.

Table 17.2-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-006(B), UNDERGROUND SEEPAGE PIT.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfate/Chromate/Copper Salts	Alkalinity, pH	Nitrates, pH
TA-21-118																																		
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
Rinsate Blank																																		
Field Blank																																		
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		20.0 – 25.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
Trip Blank																																		
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		20.0 – 25.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X	X	X		X	X				
Trip Blank																																		

Table 17.2-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-006(B), UNDERGROUND SEEPAGE PIT.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moisture	Field Laboratory Measurements:	Field Laboratory Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Thorium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: Sulfates/Chromates/Copper Salts	Laboratory Analysis: Alkalinity, pH	Laboratory Analysis: Nitrates, pH
Vertical Borehole	3	0.0 - 5.0 R																																
		5.0 - 10.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		10.0 - 15.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
Rinsate Blank																																		
Field Blank																																		
		15.0 - 20.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		20.0 - 25.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		25.0 - 30.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		30.0 - 35.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		35.0 - 40.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
Field Duplicate		40.0 - 45.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		45.0 - 50.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
Trip Blank																												X					
Vertical Borehole	4	0.0 - 5.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		5.0 - 10.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		10.0 - 15.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		15.0 - 20.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		20.0 - 25.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		25.0 - 30.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		30.0 - 35.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		35.0 - 40.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		40.0 - 45.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		45.0 - 50.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				
Trip Blank																																		
Vertical Borehole	5	0.0 - 5.0 R						X	X	X	X	X	X	X	X	X	X					X	X	X	X	X	X	X	X	X				

Table 17.2-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-006(B), UNDERGROUND SEEPAGE PIT.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 9010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH	
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
		15.0 – 20.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft							X		X	X	X	X	X	X	X																		
		25.0 – 30.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		30.0 – 35.0 ft							X		X	X	X	X	X	X	X																		
		35.0 – 40.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		40.0 – 45.0 ft							X		X	X	X	X	X	X	X																		
		45.0 – 50.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
Trip Blank																											X								
Vertical Borehole	6	0.0 – 5.0 ft							X		X	X	X	X	X	X	X																		
		5.0 – 10.0 ft							X		X	X	X	X	X	X	X																		
		10.0 – 15.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft							X		X	X	X	X	X	X	X																		
		20.0 – 25.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft							X		X	X	X	X	X	X	X																		
		30.0 – 35.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		35.0 – 40.0 ft							X		X	X	X	X	X	X	X																		
		40.0 – 45.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					
		45.0 – 50.0 ft							X		X	X	X	X	X	X	X																		
Trip Blank																											X								
Vertical Borehole	7	0.0 – 5.0 ft							X		X	X	X	X	X	X	X																		
		5.0 – 10.0 ft							X		X	X	X	X	X	X	X																		
		10.0 – 15.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X					

Table 17.2-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-006(B), UNDERGROUND SEEPAGE PIT.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Measurements: Gross Alpha	Field Measurements: Gamma Spectrometry	Field Measurements: Tritium	Field Measurements: Volatile Organics	Field Measurements: PCB	Field Measurements: Soil Moisture	Field Measurements:	Field Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Thorium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: Sulfates/Chromates/Copper Salts	Laboratory Analysis: Alkalinity, pH	Laboratory Analysis: Nitrates, pH
Rinsate Blank																																		
Field Blank																																		
		15.0 – 20.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
Field Duplicate		40.0 – 45.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft							X		X	X	X	X	X	X	X					X	X	X	X		X	X	X	X				
Trip Blank																																		
Vertical Borehole	8	0.0 – 5.0 ft							X		X	X	X	X	X	X	X																	
		5.0 – 10.0 ft							X		X	X	X	X	X	X	X																	
		10.0 – 15.0 ft							X		X	X	X	X	X	X	X					X		X										
		15.0 – 20.0 ft							X		X	X	X	X	X	X	X																	
		20.0 – 25.0 ft							X		X	X	X	X	X	X	X					X		X										
		25.0 – 30.0 ft							X		X	X	X	X	X	X	X																	
		30.0 – 35.0 ft							X		X	X	X	X	X	X	X					X		X										
		35.0 – 40.0 ft							X		X	X	X	X	X	X	X																	
		40.0 – 45.0 ft							X		X	X	X	X	X	X	X					X		X										
		45.0 – 50.0 ft							X		X	X	X	X	X	X	X																	
Trip Blank			X																			X		X			X	X	X				

17.3 SWMU 21-009 Waste Treatment Laboratory

17.3.1 Site Description

This section describes the field activities for the location of the former waste treatment laboratory (SWMU 21-009) located at TA-21 (Fig. 17.3-1). This SWMU addresses a site on which a plutonium-contaminated building stood. The former waste treatment laboratory was decontaminated and decommissioned, but contaminated drain lines may still be present. No releases from the former waste treatment laboratory to the environment are documented.

17.3.1.1 Site History

The waste treatment laboratory, TA-21-33, was constructed in August 1948. Building TA-21-33 was a wood frame structure with a wooden floor built on concrete pillars and measuring 16 ft by 48 ft, with a 12-ft ceiling. During the course of operations between September 1948 and January 1965, the floor, work benches, hoods, shelves, drains, and exhaust ducts were contaminated with plutonium dust (Romero 1963). Perchloric acid was also used and may have contaminated the hoods (Romero 1965).

The building was decontaminated and decommissioned between January 29, 1965, and April 21, 1965. It was cut in two sections and was removed to MDA G where it was burned (LASL 1965). The concrete foundation of TA-21-33 was bulldozed from its original site into Los Alamos Canyon (LASL 1965). This bulldozed waste disposal area is considered in Sec. 14.7 as a surface disposal area, SWMU 21-013(b). No physical evidence of the waste treatment laboratory remains at its former location, which appears to have been back-filled.

Two waste lines were present beneath the laboratory. It is not known how deep these lines were buried. One line carried waste from TA-21-33 to septic tank TA-21-62 and ultimately to an outfall near the canyon rim. Tank TA-21-62 was removed during demolition, although it is not clear whether the waste line from TA-21-33 to septic tank TA-21-62 was removed. The outfall and tank associated with this drain lines is addressed as SWMU 21-023(c) in Sec. 15.2.

The second waste line ran from TA-21-47 along the west side of the laboratory to an outfall near the canyon rim. The second drain lines was decontaminated and decommissioned in March 1965 along with the associated oil tank, TA-21-47 (LANL no date). The outfall is SWMU 21-027(d) in Sec. 15.2.

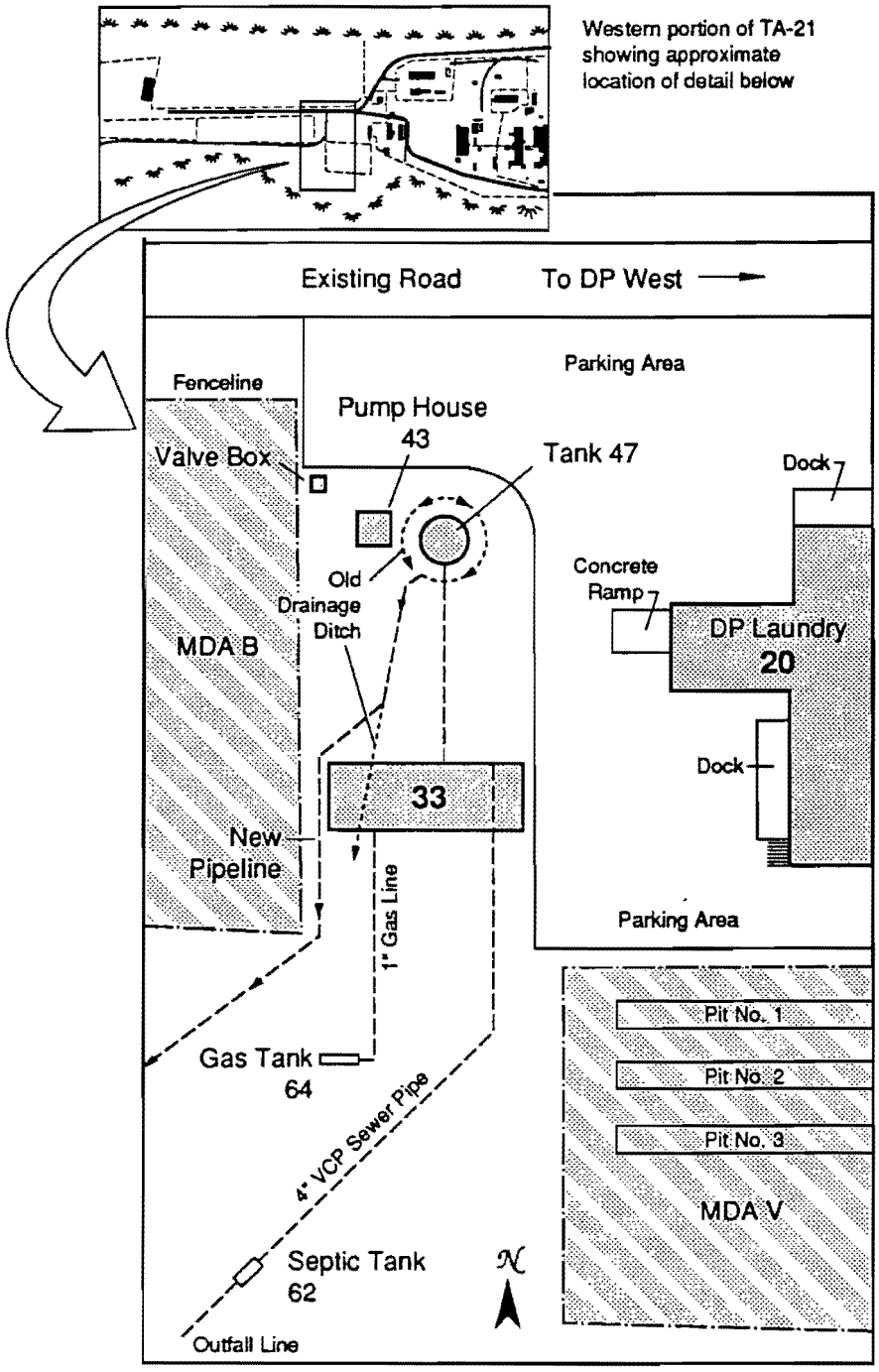


Fig. 17.3-1 Location of Building 33 at TA-21 in 1948. (LASL 1948)

17.3.1.2 Existing Information

No data exist regarding contamination of either buried waste lines. No releases from buried waste lines or the former waste treatment laboratory to the environment were documented (LANL 1990). However, plutonium contamination of the building was identified.

Plutonium dust on surfaces within the waste treatment laboratory measured between 1000 cpm and 20,000 cpm alpha (Romero 1963). Hoods may have been contaminated with perchloric acid as well (Romero 1963).

17.3.1.3 Source Term

The contaminant source term represented by drain lines beneath the former waste treatment laboratory, TA-21-33, is not known. Releases to surface and subsurface soil may have occurred from the drain lines.

The contaminant source term represented by the former waste treatment laboratory, TA-21-33, is not known except that plutonium dust and possibly perchloric acid are possible (Romero 1963). Releases to surface soil may have occurred via exhaust ducts. Releases to surface and subsurface soil may have occurred from the floor, drains, or waste lines.

17.3.2 Objectives and Data Needs

The objective of this investigation is to confirm the absence of contamination at SWMU 21-009.

Specific data required to assess contamination at SWMU 21-009 include the following:

1. Determine the location of the former waste treatment laboratory, TA-21-33, and associated buried waste lines by surveying from old drawings, and using an exploratory trench. This building was decontaminated and decommissioned, but contaminated drain lines may have been left in place.

2. Identify if contaminants are present using Level II and III data. Radionuclides may have been present in buried drain lines or at the former location of the waste treatment laboratory.

3. If contaminants are identified, determine the lateral and vertical extent of contaminant migration by surface and subsurface soil sampling and Level III/IV analyses.

17.3.3. Field Sampling/Investigation Rationale

Two phases of investigations are planned for SWMU 21-009. The initial investigation consists of locating the buried waste line by digging a trench perpendicular to the course of the line between the former location of tank TA-21-62 and the waste treatment laboratory, TA-21-33, and subsurface soil sampling to determine the presence of contaminant types and concentrations within this area.

Building TA-21-33 was contaminated with plutonium dust; therefore, shallow boreholes will be drilled and subsurface soil samples will be collected at the building's former location. These samples will address the potential for residual contamination remaining after decontamination and decommissioning.

The samples obtained from the initial investigation will be assessed in the field laboratory and 25% will be subjected to a full analytical suite to determine the types and concentrations of contaminants present.

Additional surface and subsurface soil sampling will constitute a subsequent investigation to define the lateral and vertical extent of contamination. These samples will be submitted for laboratory analysis for a full suite of analyses unless sampling results from the first phase allow specification of a more focused analytical suite.

17.3.4 Sampling Plan

17.3.4.1. Initial Investigation

The former location of the waste treatment laboratory and septic tank TA-21-62 will be surveyed from old drawings (LASL ~~1954~~ 1946) (for method see Sec. 11.3.2) and marked.

An exploratory trench will be dug between the former locations of septic tank TA-21-62 and the waste treatment laboratory, TA-21-33 (modified from method, Sec. 11.5.4). The long axis of the trench will be dug approximately east-west (perpendicular to the drain lines). The trench will initially be 10-ft long by 5-ft deep, unless the drain lines or backfill that implicates their former presence are identified. If the drain lines are located, a sample will be taken from beneath the joints in the drain lines. If the drain lines are not present, but the former location is identified, soil samples will be taken from beneath the former location. The trench will be extended 5 ft on both ends if no evidence of the former drain lines is discovered during the initial trenching. If the drain

lines or their former locations are not identified, three soil samples will be taken from the bottom of the trench at equal distances along the trench. In addition, one composite sample will be taken from the excavated soil. Field screening will be performed continuously, and field laboratory analyses for radionuclides and other contaminants will be performed on all samples taken. Trenching will stop at the 5-ft depth unless there is clear indication that the former drain line trench is deeper.

Three shallow boreholes will be drilled in the footprint of the former location of Building TA-21-33 (for method see Sec. 11.5.3.1) to determine whether any past releases from the building occurred. The boreholes will be drilled on the center line of the long axis of the building, at equal distances from one another. The boreholes will be drilled to a nominal 10-ft depth at locations shown in Fig. 17.3-2.

For planning purposes, it is assumed that three trench samples and one composite sample will be collected and three boreholes with four samples each will be placed. This totals 16 samples collected, to be processed in the field laboratory. Twenty-five percent of the total number of samples collected will be sent to the analytical laboratory. Because the objective of this investigation is to document absence of contamination, all samples with "hits" in the field laboratory plus samples with no contaminants identified in the field laboratory, will be sent to the analytical laboratory for confirmation. The screening and sample analysis requirements for the initial phase of investigation are shown in Table 17.3-I. If no contamination is identified, no further action will be taken at SWMU 21-009.

17.3.4.2. Subsequent Investigations

If contaminants are identified, it will be necessary to determine the lateral and vertical extent of contamination by additional shallow borehole sampling and Level III/IV sample analyses. Shallow boreholes will be drilled (for method see Sec. 11.5.3.1) at 20-ft spacings outward from sampling points at which contamination is identified. For planning purposes, it is anticipated that no more than five additional boreholes to a 10-ft nominal depth will be required (Fig. 17.3-2). This will result in a total of 20 samples to be analyzed in the field laboratory. Twenty-five percent of those samples will be submitted to an analytical laboratory for confirmatory and additional analyses. The screening and sample analysis requirements for subsequent investigations are shown in Table 17.3-II.

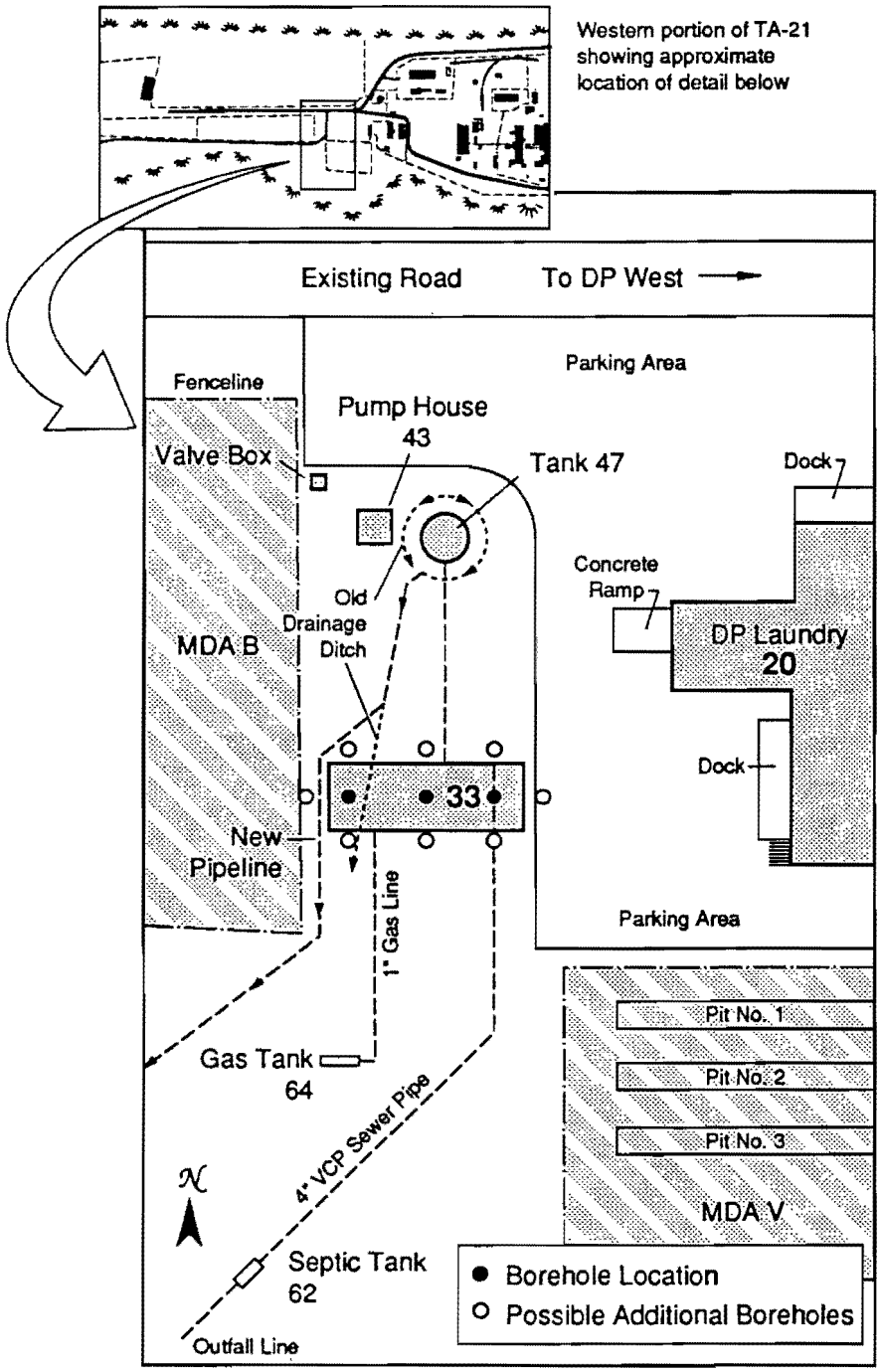


Fig. 17.3-2 Location of borehole sitings around Building 33 (now removed).

Table 17.3-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-009, WASTE TREATMENT LABORATORY.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH		
Trench from TA-21-62 to TA-21-33																																				
Trench Soil Sample	1						X	X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
	2							X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
	3							X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
Composite Soil Sample								X	X		X	X	X	X	X	X	X																			
TA-21-33																																				
Shallow Borehole	1	0.0 - 2.5 ft					X	X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
Field Duplicate																						E	E	E	E		E	E	E	E						
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X																			
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																			
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																			
	2	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X																			
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																			
Rinsate Blank																						X	X	X	X		X	X	X	X						
Field Blank																												X	X	X						
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																			
	3	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X																			
		6.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																			
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E						
Trip Blank																												X								

Table 17.3-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-009, WASTE TREATMENT LABORATORY.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
SWMU 21-009																																		
Shallow Borehole	1	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																	
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																	
	2	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X																	
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																	
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																	
	3	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X																	
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																	
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																	
	4	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
Field Duplicate		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X																	
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X																	
	5	0.0 - 2.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		2.5 - 5.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		5.0 - 7.5 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
		7.5 - 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E			E	E	E				
Rinsate Blank																						X	X	X	X			X	X	X				
Field Blank																						X	X	X	X			X	X	X				
Trip Blank																						X	X	X	X			X	X	X				

17.4 SWMU 21-012 Dry Wells

17.4.1 Site Description

This section describes the field activities for the dry wells (SWMU 21-012) and related structures associated with steam plants at TA-21. One dry well associated with the new steam plant, Building TA-21-357, which was designated SWMU 21-012(a) (LANL 1990), does not exist (Roy T. Weston 1990a). SWMU 21-012(a) is described in Chapter 20, No-Investigation Units.

A second dry well was associated with the former steam plant, Building TA-21-9, designated SWMU 21-012(b). The former steam plant and related aboveground structures were removed, but subsurface structures and piping may remain. No contaminant releases from the dry well and related structures have been documented.

17.4.1.1 Site History

The former steam plant was constructed between May 1, 1945, and September 1, 1945 (LASL no date). For several years, boiler blowdown (pressurized discharge of gaseous steam from the boiler) was discharged from the building into two concrete steam blowdown pits adjacent to the south side of the steam plant (TA-21-266 and TA-21-267). A separate 6-in.-diameter, steel drain line drained each pit toward the southern edge of DP Mesa (Fig. 17.4-1) (LASL 1958). Based upon an engineering drawing (LASL 1958), the two lines are approximately 30 ft apart. Sections of two exposed underground steel lines, which may be from the two concrete blowdown pits, have been observed between the security fence and the road (Roy T. Weston 1990b). It cannot be determined from the site reconnaissance or available LANL engineering drawings if the liquid discharged to the ground surface or to an outfall on the edge of Los Alamos Canyon.

In 1971, boiler blowdown was routed to a 2500-gal. blowdown tank. The tank released overflow liquid into a 6-ft square by 2-ft deep seepage pit filled with river stones (Fig. 17.4-2) (LASL 1979).

In May 1980, a dry well was installed south of the blowdown tank to replace the seepage pit (Fig. 17.4-2) (LASL 1979). Underground piping connected the two structures. The dry well was 4-ft square by 54-ft deep. A 3-in.-diameter, perforated pipe hung vertically in the well to a 49-ft depth. The space surrounding the perforated pipe was filled with large gravel.

Engineering drawings (LASL 1958; LASL 1971; LASL 1979), show the blowdown tank seepage pit and the dry well were centrally located between the two steel drain lines.

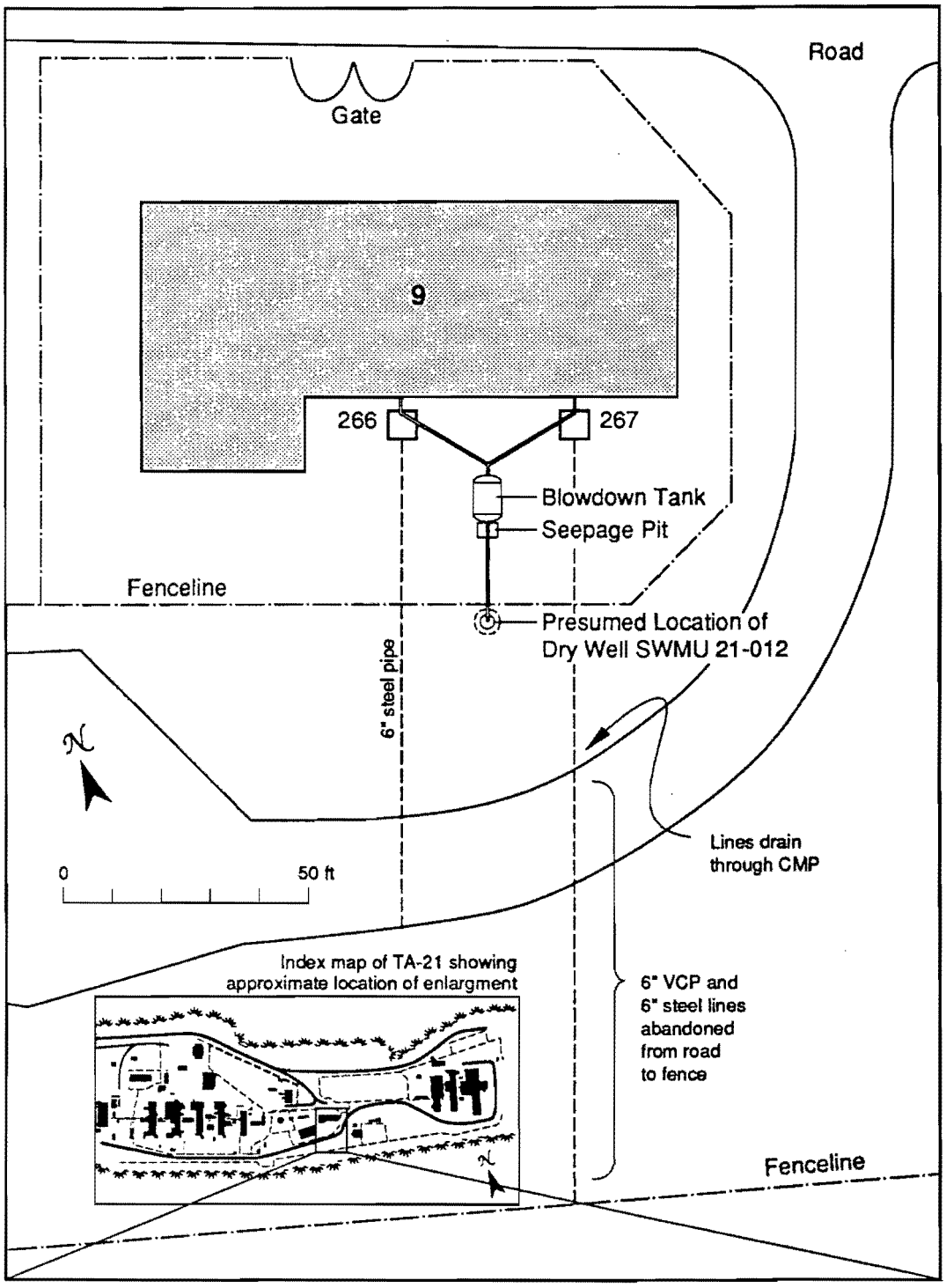


Fig. 17.4-1 Building TA-21-9 and blowdown discharge pipes, 1958. (LASL 1958, 1971, 1979)

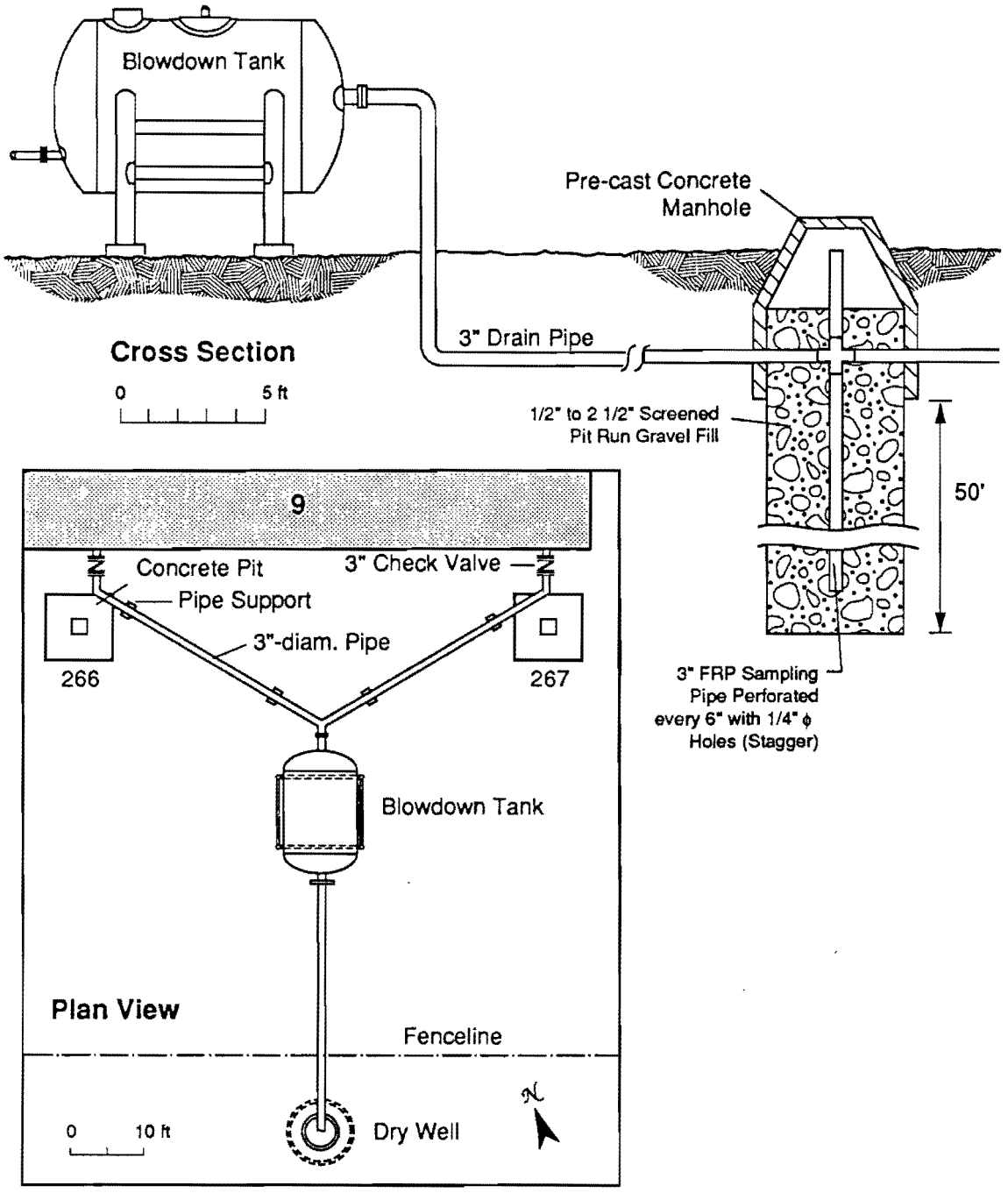


Fig. 17.4-2 Cross section and plan view of the blowdown tank and dry well on the south side of Building TA-21-9 in 1979. (LASL 1979)

The old steam plant was removed in 1985 and was replaced by the new steam plant, TA-21-357 (LANL no date). The area was regraded, and no visible evidence of the former steam plant or the concrete manhole cover for the dry well can be seen. It is not clear whether underground piping from the 2500-gal. tank was removed during demolition. The dry well may remain as well, as evidenced by an area of pavement that remains frost- and ice-free, except after heavy snows or very cold temperatures (Roy T. Weston 1990a).

17.4.1.2 Existing Information

No data exist regarding contamination in the area of the former steam plant dry well and related structures.

17.4.1.3 Source Term

The contaminant source term represented by steam plant blowdown is unknown. Common constituents in boiler blowdown include sulfite and copper salts to control dissolved oxygen and to catalyze the oxidation of manganese, and chromates as scale inhibitors, respectively (APHA 1989).

17.4.2. Objectives and Data Needs

The objective of this investigation is to confirm the absence of contamination at SWMU 21-012.

Specific data required to assess contamination at SWMU 21-012 include the following:

1. Determine the location of Building TA-21-9, structures TA-21-266 and TA-21-267, the pit beneath the blowdown tank, and the dry well. Some of these structures may have been removed, and the dry well may have been paved over.

2. Identify the contaminants present using Level II and III data. Contaminants are not documented, but common constituents in boiler blowdown include sulfite, copper salts, and chromates.

3. If contaminants are identified, determine the lateral and vertical extent of contaminant migration by subsurface soil sampling and Level III/IV analyses.

17.4.3. Sampling/Investigation Rationale

There are two objectives of the initial investigation. The first objective will be to accurately locate the former structures at this SWMU, and the second will be to identify any blowdown-related constituents within them.

Engineering drawings will be used to locate the boiler blowdown structures within this SWMU. Subsurface soil sampling at the three pit locations and at the dry well will be used to assess the presence of contaminants.

Laboratory analyses for the initial investigation target those constituents resulting from boiler blowdown. A full analytical suite will also be used for 30% of the samples to provide a high degree of certainty that other contaminants are not present.

A subsequent investigation may be necessary if unexpected hazardous substances are identified. The objective would be to determine the lateral and vertical extent of contamination, which would be accomplished with additional subsurface sampling. Based upon analytical results from the initial investigation, the analytical suite may be more focused in a subsequent investigation.

17.4.4. Sampling Plan

17.4.4.1. Initial Investigation

Identify Structure Locations. The former locations of Building TA-21-9 and structures TA-21-266 and TA-21-267 will be determined based on an engineering drawing (LANL 1983) and will be surveyed and marked in the field (for method see Sec. 11.4.3.). The two abandoned steel lines exposed at the ground surface south of the road will be visually identified. These lines can be traced in a straight line to the area of structures TA-21-266 and TA-21-267.

Plan details on other engineering drawings (LASL 1971; LASL 1979) will be used to determine the approximate locations of the former pit beneath the blowdown tank and the dry well. The approximate locations will be staked. Accuracy of the location will be based on visual inspection of core samples to determine the presence of gravel or river stones. A comparison of analytical data from these locations with established background levels for the common constituents in boiler blowdown (sulfite, copper salts, and chromate), as well as alkalinity and pH, may also provide an indication the locations have been identified.

Figure 17.4-3 identifies sampling locations for the dry well and related structures.

Structures TA-21-266, TA-21-267, and Blowdown Tank Pit. One shallow borehole will be drilled at the center of these structures (for method see Sec. 11.5.3.1). The presence of fill soil, gravel, or river rock in the soil core may constitute evidence of a positive location for these structures. However, it is not known with certainty if they were filled with gravel or river rock or whether they had a concrete bottom. Nominal borehole depth will be 10 ft. Subsurface soil

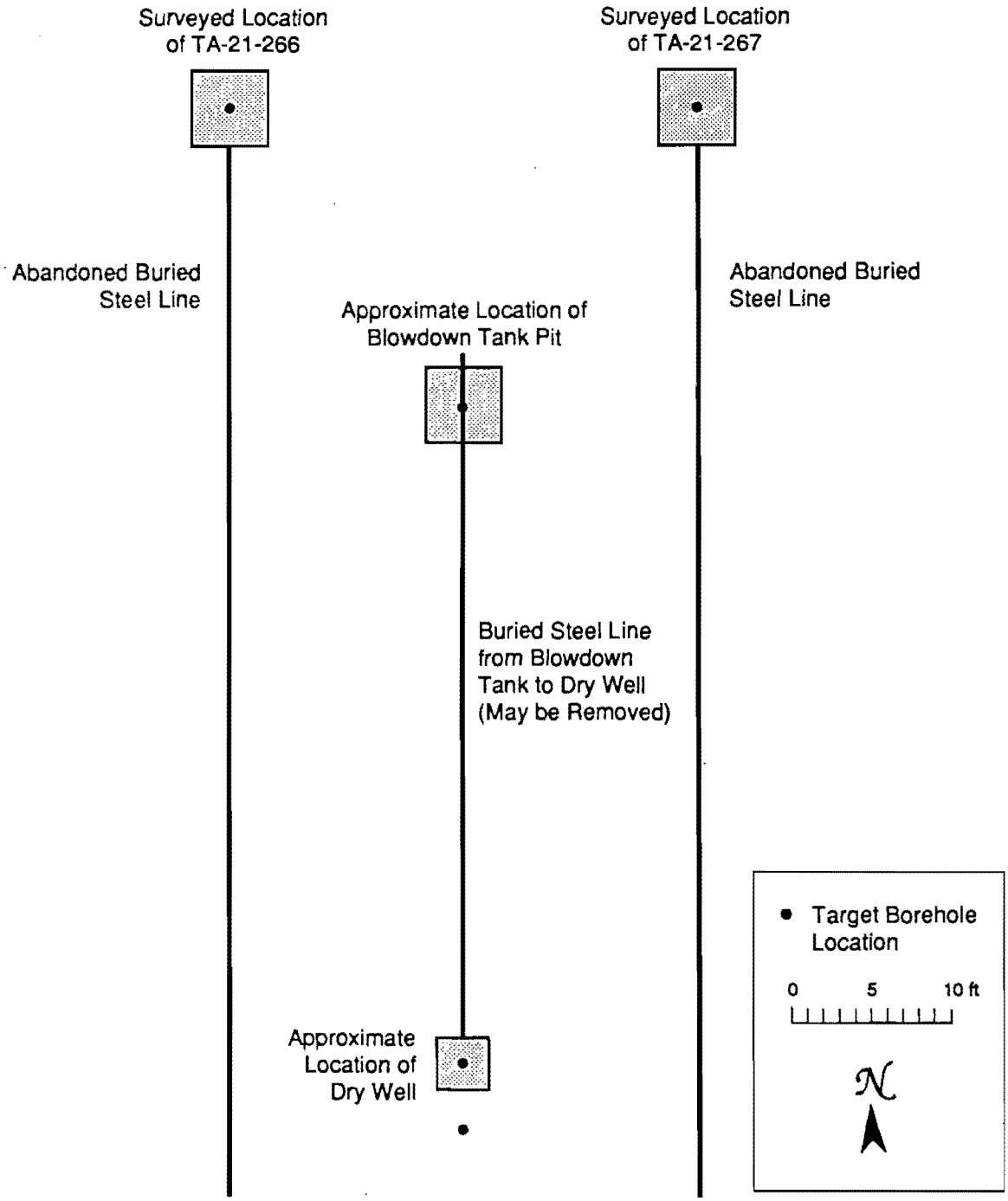


Fig. 17.4-3 Field investigation at SWMU 21-012. (LASL 1958)

samples at these three locations will be collected at the following intervals: 2.5–5 ft, 5–7.5 ft, and 7.5–10 ft, for three samples at each location.

The field screening, field laboratory, and sample analysis requirements for these structures are shown in Table 17.4-I. All samples will be submitted to an analytical laboratory for analysis of common blowdown constituents (sulfates, chromates, and copper salts). In addition, a full analytical suite will be done on 30% of the samples. If no contaminants are identified, no further action will be taken at structures TA-21-266, TA-21-267, and the blowdown tank pit.

Dry Well. Two vertical boreholes will be drilled to investigate the dry well (for method see Sec. 11.5.3.2). The first borehole will be drilled through the approximate center of the dry well. The presence of gravels in the soil core would constitute evidence of a positive location for the dry well. The second borehole will be located 5 ft south of the first borehole. Nominal borehole depth for both boreholes will be 60 ft.

Core samples at the two locations will be collected only at the following intervals: 5–10 ft, 20–25 ft, 35–40 ft, 45–50 ft, 50–55 ft, and 55–60 ft. This sampling interval will result in the collection of six samples at each location and is intended to address the most probable area of contamination at the bottom of the dry well. All of these samples will be analyzed for blowdown constituents, and 30% will be subjected to the full suite of analyses to confirm the absence of any other contaminants. The field screening, field laboratory and sample analysis requirements for the dry well are shown in Table 17.4-I. If no contaminants are identified, no further action will be taken at the dry well.

17.4.4.2. Subsequent Investigation

Although not anticipated, a subsequent investigation may be necessary if unexpected hazardous substances are identified during the initial investigation. If RCRA metals are detected in the initial investigation, then the TCLP will be part of the analytical suite in the subsequent investigations to determine if samples contain a RCRA hazardous waste. Additional borehole locations will be established at 10-ft spacings. Depth intervals and an appropriate analytical suite will be based on analytical results from the initial investigation.

Table 17.4-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-012, DRY WELLS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH	
		35.0 – 40.0 ft						X	X		X		X																		X		
		45.0 – 50.0 ft						X	X		X		X								X	X	X	X			X	X	X		X	X	
		50.0 – 55.0 ft						X	X		X		X																		X		
		55.0 – 60.0 ft						X	X		X		X																		X		
Trip Blank																											X					
Vertical Borehole	2	0.0 – 5.0 ft					X	X	X		X		X																				
		5.0 – 10.0 ft						X	X		X		X																		X		
		20.0 – 25.0 ft						X	X		X		X																				
		20.0 – 25.0 ft						X	X		X		X								X	X	X	X			X	X	X		X	X	
		25.0 – 30.0 ft						X	X		X		X																				
		30.0 – 35.0 ft						X	X		X		X																				
		35.0 – 40.0 ft						X	X		X		X																		X		
		45.0 – 50.0 ft						X	X		X		X																		X		
		50.0 – 55.0 ft						X	X		X		X																		X		
		55.0 – 60.0 ft						X	X		X		X								X	X	X	X			X	X	X		X	X	
Rinsate Blank																					X	X	X	X			X	X	X		X	X	
Field Blank																											X	X	X		X	X	
Trip Blank																											X						

Table 17.4-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-012, DRY WELLS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH	
TA-21-266																																			
Shallow Borehole	1	0.0 - 2.5 ft					X	X	X		X		X																						
		2.5 - 5.0 ft						X	X		X		X									X	X	X	X		X	X	X		X	X		
		5.0 - 7.5 ft						X	X		X		X																			X			
		7.5 - 10.0 ft						X	X		X		X																			X			
TA-21-267																																			
Shallow Borehole	1	0.0 - 2.5 ft					X	X	X		X		X																						
		2.5 - 5.0 ft						X	X		X		X																			X			
		5.0 - 7.5 ft						X	X		X		X									X	X	X	X		X	X	X		X	X		
		7.5 - 10.0 ft						X	X		X		X																			X			
Blowdown Tank Pit																																			
Shallow Borehole	1	0.0 - 2.5 ft					X	X	X		X		X																						
		2.5 - 5.0 ft						X	X		X		X																			X			
Rinsate Blank																						X	X	X	X		X	X	X		X	X		
Field Blank																											X	X	X		X	X		
		5.0 - 7.5 ft						X	X		X		X																			X			
		7.5 - 10.0 ft						X	X		X		X									X	X	X	X		X	X	X		X	X		
Field Duplicate																						X	X	X	X		X	X	X		X	X		
Dry Well																																			
Vertical Borehole	1	0.0 - 5.0 ft					X	X	X		X		X																						
		5.0 - 10.0 ft						X	X		X		X																			X			
		15.0 - 20.0 ft						X	X		X		X																						
		20.0 - 25.0 ft						X	X		X		X																			X			
		25.0 - 30.0 ft						X	X		X		X																						
		30.0 - 35.0 ft						X	X		X		X																						

17.5. Acid Waste Lines and Sumps

17.5.1. Site Description

There are 10 subunits identified in SWMU 21-022, Acid Waste Lines and Sumps. Because the presence of existing buildings and other structures preclude characterization investigations, eight of these subunits are discussed in Chapter 18, Units for Coordination with Building D&D. The two subunits discussed in this section, SWMUs 21-022(a) and (f), are accessible, and neither characterization nor remediation should be precluded by the presence of structures.

17.5.1.1. History

SWMU 21-022(a), sump TA-21-74, is located north of Building TA-21-21 (Fig. 17.5-1). The sump was constructed of brick about July 1946, is of unknown depth, and is 5 ft in diameter with a wood cover (LANL no date). TA-21-21 was a vault used for storage of plutonium and uranium, although it is no longer used for storage of nuclear materials. A detailed drawing (LASL 1960) shows the sump as a cylindrical structure with one inlet line from the old portion of the vault and another to be constructed for the new addition to the building (these are shown in Fig. 17.5-1). No outlets are shown. In 1973, a tank (TA-21-335) was constructed to receive releases from TA-21-21. The tank may have replaced sump TA-21-74, although this is not entirely clear. No drawings showing the connections to the tank have been found. The lid of the sump is visible north of TA-21-21, and a sign on the fence just north of the sump identifies it as DP-74 (LANL 1988).

SWMU 21-022(f), sump TA-21-173, is located off the northeast corner of TA-21-152 (Fig. 17.5-1). It is 5.5 ft in diameter and 6-ft deep (LANL no date). A 6-in. drain line leads from the sump to MDA U (SWMU 21-017) to the northeast. The round lid of the sump is visible about 10 ft to 15 ft off the northeast corner of TA-21-152 (LANL 1988). The sump and its drain line are not believed to be in use.

17.5.1.2. Existing Information

SWMU 21-022(a). There is no quantitative contaminant information available for this subunit. No previous sampling has been performed.

SWMU 21-022(f). There is no quantitative contaminant information available for this subunit. No previous sampling has been performed.

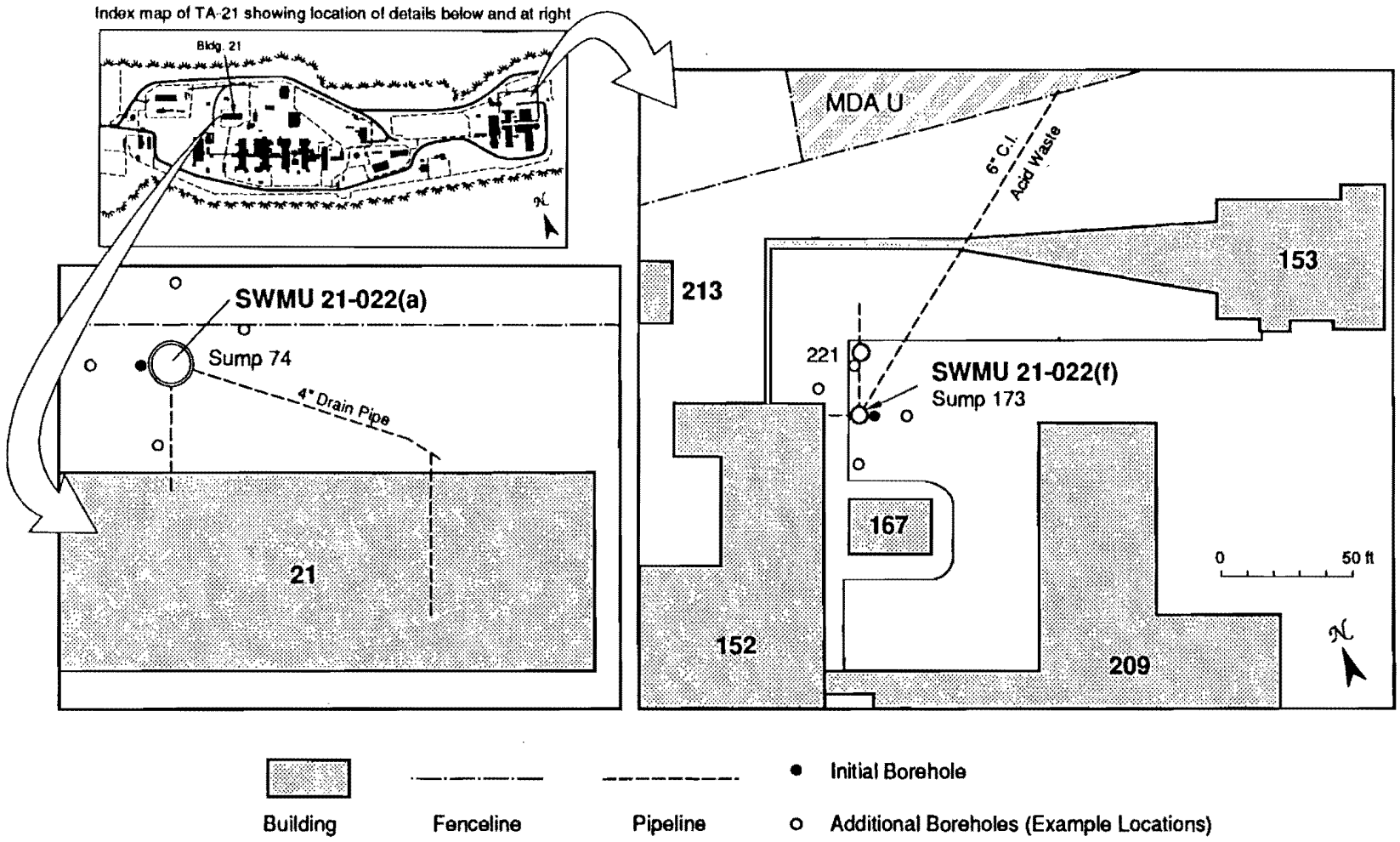


Fig. 17.5-1 Location of SWMUs 21-022(a) (f). (LASL 1960, 1964)

17.5.1.3. Source Term

SWMU 21-022(a) is expected to be contaminated with plutonium and uranium because TA-21-21 was used to store these materials. It is not known if hazardous constituents are associated with these radionuclides. It is also not known whether environmental contamination is present.

SWMU 21-022(f) is in the eastern portion of TA-21 where ^{210}Po and ^{227}Ac are associated with the waste from DP East (LANL 1990). Other radionuclides and hazardous constituents may also be present. It is not known if environmental contamination is present.

17.5.2 Objectives and Data Needs

The objective of this investigation is to confirm the presence or absence of contamination and determine the extent of contamination at SWMUs 21-022(a) and (f).

Specific data requirements to assess contamination at SMWU 21-022(a) and (f) include the following:

1. Identify the contaminants present using Level II and III data. Plutonium and uranium contamination may be associated with SWMU 21-022(a), and polonium and actinium may be associated with SWMU 21-022(f). Collect Level III data from boreholes beside the acid sumps, TA-21-74 and TA-21-173.

2. If contaminants are identified, determine the lateral and vertical extent of contaminant migration by subsurface soil sampling and Level III/IV analyses.

17.5.3. Sampling/Investigation Rationale

Boreholes will be drilled in the immediate vicinity of SWMUs 21-022(a) and (f) to determine the nature and extent of contamination. Initial boreholes will determine the presence and depth of contamination. Subsequent investigations may be needed to determine the extent of contamination, if any is present.

17.5.4. Sampling Plan

17.5.4.1. Initial Investigations

SWMU 21-022(a) and (f). For both sumps, sampling will be performed by drilling a vertical borehole approximately 2 ft west of the wall of the sump (for method see Sec. 11.5.3.2) (Fig.

17.5-1). The nominal depth of each borehole is 30 ft, resulting in six samples per borehole.

Because comparable sumps in other locations at TA-21 have leaked, a contingency for sampling each borehole to greater depths is considered necessary. The contingency allows for an additional 70 ft for each borehole to be sampled, with an additional six samples per borehole submitted for laboratory analysis.

The major purpose of the field laboratory for the first 30 ft of investigation is to define whether the nominal depth has reached the edge of the contaminant plume or whether each borehole needs to be deeper. Because it is unknown whether these sumps are contaminated, an additional purpose of the field laboratory is to identify the presence of contamination. All samples from the upper 30 ft will be submitted to the analytical laboratory.

Should the boreholes be extended beyond 70 ft, samples to be submitted to the analytical laboratory will include both samples with "hits" in the field laboratory to document the kinds of contaminants present at depth (i.e., contaminant source term definition) and samples without contaminants to document the edges of the plume and confirm absence of contamination.

Table 17.5-I lists the screening and analysis to be performed on samples gathered in the investigation of each sump. If no contamination is identified, then no further action will be taken at SWMU 21-022(a) and (f).

17.5.4.2. Subsequent Investigation

SWMU 21-022(a) and (f). If contamination is detected in the initial borehole, additional information on the lateral extent of contamination may be required. The need for this information will be met by locating boreholes in the four quadrants north, south, west, and east of the center of the sump. The first four of these secondary boreholes will be located 20 ft from the center of the sump (Fig. 17.5-1). Samples from these boreholes will serve to determine if lateral migration of contaminants has occurred. If the direction of lateral movement can be determined from this first set of secondary boreholes, then any additional boreholes may be placed only in the direction of migration. It is expected that no more than six additional boreholes per sump will be required to characterize the extent of contaminant migration.

All subsequent investigation boreholes will be vertical boreholes drilled by the same method used for the initial boreholes (see Sec. 11.5.3.2). The nominal depth for each borehole is assumed to be 60 ft, although this may be adjusted depending on results from the initial investigation. All 12 samples from each borehole will be subjected to field laboratory measurements, but a maximum

Table 17.5-1

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINE AND SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
TA-21-74																																		
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X				
Field Duplicate																																		
Contingency		30.0 – 35.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		35.0 – 40.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		40.0 – 45.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		45.0 – 50.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		50.0 – 55.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		55.0 – 60.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		60.0 – 65.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		65.0 – 70.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		70.0 – 75.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		75.0 – 80.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		80.0 – 85.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		85.0 – 90.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		90.0 – 95.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
		95.0 – 100.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C				
Rinsate Blank																						C	X	C										
Field Blank																						C	X	C				X						
Field Duplicate																						C	X	C				X						

Table 17.5-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINE AND SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																			
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH							
Trip Blank																											X													
TA-21-173																																								
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
		5.0 - 10.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
		10.0 - 15.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
		15.0 - 20.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
		20.0 - 25.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
		25.0 - 30.0 ft						X	X		X		X	X	X	X	X					X	X	X	X	X	X	X	X	X										
Field Duplicate																						X	X	X	X	X	X	X	X										
Contingency		30.0 - 35.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
		35.0 - 40.0 ft						C	C		C		C	C	C	C	C																							
		40.0 - 45.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
		45.0 - 50.0 ft						C	C		C		C	C	C	C	C																							
		50.0 - 55.0 ft						C	C		C		C	C	C	C	C																							
		55.0 - 60.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
		60.0 - 65.0 ft						C	C		C		C	C	C	C	C																							
		65.0 - 70.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
		70.0 - 75.0 ft						C	C		C		C	C	C	C	C																							
		75.0 - 80.0 ft						C	C		C		C	C	C	C	C																							
		80.0 - 85.0 ft						C	C		C		C	C	C	C	C																							
		85.0 - 90.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
		90.0 - 95.0 ft						C	C		C		C	C	C	C	C																							
		95.0 - 100.0 ft						C	C		C		C	C	C	C	C					C	C	C	C	C	C	C	C	C										
Rinsate Blank																						X	X	X	X	X	X	X	X										
Field Blank																												X	X										
Field Duplicate																						C	C	C	C	C	C	C	C										

Table 17.5-1

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINE AND SUMPS.

	Sample Identification	Interval	Sampling Location	Sample Type	
				Trip Blank	
					Field Surveys: Gross Gamma
					Field Surveys: Low-Energy Gamma
					Field Surveys: Electromagnetic
					Field Surveys: Land Survey
					Field Screening: Gross Gamma
					Field Screening: Gross Alpha
					Field Screening: Organic Vapor
					Field Screening: Combustible Gas/Oxygen
					Field Screening: Lithological Logging
					Laboratory Measurements: Gross Alpha
					Laboratory Measurements: Gamma Spectrometry
					Laboratory Measurements: Tritium
					Laboratory Measurements: Volatile Organics
					Laboratory Measurements: PCB
					Laboratory Measurements: Soil Moisture
					Laboratory Analysis: Gamma Spectrometry
					Laboratory Analysis: Tritium
					Laboratory Analysis: Total Uranium
					Laboratory Analysis: Isotopic Plutonium
					Laboratory Analysis: Isotopic Thorium
					Laboratory Analysis: Strontium 90
X					Laboratory Analysis: VOA (SW 8240)
					Laboratory Analysis: Semivolatiles (SW 8270)
					Laboratory Analysis: Metals (SW 6010)
					Laboratory Analysis: PCB (SW 8080)
					Laboratory Analysis: Sulfates/Chromates/Copper Salts
					Laboratory Analysis: Alkalinity, pH
					Laboratory Analysis: Nitrates, pH

of four per borehole is assumed to be submitted for analytical laboratory measurements.

For each of the two sumps the assumed subsequent investigations will total 72 samples, of which 30% (21 samples) will be sent for laboratory analysis. The analytical suite specified for the samples may be focused based on initial sample analysis results, but for planning purposes, it is assumed that a full analytical suite will be used. Table 17.5-II identifies the assumed screening and analysis requirements for the subsequent investigations.

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture					Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
TA-21-74																																			
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X		X	X	E		X							E											
		5.0 - 10.0 ft						X	X		X		X	X	E		X							E											
		10.0 - 15.0 ft						X	X		X		X	X			X																		
		15.0 - 20.0 ft						X	X		X		X	X			X																		
		20.0 - 25.0 ft						X	X		X		X	X	E		X							E											
		25.0 - 30.0 ft						X	X		X		X	X	E		X							E											
Rinsate Blank																																			
Field Blank		30.0 - 35.0 ft						X	X		X		X	X		X	X							X						X					
		35.0 - 40.0 ft						X	X		X		X	X		X	X							X						X					
		40.0 - 45.0 ft						X	X		X		X	X		X	X							X						X					
		45.0 - 50.0 ft						X	X		X		X	X		X	X							X						X					
		50.0 - 55.0 ft						X	X		X		X	X		X	X							X						X					
		55.0 - 60.0 ft						X	X		X		X	X		X	X							X						X					
Trip Blank																																			
Vertical Borehole	2	0.0 - 5.0 ft						X	X		X		X	X	E		X							E						X					
		5.0 - 10.0 ft						X	X		X		X	X	E		X							E						X					
		10.0 - 15.0 ft						X	X		X		X	X			X																		
		15.0 - 20.0 ft						X	X		X		X	X			X																		
		20.0 - 25.0 ft						X	X		X		X	X	E		X							E											
		25.0 - 30.0 ft						X	X		X		X	X	E		X							E											
		30.0 - 35.0 ft						X	X		X		X	X	E		X							E											
		35.0 - 40.0 ft						X	X		X		X	X	E		X							E											
		40.0 - 45.0 ft						X	X		X		X	X	E		X							E											

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis														
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X																	
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X																	
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X																	
Trip Blank																											X							
Vertical Borehole	3	0.0 – 5.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																	
Rinsate Blank																						X	X	X	X	X	X	X	X	X				
Field Blank																											X	X	X					
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																	
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																	
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																	
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																	
		35.0 – 40.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 – 45.0 ft						X	X		X		X	X	X	X	X																	
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X																	
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X																	
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Trip Blank																											X							
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																	
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																	
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																	
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																	
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																	

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

| Sample Type | Sampling Location | Interval | Sample Identification | Field Surveys | | | | Field Screening | | | | | Laboratory Measurements | | | | Laboratory Analysis | | | | |

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E			E				
Rinsate Blank		25.0 – 30.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E			E				
Field Blank		30.0 – 35.0 ft						X						X	X	X	X					X	X	X	X	X	X	X	X	X				
		35.0 – 40.0 ft						X						X	X	X	X																	
		40.0 – 45.0 ft						X						X	X	X	X																	
		45.0 – 50.0 ft						X						X	X	X	X																	
		50.0 – 55.0 ft						X						X	X	X	X																	
		55.0 – 60.0 ft						X						X	X	X	X																	
Field Duplicate																						X	E	E	E	E	E	E	E	E				
Trip Blank																						X	E	E	E	E	E	E	E	E				
TA-21-173																																		
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Rinsate Blank																						X	E	E	E	E	E	E	E	E				
Field Blank		30.0 – 35.0 ft						X	X		X		X	X	X	X	X					X	E	E	E	E	E	E	E	E				
		35.0 – 40.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 – 45.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Trip Blank																												X						
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X		X	X	X	X	X																	
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																	
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																	
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																	
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																	
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																	
		35.0 – 40.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 – 45.0 ft						X	X		X		X	X	X	X	X																	
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X																	
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X																	
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Trip Blank																												X						
Vertical Borehole	3	0.0 – 5.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																	
Rinsate Blank																						X	X	X	X	X	X	X	X	X				
Field Blank																												X	X	X				
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																	
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																	
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																	
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																	
		35.0 – 40.0 ft						X	X		X		X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 – 45.0 ft						X	X		X		X	X	X	X	X																	

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

				Field Surveys				Field Screening					Field Laboratory Measurements									Laboratory Analysis																			
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH			
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X																						
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X																						
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X																						
Trip Blank																												X										
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																						
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																						
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																						
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																						
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																						
		35.0 – 40.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
		40.0 – 45.0 ft						X	X		X		X	X	X	X	X																						
		45.0 – 50.0 ft						X	X		X		X	X	X	X	X																						
Rinsate Blank																							X	X	X	X	X	X	X	X	X								
Field Blank																												X	X	X								
		50.0 – 55.0 ft						X	X		X		X	X	X	X	X																						
		55.0 – 60.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
Trip Blank																												X										
Vertical Borehole	6	0.0 – 5.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
		5.0 – 10.0 ft						X	X		X		X	X	X	X	X																						
		10.0 – 15.0 ft						X	X		X		X	X	X	X	X																						
		15.0 – 20.0 ft						X	X		X		X	X	X	X	X																						
		20.0 – 25.0 ft						X	X		X		X	X	X	X	X						E	E	E	E	E	E	E	E	E								
		25.0 – 30.0 ft						X	X		X		X	X	X	X	X																						
		30.0 – 35.0 ft						X	X		X		X	X	X	X	X																						

Table 17.5-II

SCREENING AND ANALYSIS FOR SUBSEQUENT INVESTIGATIONS AT SWMU 21-022(A) AND 21-022(F), ACID WASTE LINES AND SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Thorium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	Sulfates/Chromates/Copper Salts	Alkalinity, pH	Nitrates, pH
		35.0 - 40.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 - 45.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		45.0 - 50.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		50.0 - 55.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		55.0 - 60.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Trip Blank																																		
Vertical Borehole	6	0.0 - 5.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Field Duplicate		5.0 - 10.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		10.0 - 15.0 ft						X	X				X	X	X	X	X																	
		15.0 - 20.0 ft						X	X				X	X	X	X	X																	
		20.0 - 25.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		25.0 - 30.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Rinsate Blank																						X	X	X	X	X	X	X	X	X				
Field Blank																						X	X	X	X	X	X	X	X	X				
		30.0 - 35.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		35.0 - 40.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		40.0 - 45.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		45.0 - 50.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		50.0 - 55.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
		55.0 - 60.0 ft						X	X				X	X	X	X	X					E	E	E	E	E	E	E	E	E				
Trip Blank																						X	X	X	X	X	X	X	X	X				
Field Duplicate																						E	E	E	E	E	E	E	E	E				

17.6 SWMU 21-005 Acid Pit

17.6.1 Site Description

This section describes the field activities for the acid pit (SWMU 21-005) (Fig. 17.6-1). This SWMU addresses a site that used nitric acid to destroy classified correspondence but is no longer active. No releases from the acid pit to the environment are documented.

17.6.1.1 Site History

The acid pit, TA-21-70, was installed in 1946 to dispose of classified correspondence. The acid pit was a 3-ft square by 4-ft deep reinforced concrete structure covered with sheet iron. The acid pit contained concentrated nitric acid, which digested classified materials (LASL 1966). The volume and concentration of acid used were not documented.

The concrete structure was removed between January 3 and January 20, 1967, and disposed of at MDA G (LANL no date). Soil may have been placed inside the concrete structure to absorb the acid before it was lifted from the ground as a single unit (LASL1966). It is not known whether any soil from around the acid pit was removed during excavation. Presently, the west end of trailer TA-21-363 may occupy the former location of the acid pit (LANL 1990).

17.6.1.2 Existing Information

No data exist regarding contamination in the area of the former acid pit, TA-21-70. No releases from the acid pit to the environment were documented (LANL 1990).

17.6.1.3 Source Term

The only known material used in the acid pit was concentrated nitric acid. Although no data are available on whether other contaminants were present in the acid pit, no contaminants are suspected. There are no known releases from this unit (LANL 1990); however, it is not known how structurally sound the acid pit was during its period of use.

17.6.2 Objectives and Data Needs

The objective of this investigation is to confirm the absence of contamination at SWMU 21-005. Specific data required to assess contamination at SWMU 21-005 include the following:

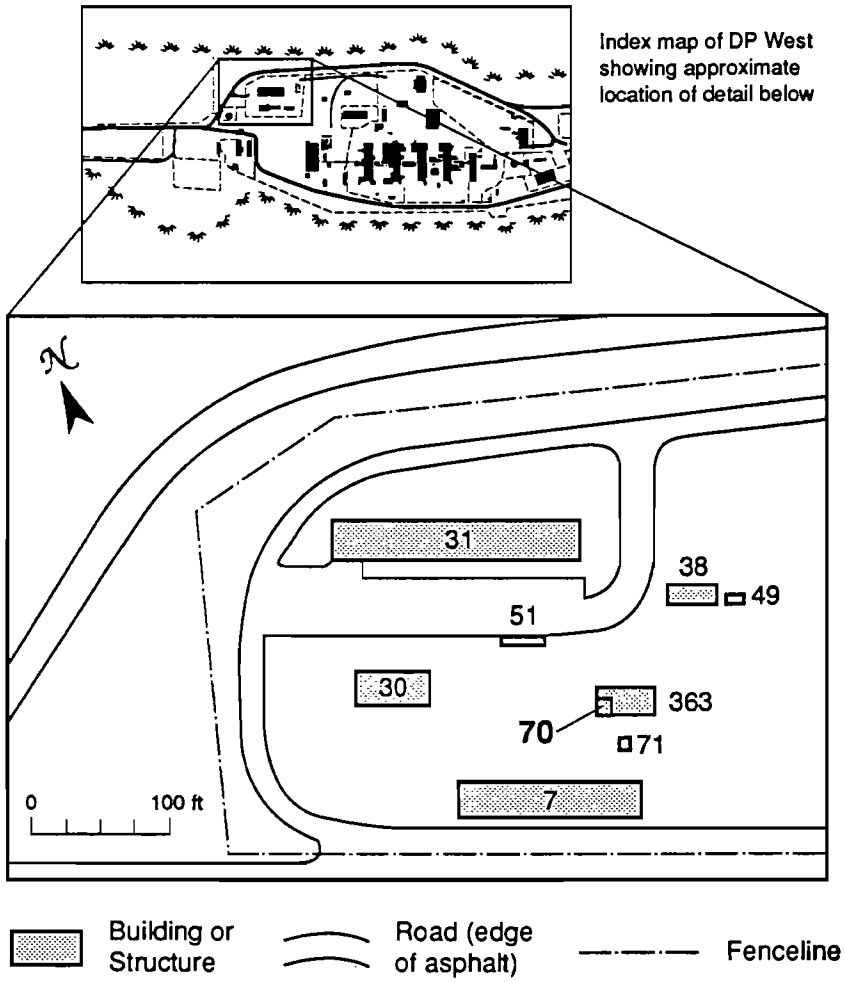


Fig. 17.6-1 Approximate location of acid pit TA-21-70. (LASL 1955)

1. Determine the location of the acid pit, TA-21-70. The location of the acid pit may be under an existing trailer, TA-21-363.

2. Identify if contaminants are present using Level II and III data. The acid pit contained nitric acid, but it is not known if any leaks occurred.

3. If contaminants are identified, determine the lateral and vertical extent of contaminant migration by subsurface soil sampling and Level III/IV analysis.

17.6.3 Field Sampling/Investigation Rationale

Two phases of investigations are planned for SWMU 21-005. Because the western end of portable office TA-21-363 was placed above the location of the former acid pit, contaminant assessment at TA-21-70 cannot be performed by vertical drilling. Therefore, the initial investiga-

tion consists of angled drilling and subsurface soil sampling to confirm the absence of of contamination beneath TA-21-70 and to determine contaminant types and concentrations if necessary. These samples will be assessed for pH and nitrates.

If indications of leakage are found, then trailer TA-32-363 may need to be relocated to allow additional investigation. Additional vertical borehole sampling in and around the pit will constitute a subsequent investigation that will determine the lateral and vertical extent of contamination.

17.6.4 Sampling Plan

17.6.4.1. Initial Investigation

The location of the former acid pit will be surveyed and marked based on engineering drawings (LASL 1955) (for method see Sec. 11.3.2). One angled borehole will be drilled beneath the acid pit in line with its center. The borehole will be drilled approximately 5 ft from the trailer and will be drilled at approximately 45° from the vertical to pass beneath the pit in the depth interval between 5 and 10 ft below the surface. Figure 17.6-2 provides a graphic representation of the drilling to be performed at TA-21-70. The total core length will be approximately 10 ft and will reach a depth of approximately 7 ft. This provides sampling just below the disturbed zone that resulted from the acid pit's removal in 1967. Samples will be collected at 2.5-ft intervals (modified from method given in Sec. 11.5.3.3) resulting in a total of four samples.

The sampling and analysis requirements for the initial investigation are shown in Table 17.6-I. All samples will be submitted to the analytical laboratory for pH and nitrates analyses on a fast turnaround. Samples testing positive for low pH and high nitrates will be submitted for a full analytical suite, plus corrosivity. If none of the samples are acidic, two of the four will be submitted for a full analytical suite. For planning purposes, it is assumed that two samples will be analyzed for the full suite. If no contamination is identified, no further action will be taken at SWMU 21-005.

17.6.4.2. Subsequent Investigation

If contamination is found to be present, additional boreholes may be required. If necessary, Trailer TA-21-363 will be relocated for this portion of the investigation.

The vertical and lateral extent of contamination will be determined by drilling three vertical boreholes (for method see Sec. 11.5.3.2). The first borehole will be drilled through the center of the

Table 17.6-1

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-005, ACID PIT.

| Sample Type | Sampling Location | Interval | Sample Identification | | Field Surveys | Field Screening | | | Field Measurements | | | Laboratory Analysis | | |

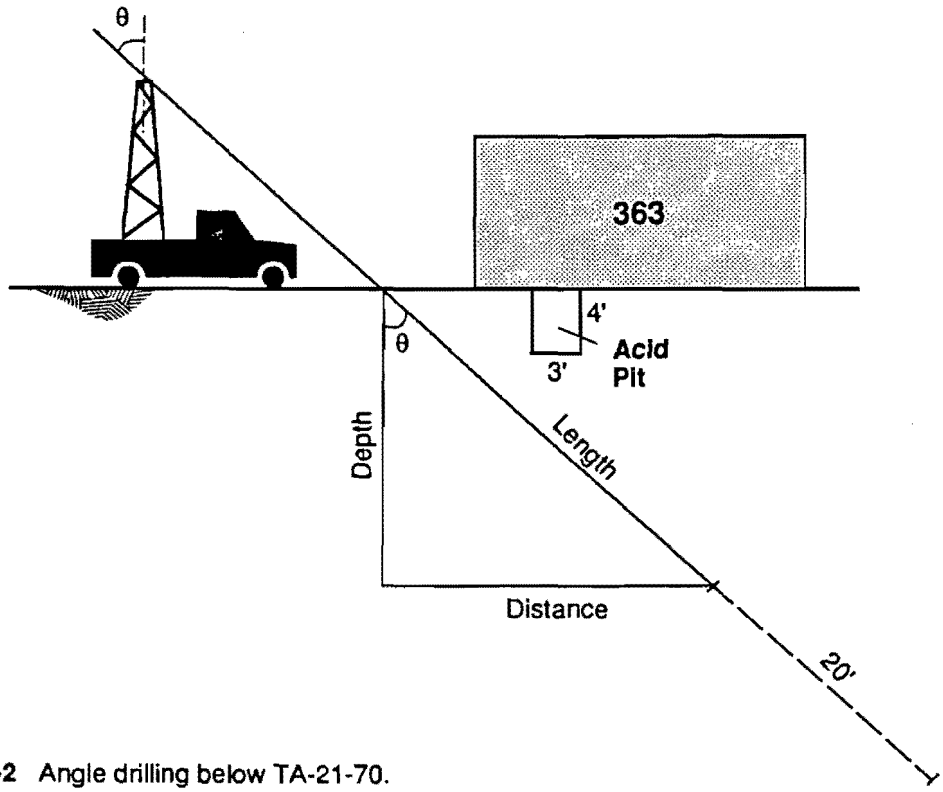


Fig. 17.6-2 Angle drilling below TA-21-70.

acid pit, and the remaining boreholes will be placed 3 ft to the north and 3 ft to the south of the acid pit. The nominal depth of the boreholes will be 15 ft.

It is anticipated that no more than three additional boreholes will be required to define the lateral and vertical extent of contamination. For planning purposes, however, it is assumed that no additional boreholes will be required.

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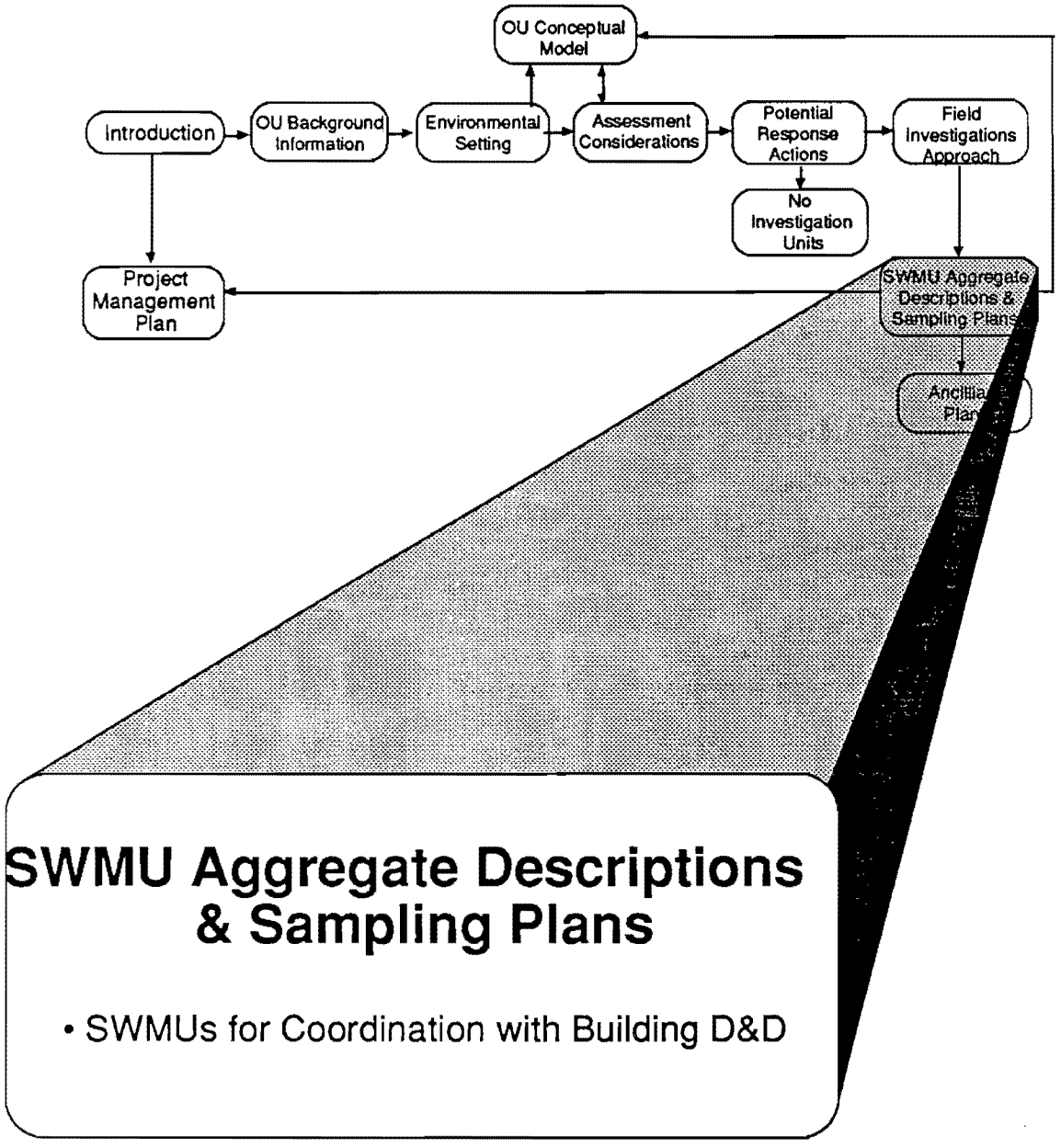
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CHAPTER 18


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
SWMU Aggregate Descriptions & Sampling Plans
• SWMUs for Coordination with Building D&D

18. SWMUS FOR COORDINATION WITH BUILDING D&D DESCRIPTION AND SAMPLING PLAN

18.1. Introduction

This chapter contains the histories and suggested sampling schemes for potential release sites, which are to be characterized during or after the decontamination and decommissioning (D&D) of buildings at TA-21, DP West. This approach is being taken because these potential release sites are within, surrounded, or covered by other buildings or structures scheduled for D & D, including structure demolition. These sites are currently inaccessible, and the exact locations of some of these sites are unknown. Also addressed are units with documented subsurface contamination that were partially cleaned up between 1978 and 1981 (Garde et al. 1982).

These potential release sites are grouped under four different SWMUs. The list below identifies the SWMUs addressed in this Chapter and the section in which they are addressed (see Fig. 18.1-1). Only Secs. 18.8 and 18.9 contain actual field sampling plans.

- Section 18.2

  SWMU 21-006(a), (c)–(f), Underground Seepage Pits

- Section 18.3

  SWMU 21-023 (a), (b), (d), Decommissioned Septic Systems

- Section 18.4

  SWMU 21-022 (a), Inactive Container Storage Areas

  SWMU 21-028(c), Active Container Storage Areas

- Section 18.5

  SWMU 21-022, Acid Waste Lines and Sumps

- Section 18.6

  Utility Tunnels

- Section 18.7

  C-21-001; -006; -027; -032, Areas of Concern

- Section 18.8

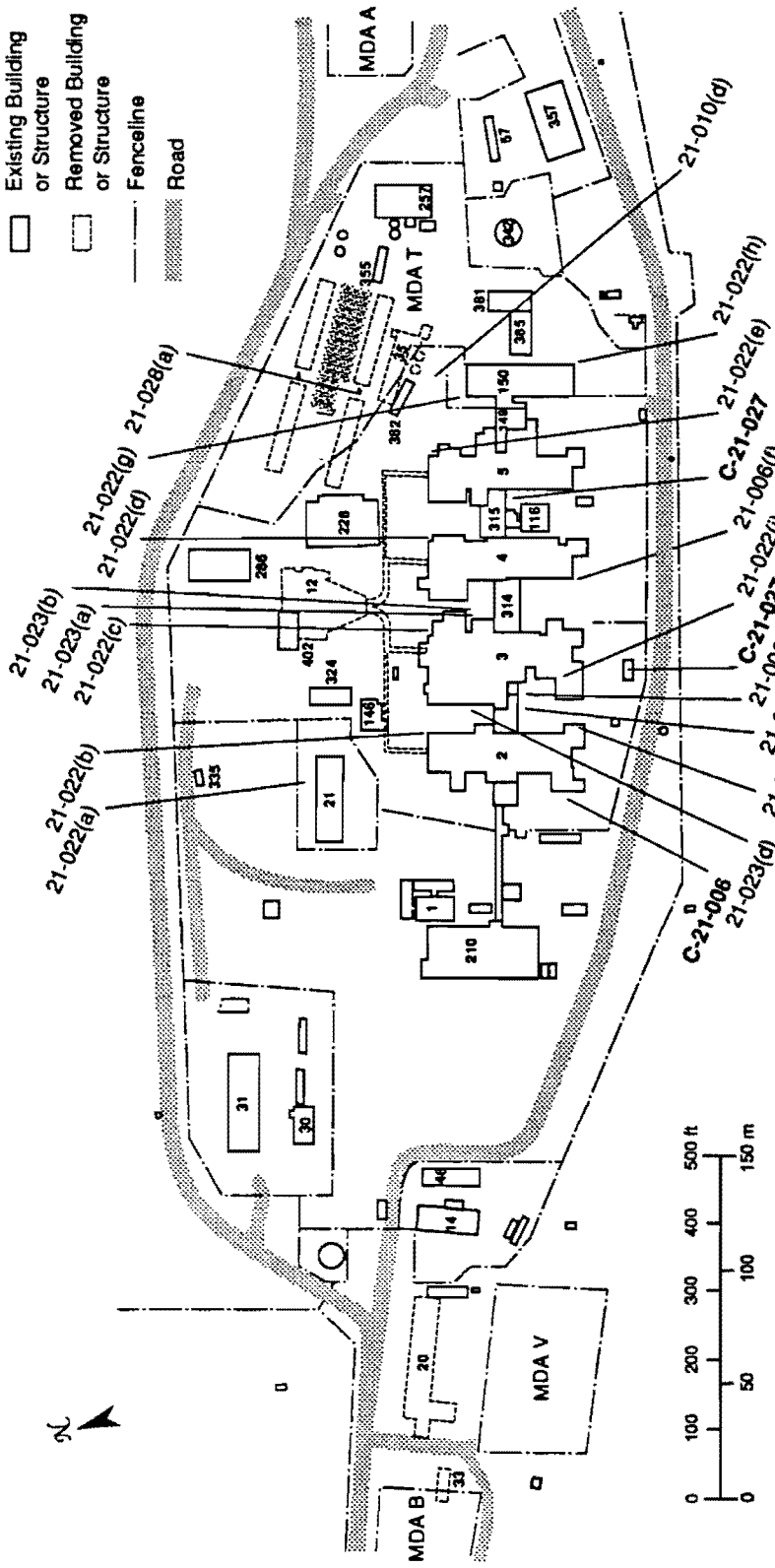


Fig. 18.1-1 Location of SWMUs and areas of concern to be addressed in conjunction with building D&D.

SWMU 21-022, (b), (e)–(g), Acid Waste Sumps

- Section 18.9

  SWMU 21-022, (h)–(j), South Side of Plutonium-Processing Complex

ER and D&D Program approaches to clean up these areas will, to the extent possible, be integrated. In the interim before full access to the SWMUs is possible, the lateral and vertical extent of potential contaminant plumes around DP West will be bounded and monitored to confirm that neither unknown nor uncontrolled contaminant migration is occurring. Complete site characterization activities will be deferred until D&D.

Therefore, the approach in this chapter is to detail what is known about each potential release site and propose a sampling plan that characterizes only the acid sumps, SWMU 21-022, because they are the most highly contaminated. The contaminated sumps received the largest volume and concentration of waste. These sumps are located throughout the old plutonium-processing facility, so that the lateral extent of contamination will also be defined. Because these acid sumps were removed or are no longer used, no water remains to facilitate contaminant movement to greater depths. The sampling plan to characterize SWMU 21-022 is developed as two field investigations in Secs. 18.8 and 18.9. The following paragraphs are a summary of the proposed field investigations.

The field investigation in Sec. 18.8 is to characterize subsurface contamination below the former location of five sumps that were located on the north side of the old plutonium-processing facility at TA-21. Contamination around and beneath the sumps was documented during their removal in 1979–1980. Of all the sites affected by the D&D program, the five sumps have the major documented releases and are believed to have the greatest potential for movement of contaminants into the subsurface. Surveys at the time of excavation showed gross alpha contamination in the soil, possibly from plutonium. Other potential contaminants include arsenic, boron, cobalt, molybdenum, niobium, nickel, lead, antimony, uranium, and zinc.

The objective of the field investigations at the five sumps is to determine the depth to which contaminants released from the sumps have migrated into the subsurface. By meeting this objective, the probable maximum extent of contaminant migration due to releases in the plutonium-processing complex will be determined. The strategy for the field investigation at the five sumps is presented in the decision flow diagram in Fig. 18.1-2. The primary data needs are

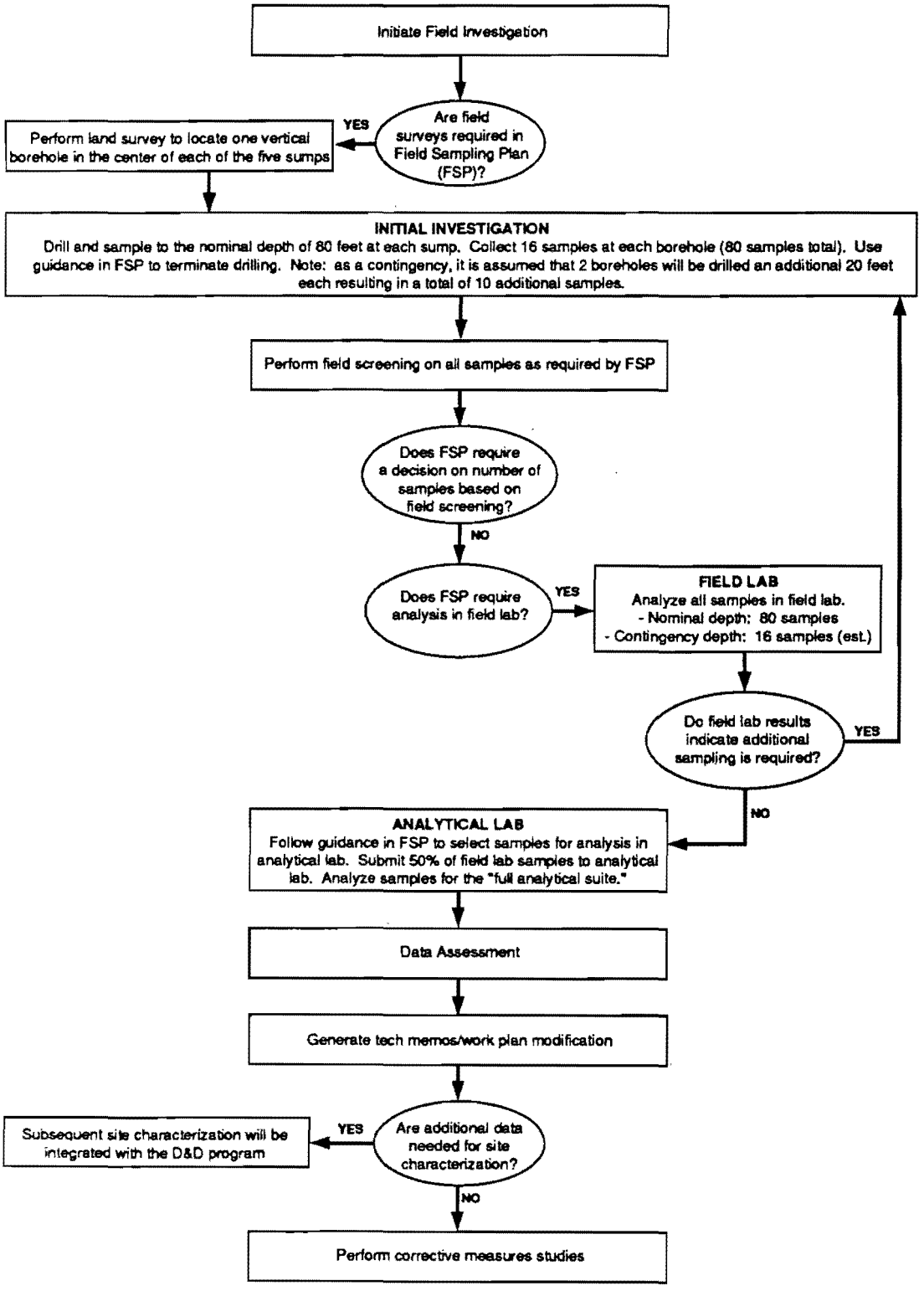


Fig. 18.1-2 Logic flow for the field investigation at acid waste sumps [SWMUs 21-022(b)–(e)].

- subsurface samples from boreholes placed through the former locations of the five sumps with
    - Level I/II data to guide the drilling and selection of samples for submittal to an analytical laboratory for Level III/IV analysis; and
    - Level III/IV data for a selected subset of the borehole samples to identify contaminant species and to determine the depth to which contaminants have penetrated. The selected subset includes samples from directly beneath the backfill materials emplaced when the sumps were removed, highly contaminated samples that are identified from field screening and field laboratory results, samples along fractures that are penetrated, and samples from the very bottom of the boreholes.

Tables 18.1-I and 18.2-II present a summary of measurements to be taken during the field investigation and a summary of analyses for subsurface soil samples collected from the five boreholes.

The purpose of the field investigation in Sec. 18.9 is to characterize subsurface contamination from three inactive sumps located along the south side of the plutonium-processing complex. Deep contaminant releases are not expected from these SWMUs as they are for the acid waste sumps described above. No information is available on radioactive or hazardous constituents present at these units. Potential contaminants are plutonium, uranium, other radionuclides, organics, and various acids resulting from plutonium-processing operations.

The strategy for the field investigation at the inactive sumps is presented in Fig. 18.1-3. The primary data needs are

- subsurface soil samples from three boreholes along the southern side of the plutonium processing complex with
    - Level I/II data to guide the drilling and selection of samples for Level III/IV analyses; and
    - Level III/IV data for a selected subset of the subsurface samples to identify contaminants.

18.1-I SUMMARY OF INITIAL INVESTIGATIONS BY SECTION FOR CHAPTER 18.

		Survey Areas		
Section	Description	Land	Radiological	Geophysical
18.8	Acid Waste Sumps	5		
18.9	South Side Pu Complex			
	Total	5		

		Boreholes						Q A
		Shallow			Vertical			
Section	Description	Number	Total Footage	No. of Samples	Number	Total Footage	No. of Samples	
18.8	Acid Waste Sumps				5	480	96	20
18.9	South Side Pu Complex				3	190	38	10
	Total				8	670	134	30

18.1-II SUMMARY OF SAMPLE AND ANALYSIS FOR INITIAL INVESTIGATIONS BY SECTION FOR CHAPTER 18.

	18.8	18.9									Total
Field Sample Screening											
Gross Gamma	96	38									134
Gross Alpha	96	38									134
Organic Vapor	96	38									134
Combustible Gas/Oxygen	96	38									134
Lithological Logging	96	38									134
Field Laboratory Measurements											
Gross Alpha	96	38									134
Gamma Spectrometry	96	38									134
Tritium	96	38									134
Volatile Organics	96	38									134
PCB											
Soil Moisture											
Laboratory Analysis											
Gamma Spectrometry	57	23									80
Tritium	57	23									80
Total Uranium	57	23									80
Isotopic Plutonium	57	23									80
Isotopic Uranium											
Strontium 90	57	23									80
VOA (SW 8240)	68	29									97
Semivolatiles (SW 8270)	63	26									89
Metals (SW 6010)	63	26									89
PCB (SW 8080)											
TCLP Metals											
Isotopic Thorium	57	23									80

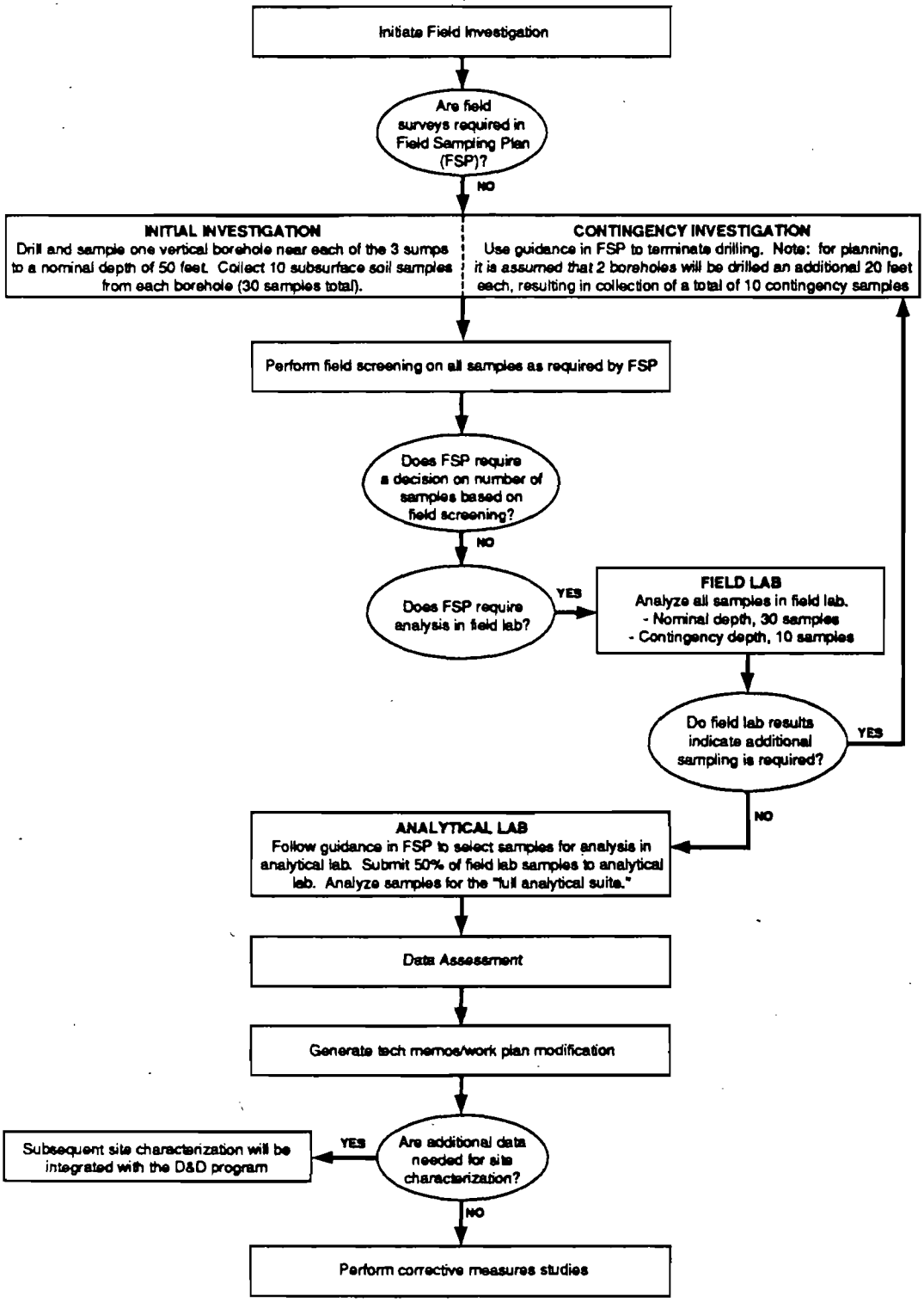


Fig. 18.1-3 Logic flow for the field investigation at SWMUs 21-022(h)–(j) sumps.

Table 18.1-II presents a summary of measurements to be taken during the field investigation and a summary of analyses for subsurface soil samples collected from the three boreholes to be taken during the field investigation.

The field investigation described in Secs. 18.8 and 18.9 will provide important information on the nature and extent of subsurface contamination from the former plutonium-processing complex. In addition to the acid waste sumps, the area investigated may include contaminants released from SWMUs 21-006, 21-023, and 21-028 that are discussed in this chapter. The investigations will also provide information for planning subsequent D&D and ER characterization efforts.

No subsequent sampling is planned prior to removal of structures, unless results of the initial investigation at SWMU 21-022 indicate it is necessary. Sampling plans specific to the remaining SWMUs will not be developed at this time. D&D and ER will work closely to plan their activities to meet both program objectives. Known SWMU locations and selected structure locations will be surveyed prior to building demolition to facilitate field reconnaissance once buildings are removed. D&D will remove units adjacent or beneath former building locations and will notify ER if any SWMUs are located in these activities. Removal and verification sampling may be conducted in lieu of SWMU characterization. Once D&D is complete, ER investigation of residual contamination will characterize the nature and extent of remaining contamination at each former SWMU location. Additionally, the entire area formerly occupied by buildings will be randomly sampled to verify that no residual contamination is present.

18.2. SWMU 21-006, Underground Seepage Pits

18.2.1. Site Description

This section describes potential release sites identified as underground seepage pits, SWMU 21-006(a), (c)–(f), (Fig. 18.2-1). SWMU 21-006(b) is discussed in Chapter 17, Subsurface Units Description and Sampling Plan. The exact number and location of the seepage pits is uncertain. Release sites SWMU 21-006(a), (c), and (d) may actually be the same site. Similarly, release sites SWMU 21-006(e) and (f) may be the same site.

18.2.1.1. Site History

SWMU 21-006(a) is described as an unmarked, underground seepage pit, approximately 0.1 acre, located between buildings TA-21-2 and TA-21-3 (LASL 1978). This pit was used to dispose of liquids from the Hanford container washing operation. It is not known whether this seepage pit is located on the south side or the north side of the corridor connecting Buildings TA-21-2 and TA-21-3 (Fig. 18.2-2). If it is on the south side of the corridor, this seepage pit may be the same site as SWMU 21-006(c) and (d). If it is on the north side of the corridor, it may be the same as structure TA-21-187, SWMU 21-023(d), which is discussed in Sec. 18.5.

SWMU 21-006(c) is 15 ft outside of the door to the bomb cleaning room 322, at Building TA-21-3. This seepage pit reportedly received "bomb electrolytic decontamination solution" from a drain in Room 322, which may have been contaminated with plutonium (Tribby 1947). The length of time this seepage pit was used is not known. At one time, the location of Room 322 was very near the northeast corner of the southern bay between Buildings TA-21-2 and TA-21-3 (Fig. 18.2-3). However, additions have been made to the southern portion of Building TA-21-3, and its location may be partially or entirely beneath either the center of Room 3131 or 3133 of the new addition.

SWMU 21-006(d) may be associated with a concrete pad and French drain system called the TA-21-272 dock (Fig. 18.2-3). Waste from a second story chemical make-up room was dumped or pumped into a stone-filled seepage pit (Walker 1979; Maraman and Christensen 1987) somewhere in the area. No other information regarding this seepage pit is available. Because the TA-21-272 dock seepage pit, SWMU 21-006(d), and the Room 322 seepage pit, SWMU 21-006(c), are in close proximity, these two seepage pits may be the same release site. Seepage pit, SWMU 21-006(a), located between Buildings TA-21-2 and TA-21-3, is also in the general vicinity of SWMUs 21-006(c) and (d) and may also be related.

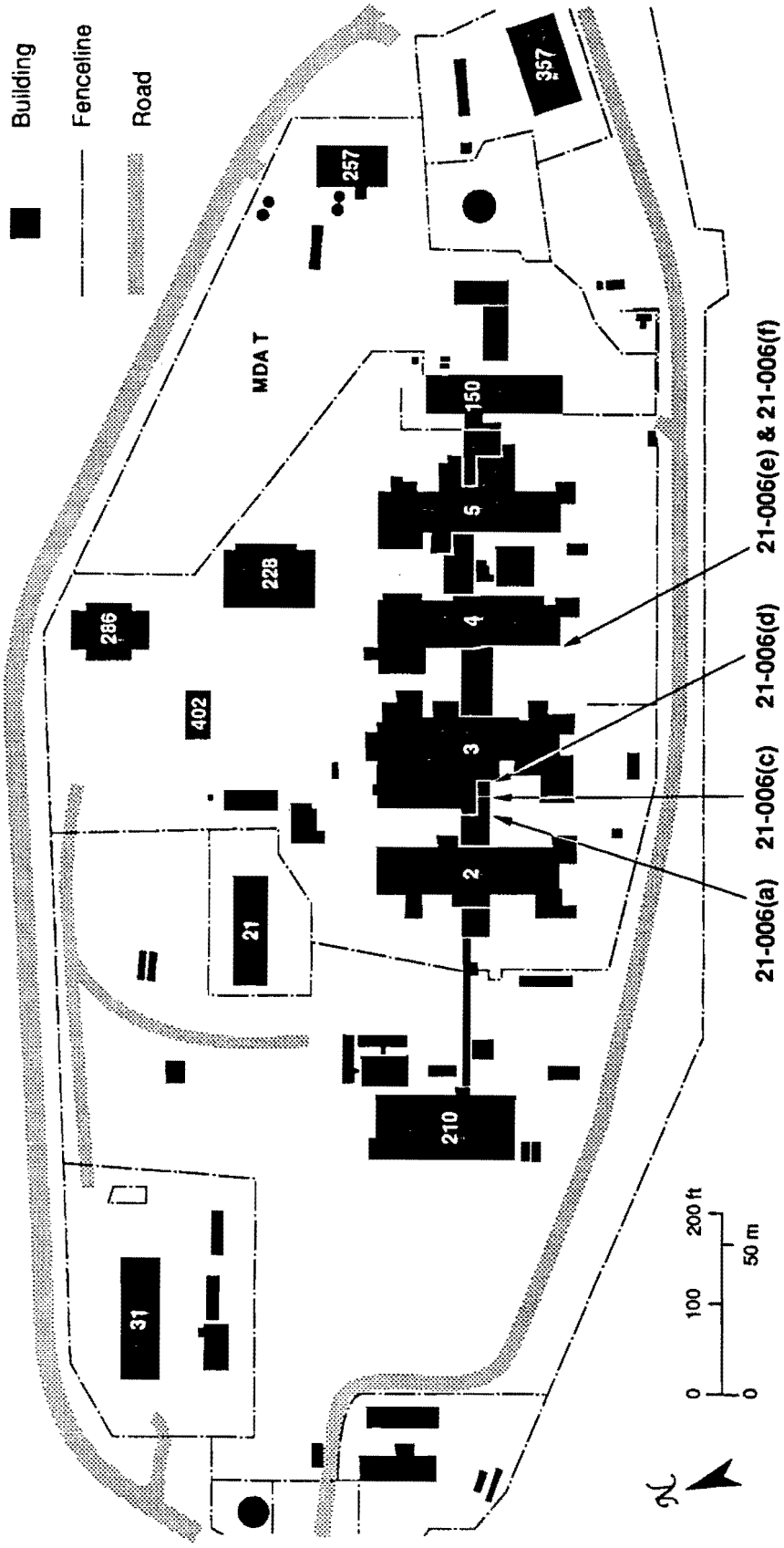


Fig. 18.2-1 General location of underground seepage pits, SWMUs 21-006(a), (c)–(f). (LANL 1990)

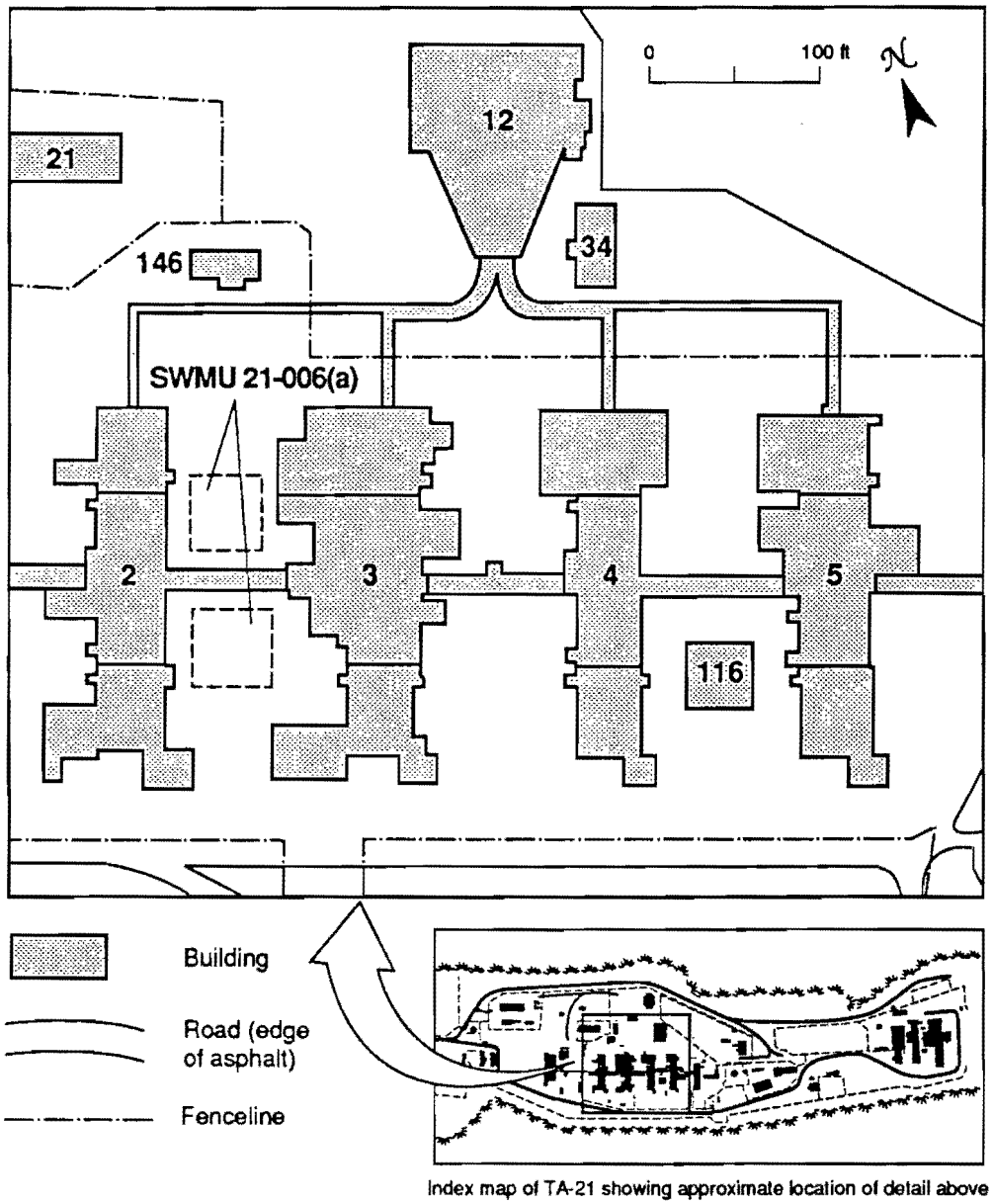


Fig. 18.2-2 General location of SWMU 21-006(a) and the 1964 configuration of Buildings 2 and 3 at TA-21. (LASL 1964)

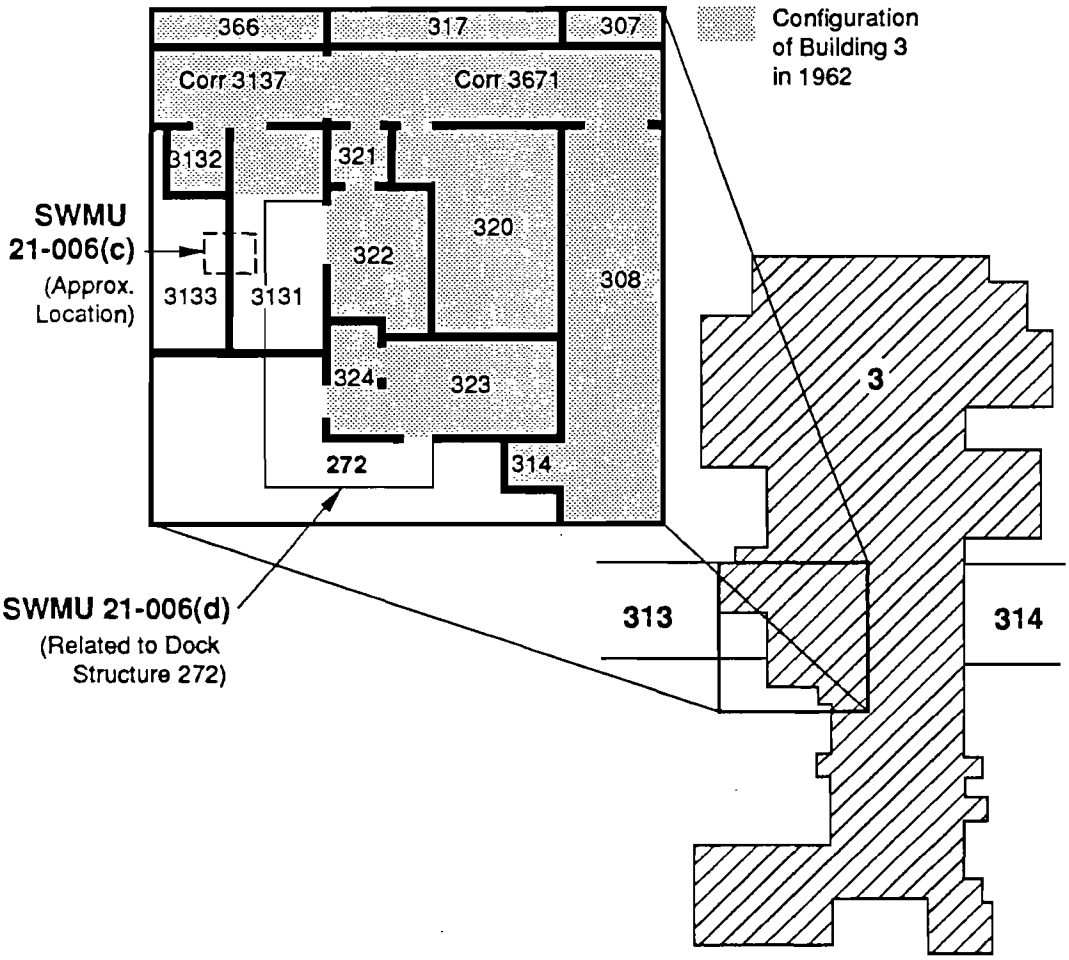


Fig. 18.2-3 Approximate location of SWMU 21-006(c) and (d) near Room 322 in Building 3 as seen in 1962 and 1983. (LASL 1962; LANL 1983b).

SWMU 21-006(e) may be located south of Building TA-21-4 (IT Corp 1989) (Fig. 18.2-1). The location of this seepage pit is unclear. No other information regarding this potential release-site exists. Seepage pit, SWMU 21-006(e), may be the same release-site as seepage pit, SWMU 21-006(f).

SWMU 21-006(f) has been described as a gravel seepage pit located on the south side of the DP West complex (Tribby 1947) (Fig. 18.2-1). This seepage pit may have received up to 4,000 L per day of hydrogen fluoride waste water effluent from a hydrofluorination process located in Room 413, the southernmost room of Building TA-21-4 (Tribby 1947). Wastewater from this seepage pit may have emptied into Los Alamos Canyon, although how this occurred is unknown. The length of time this seepage pit was used is also not known.

18.2.1.2. Existing Information

No data exist regarding contamination in and around the seepage pit areas, SWMU 21-006(a), (c)–(f).

18.2.1.3. Source Term

SWMUs 21-006(a), (c), (d) include seepage pits that reportedly disposed of Hanford container wash water, bomb electrolytic decontamination solution (ethylene glycol, phosphorous acid, and plutonium), and chemical makeup room wastewater. Approximately 12 gal. of ethylene glycol and phosphorous acid electrolytic solution may have been emptied into the drain in Room 322 each day. Assays of the liquid waste source indicated that approximately 1.9 mg of plutonium were released daily (Tribby 1947). The "Radioactive Waste Management Site Plan" (LASL 1978) indicated that the estimated radioactivity associated with SWMU 21-006(a) was high. Plutonium may be the principal radionuclide in waste in SWMU 21-006(a), (c)–(f) (Balo and Warren 1986), but ethylene glycol, phosphorous acid, and other radionuclides may be present (Tribby 1947; IT Corp 1988).

SWMU 21-006(e), (f) may have received hydrogen fluoride waste water effluent from a hydrofluorination process located in Room 413, the southernmost room of Building TA-21-4 (Tribby 1947). Assays performed on the effluent source yielded approximately 0.18 micrograms of plutonium per L of effluent, or approximately 0.72 mg of plutonium per day (Tribby 1947). Based upon a maximum daily discharge volume of 4,000 L, an estimated 0.72 mg of plutonium per day could have been discharged into this seepage pit.

18.2.2. Data Needs

Investigations will be performed in conjunction with the D&D program at TA-21. The locations of these SWMUs will be determined during the D&D characterization process or during site D&D when waste lines and residual contamination are chased. When access to these SWMUs is provided, ER activities will be coordinated with any continuing D&D activities. Removal and verification sampling may be conducted in lieu of SWMU characterization. As appropriate, characterization to address the specific data needs for SWMU 21-006(a), (c)–(f) listed below will be performed.

1. Determine the location and survey each of the five seepage pits.

2. Perform field reconnaissance at each of the five seepage pits to determine the nature and extent of contamination.

3. Identify the presence of environmental contamination resulting from the seepage pits by analysis of subsurface soil samples from within each area.

4. If contaminants are identified, determine the vertical and lateral extent of contamination by additional subsurface soil sampling and analyses.

18.3. SWMU 21-023 Decommissioned Septic Systems

18.3.1. Site Description

This section describes three potential release sites identified as decommissioned septic systems under existing buildings in SWMU 21-023(a), (b), (d) (Fig. 18.3-1). SWMU 21-023(c), septic tank TA-21-62, is discussed in Chapter 15, Outfalls (Sec. 15.2), because it is part of a septic system that has an identified outfall.

18.3.1.1. History

SWMU 21-023(a), septic tank TA-21-225, is located between two additions to Building TA-21-3 (Fig. 18.3-1). It is not known what portions of Building TA-21-3 were served by the septic tank, nor when it was installed. The tank was constructed of reinforced concrete with dimensions 5 ft by 9 ft with a depth of 6 ft. The tank and associated sewer line were removed July 18, 1966 (LASL no date). Assays for gross alpha on sludge samples did not indicate contamination was present. No alpha activity was detected in the associated piping (Romero 1966). This tank was disposed of without restriction (Kennedy 1966).

SWMU 21-023(b), sanitary waste septic system, TA-21-142, was installed in September 1945 (Fig. 18.3-2). This system included a 500-gal. capacity steel tank and associated sewer lines. This septic system received wastewater from the shower room, 363, in Building TA-21-3 and drained into acid sump TA-21-84, SWMU 21-022(c), (LANL 1990; LASL 1959a) discussed in Sec. 18.5. The septic tank was removed in February 1966, and its former location is now beneath Rooms 361 and 362.

SWMU 21-023(d), septic system, TA-21-187, included a reinforced concrete septic tank installed in June 1960, with dimensions of 5 ft by 3 ft with a depth of 5.5 ft (LANL 1990) and 80 ft of pipe (Russo 1965) (Fig. 18.3-3). The septic tank collected industrial waste and sewage from Building TA-21-3. The drain line carried waste from TA-21-187 north to the contaminated waste line serving acid waste sump TA-21-82, SWMU 21-022(b), discussed in Sec. 18.5. This tank was removed and disposed of without restriction in October 1966 (Kennedy 1966). Its former location is now beneath a new addition to Building TA-21-3.

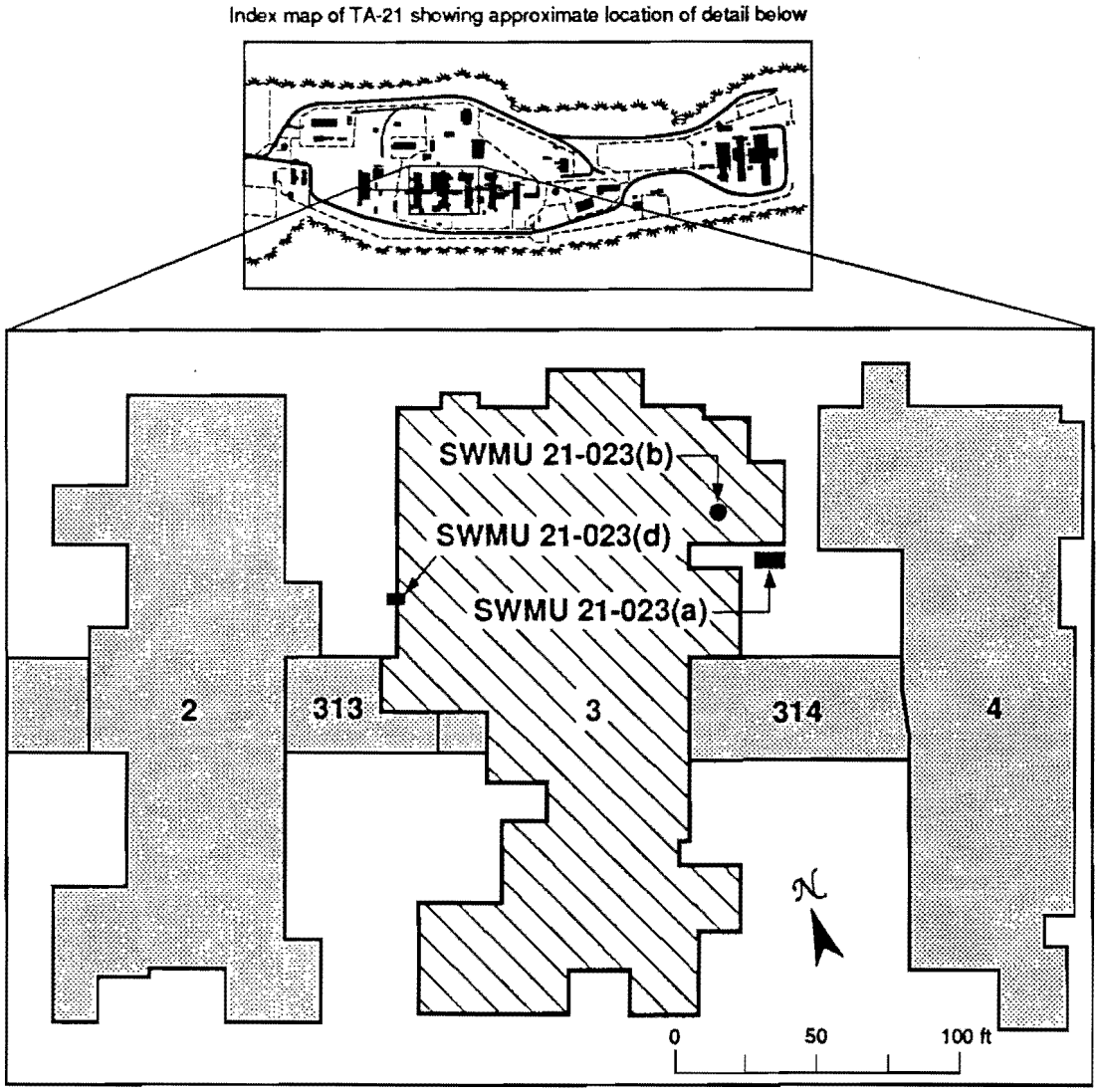


Fig. 18.3-1 Location of SWMUs 21-023(a), (b), and (d) in relation to current configuration of Building 3. (LASL 1964, 1968a)

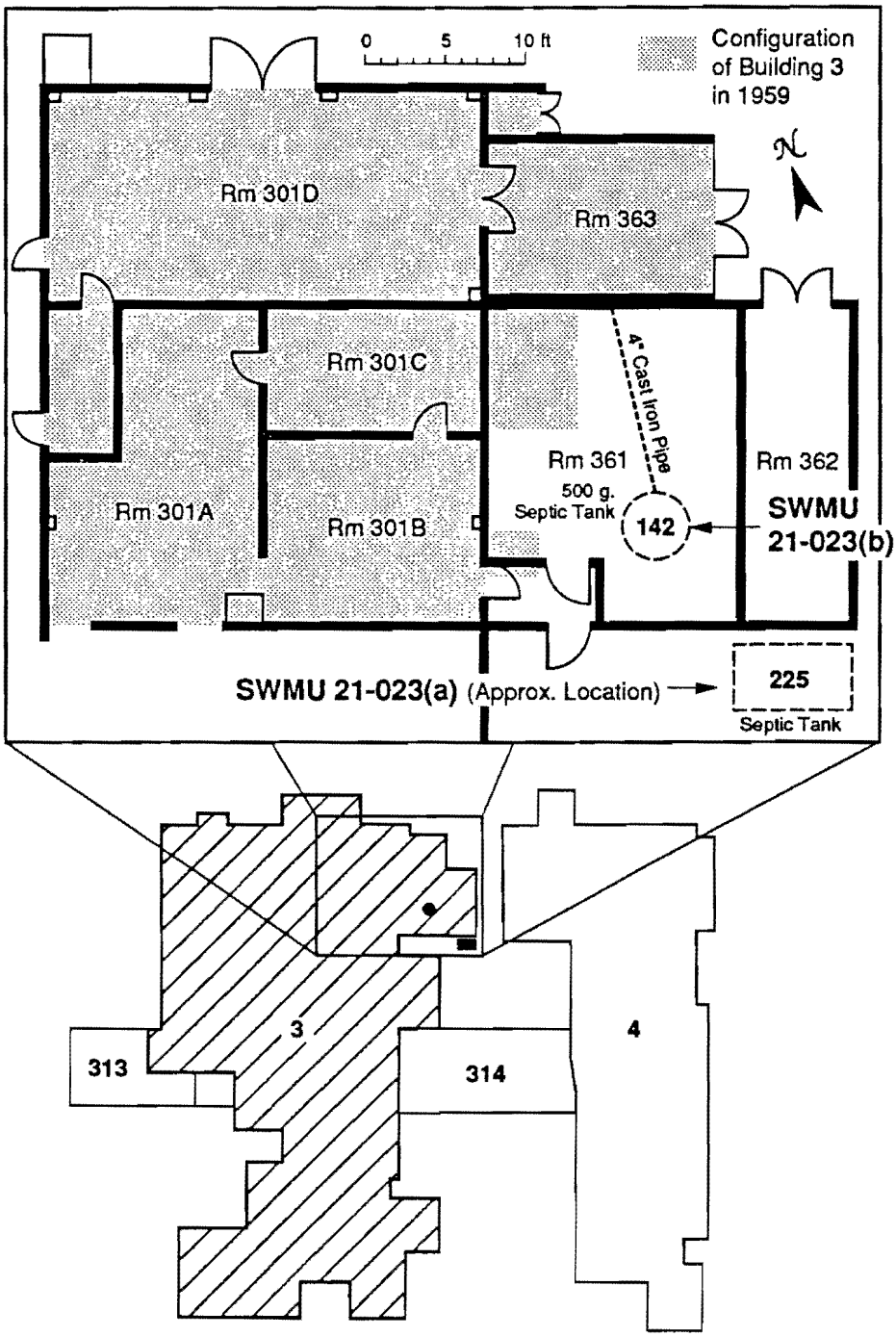


Fig. 18.3-2 Location of SWMU 21-023(b) (septic tank TA-21-142) and SWMU 21-023(a) (septic tank TA-21-225) in relation to Building 3 in 1959 and 1966. (LASL 1959a, 1966)

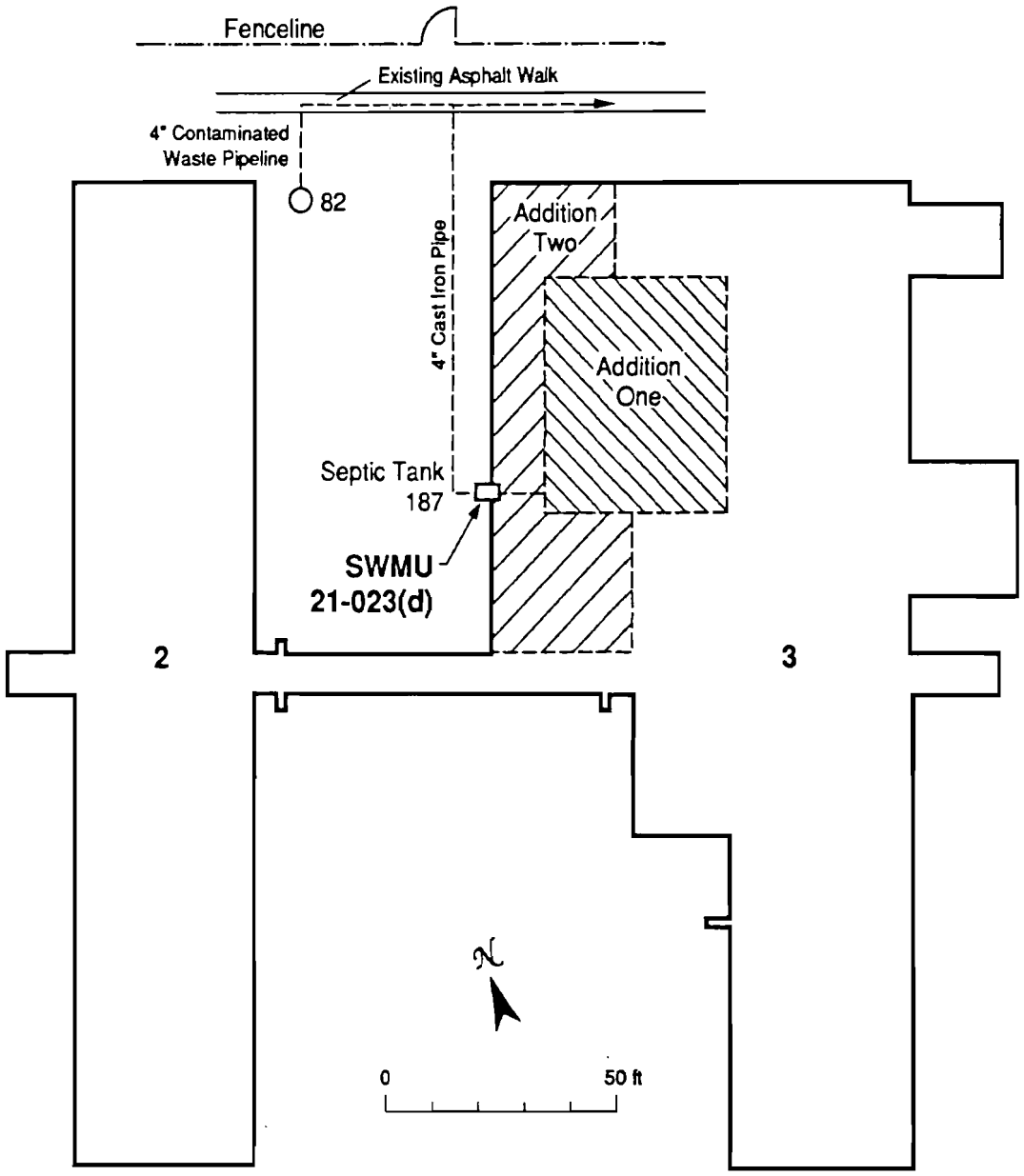


Fig. 18.3-3 Location of SWMU 21-023(d) (septic tank 187) and drain lines. (LASL 1959b, 1968b)

18.3.1.2. Existing Information

Assays from sludge in the two septic tanks, SWMUs 21-023(a), (d), indicated that no alpha activity was detected (Romero 1966). The piping associated with these tanks was also monitored, and no contamination was detected (Romero 1966). No data exist regarding contamination in and around the third decommissioned septic system, SWMU 21-023(b).

18.3.1.3. Source Term

SWMUs 21-023(a), (c), (d) include decommissioned septic systems, which have not been evaluated with the exception of sludge and piping associated with TA-21-225 and TA-21-187. Based on the material handled in the buildings that served these septic systems, these systems could contain radioactive contamination and/or hazardous materials. The amounts of these contaminants are unknown.

18.3.2 Data Needs

Investigations will be performed in conjunction with the D&D program at TA-21. If these former septic system locations are discernible, they will be determined during the D&D characterization process or during site D&D when waste lines and residual contamination are chased. When access to these SWMUs is provided, ER activities will be coordinated with any continuing D&D activities. Removal and verification sampling may be conducted in lieu of SWMU characterization. As appropriate, characterization to address the specific data needs for SWMU 21-006(a), (c)–(f) listed below can be performed.

1. If the locations of these former septic systems are identified, determine the location, and survey each of the septic systems.

2. Perform field reconnaissance at each of the septic systems to determine the nature and extent of contamination.

3. Identify the presence of environmental contamination resulting from the septic systems by analysis of subsurface soil samples from within each area.

4. If contaminants are identified, determine the vertical and lateral extent of contamination by additional subsurface soil sampling and analyses.

18.4. SWMU 21-028, Active Container Storage Areas

18.4.1. Site Description

This section describes two potential release sites, inactive container storage areas in SWMU 21-002(a), and an active container storage area, SWMU 21-028(c) (Fig. 18.4-1). SWMU 21-002(b) was addressed in Sec. 14.6 because it has an identifiable location. SWMU 21-028(a) is addressed in Sec. 16.3 because it is located within MDA T. SWMU 21-028(b) and those parts of 21-028(e) addressing active container storage areas within buildings are recommended for no further action in Chapter 20. SWMU 21-028(d) and remaining parts of 21-028(e) are addressed in Chapter 14, Surface Units, because they are associated with Buildings TA-21-209 and TA-21-210, which are not currently planned for decontamination and decommissioning.

18.4.1.1. Site History

SWMU 21-002(a) is intended to include all inactive container storage areas located throughout TA-21, except SWMU 21-002(b) (LANL 1990). Drums, gas cylinders, and other containers were reported to have been stored in "several locations" throughout TA-21, and some were reported to have leaked.

The drum and gas cylinder storage in "several locations" cannot be addressed in this sampling plan because the locations of these storage areas cannot be identified specifically. However, each of these storage areas would have been associated with operations at a specific TA-21 facility, and it is reasonable to assume that decontamination and decommissioning of those facilities will include removal of contamination originating from any spills at these storage areas. Thus, any potential contamination resulting from SWMU 21-002(a) will be addressed by the general activities described in this sampling plan.

SWMU 21-028(c) consists of four satellite container storage areas located around Building TA-21-3 (Fig. 18.4-2). The four container storage areas at Building TA-21-3 are located at the door to Room 301 on the north dock, at the outer door to Room 360, at the northeast side of the fan Room, 3N, and inside a chemical safety cabinet in Room 362. These container storage areas have been used from an unknown starting date through the present (LANL 1990). Storage may have begun as early as 1945 when Building TA-21-3 was completed (Nyhan 1990).

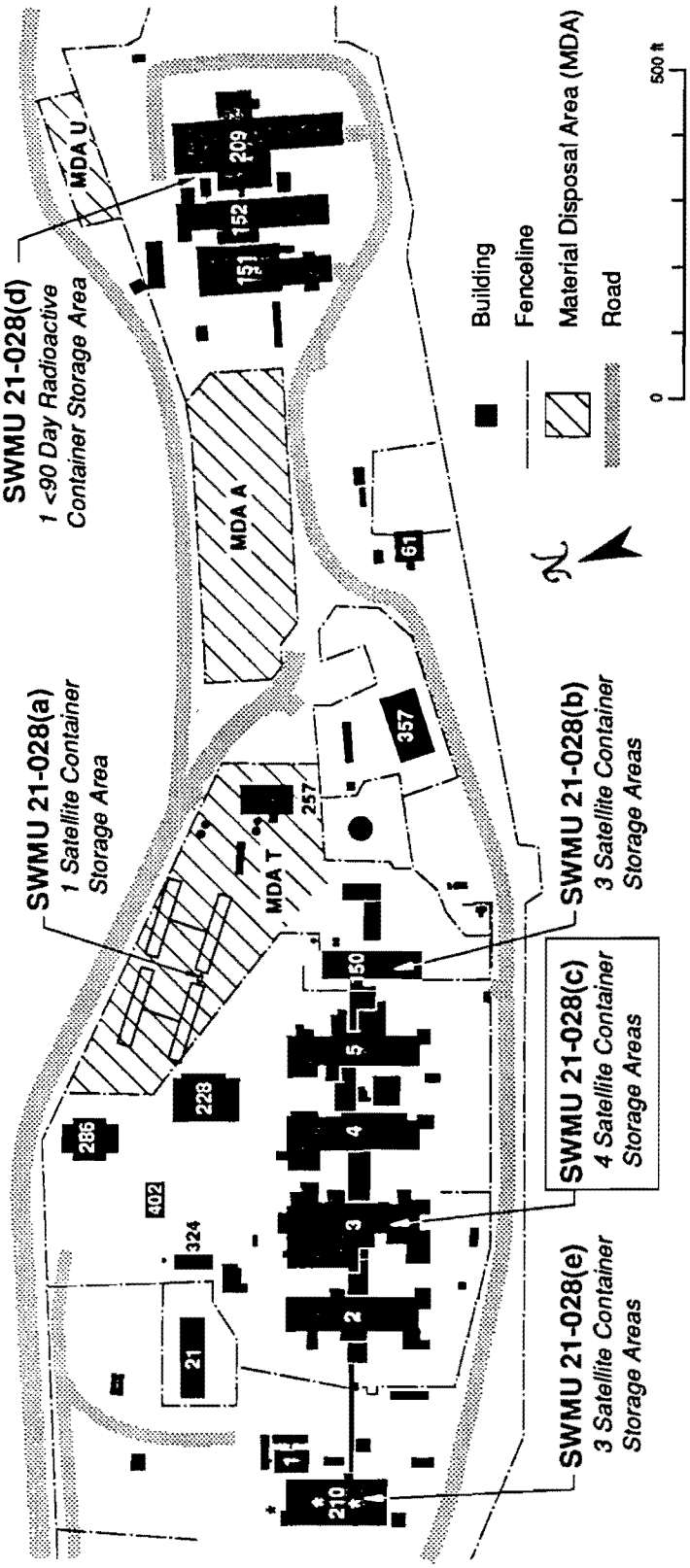


Fig. 18.4-1 Locations of the active container storage areas at TA-21 [SWMUs 21-018(a)–(e)].

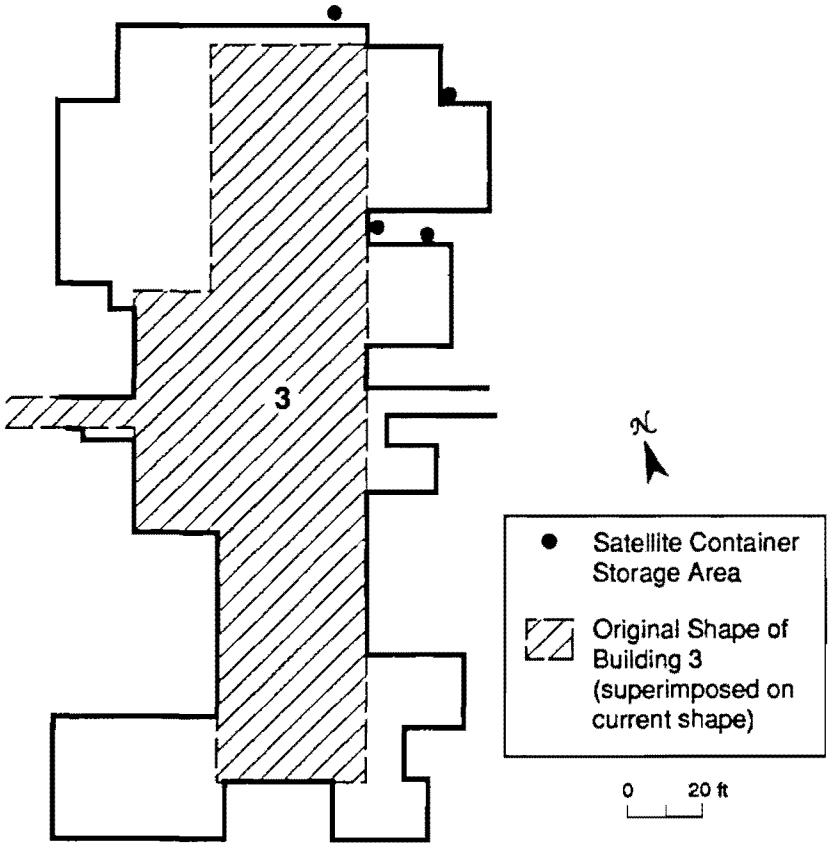


Fig. 18.4-2 Locations of the active container storage areas in relation to the 1966 and current configurations of Building 3.

18.4.1.2. Existing Information

No information regarding sampling and analysis in or around SWMU 21-028(c) is available.

18.4.1.3. Source Term

SWMU 21-028(c), the satellite storage areas at Building TA-21-3, include the following material stored outside of the chemistry research lab, Room 301, by the dock:

- halogenated organic chemicals—chloroform, alkyl halides, carbon tetrachloride, and methyl chloride; and
- nonhalogenated organic chemicals—tetrahydrofuran, acetone, toluene, benzene, ethanol, methanol, butanol, diethyl ether, and isopropanol.

These chemicals may be contaminated with thorium, depleted uranium, technetium, and other metals (LANL no date b). Nothing is currently stored at this location, and no stains are present on the loading dock or asphalt surrounding the dock (Roy F. Weston 1990).

The materials currently being stored in a safety cabinet outside of the organometallic research lab, Room 360, at Building TA-21-3, include the following:

- liquids—acetone, ethanol, toluene, Et20, hexane, benzene, benzene d6, and THF;
- inorganic and organic reagents—phosphines, ethyl acetate, cycloheptariene, propionitrile, depleted uranium and thorium, phosphites, zinc, silver, tungsten, ruthenium, iron, molybdenum, cobalt, boron, and copper salts, various acids, arsines, amines, various tin, lithium, bismuth, and metal salts, toluene-d8, thiols, and filtering agent celite (LANL no date b).

These chemicals are stored in a chemical safety cabinet (Roy F. Weston 1990). This lab is dedicated to the synthesis of new, previously unknown complexes and uses a wide variety of inorganic and organic reagents in small quantities. The reagents used change constantly, as does the composition of the wastes generated here (LANL no date). No stains are observable on the soil surrounding the storage cabinet (Roy F. Weston 1990).

The materials being stored in a chemical safety cabinet on the northeast side of the fan room, small-scale synthetic inorganic lab, at Building TA-21-3 include the following:

- diethyl ether, alkanes, tetrahydrofuran, acetonitrile, chloroform, dimethoxyethane, organic isocyanides, D38 and natural thorium salts, phosphines, phosphites, acetone, toluene, alcohols, carbon tetrachloride, methylene chloride, bismuth salts, and barium salts (LANL no date).

In addition, four 5- to 10-gal. plastic containers labeled "Haz. Waste: non chlorinated, non rad." and "Haz. Waste: rad waste" were present (Roy F. Weston 1990). A large variety of materials may appear in the wastes at this site. Some of these are

- depleted ^{238}U salts, transition metal salts, metal sulfides, cycloheptatriene, organic esters, and propionitrile (LANL no date).

No stains are present on the asphalt around the storage area (Roy F. Weston 1990).

The materials being stored in a chemical safety cabinet outside of Room 362, at Building TA-21-3, include used chromic acid, waste mercury, waste nitric acid, and waste sulfuric acid. Some of the bottles of waste chromic acid were also wrapped in plastic garbage bags. Stains were noted on the soil surrounding the storage cabinet (Roy F. Weston 1990).

18.4.2. Data Needs

Investigations will be performed in conjunction with the D&D program at TA-21. During site D&D, all interior portions of these SWMUs will be removed with the buildings. Exterior areas will be sampled, characterized, and removed as well. If these SWMUs are removed during D&D, ER will conduct verification sampling afterwards. The following data needs will be assessed during the D&D process:

1. If necessary, determine the location and survey each of the active container storage areas.

2. Perform field reconnaissance at each of the active container storage areas to determine the nature and extent of contamination.

3. Identify the presence of environmental contamination resulting from the active container storage areas by analysis of subsurface soil samples from within each area.

4. If contaminants are identified, determine the vertical and lateral extent of contamination by additional subsurface soil sampling and analyses.

18.5. Acid Waste Lines

18.5.1. Site Description

The acid lines covered in this section are part of SWMU 21-022(b)–(e), (g). These lines drain the acid sumps TA-21-82, 84, 87, 89, and 189, which are covered in Sec. 18.8. The acid lines are being discussed separately from the sumps because the lines will not be investigated prior to D&D. This is because the area in which the acid lines are buried contains numerous water, electrical, gas, and steam lines, which are currently in use, making any investigation of the lines difficult and dangerous. In addition, as part of D&D, all lines connected to the building will be removed. Sampling will best be accomplished at this time.

18.5.1.1. History

Between 1945 and 1952, a 6-in. iron pipe carried liquid waste from sumps TA-21-82, 84, 87, and 89 to MDA T (SWMU 21-016) (Fig. 18.5-1). This pipe was installed between 6.5- and 8-ft deep.

In 1952, the waste disposal plant, TA-21-35 (SWMU 21-010), was constructed, and a new 4-in. extra heavy cast iron (EHCI) waste line was installed parallel and approximately 20 ft north of the old pipe, which was abandoned in place (LANL 1990). In addition, three 1.5-in. stainless steel lines were installed 1 ft above the new 4-in. waste line in the same trench. One of these lines originated from the northeast corner of TA-21-2 and carried "special waste" directly to TA-21-35. The remaining two carried raffinate from TA-21-3 and 5 to holding tanks and then into TA-21-35 (LASL 1976).

In 1962, a 4-in. cast iron line from sump TA-21-189 was connected to the existing 4-in. EHCI line to TA-21-35.

The 4- and 1.5-in. waste lines were rerouted in 1967 when TA-21-35 was removed, and a new waste disposal plant (TA-21-257, SWMU 21-011) began operation. The line segments from the new portion of the lines to TA-21-35 were removed (LASL 1976a).

18.5.1.2. Existing Information

During the summer of 1989, a section of acid waste line was removed from the utility tunnels within and beneath TA-21-3 and -4 north (Montoya 1989). Semiquantitative analyses by ICP-MS were performed on sludge found in a 1-ft section of this pipe, which fed sumps TA-21-84 and 87.

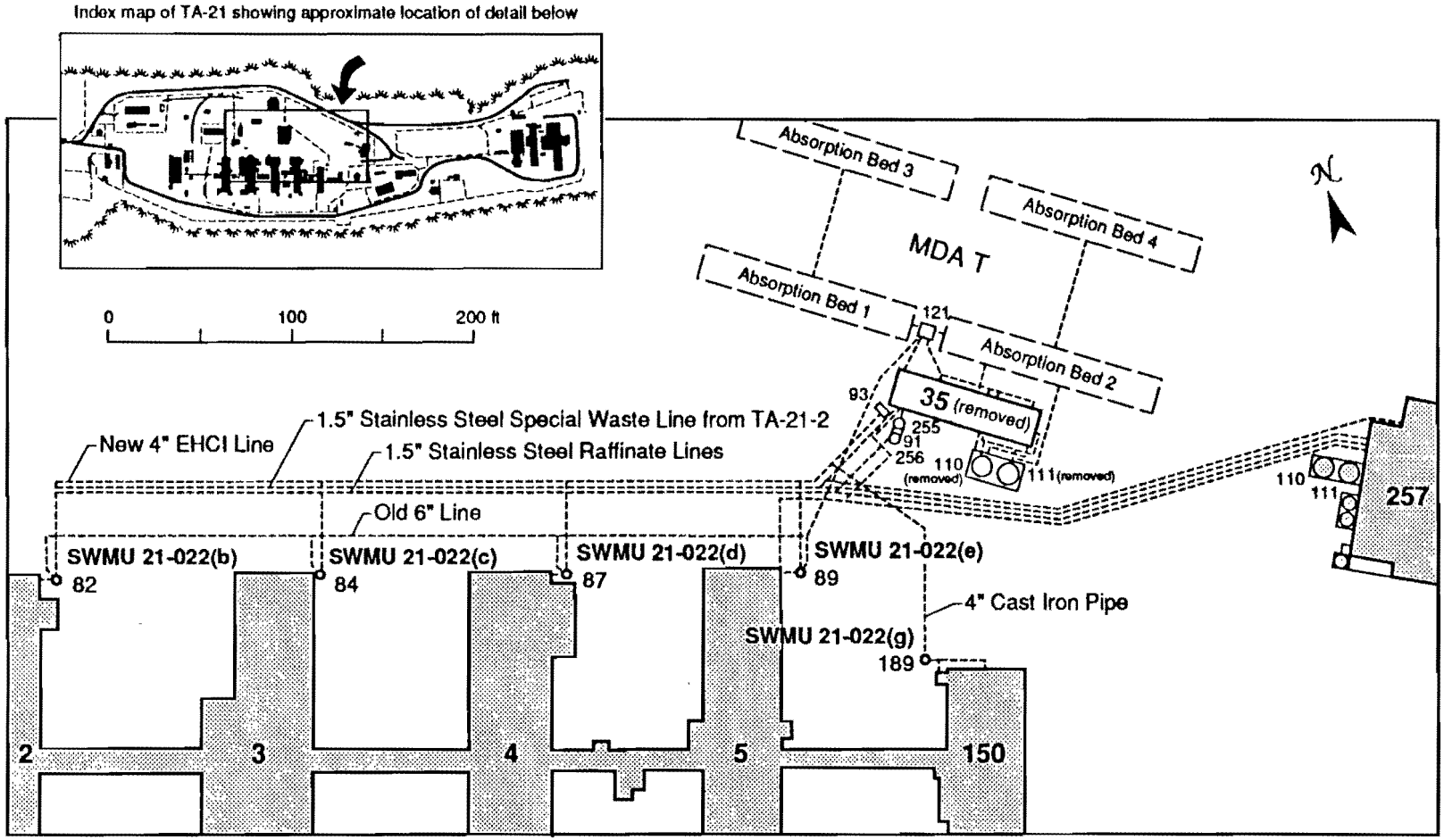


Fig. 18.5-1 Location of acid waste lines and sumps as they appeared in 1954 and 1962 on the north end of Buildings 2, 3, 4, 5, and 150. (LASL 1961, 1976b)

These data provide an indication of the contaminants expected in the acid waste lines that drained these sumps (Garde 1990). The analyses of that sludge are presented (Table 18.5-I) as a guide for constituents that should be expected to be present in unknown concentrations in the acid waste lines to the north of TA-21-2,3,4, and 5. The uncertainties associated with these results are large. Plutonium was also present, but because of a standards problem was not quantified.

A comparison of these results with the background level data given in Sec. 4.2.4 indicates above-background concentrations of arsenic, boron, cobalt, molybdenum, niobium, nickel, lead, antimony, uranium, and zinc. Plutonium was also present, but not quantified.

18.5.1.3. Source Term

The acid lines are likely to be contaminated with nitrates, chlorides, and fluorides as a result of nitric, hydrochloric, and hydrofluoric acids discharged to them from the plutonium separation operations. Surveys at the time of excavation of the sumps showed gross alpha contamination in the soil around sumps TA-21-82, 84, 87, and 89 (Garde et al. 1982; see Sec. 18.8). In addition, the analyses of the sludge indicates arsenic, boron, cobolt, molybdenum, niobium, nickel, lead, antimony, uranium, and zinc are present.

18.5.2. Data Needs

Investigations will be performed in conjunction with the D&D program at TA-21. The locations of these lines will be determined during site D&D when waste lines and residual contamination are chased. Removal and verification sampling may be conducted in lieu of SWMU characterization. As appropriate, characterization to address the following data need will be performed:

- Determine the nature and extent of contamination in soils around former acid line locations.

TABLE 18.5-I SEMIQUANTITATIVE ICP-MS ANALYSES OF SLUDGE FROM WASTE LINE REMOVED IN 1989[a]

Element	Conc (µg/g)	Mean $\bar{x}$	Std. (s)	Upper Limit of Background (µg/g) $\bar{x} + 2s$
Ag	24	—	—	not reported
As	11	3.9	1.6	7.1
B	45	16	7.2	30.4
Bi	66	—	—	not reported
Ce	18	—	—	65 ± 1.71[b]
Co	11	—	—	7.1 ± 1.97[b]
Cr	47	27	24	75
Eu	77	—	—	not reported
Ho	58	—	—	not reported
Li	32	24	4.6	33.2
Mn	62	510	130	770
Mo	44	—	—	0.85 ± 2.17[b]
Na	64	—	—	9.700 ± 1.95[b]
Nb	16	—	—	8.7 ± 1.82[b]
Ni	180	8.9	4.8	18.5
Pb	93	24	15	54
Rb	40	120	15	150
Sb	24	—	—	0.47 ± 2.15[b]
Sr	65	—	—	200 ± 2.16[b]
Ta	47	—	—	not reported
Ti	1300	—	—	not reported
U	34	—	—	2.5 ± 1.45[b]
V	31	—	—	70 ± 1.95[b]
W	49	—	—	not reported
Zn	330	54	12	78
Zr	21	—	—	160 ± 1.77[b]

[a]Only results over 10 µg/g are reported.

[b]Geometric mean ± geometric standard deviation (Shacklette and Boerngen 1984).

18.6. Utility Tunnels

18.6.1 Site Description

Several of the SWMUs associated with the plutonium-processing complex (Buildings TA-21-2, TA-21-3, TA-21-4, TA-21-5, and TA-21-150) originate from the acid-liquid waste system that served the complex. The acid waste system begins in the utility tunnels that encircled the original foundations of those buildings. Releases of contaminants into the subsurface from within the utility tunnels have not been documented, but are suspected. This section describes potential SWMUs that must be evaluated during the decontamination and decommissioning of the several buildings.

18.6.1.1. Site History

Utility Tunnels. TA-21-2, -3, -4, and -5 were constructed with utility tunnels that circled the perimeter of each building (Fig. 18.6-1). These utility tunnels contain the water, vacuum, chilled cooling water, air, steam, acid waste, acid supply, and caustic lines servicing each building. These service lines are connected to the interior of the building by pipe troughs, which pass through all the major rooms.

The utility tunnels are 4-ft wide by 4-ft deep with dirt floors (LASL 1945a). Typically, there are six entrances to a building's utility tunnels: access airways at the north and south ends and two access manholes on both the east and west sides.

The pipe troughs that connect the utility tunnels to the interior of the building are 1-ft 3-in. wide, 6-in. deep at the west end, and approximately 1.5-ft deep at the east end. They are constructed of reinforced concrete as part of each building's foundation.

Between 1979 and 1981, the plutonium-processing facilities at DP West were decontaminated. This project covered Rooms 308 and 312 in TA-21-3, Rooms 401 East, 401-A, 401-B, 401-C, 403, 404, 406, and 407 in TA-21-4, and all of TA-21-2 and -5. As part of the project, the pipe troughs in the floors of these areas were cleaned until no removable radioactive contamination was detected. They were then painted and filled-in with concrete. Fixed contamination remaining in the pipe troughs after decontamination ranged from 2 x 104 dpm/100 cm^2 to 1 x 106 dpm/100 cm^2 of alpha activity (LANL no date a, b, c, and d).

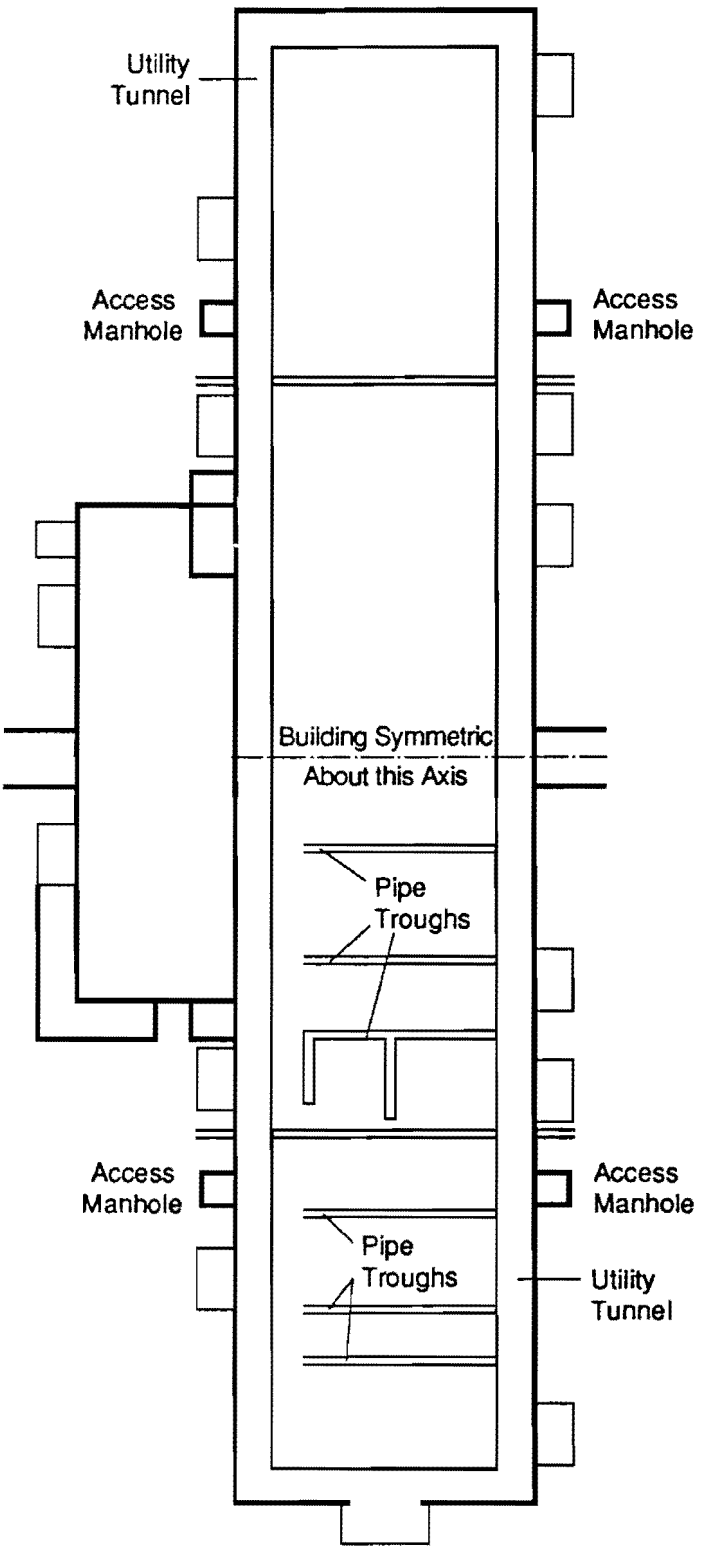


Fig. 18.6-1 Foundation plan for Building 3. (LASL 1945c)

In addition to pipe troughs, the perimeter utility tunnels around TA-21-2, -5, and the north end of TA-21-4 were partially decontaminated by removing all process piping including acid waste and vacuum lines. During decontamination, it was found that the utility tunnels were generally contaminated with plutonium. Soil in the most highly contaminated areas, located under Room 501 in the northeast corner of TA-21-5 and between Rooms 218 and 213 in the southwest corner of TA-21-2, was removed. The remaining contamination in the utility tunnels was fixed by spraying the surfaces of the tunnels with water-based asphalt. The utility tunnel entrances were sealed off from the rooms (LANL no date a, b, c, and d).

Pits. Anecdotal information indicates the potential presence of pits created by acid leaks in the utility tunnels around Buildings TA-21-2 and TA-21-4. The pits may have been formed by the leaching action of acidic fluids, primarily hydrogen fluoride, from leaks in the acid lines. There is no information about the depth of any pits that may exist, and no remediation is known to have been performed. Pits have been rumored to exist at three locations. One each may be in the northeast and southeast portions of the TA-21-4 utility tunnel (Christensen 1986), and another was reported to be present in the utility tunnel in the southwest corner of TA-21-2 between Rooms 218 and 213 (Wenzel 1990). However, the TA-21-2 utility tunnel between Rooms 218 and 213 was decontaminated in 1980, and no evidence of a pit was found (Cox 1991).

Acid Supply Line. In addition to the perimeter utility tunnels and pipe troughs, there was an acid line running from the southwest side of TA-21-2 to equipment room 3A on the southwest side of TA-21-3. This 3/4-in. line of unspecified type carried nitric acid from TA-21-2 to the nitric acid tank located on the dock outside of Room 313. This line carried only pure nitric acid, but other lines carrying unspecified liquids are believed to have been present in the same trench (Cox 1991).

18.6.1.2. Existing Information

Utility Tunnels. Soil removed from the southwest corner of the TA-21-2 utility tunnel had an average plutonium contamination of 240 nCi/g with a high of 1650 nCi/g (LANL 1980a). Three additional soil samples taken after excavation had plutonium levels of 8.8, 524, and 75.7 nCi/g (LANL 1980b). Samples collected from throughout the TA-21-5 utility tunnel showed plutonium concentrations ranging from less than 1 nCi/g to 46 nCi/g. The highest values were from the area under Room 501 in the northeast corner of TA-21-5 (LASL 1979). Contamination was measured in pipe troughs prior to painting and filling with concrete. Readings ranged from 2 x 104 dpm/100 cm^2 to 1 x 106 dpm/100 cm^2 of gross alpha activity (LANL no date a, b, c, and d).

Pits. No information exists for contaminants present in potential pits.

Acid Supply Line. No quantitative information exists on potential contaminants from this line.

18.6.1.3. Source Term

Utility Tunnels were sampled during the D&D of TA-21-2 and -5. This sampling indicates general contamination from plutonium throughout the tunnels. It can be reasonably expected that the utility tunnels around TA-21-3 and -4 have similar levels of contamination. No information is available on chemical contaminants present in the utility tunnels. It is likely that various acids and caustics, as well as organic contaminants, are present due to leaks in the process piping that ran through the tunnels.

Pits. If pits do exist, they may have been created by acids used in plutonium separation processes. However, the specific origin of these acids is unknown.

Acid Supply Line. Nitrates resulting from nitric acid leaks in the line from TA-21-2 to TA-21-3 may be present. Additional radioactive and nonradioactive contaminants may be present from leaks in other lines potentially in the same trench.

18.6.2. Data Needs

Investigations will be performed in conjunction with the D&D program at TA-21. Removal and verification sampling may be conducted in lieu of characterization. As appropriate, the following characterization to address the specific data needs listed below can be performed:

- determination of the location of any pits in coordination with D&D efforts;
- determination of presence or absence of contamination beneath any pits, utility tunnels, and acid supply line;
- Level III data from soils beneath the utility tunnels and any identified pits;
- Level III data from the acid supply line trench; and
- determination of the lateral and vertical extent of any contamination identified using Level III/IV data.

18.7 Areas of Concern

18.7.1 Site Description

This section addresses areas of concern located either within, or immediately adjacent to, existing structures. The sites in this category are C-21-001; -006; and -027. Remaining areas of concern are addressed in Chapter 19 and in other chapters as detailed therein. With the exception of C-21-006, all available data on each of these sites are presented in Table 18.7-I. No additional data are available. Locations of these areas of concern are shown in Fig. 18.7-1.

Area of concern C-21-006 is an approximate 25-sq-ft site (Wenzel 1977) where ^{241}Am was routinely spilled from a transportable trailer. This site is adjacent to the west side of Building TA-21-2 and has subsequently been covered with asphalt (Wenzel 1977).

18.7.1.1 History

Area of concern C-21-006. From 1949 (or 1950) to 1979, tanker trailers were loaded on the north side of Room 218 at Building TA-21-2. Room 218 was located on the southwest corner of the building (Maraman 1987). On occasion, overflow from the tanker trailers was thought to have occurred south of Building 2 to the canyon (Walker 1979). Trailers were loaded by pulling a vacuum on the trailer tank. When the trailer was full, it was moved to Building TA-21-257, the waste treatment plant, where the contents were emptied and treated.

In 1977, a large area at TA-21 was contaminated with ^{241}Am when a transportable trailer leaked (Wenzel 1977). It is not clear how the leak occurred because procedures for filling and emptying trailers were in place. If the trailer was filled to the overflow mark, the overflow should have gone back into the plant or into the vacuum system and its traps (Maraman 1987).

18.7.1.2 Existing Information

At area of concern C-21-006, a survey performed at the time of the spill indicated that contamination existed up to $5x10^4$ counts per minute per 100 cm^2 (Wenzel 1977). The area of the main spill, which covered an area of approximately 25 sq ft, has subsequently been covered with asphalt. It is possible that the road between Buildings TA-21-2 and TA-21-257 was also contaminated. No other information exists regarding sampling or analyses at this site. This contamination is presumed to be ^{241}Am only, and no other contaminants are known to exist.

TABLE 18.7-I
AREAS OF CONCERN FOR COORDINATION WITH BUILDING DECONTAMINATION AND DECOMMISSIONING

SITE NO.	ASSOCIATED STRUCTURE	DESCRIPTION
C-21-001	TA-21-17	A hydrogen fluoride spill in a corridor of this building. (Task 10, Record 176.)
C-21-006	TA-21-2	Release of ^{241}Am from a leaking transport trailer. The contaminated area was covered with asphalt. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 182).
C-21-027	TA-21-143	A chilled water recirculator which is still active. (Task 10, Record 172).

Data source in parentheses is TA-21 Release Site Data Base, EES-15, September 1989.

18.7.1.3 Source Term

The spills were contaminated with ^{241}Am. No other contaminants are known to exist.

18.7.2 Data Needs

Because existing information on these areas of concern is minimal and associated spills are clearly bounded by acid waste sump field investigations detailed in Sec. 18.8, these sites will not be investigated until D&D occurs at DP West. Additionally, in the case of C-21-001 and C-21-006, it is impossible to tie any contamination found now back to these past spills. However, in the general cleanup of DP West by D&D and the ER Program, any contamination remaining at these two sites will be removed. Removal and verification sampling may be conducted in lieu of characterization once structure TA-21-143 (area of concern C-21-027) is removed.

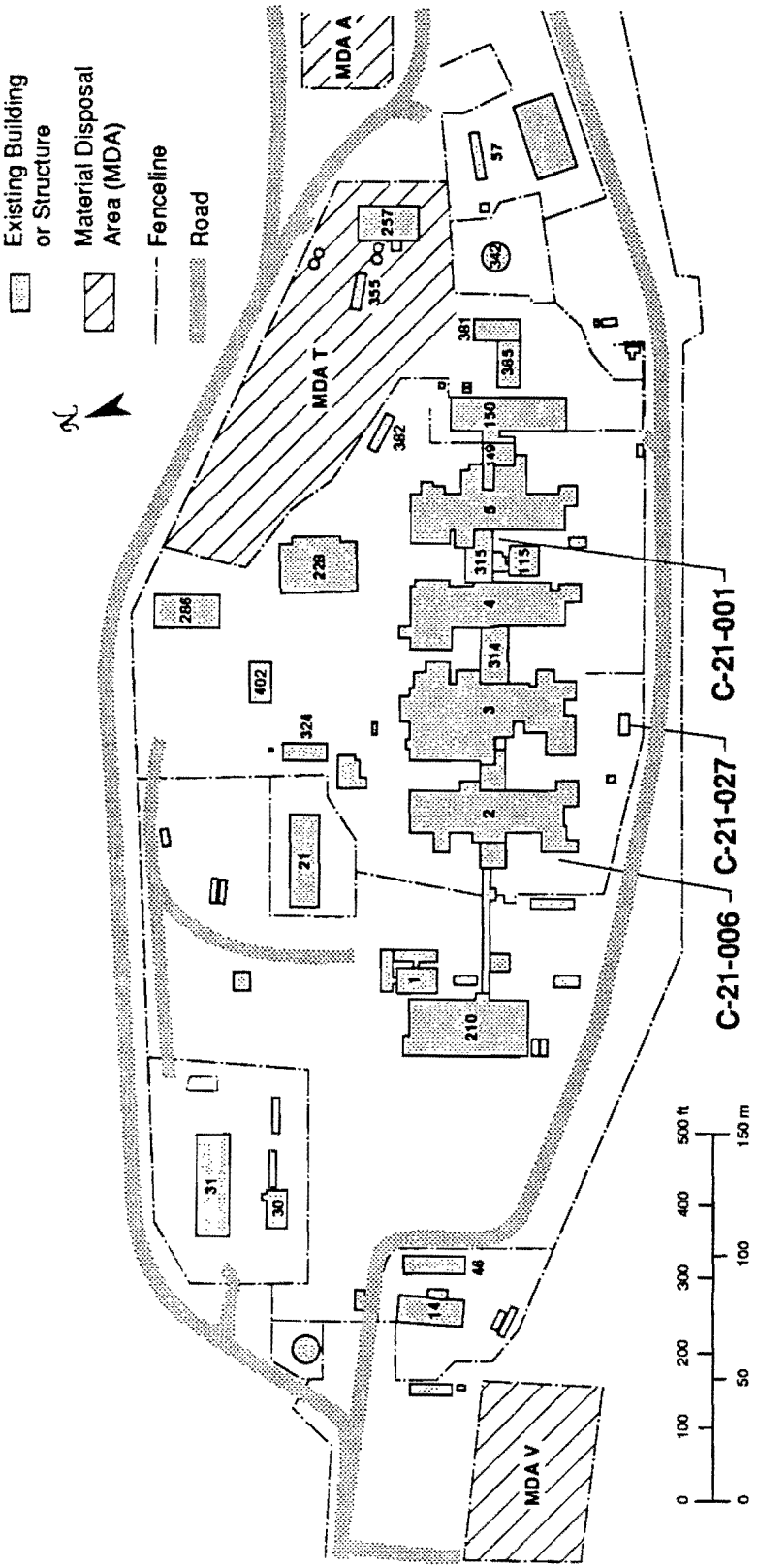


Fig. 18.7-1 Location of three areas of concern to be addressed in conjunction with building D&D.

18.8. Acid Waste Sumps

18.8.1 Site Description

Five underground liquid waste holding sumps (SWMUs 21-022(b)–(e), (g) were located along the north side of the plutonium-processing complex at TA-21 (Fig. 18.8-1). During removal of these sumps in 1979–1980, extensive contamination around and beneath the sumps was documented. Leakage of plutonium-bearing liquid wastes over the nearly 40–yr history of some of the sumps may have resulted in considerable migration of contaminants into the subsurface.

As part of the complex of buildings for which decontamination and decommissioning (D&D) is being planned, these sumps represent significant release sites for which characterization and remediation must be coordinated with the D&D program. Of all of the sites affected by the D&D program, these sumps have the major documented releases and are believed to have the greatest potential for significant liquid releases leading to movement of contaminants into the subsurface. Because of this, as well as the accessibility of the sump locations, it is proposed that limited site investigation be conducted to determine the depth of contaminant penetration beneath the sumps. Determining the depth of contamination beneath the sumps should bound the depth of contaminant releases throughout the complex of buildings to be decontaminated and decommissioned. Additionally, it should provide information allowing an assessment of the potential for significant migration prior to the implementation of D&D.

18.8.1.1. Site History

SWMUs 21-022(b)–(e) are brick sumps constructed to receive liquid wastes before disposal and to provide a point where samples could be collected. The sumps were located adjacent to the northeast corners of Buildings TA-21-2, -3, -4, and -5. They had structure numbers TA-21-82, TA-21-84, TA-21-87, and TA-21-89, respectively, and were constructed between June and July 1945 (Fig. 18.8-1). These sumps received all of the liquid waste discharges, including the floor drains, janitor sinks, and chilled water overflows from their associated buildings (Maraman and Christensen 1987).

Each sump was approximately 5 ft 5 in. in diameter and 10-ft deep (LASL no date). Construction drawings (Fig. 18.8-2) show a 2-ft diameter, 5-ft deep, steel catch basin within each sump. In 1963, plastic liners were placed inside and grouted to the walls of each sump.

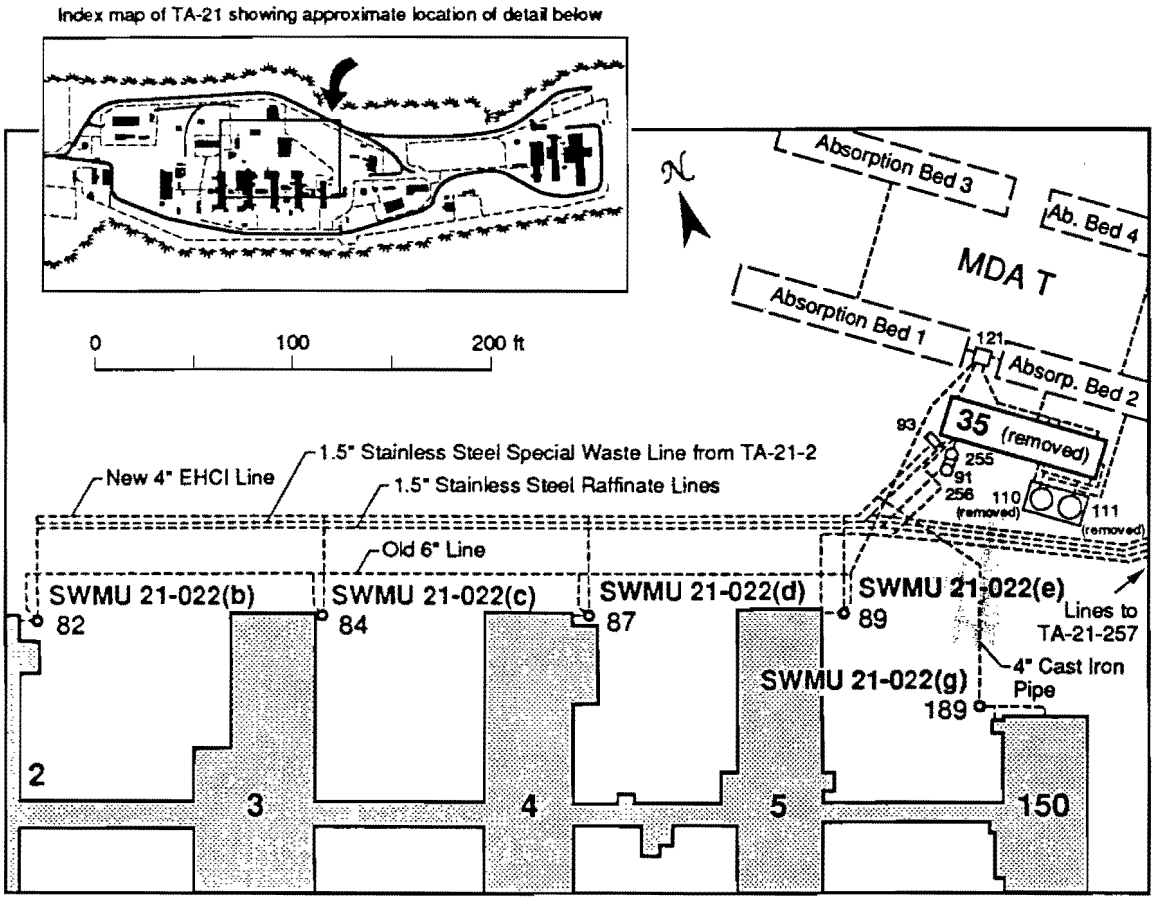


Fig. 18.8-1 Location of acid waste lines and sumps as they appeared in 1954 and 1962 on the north end of Buildings 2, 3, 4, 5, and 150. (LASL 1961, 1976b)

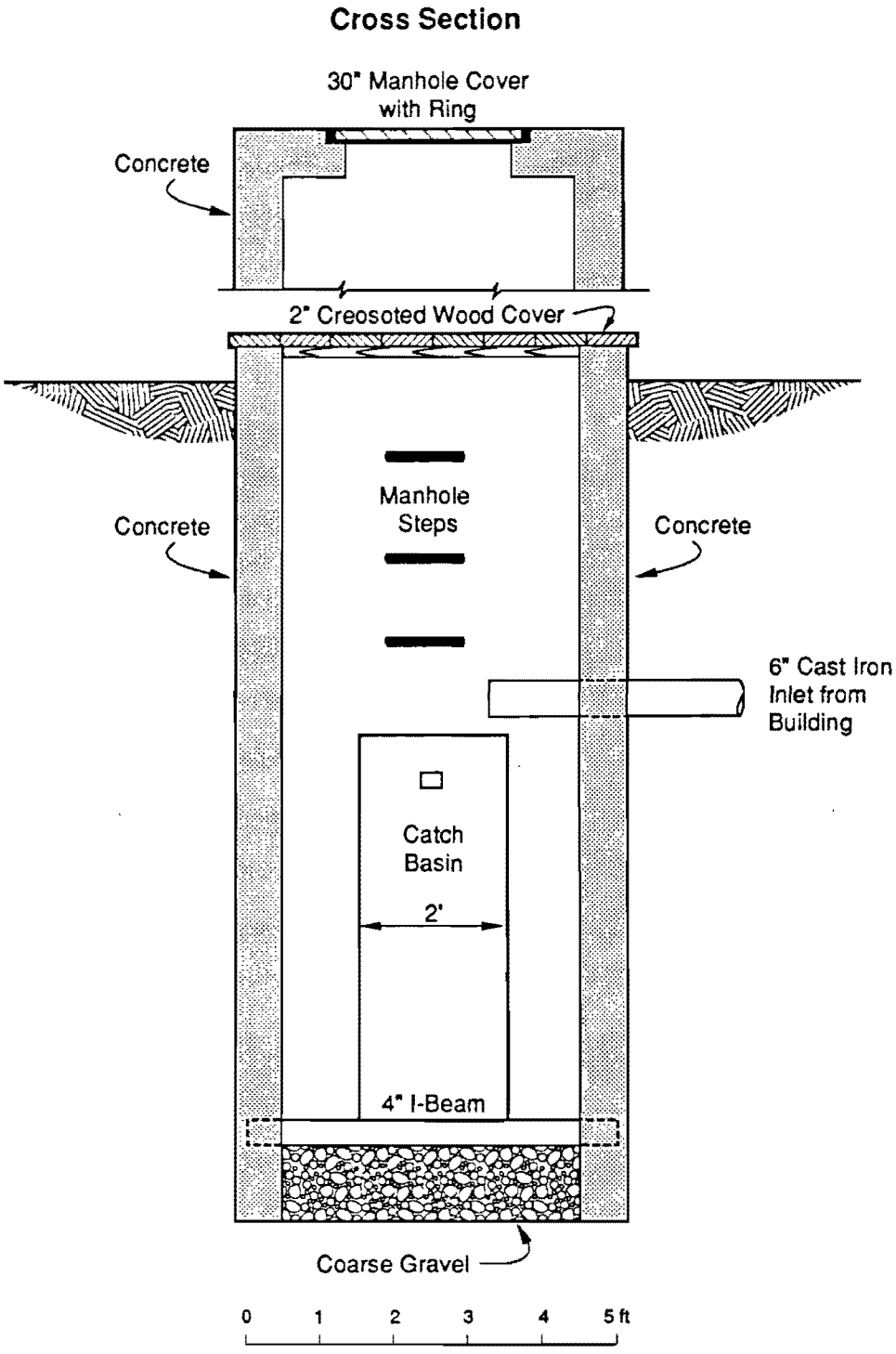


Fig. 18.8-2 Design of acid sumps TA-21-82, 84, 87, and 89. (LASL 1945e)

During 1979–80, these sumps and SWMU 21-022(g) (see below) were excavated and disposed of at MDA G (Garde et al. 1982). Following removal, the waste line entering each sump was reconnected to the line that had exited the sump, forming a direct connection. The brick construction of sump TA-21-82 [SWMU 21-022(b)] collapsed during removal; the other three remained intact when removed by crane, indicating that the brick was cemented together.

Contaminated soil was removed around the sumps until further excavation jeopardized the buildings. Additional soil was judged best to be removed at a later date when the buildings or waste lines were decommissioned (Garde et al. 1982). Excavation pit walls were sprayed with asphalt to alert future excavators, and the pits were backfilled with clean soil (Garde et al. 1982).

Two-inch-wide cracks were found in the tuff at the bottom of the excavation around TA-21-82. The cracks provide a path for liquids leaking from the sump to migrate downward into the tuff.

SWMU 21-022(g), sump TA-21-189, is located off of the northwest corner of TA-21-150, the plutonium fuel service building (Fig. 18.8-1). It was constructed in 1961–62 of concrete (LANL no date) and had dimensions of 4 ft by 4 ft by 11 ft 1 in. (LASL 1962). This sump was also removed in 1979 (Garde et al. 1982). The drain line that carried waste from TA-21-189 was a 4-in. diameter cast iron pipe. It connected to the 4-in. waste line that connected the other four sumps to TA-21-35.

18.8.1.2. Existing Information

SWMUs 21-022(b)–(e) were excavated, and the radioactive contamination remaining on the walls and bottoms of the pits was monitored using a ZnS alpha scintillator (Ahlquist et al. 1977). The results were graphed in internal reports (LANL 1982a, b, c, d, e) and are reproduced here in Figs. 18.8-3 to 18.8-8.

All values in the figures are pCi/g gross alpha (Garde 1990). The depths of the excavations at all four sumps were approximately 15 ft; thus contamination at that depth may be assumed.

In addition, a sludge sample taken from a section of acid waste line that fed sumps TA-21-84 and 87 was analyzed by ICP-MS. The analyses on the sludge sample are described in Sec. 18.5.1.2. The analyses indicate above-background concentrations of arsenic, boron, cobalt, molybdenum, niobium, nickel, lead, antimony, uranium, and zinc.

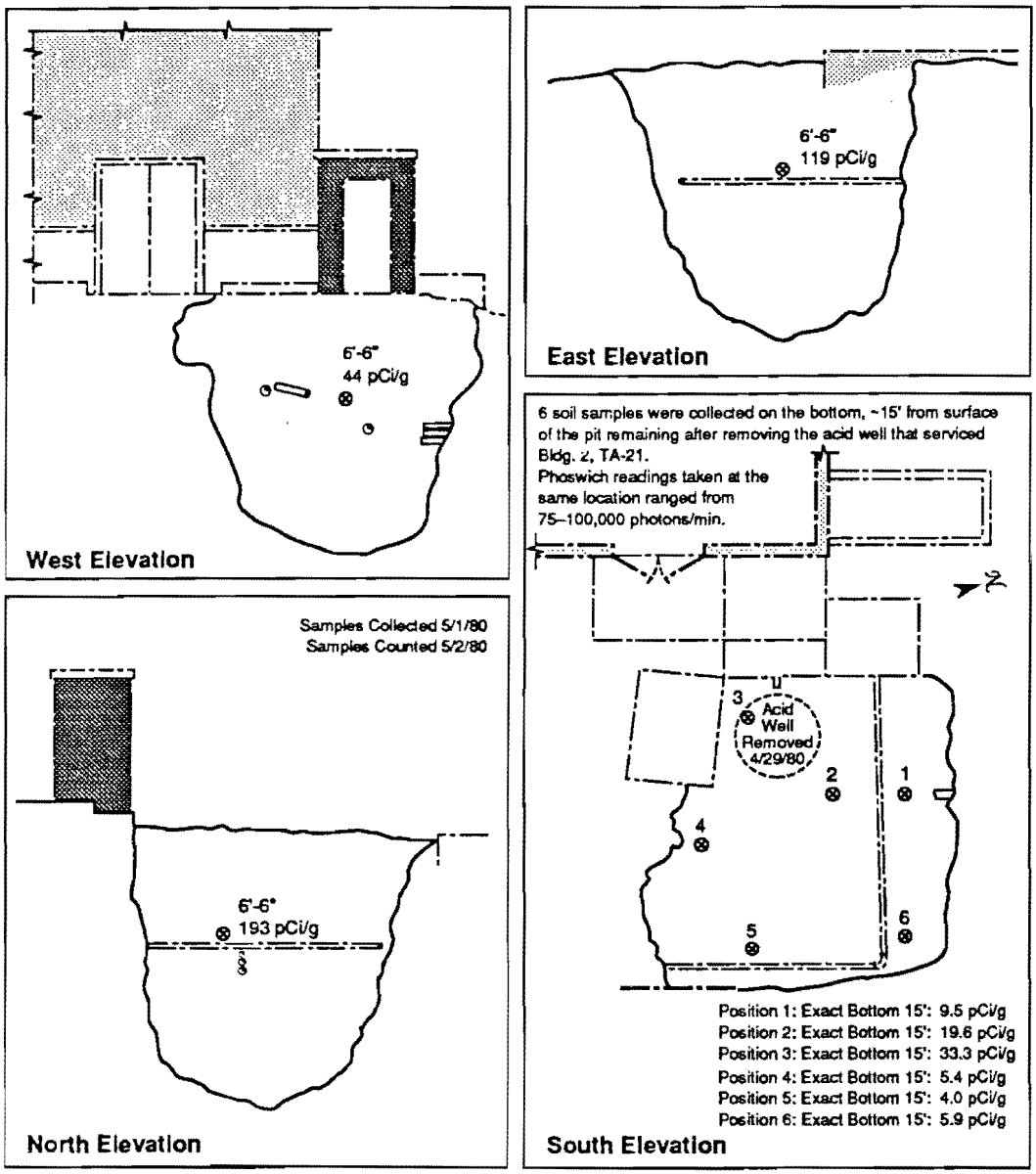


Fig. 18.8-3 Gross alpha contamination remaining after excavation of sump TA-21-82 [SWMU 21-022(b)]. (LANL 1982b)

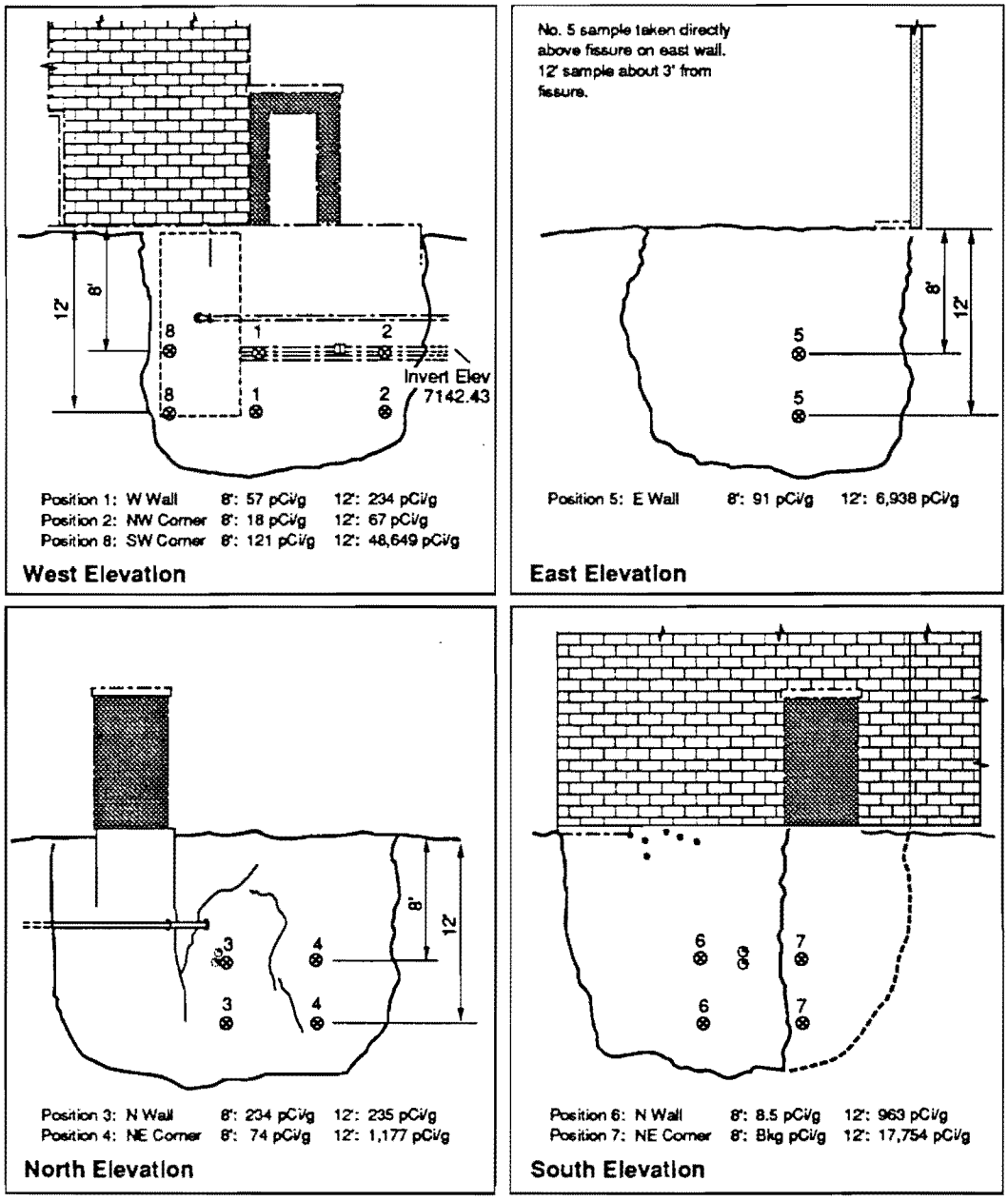


Fig. 18.8-4 Gross alpha contamination remaining after excavation of sump TA-21-84 [SWMU 21-022(c)]. (LANL 1982c)

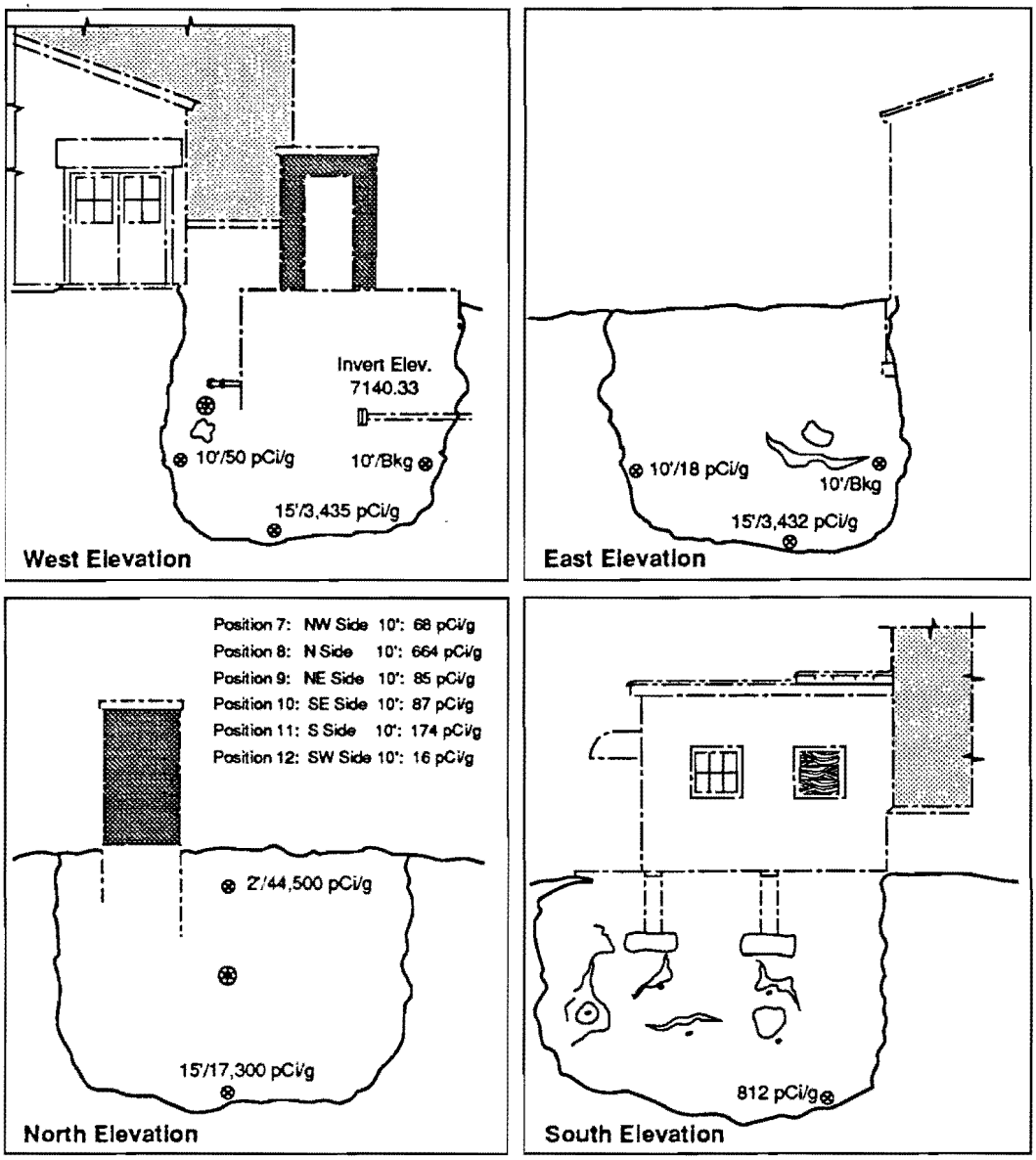


Fig. 18.8-5 Gross alpha contamination remaining after excavation of sump TA-21-87 [SWMU 21-022(d)]. (LANL 1982d)

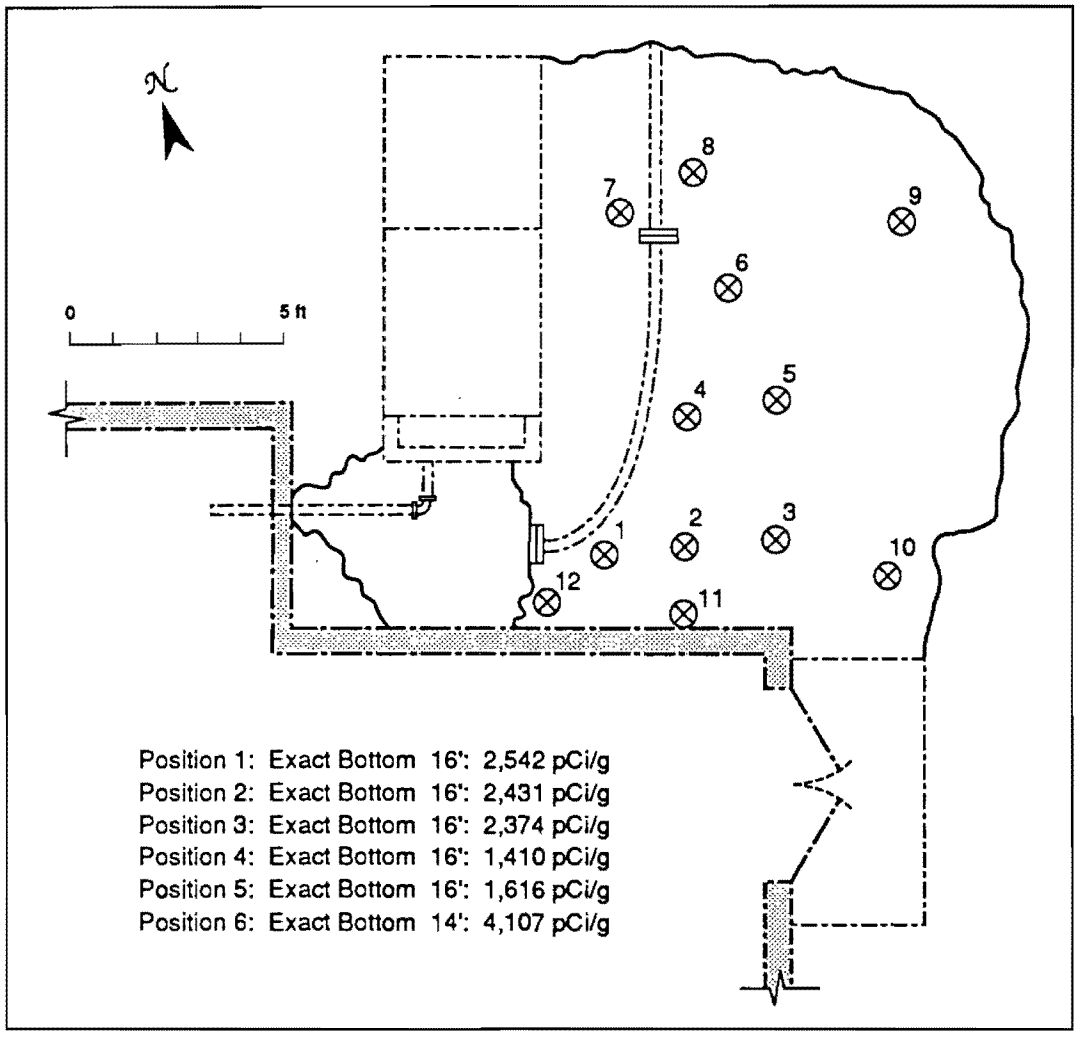


Fig. 18.8-6 Gross alpha contamination remaining on bottom after excavation of sump TA-21-87 [SWMU 21-022(d)]. (LANL 1982d)

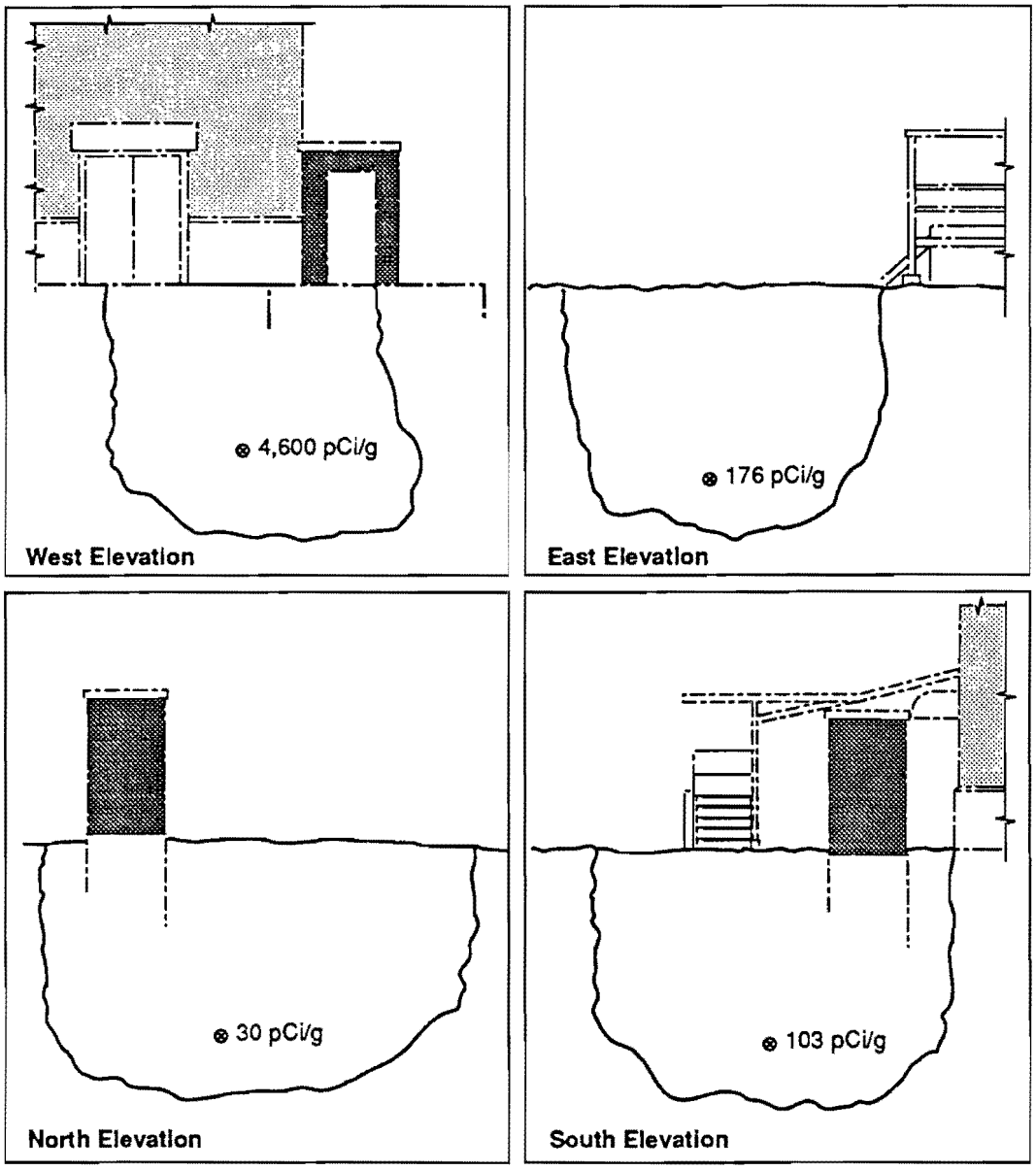


Fig. 18.8-7 Gross alpha contamination remaining after excavation of sump TA-21-89 [SWMU 21-022(e)]. (LANL 1982e)

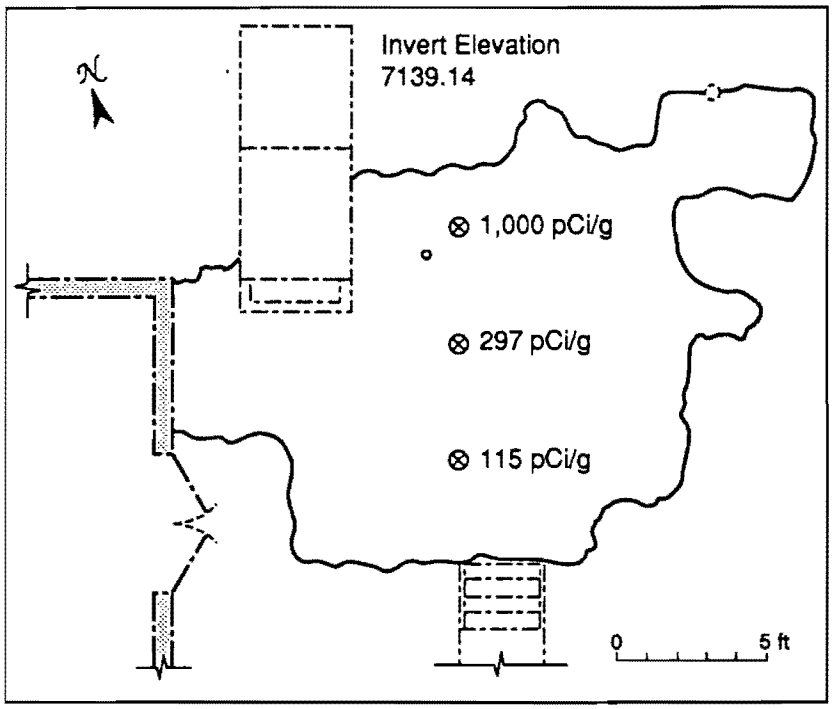


Fig. 18.8-8 Gross alpha contamination remaining on bottom after excavation of sump TA-21-89 [SWMU 21-022(e)]. (LANL no date e)

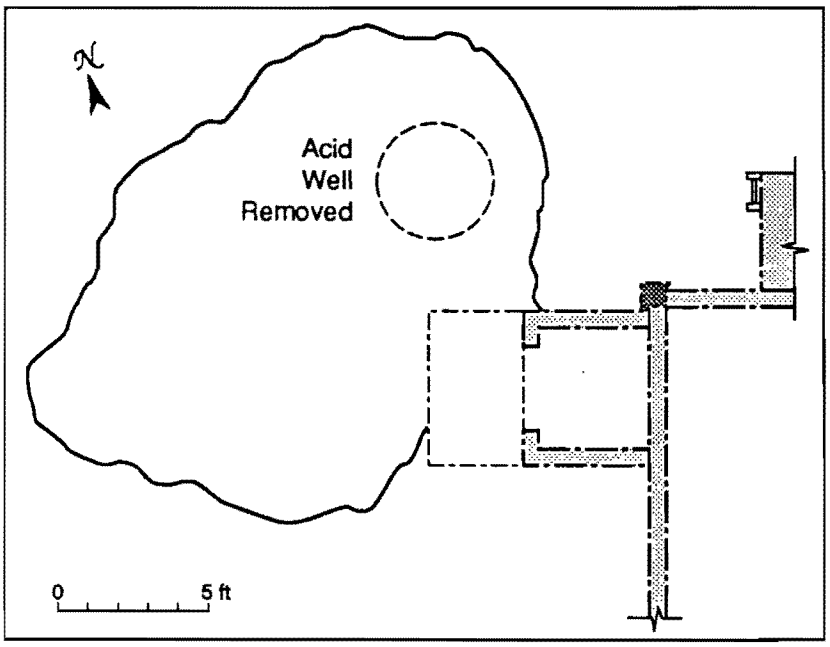


Fig. 18.8-9 Gross alpha contamination remaining after excavation of sump TA-21-189 [SWMU 21-022(g)]. All samples were less than 25 pCi/g. (LANL 1982a)

SWMU 21-022(g) was excavated and surveyed for gross alpha contamination in the same manner as SWMU 21-022(b)–(e) above. All soil samples taken from the pit walls and the bottom of the pit contained less than 25 pCi/g gross alpha (Fig. 18.8-9).

18.8.1.3. Source Term

SWMUs 21-022(b)–(e) are likely to be contaminated with nitrates, chlorides, and fluorides as a result of nitric, hydrochloric, and hydrofluoric acids discharged to the sumps from the plutonium separation operations. Surveys at the time of excavation showed gross alpha contamination in the soil around each sump, possibly from plutonium. In addition, previous sampling of drain line sludge indicates arsenic, boron, cobalt, molybdenum, niobium, nickel, lead, antimony, uranium, and zinc are present. No estimate of the volume of liquid waste leakage is possible.

SWMU 21-022(g). Sampling performed after the removal of this sump indicated levels of gross alpha radiation in the excavated pit were below the detection limit of the screening instrument (25 pCi/g). However, analysis for other contaminants was not performed. Therefore, it is possible that the other contaminants listed for SWMU 21-022(b)–(e) are also present at TA-21-189. No estimate of the volume of liquid waste leakage is possible.

18.8.2. Objectives and Data Needs

The objective of the investigations at the acid waste sumps is to determine the depth to which contaminants released from the sumps have migrated into the subsurface. By meeting this objective, the probable maximum extent of contaminant migration due to releases from operations in the plutonium-processing complex will be determined. This includes releases from SWMUs 21-006, 21-023, and 21-028 discussed previously in this chapter. The primary data needs are as follows:

- subsurface samples from boreholes placed through the former locations of the five sumps with
  - Level II/III field data laboratory data to guide the drilling and selection of samples for subsequent Level III/IV analysis; and
  - Level III/IV data for a selected subset of the borehole samples to identify contaminant species and to determine the depth to which contaminants have penetrated.

18.8.3 Sampling/Investigation Rationale

A single borehole will be drilled through the former location of each sump. Because these sumps leaked large amounts of liquid waste, they present the greatest potential for contamination at depth of any SWMU discussed in this chapter. These boreholes will determine the depth of contaminated tuff and will bound the probable maximum depth of releases from the plutonium-processing complex.

The nominal depths selected for the initial investigations will be sufficiently deep to allow an assessment of the importance of horizontal fractures in the tuff as a lateral transport pathway for contaminants at depth. Field screening of samples will pay particular attention to tuff fractures in the cores. The absence of detectable contaminants in field laboratory analyses will be used to guide the decision to terminate the drilling of each hole. If contaminants continue to be detected, the drilling will continue deeper than the nominal depth to document the nature and depth of the contaminant penetration.

No additional boreholes will be placed laterally away from the boreholes through the former sump areas due to the large number of underground utility lines to the north of this area. Thus lateral extent of any contaminant plumes cannot be addressed until the D&D process has resulted in the removal of the obstructions.

In addition to guiding the depth of borehole sampling, results of field laboratory analyses will aid in selecting samples to be submitted to an analytical laboratory. For this investigation, identification of the depth of contaminant penetration is critical; thus the selection of samples for laboratory analyses will focus first on those close to the detection limits of the field laboratory techniques and the deeper samples in the boreholes. A secondary focus will be to identify all contaminant species potentially of interest. For this purpose, the most contaminated samples identified in the field laboratory or the samples directly beneath the sump excavation should be used. It is not expected that samples from within the backfilled sump excavation will be submitted to an analytical laboratory.

It is assumed that 50% of the total number of samples collected will be submitted to the analytical laboratory. The selection of samples will be biased as noted above. If no data from the field laboratory allow biased selection of the samples, then sample selection should concentrate on the depth intervals immediately below the back-filled sump excavations, with widely spaced samples selected at random from deeper in the boreholes. Given the availability of supporting Level II/III data from the field laboratory, it is expected that the investigation goals can easily be

achieved with a 50% submission to an analytical laboratory for Level III/IV data. Those higher level analyses will be focused on contaminant identification and on defining the depth of contaminant penetration.

18.8.4 Sampling Plan

The sump locations will be determined by surveying prior to drilling. All boreholes will be drilled according to the method in Sec. 11.5.3.2, Vertical Split Barrel Core Samples. Table 18.8-I identifies the screening and analyses to be performed on each of the samples.

18.8.4.1 Initial Investigations

SWMUs 21-022(b)–(e), (g) will be sampled by drilling a borehole to a nominal depth of 80 ft through the former sump locations (Fig. 18.8-1). For the five boreholes, this will result in the collection of a total of 80 samples (5-ft core interval).

The exact location of the reconnected drain lines within each backfilled sump excavation should be determined prior to drilling. The initial samples from these boreholes are expected to be uncontaminated because the excavations to remove the sumps were backfilled with clean material. These should not be selected for submission to the analytical laboratory. Careful attention will be given to identifying asphalt in the cores of the boreholes because asphalt will mark the boundary between the clean backfill material and unexcavated soil.

Because contaminant releases have been documented, it is reasonable to allow a contingency for drilling the boreholes to deeper depths if contaminated soils persist. For planning purposes, it is assumed that an additional 40 ft of core sampling may be needed for two of the five boreholes. This contingency adds 16 additional samples. These samples are indicated in Table 18.8-1 as 40 ft additions to two of the boreholes; but in the field, the contingency may be applied as needed to one or several of the holes.

18.8.4.2 Subsequent Investigations.

No subsequent investigations are envisioned prior to the D&D of the buildings and waste lines. At that time, the D&D Program will remove all structures, chase all waste and utility lines, and remove associated contamination. The ER Program will integrate SWMU investigations with D&D Program cleanup efforts and will assess the need for additional remediation on the basis of any residual contamination remaining following D&D.

Table 18.8-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(B)-(E) AND (G), ACID WASTE SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium	
21-022(b)																																			
Vertical Borehole	1	0.0 - 5.0 ft					X	X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		5.0 - 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		10.0 - 15.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		15.0 - 20.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		20.0 - 25.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		25.0 - 30.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		30.0 - 35.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		35.0 - 40.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		40.0 - 45.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
Field Duplicate		45.0 - 50.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		50.0 - 55.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
Rinsate Blank																						E	E	E	E	X	E	E	E	E	E		E	
Field Blank		55.0 - 60.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
		60.0 - 65.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
		75.0 - 80.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E	X	E	E	E	E	E		E	
Trip Blank																										X								
21-022(c)																																		
Vertical Borehole	2	0.0 - 5.0 ft					X	X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		5.0 - 10.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	
		10.0 - 15.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E	E		E	

Field Surveys | Field Screening | Laboratory Measurements | Field | Laboratory Analysis

Table 18.8-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(B)-(E) AND (G), ACID WASTE SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium	
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X																
		20.0 – 25.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X																
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X																
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X																
		50.0 – 55.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
Rinsate Blank																						X	X	X	X		X	X	X	X			X	
Field Blank																												X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X	X	X	X	X																
		60.0 – 65.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X																
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		75.0 – 80.0 ft						X	X		X	X	X	X	X	X	X																
Trip Blank																											X						
21-022(d)																																	
Vertical Borehole	3	0.0 – 5.0 ft					X	X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X																
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X																
		20.0 – 25.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X																
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X																

Table 18.8-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(B)-(E) AND (G), ACID WASTE SUMPS.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture	Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium
		40.0 - 45.0 ft																	E	E	E	E		E					E
		45.0 - 50.0 ft																	E	E	E	E		E					E
		50.0 - 55.0 ft																	E	E	E	E		E					E
		55.0 - 60.0 ft																	E	E	E	E		E					E
		60.0 - 65.0 ft																	E	E	E	E		E					E
		65.0 - 70.0 ft																	E	E	E	E		E					E
		70.0 - 75.0 ft																	E	E	E	E		E					E
		75.0 - 80.0 ft																	E	E	E	E		E					E
Trip Blank																									X				
21-022(e)																													
Vertical Borehole	4	0.0 - 5.0 ft					X	X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		5.0 - 10.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		10.0 - 15.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		15.0 - 20.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		20.0 - 25.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		25.0 - 30.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		30.0 - 35.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		35.0 - 40.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		40.0 - 45.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		45.0 - 50.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		50.0 - 55.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		55.0 - 60.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
Field Blank																													
Rinsate Blank																			X	X	X	X		X	X	X	X		X
Field Duplicate		75.0 - 80.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		70.0 - 75.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		65.0 - 70.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		60.0 - 65.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
Field Blank																													
Rinsate Blank																			X	X	X	X		X	X	X	X		X
Field Duplicate		55.0 - 60.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		50.0 - 55.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		45.0 - 50.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E
		40.0 - 45.0 ft						X	X	X	X	X	X	X	X	X	X		E	E	E	E		E	E	E	E		E

Table 18.8-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(B)-(E) AND (G), ACID WASTE SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture	Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X													
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
Rinsate Blank																			X	X	X	X		X	X	X	X		X	
Field Blank																									X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X	X	X	X														
		80.0 - 85.0 ft						C	C		C	C	C	C	C	C			C	C	C	C		C	C	C	C		C	
		85.0 - 90.0 ft						C	C		C	C	C	C	C	C														
		90.0 - 95.0 ft						C	C		C	C	C	C	C	C			C	C	C	C		C	C	C	C		C	
		95.0 - 100.0 ft						C	C		C	C	C	C	C	C														
		100.0 - 105.0 ft						C	C		C	C	C	C	C	C			C	C	C	C		C	C	C	C		C	
		105.0 - 110.0 ft						C	C		C	C	C	C	C	C														
		110.0 - 115.0 ft						C	C		C	C	C	C	C	C			C	C	C	C		C	C	C	C		C	
		115.0 - 120.0 ft						C	C		C	C	C	C	C	C														
Trip Blank																									X				
21-022(g)																													
Vertical Borehole	5	0.0 - 5.0 ft					X	X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
		5.0 - 10.0 ft						X	X		X	X	X	X	X	X														
		10.0 - 15.0 ft						X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
		15.0 - 20.0 ft						X	X		X	X	X	X	X	X														
		20.0 - 25.0 ft						X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
		25.0 - 30.0 ft						X	X		X	X	X	X	X	X														
		30.0 - 35.0 ft						X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
		35.0 - 40.0 ft						X	X		X	X	X	X	X	X														
		40.0 - 45.0 ft						X	X		X	X	X	X	X	X			E	E	E	E		E	E	E	E		E	
		45.0 - 50.0 ft						X	X		X	X	X	X	X	X														
Rinsate Blank																			X	X	X	X		X	X	X	X		X	

Table 18.8-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(B)-(E) AND (G), ACID WASTE SUMPS.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening							Field Laboratory Measurements										Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB		Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium		Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)		PCB (SW 8080)		TCLP Metals		Isotopic Thorium		
Field Blank																														X	X	X									
		50.0 – 55.0 ft						X	X		X	X	X		X	X	X	X						E	E	E	E		E	E	E	E				E				
		55.0 – 60.0 ft						X	X		X	X	X		X	X	X	X																						
		60.0 – 65.0 ft						X	X		X	X	X		X	X	X	X						E	E	E	E		E	E	E	E				E				
		65.0 – 70.0 ft						X	X		X	X	X		X	X	X	X																						
		70.0 – 75.0 ft						X	X		X	X	X		X	X	X	X						E	E	E	E		E	E	E	E				E				
Field Duplicate																								E	E	E	E		E	E	E	E				E				
		75.0 – 80.0 ft						X	X		X	X	X		X	X	X	X																						
		80.0 – 85.0 ft						C	C		C	C	C		C	C	C	C						C	C	C	C		C	C	C	C				C				
		85.0 – 90.0 ft						C	C		C	C	C		C	C	C	C																						
		90.0 – 95.0 ft						C	C		C	C	C		C	C	C	C						C	C	C	C		C	C	C	C				C				
		95.0 – 100.0 ft						C	C		C	C	C		C	C	C	C																						
		100.0 – 105.0 ft						C	C		C	C	C		C	C	C	C						C	C	C	C		C	C	C	C				C				
		105.0 – 110.0 ft						C	C		C	C	C		C	C	C	C																						
		110.0 – 115.0 ft						C	C		C	C	C		C	C	C	C						C	C	C	C		C	C	C	C				C				
		115.0 – 120.0 ft						C	C		C	C	C		C	C	C	C																						
Rinsate Blank																								C	C	C	C		C	C	C	C				C				
Field Blank																														C	C	C									
Trip Blank																														X											

18.9. South Side of Plutonium-Processing Complex

18.9.1 Site Description

Three SWMUs (21-022(h)–(j)) are located along the south side of the plutonium-processing complex as indicated in Fig. 18.9-1. These SWMUs do not have the same potential for significant environmental releases as were documented for the five acid waste sumps described in Sec. 18.8. However, the known locations and accessibility of these SWMUs make them reasonable choices for investigations to address the potential for environmental releases on the south side of the plutonium-processing complex. As for the investigations addressed in Sec. 18.8, investigations at these SWMUs are to document and bound the extent of existing contamination prior to the time D&D can be implemented.

For SWMUs 21-022(h)–(j), deep contaminant releases are not expected as they were for the SWMUs discussed in Sec. 18.8. Therefore, the focus of the investigations will be on bounding the lateral extent of subsurface contamination on the south side of the plutonium-processing complex.

18.9.1.1. Site History

SWMU 21-022(h), sump TA-21-202 and its associated drain line, is located off the southeast corner of TA-21-150 (Fig. 18.9-1). This sump is an acid industrial waste manhole constructed in 1961–62 (LANL no date) from 36-in.-diameter, corrugated metal pipe. It received drainage from the basement floor drains and roof drains in building TA-21-150 (LASL 1961). The drain from the sump is 6 in. in diameter and discharges south into Los Alamos Canyon as NPDES outfall EPA 03A032 (see Sec. 15.4). This outfall reportedly drains cooling water overflow from TA-21-150 (EPA 1987).

SWMU 21-022(I) is a sump pump located in the equipment room at the southeast corner of TA-21-2 (LANL 1990; LASL 1945, 1966) (Fig. 18.9-2). This room housed air compressors and evaporative coolers, and no contamination is expected (Walker 1979). The bottom of the sump is estimated to be 14 ft below ground level (LASL 1945b) and may have a capacity of 1000 gal. per hour (LASL 1945d). It is not clear where effluent from this sump was pumped to, and no drain lines south of the equipment room have been identified.

SWMU 21-022(j) is described as a sump pump in the south end of Building TA-21-3 (LANL 1990). It is believed this refers to equipment room 3 on the southeast corner of TA-21-3. This

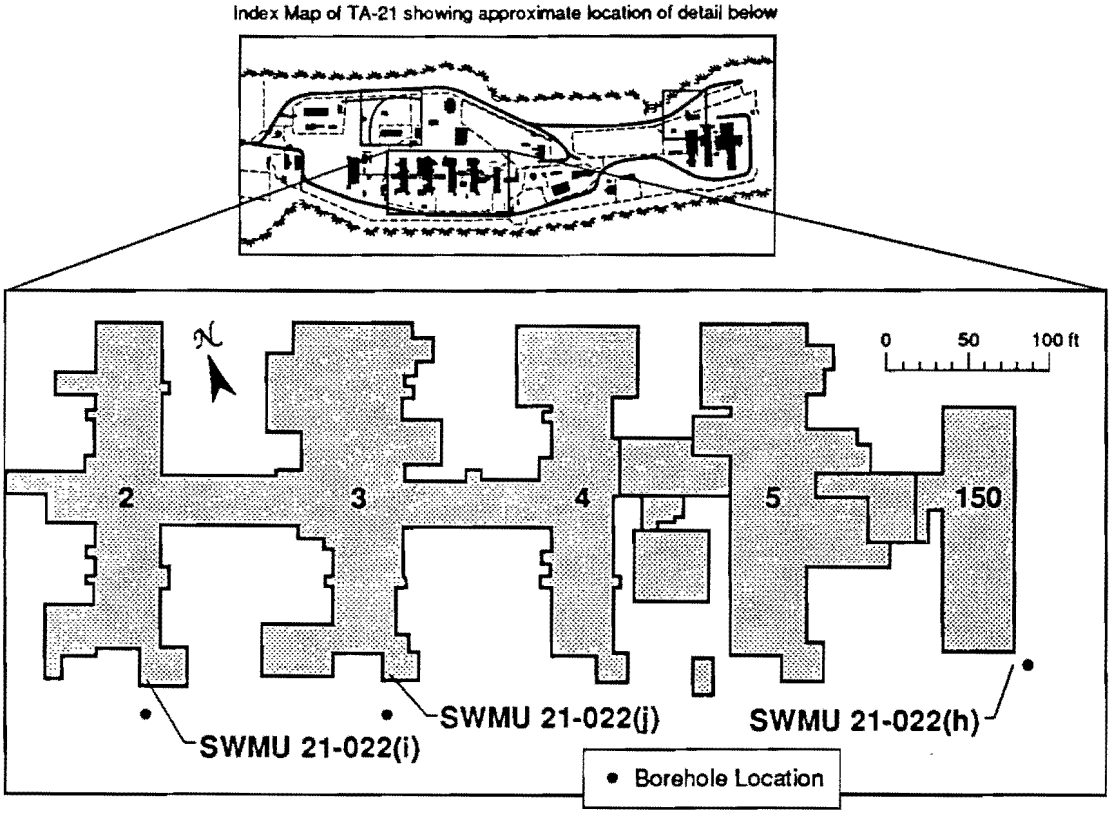


Fig. 18.9-1 Location of boreholes and SWMUs 21-022(h)–(j).

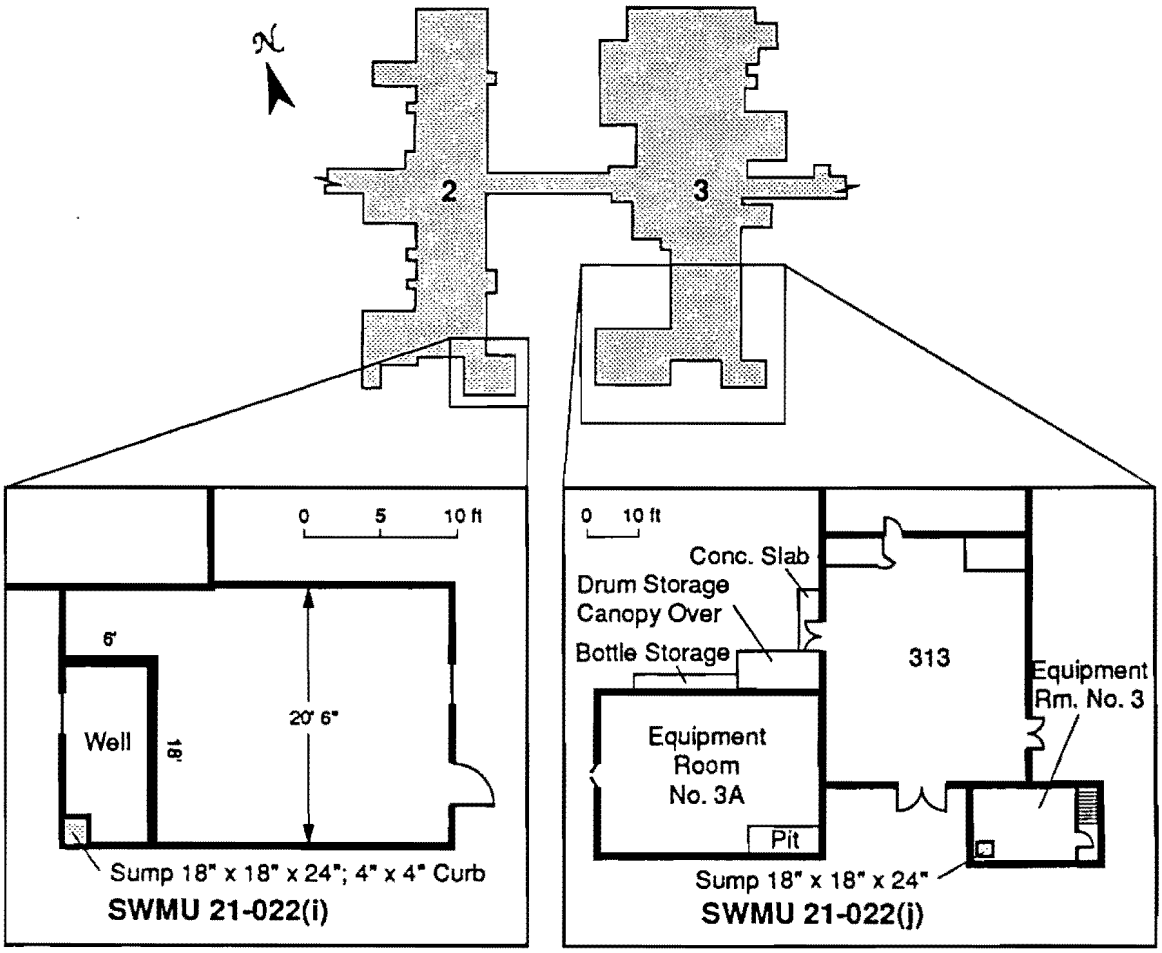


Fig. 18.9-2 Location of SWMU 21-022(i) on the south end of Building 2, and SWMU 21-022(j) on the south end of Building 3. (LASL 1945b, d; 1966)

room is similar to the sump in the equipment room on the southeast side of TA-21-2 discussed above. Fig. 18.9-3 shows the sump location and its dimensions. It is estimated that the bottom of the sump is 8 ft below ground level (LASL 1945d). No drain lines have been identified.

There also is an equipment room 3A on the southwest corner of TA-21-3. This room contains a trench that could be misidentified as a sump (Fig. 18.9-2). The trench is drained by two 3-in. lines that join a 4-in. line and discharge to a storm drain on the southwest corner of the building. This storm drain is the upper end of SWMU 21-027(a) described in Sec. 15.5, and equipment room 3A should be considered part of that SWMU.

18.9.1.2. Existing Information

SWMU 21-022(h)–(j). No sample analysis results or other quantitative information are available regarding the presence of contaminants in any of these SWMUs.

18.9.1.3. Source Term

SWMU 21-022(h)–(j). No information is available regarding whether any of these units contain radioactive or hazardous constituents. Likely contaminants are plutonium, uranium, mercury, lead, organics, and various acids that were associated with the plutonium purification process at TA-21.

18.9.2. Objectives and Data Needs

The objective of this investigation is to determine if contaminants have entered the environment from SWMUs 21-022(h)–(j) and from other SWMUs along the southern side of the plutonium-processing complex. By meeting this objective, the lateral extent of potential contamination from the plutonium-processing complex will be bounded. The area investigated may include contaminants released from SWMUs 21-006, 21-023, and 21-028 discussed previously in this chapter. The primary data needs are

- subsurface soil samples from boreholes along the southern side of the plutonium-processing complex with
    - Level II/III field laboratory data to guide the drilling and selection of samples for subsequent Level III/IV analyses; and
    - Level III/IV data for a selected subset of the borehole samples to identify contaminant species or to confirm the absence of contaminants.

18.9.3. Sampling/Investigation Rationale

Boreholes will be drilled along the south ends of Buildings TA-21-2, -3, and -150 to determine potential contamination from SWMUs 21-022(h)–(j).

Boreholes will be located close to the buildings and will be drilled sufficiently deep (50 ft) to document the absence of deep contaminant plumes. The absence of detectable contaminants in field laboratory analyses will be used to guide the decision to terminate the drilling of each hole. If contaminants are detected at depth, drilling will continue to document the nature and depth of the identified contaminant plume.

It is expected that any contaminants that may be detected on the south side of the complex will be at fairly shallow depths (less than 20 ft). If this is borne out by the initial sampling results, no additional investigations to bound the extent of contamination prior to D&D will be needed.

Field laboratory analysis of samples will be used to guide the depth of borehole sampling and to aid in the selection of samples to be submitted to an analytical laboratory. For this investigation, the identification of the presence of contaminants is critical; thus the selection of samples for laboratory analysis will focus first on those in which contaminants were detected in the field laboratory. A secondary focus will be to confirm the absence of contaminants in samples in which no contaminants were identified in the field laboratory. This secondary focus will be more intensive for any samples that might be construed to be close to the edge of a contaminant plume and less intensive for samples further away from any detected plume.

It is assumed that 50% of the total number of samples collected will be submitted to the analytical laboratory. The selection of samples will be biased as noted above. If no information is found in the field laboratory to allow biased selection of the samples, then a nonbiased selection of 50% of the collected samples will be submitted. Given the purpose of the investigation and the supporting Level II/III information from the field laboratory analyses, a 50% submission to the analytical laboratory for Level III/IV data to identify specific contaminant species or to confirm the absence of contaminants is appropriate.

18.9.4. Sampling Plan

18.9.4.1. Initial Investigation

The sump locations will be determined by surveying prior to drilling. All boreholes will be drilled according to the method in Sec. 11.5.3.2, Vertical Split Barrel Core Samples. Table 18.9-I identifies the samples and analyses for the initial investigations.

SWMU 21-022(h). The sampling for contaminants released to the soil from TA-21-202 will be performed by drilling a borehole approximately 2 ft east of the wall of the sump (Fig. 18.9-1). The borehole will be drilled to a nominal depth of 50 ft, resulting in the collection of 10 samples (5-ft core interval). (Note: the outfall from this sump also will be sampled as part of the outfalls sampling effort, Sec. 15.4.)

SWMUs 21-022(i) and (j) will be sampled by drilling a borehole 20 ft south of the sumps in their respective equipment rooms (Fig. 18.9-1). The boreholes will be drilled to a nominal depth of 50 ft, resulting in the collection of a total of 20 samples (5-ft core interval).

Because the potential exists that deep contamination may be found in the vicinity of the plutonium complex, it is appropriate to allow a contingency for drilling two of the three boreholes planned above deeper than the specified nominal depth. These contingency samples are shown in Table 18.9-I as 20-ft additions to two of the boreholes. In the field, the contingency may be applied as needed to one or several of the holes.

18.9.4.2. Subsequent Investigations

No subsequent investigations are envisioned prior to the D&D of the buildings and waste lines. At that time, the D&D Program will remove all structures, chase all waste and utility lines, and remove associated contamination. The ER Program will integrate SWMU investigations with D&D Program cleanup efforts and will assess the need for additional remediation on the basis of any residual contamination remaining following D&D.

Table 18.9-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(H) - (J), SOUTH SIDE OF PLUTONIUM-PROCESSING COMPLEX.

				Field Surveys					Field Screening						Field Laboratory Measurements												Laboratory Analysis														
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium						
21-022(h)																																								
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		5.0 - 10.0 ft						X	X		X	X	X		X	X	X	X																						
		10.0 - 15.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		15.0 - 20.0 ft						X	X		X	X	X		X	X	X	X																						
		20.0 - 25.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		25.0 - 30.0 ft						X	X		X	X	X		X	X	X	X																						
		30.0 - 35.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		35.0 - 40.0 ft						X	X		X	X	X		X	X	X	X																						
		40.0 - 45.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
Field Duplicate																							E	E	E	E		E	E	E	E			E						
		45.0 - 50.0 ft						X	X		X	X	X		X	X	X	X																						
		50.0 - 55.0 ft						C	C		C	C	C		C	C	C	C					C	C	C	C		C	C	C	C			C						
Rinsate Blank																							X	X	X	X		X	X	X	X			X						
Field Blank																													X	X	X									
		55.0 - 60.0 ft						C	C		C	C	C		C	C	C	C																						
		60.0 - 65.0 ft						C	C		C	C	C		C	C	C	C					C	C	C	C		C	C	C	C			C						
		65.0 - 70.0 ft						C	C		C	C	C		C	C	C	C																						
Trip Blank																													X										
21-022(i and j)																																								
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		5.0 - 10.0 ft						X	X		X	X	X		X	X	X	X																						
		10.0 - 15.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						
		15.0 - 20.0 ft						X	X		X	X	X		X	X	X	X																						
		20.0 - 25.0 ft						X	X		X	X	X		X	X	X	X					E	E	E	E		E	E	E	E			E						

Table 18.9-I

SCREENING AND ANALYSIS FOR INITIAL INVESTIGATIONS AT SWMU 21-022(H) - (J), SOUTH SIDE OF PLUTONIUM-PROCESSING COMPLEX.

				Field Surveys				Field Screening					Field Laboratory Measurements								Laboratory Analysis											
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	Isotopic Thorium	
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X															
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X																
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X																
		50.0 – 55.0 ft						C	C		C	C	C	C	C	C	C					C	C	C	C		C	C	C	C			C	
Rinsate Blank																						X	X	X	X		X	X	X	X			X	
Field Blank																												X	X	X				
		55.0 – 60.0 ft						C	C		C	C	C	C	C	C	C																
		60.0 – 65.0 ft						C	C		C	C	C	C	C	C	C					C	C	C	C		C	C	C	C			C	
		65.0 – 70.0 ft						C	C		C	C	C	C	C	C	C																
Trip Blank																												X						
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		5.0 – 10.0 ft						X	X		X	X	X	X	X	X	X																
		10.0 – 15.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		15.0 – 20.0 ft						X	X		X	X	X	X	X	X	X																
		20.0 – 25.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		25.0 – 30.0 ft						X	X		X	X	X	X	X	X	X																
		30.0 – 35.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		35.0 – 40.0 ft						X	X		X	X	X	X	X	X	X																
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X					E	E	E	E		E	E	E	E			E	
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X																
Rinsate Blank																						X	X	X	X		X	X	X	X			X	
Field Blank																												X	X	X				
Trip Blank																												X						

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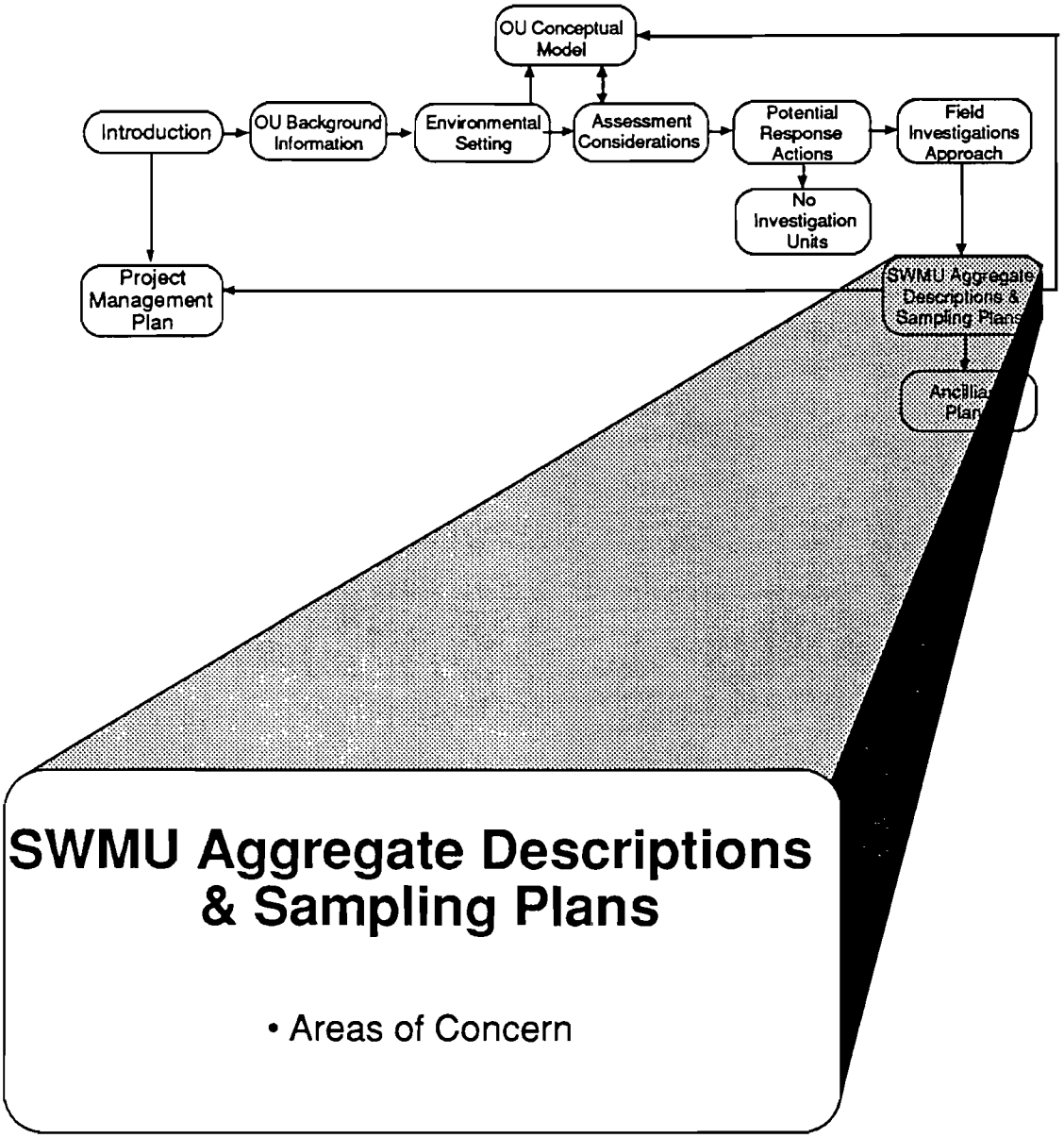
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CHAPTER 19


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
Ancillia
Plan
SWMU Aggregate Descriptions & Sampling Plans
• Areas of Concern

19. AREAS OF CONCERN DESCRIPTION AND SAMPLING PLAN

The areas of concern consist of 33 sites identified in the SWMU Report (LANL 1990a) and documented as release sites having a C-prefix in the IWP (LANL 1990b), Appendix G. They are listed in Table 19-I and shown in Figs. 19-1 and 19-2. In addition, four areas of concern were added as part of the review of information about Building TA-21-35 (see Sec. 16.4). These areas consist of a miscellany of one-time spills or releases that were identified during the preparation of the SWMU Report. It was determined that these sites do not qualify as SWMUs. Available data on each of the areas of concern are presented in Table 19-I. No additional data are available. In the paragraphs that follow, the various areas of concern are organized into groups with common attributes and are discussed together (see Table 19-II).

19.1 Cleaned Up Sites

The first subdivision includes the sites for which cleanup reports exist. For those sites where records show that no documented releases have occurred, or that releases have occurred but cleanup has been conducted and documented, no further investigation will be pursued. The areas of concern in this category are C-21-002, -003, -004, -008, -010, -011, -014, -026, -028, -029, -030, -031 and -032. No sampling activities will be performed at these sites, and no further action in regard to these sites is warranted.

19.2 Sites Associated with other Structures or SWMUs

The second subdivision includes the sites with no documented cleanup. These sites consist of two types. The first are those that are located within existing structures. These sites require no action at this time; action will be deferred to the time when the buildings in which they are located are decommissioned. At the time of decommissioning, building materials may be sampled, underlying soil may be sampled, and residues will be removed. The sites in this category are C-21-001, -006, and -027.

The second type includes the sites that will be addressed as part of investigations at various SWMUs. Surface and subsurface sampling will be performed in these areas. The areas of concern in this category are: C-21-005; -007; -009; -012, -033, -034 through -037. No specific sampling activities will be performed at these sites under this plan, but these areas will be investigated along with the associated SWMUs (see Table 19-II).

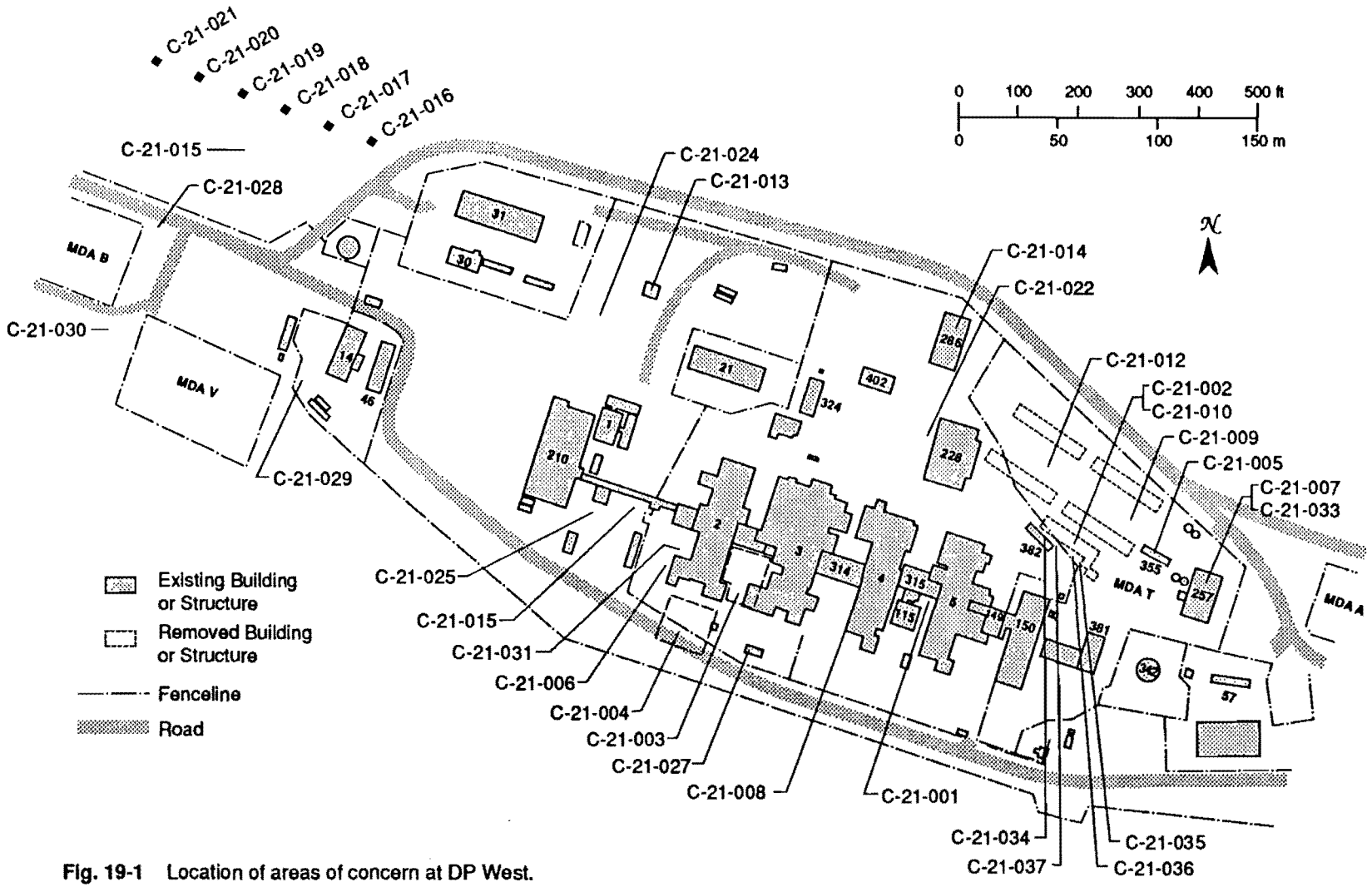


Fig. 19-1 Location of areas of concern at DP West.

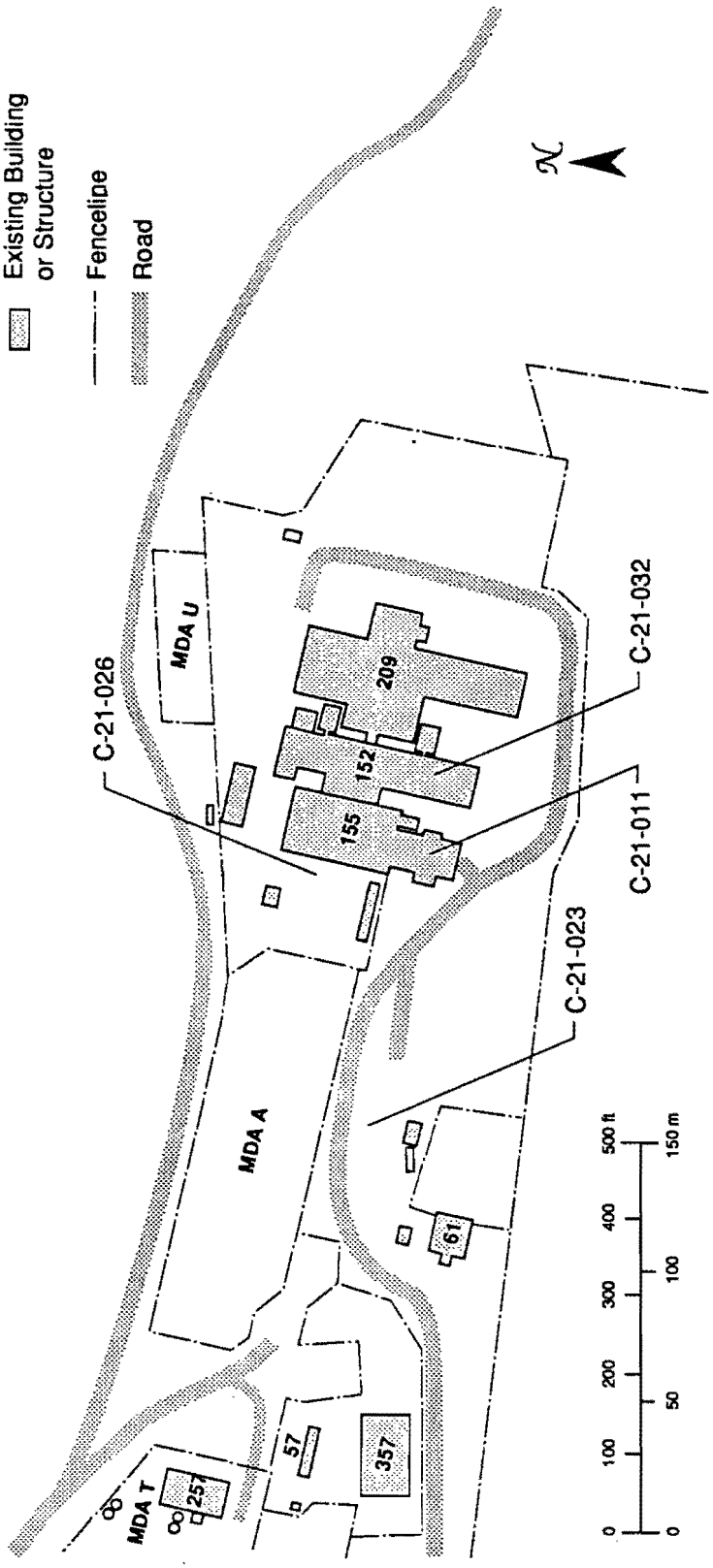


Fig. 19-2 Location of areas of concern at DP East.

TABLE 19-I
AREAS OF CONCERN AT THE TA-21 OPERABLE UNIT[a]

Site No.	Associated Structure	Description[b]
C-21-001	TA-21-17	A hydrogen flouride spill in a corridor of this building; (Task 10, Record 176).
C-21-002	TA-21-35	Leak of radionuclides from a waste storage tank to surrounding soil; soil was removed. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 177).
C-21-003	TA-21-2 and -3	Unknown releases to paved area between these two structures; area has been repaired. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 178).
C-21-004	TA-21-2	Possible radionuclide and hazardous waste release to asphalt driveways. Soil was removed and area was repaved. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 179).
C-21-005	TA-21-257	Release of ^{241}Am and plutonium on west side of building; soil was decontaminated. (RFA Unit 21.018, Task 10, Record 180). Addressed as part of 21-011.
C-21-006	TA-21-2	Release of ^{241}Am from a leaking transport trailer. The contaminated area was covered with asphalt. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 182).
C-21-007	TA-21-257	Release of plutonium, americium, and uranium from a tank vent. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 183). Addressed as part of 21-011.
C-21-008	TA-21-4	Release of radioactive material from a process exhaust line; soil was excavated. (Task 10, Record 184).
C-21-009	MDA T Shafts	Spill of ^{241}Am in a cement paste. Paste was removed, and the area was decontaminated. (Task 10, Record 185). Addressed as part of 21-016.
C-21-010	TA-21-35	Leak of ^{241}Am and plutonium from drums; area was decontaminated. (CEARP ID No. TA21-8-CA-I-RW/HW; Task 10, Record 186).
C-21-011	TA-21-155	In 1963, a plugged scrubber on the roof of Building 155 backed up, and spilled material containing Uranium-235; area was cleaned. (Task 10, Record 187).
C-21-012	MDA T	Spill of ^{241}Am and plutonium in a cement paste. (Task 10, Record 188). Addressed as part of 21-016.

TABLE 19-I (continued)

Site No.	Associated Structure	Description[b]
C-21-013	TA-21-331	A waste storage pit next to Building TA-21-212. It is possible that the pit was never built and therefore, the CEARP field team was unable to locate this pit. (CEARP ID No. TA21-2-SI-I-RW/HW).
C-21-014	TA-21-286	A currently operational equipment warehouse used by HSE-1, -6, -7. (Task 10, Record 154).
C-21-015	TA-21-45	A safety training building; building and soil were removed down to tuff. (Task 10, Record 157).
C-21-016	TA-21-23	A storage hutment removed in 1954. (Task 10, Record 158).
C-21-017	TA-21-24	A storage hutment removed in 1954. (Task 10, Record 159).
C-21-018	TA-21-25	A storage hutment removed in 1954. (Task 10, Record 160).
C-21-019	TA-21-26	A storage hutment removed in 1954. (Task 10, Record 161).
C-21-020	TA-21-27	A storage hutment removed in 1954. (Task 10, Record 162).
C-21-021	TA-21-28	A storage hutment removed in 1954. (Task 10, Record 163).
C-21-022	TA-21-34	A laboratory that was demolished and disposed of in TA-54, Area G. (Task 10, Record 164).
C-21-023	TA-21-54	Former location of a laboratory building and associated soil. Structure was demolished and disposed of in TA-54, Area G. (Task 10, Record 165).
C-21-024	TA-21-22	Former location of a warehouse and associated soil. Structure was demolished and disposed of in TA-54, Area G, Pit No. 4. (CEARP ID No. TA21-1-CA-I/A-RW/HW, Task 10, Record 166).
C-21-025	TA-21-19	Former location of a corridor contaminated with radionuclides; structure demolished in 1965. (Task 10, Record 167).
C-21-026	TA-21-151	Former location of an administrative building with shops; removed in 1966. (Task 10, Record 169).

TABLE 19-I (continued)

Site No.	Associated Structure	Description[b]
C-21-027	TA-21-143	A grilled water recirculator that is still active. (Task 10, Record 172).
C-21-028	TA-21-47	A 12,788 gal. aboveground fuel tank that was removed. (CEARP ID No. TA21-10-UST-A/I-RW/HW/PP, Task 9, Record 113).
C-21-029	TA-21-60	An aboveground 3,000 gal. steel oil tank that was removed. (CEARP ID No. TA21-10-UST-A/I-RW/HW/PP, Task 9, Record 119).
C-21-030	TA-21-64	A 320 gal. propane tank that was removed. (CEARP ID No. TA21-10-UST-A/I-RW/HW/PP, Task 9, Record 120).
C-21-031	TA-21-325	A 5,200 gal. stainless steel tank. This tank is described as half-buried. (CEARP ID No. TA21-10-UST-A/I-RW/HW/PP, Task 9, Record 115).
C-21-032	TA-21-152 Basement	A standby diesel generator served by a 300-gal. day tank and a 1000-gal. underground tank. (CEARP ID No. TA21-10-UST-A/I-RW/HW/PP).
C-21-033	TA-21-257	1976 TRU cement paste spill. (Task 10, Record 181). Addressed as part of 21-011.
C-21-034	TA-21-91	Former location of 1,000 gal. raffinate holding tank at southwest corner of TA-21-35. Addressed as part of 21-010.
C-21-035	TA-21-110	Former location of aboveground acid holding tank on south side of TA-21-35 before it was relocated to TA-21-257 where it is listed as SWMU 21-011(d). Addressed as part of 21-010.
C-21-036	TA-21-111	Former location of aboveground acid holding tank adjacent to TA-21-110 on south side of TA-21-35, before it was relocated to TA-21-257 where it is listed as SWMU 21-011(e). Addressed as part of 21-010.
C-21-037	TA-21-256	Former location of a 2,000 gal. aboveground acid tank at the southwest corner of Building TA-21-35, before it was relocated to TA-21-257 where it is listed as SWMU 21-011(h). Addressed as part of 21-010.

[a]LANL 1990 (Appendix C).
[b]Data source in parentheses is TA-21 Release Site Data Base [EES-15 (1989)].

TABLE 19-II
TA-21 AREA OF CONCERN AGGREGATIONS

Area of Concern Aggregation	Site Numbers Included	Document Section
Sites where records show either no documented release or cleanup to have occurred at time of release	C-21-002, 003, 004, 008, 010, 011, 015-026, 028, 029, 030, 031	Chapter 20
Sites for coordination with Building D&D	C-21-001, 006, ~~014~~, 027	Section 18.7
Sites being addressed as part of SWMUs	C-21-005, 007, 033	Addressed with SWMU 21-011 in Section 16.5
	C-21-009, 012	Addressed with SWMU 21-016 in Section 16.3
	C-21-034 to C-21-037	Addressed with SWMU 21-010 in Section 16.4
Site not constructed	C-21-013	Chapter 20

19.3 Area of Concern C-21-013, Possible Waste Storage Pit

The third subdivision includes a possible waste storage pit, TA-21-331, adjacent to Building TA-21-212. This area of concern is numbered C-21-013. This unit was intended to be a plywood test pit with an earthen floor and covered access, but engineering records indicate that construction of this pit was cancelled, and it is probable that this pit was never built. Subsequent reconnaissance investigations have failed to locate this pit. Therefore, this unit does not merit further investigation.

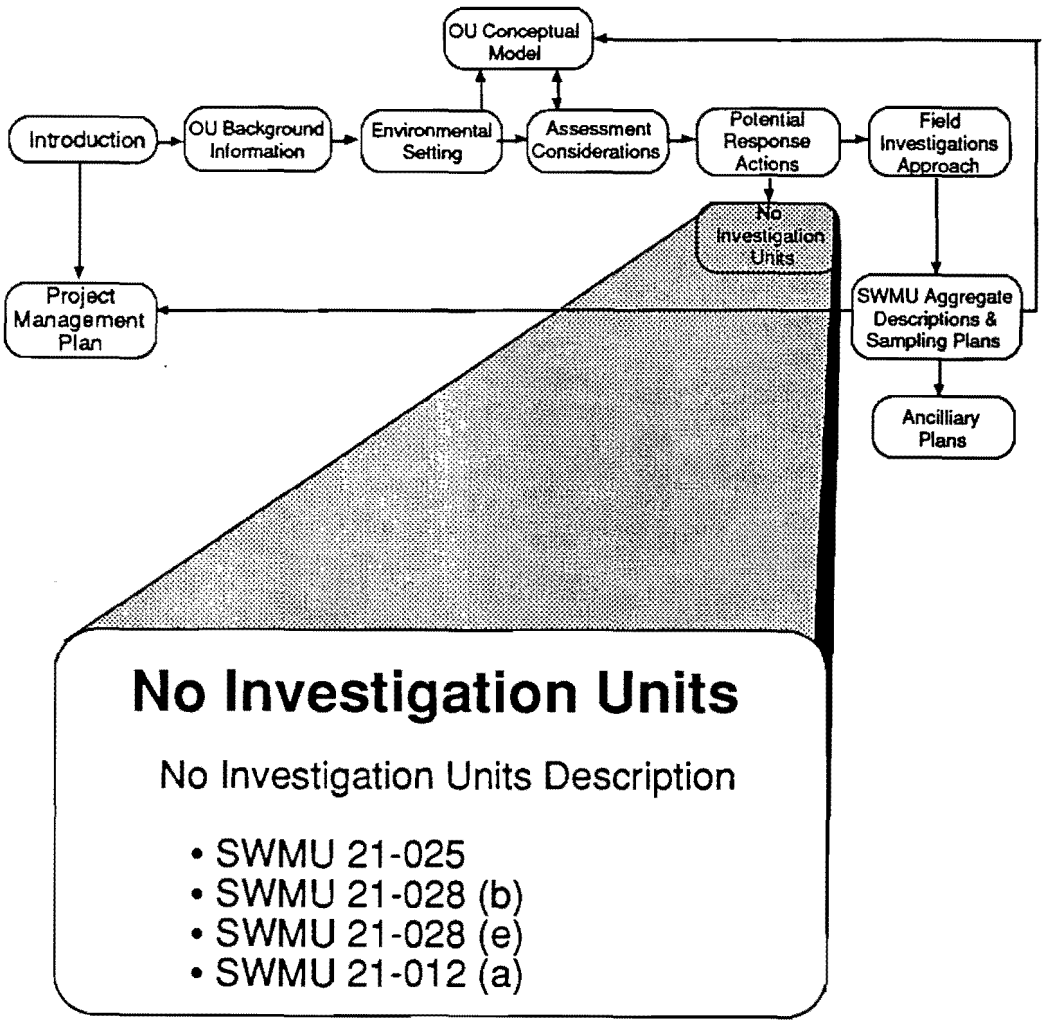
References

LANL (Los Alamos National Laboratory), September 1989. "Release Site Database, Task 9, TA-21 (DP Site)" (Preliminary Draft), prepared by Environmental Science Group, EES-15, Los Alamos National Laboratory, Los Alamos New Mexico.

LANL (Los Alamos National Laboratory), November 1990a. "Solid Waste Management Units Report," Volumes I through IV, Los Alamos National Laboratory Report No. LA-UR-90-3400, prepared by International Technology Corporation under Contract Number 9-XS8-0062R-1, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), November 1990b. "Installation Work Plan for Environmental Restoration," Los Alamos National Laboratory Report LA-UR-90-3825, Los Alamos, New Mexico.

CHAPTER 20


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• SWMU 21-028 (e)
• SWMU 21-012 (a)

20 NO-INVESTIGATION UNITS

20.1. SWMU 21-025 — Off-Gas System

20.1.1. Site Description

This section addresses two off-gas systems that have been identified as SWMU 21-025(a) and 025(b) at TA-21. These SWMUs are active systems that are monitored under routine operations at the Tritium Systems Test Assembly (TSTA) facility.

20.1.1.1. Existing Information

The first off-gas system is located in Building TA-21-155 (SWMU 21-025a), the TSTA facility, and the second is located in Building TA-21-209 (SWMU 21-025b), the high-temperature chemistry research facility. Building TA-21-155 was completed in 1982, and the first tritium operations began in 1984. Building TA-21-209 was built in 1965. The off-gas systems in both buildings are connected to exhaust stacks that are used to vent gas containing small amounts of tritiated water after treatment. The exhaust stack releases are identified as SWMU 21-019 and are discussed in Chapter 13.

The following is a description of the basic operating principle of the two off-gas systems (LANL 1990). They are designed to remove tritium from gaseous effluents prior to release to the environment. A tritium treatment train is in operation in both the TSTA facility (TA-21-155) and the high-temperature chemistry research facility (TA-21-209). On each train, gases that may contain tritium are stored in a tank until a given pressure is exceeded. When the pressure is exceeded, the gases are released from the tank and are passed through a catalyst bed operated at high temperatures in order to oxidize the tritium to tritiated water. The tritiated water is then collected in a series of molecular sieves. When a sieve is near breakthrough it is removed and hot nitrogen gas is used to strip the tritiated water from the sieve. The now- concentrated, tritiated water vapor is collected on a second series of molecular sieves. Just before break-through occurs in the second series of sieves, the sieves are removed and placed in asphalt-lined, 55-gal. drums for collection and disposal. After the off-gas streams are sufficiently detritiated, as determined by radiation monitoring, they are released to the exhaust stacks (see Chapter 13, SWMU 21-019). The entire off-gas treatment trains, including the tanks, are located entirely within the confines of Buildings TA-21-155 and TA-21-209.

20.1.1.2. Source Term

No known releases or contamination to the inside of the buildings that could have reached the environment as a result of the off-gas treatment trains have been documented.

20.1.2. Basis for Recommendation of No Further Action

It has been concluded that the two off-gas systems pose no threat to the environment and should not be investigated under field activities. It appears that the two off-gas systems have been incorrectly identified and should no longer be considered SWMUs. It has been recommended that no further action be taken in the investigation of the off-gas systems based on the following:

1. The two off-gas systems are considered to be separate from the building exhaust stacks. Any environmental contamination resulting from stack releases is not considered to be associated with the off-gas systems, but is associated with the stacks, and thus will be investigated under the TA-21 site-wide sampling plan (Chapter 12) and in relation to stack emissions, SWMU 21-019 (Chapter 13).

2. The two off-gas treatment trains, including the storage tanks, are located entirely within the confines of Buildings TA-21-155 and TA-21-209.

3. The two off-gas systems are currently in operation and are covered under routine Laboratory operations.

4. No environmental releases from inside of buildings to the environment have been documented from either TA-21-155 or TA-21-209.

20.2 SWMU 21-028(b) — Active Container Storage Areas

TA-21 contains five active container storage areas listed under SWMU 21-028(a)–(e) shown in Fig. 20.2-1. SWMU 21-028(a) is covered in Sec. 16.3 because it is located within MDA T. SWMU 21-028(c) is covered in Sec. 18.4 because it is an active container storage area located in a part of TA-21 that is scheduled for D&D. SWMU 21-028(d) and a portion of SWMU 21-028(e) are addressed in Chapter 14, Surface Units, because they are associated with buildings not currently planned for D&D. This section discusses SWMU 21-028(b), and the next section discusses the interior portions of SWMU 21-028(e). These are recommended for no further action.

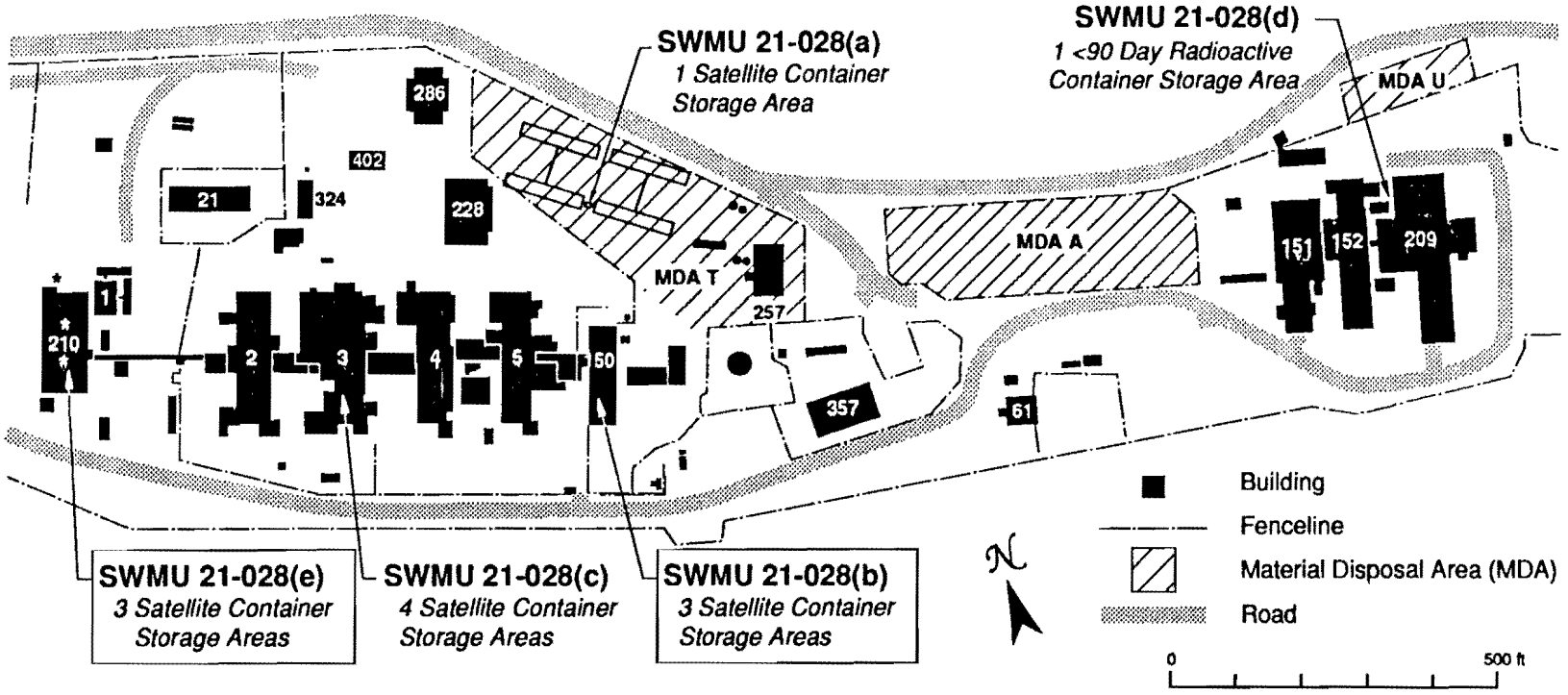


Fig. 20.2-1 Locations of the active container storage areas at TA-21 [SWMUs 21-018(a)–(e)].

20.2.1 Site Description

SWMU 21-028(b) consists of three satellite container storage areas located inside of Building TA-21-150 (Fig. 20.2-2). Generators at satellite storage sites may accumulate a total of 55 gal. of hazardous or mixed waste or up to one quart of acutely hazardous waste

20.2.1.1 Site History

The three satellite container storage areas are located under hoods within Rooms 603, 605, and 607. It is assumed that chemical waste storage at Building TA-21-150 began in 1963 when the building went into operation (Nyhan 1990).

20.2.1.2 Existing Information

No information regarding sampling and analysis in or around SWMU 21-028(b) is available.

20.2.1.3 Source Term

The types of materials that are stored under the hood in the chemistry research lab, Room 603, include

- halogenated organic chemicals—chloroform, methylene chloride, carbon tetrachloride, and alkyl halides; and
- nonhalogenated organic chemicals—acetone, toluene, tetrahydrofuran, benzene, ethanol, methanol, butanol, diethyl ether, and isopropanol.

These chemicals may be contaminated with thorium, depleted uranium, technetium, and other metals (LANL no date) .

The types of materials being stored in Room 605, the general chemistry lab, are

- liquids—acetone, dichloromethane, ether, tetrahydrofuran, hexane ethyl acetate, xylene, phenol, acetonitrile, n-butyl alcohol, benzyl alcohol, formalin, chloroform, methanol, ethanol, benzene, isopropanol, toluene, acetic anhydride, acetaldehyde, o-toluidine, pyridine, dioxane, propyl ether, t-butyl alcohol, dimethylformamide, and dimethylsulfoxide; and
- solid wastes—pipets, kimwipes, and gloves contaminated with the above-listed chemicals.

  The ethers (propyl ether, ethyl ether, and tetrahydrofuran) are stored separately in a chemical safety cabinet.

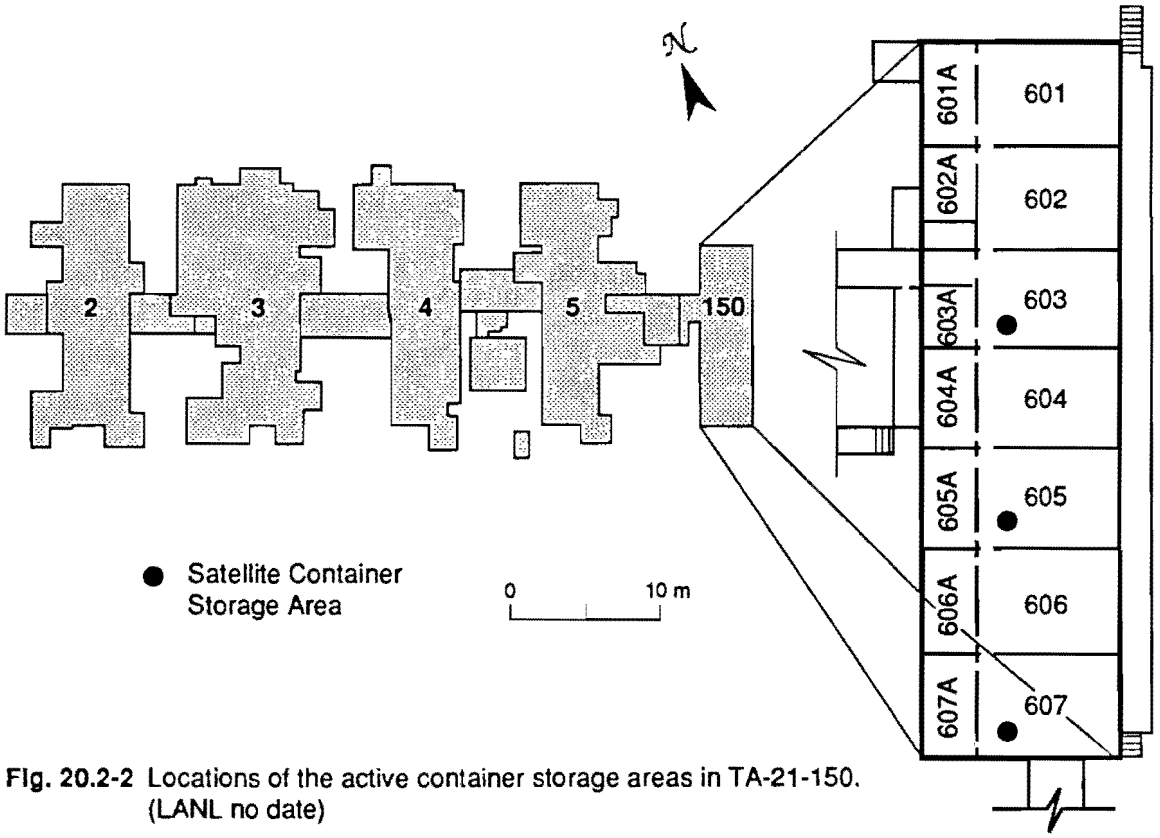


Fig. 20.2-2 Locations of the active container storage areas in TA-21-150. (LANL no date)

Mercury is also being temporarily stored under a hood in the room (LANL no date).

The types of materials being stored in Room 607, glassware cleaning room, are

- liquids — acetone, ethyl acetate, methanol, benzene, hexane, and n-butyl alcohol; and
- solid wastes — kimwipes, gloves, and pipets are contaminated with the above-listed chemicals.

Acetone and methanol are the primary reagents used (LANL no date).

20.2.2 Basis for Recommendation of No Further Action

It is recommended that no further action be taken in the investigation of the three satellite container storage areas located inside Building TA-21-150, based on the following:

1. These storage areas exhibit no evidence of routine releases.
2. No environmental releases from inside Building TA-21-150 to the environment have been documented.

20.3 SWMU 21-028(e) — Active Container Storage Areas

20.3.1 Site Description

This section addresses those parts of SWMU 21-028(e) inside Building 210. A portion of SWMU 21-028(e) is outside of the building, the north loading dock, and is covered in Sec. 14.4.

20.3.1.1 Site History

SWMU 21-028(e) consists of three satellite container storage areas located at TA-21-210. The areas are inside Room 128, inside the south lab in Room 120, and outside on the north loading dock. Only the areas inside Rooms 120 and 128 are considered here (see Fig. 20.2-1).

20.3.1.2 Existing Information

TA-21-210, Room 128, has been used periodically to store alcohol and solvents. Room 120 in Building 210 has been used to store waste oil from machines and wipes that have been used to absorb freon (LANL no date).

No information regarding sampling and analysis in or around SWMU 21-028(e), Rooms 120 and 128, is available.

20.3.2 Basis for Recommendation of No Further Action

It is recommended that no further action be taken in the investigation of the satellite storage areas located inside Building TA-21-210, Rooms 120 and 128, based on the following:

1. These storage areas exhibit no evidence of routine releases.
2. No environmental releases from inside Building TA-21-210 to the environment have been documented.

20.4 SWMU 21-012(a) — Dry Well Inside Steam Plant

20.4.1 Site Description

The SWMU Report (LANL 1990) states that "there is a dry well inside the steam plant (TA-21-357) that receives liquids from the steam plant."

20.4.1.1 Site History

The former steam plant (TA-21-9) was constructed in 1945 and was removed in 1985. A dry well associated with this steam plant is identified as SWMU 21-012(b) and is addressed in Sec. 17.4. The new steam plant, TA-21-357, was put on line in 1985.

20.4.1.2 Existing Information

Two site visits on May 11, 1990, and August 8, 1990 (Roy F. Weston 1990a, 1990b), verified that there is not a dry well associated with the new steam plant.

20.4.2 Basis for Recommendation of No Further Action

It is recommended that no further action be taken in the investigation of a dry well at the new steam plant because no dry well exists.

References

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Volumes I through IV, Los Alamos National Laboratory Report No. LA-UR-90-3400, prepared by International Technology Corporation under Contract Number 9-XS8-0062R-1, Los Alamos, New Mexico.

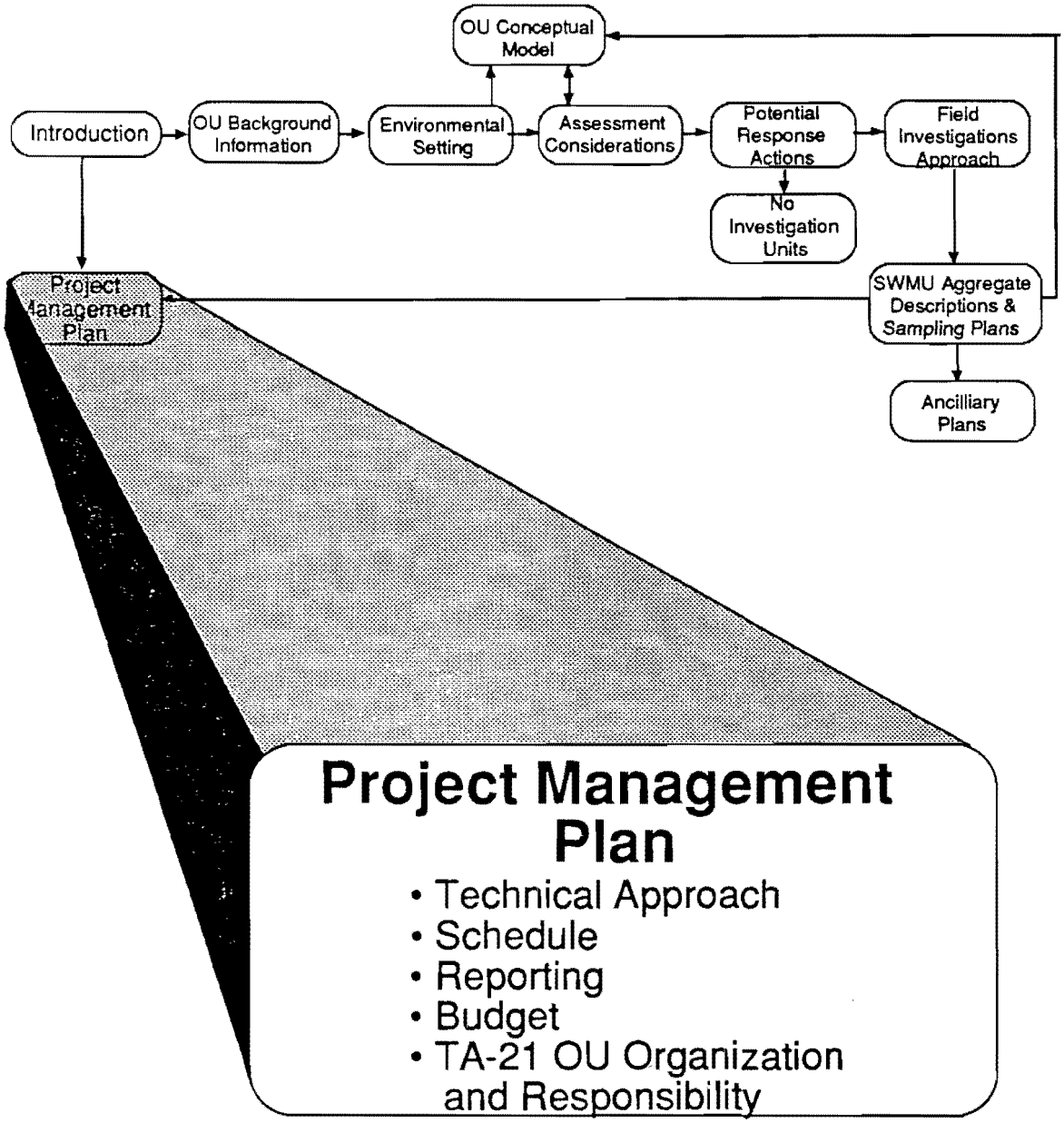
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Roy F. Weston, Inc., May 1990. Site reconnaissance visit to TA-21, August 8, 1990, Roy F. Weston, Inc., site reconnaissance performed in support of the Environmental Restoration Program, US Department of Energy, Albuquerque Operations Office, Albuquerque, New Mexico.

CHAPTER 21


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21. PROJECT MANAGEMENT PLAN

This chapter presents the technical approach, management structure, schedule, budget, and reporting milestones for implementation of the TA-21 OU RFI as set forth in this work plan. The project management plan for the TA-21 OU RFI is an extension of the ER Program project management plan given in Annex I of the IWP (ER 1990). This chapter addresses the project management plan requirements of the HSWA Module (Task II, E., p. 39) of the Laboratory's RCRA Part B Permit (EPA 1990).

21.1 Technical Approach

The technical approach employed for investigation of the TA-21 OU RFI is described in Sec. 2.3.1, Technical Approach. The approach used for TA-21 is based on the ER Program's overall technical approach to the RFI/CMS process as described in Chapter 3 of the IWP (LANL 1990). The following key features characterize the ER Program approach:

- use of action levels as criteria to trigger a corrective measures study (CMS);
- sampling approach to site characterization;
- decision analysis and cost effectiveness to support the selection of remedial alternatives; and
- the application of the "observational" or "streamlined" approach to the RCRA Facility Investigation (RFI)/CMS process as a general philosophical framework.

The general philosophy is to develop and iteratively refine the TA-21 OU conceptual model through carefully planned stages of investigation and data interpretation. An objective is to support interim corrective measures or a corrective measures study using the minimum data necessary.

The technical objectives of the TA-21 OU RFI are presented in Sec. 2.3.2, TA-21 Objectives and Approach. As detailed throughout this work plan, the objectives are

- Identify contaminants present at each SWMU
- Determine the vertical and lateral extent of the contamination at each SWMU
- Identify contaminant migration pathways
- Acquire sufficient information to allow quantitative migration pathway and risk assessment, as necessary

- Provide necessary data for the assessment of potential remedial alternatives
- Provide the basis for planning detailed corrective measures studies

21.1.1 Technical Implementation Rationale

The scheduling of the investigations at the TA-21 OU is based on the following rationale and priorities, as illustrated in Fig. 21.1-1.

Initial efforts are focused on obtaining OU-wide environmental data that form the basis for understanding contaminant transport processes. These investigations, described in Chapter 12, include

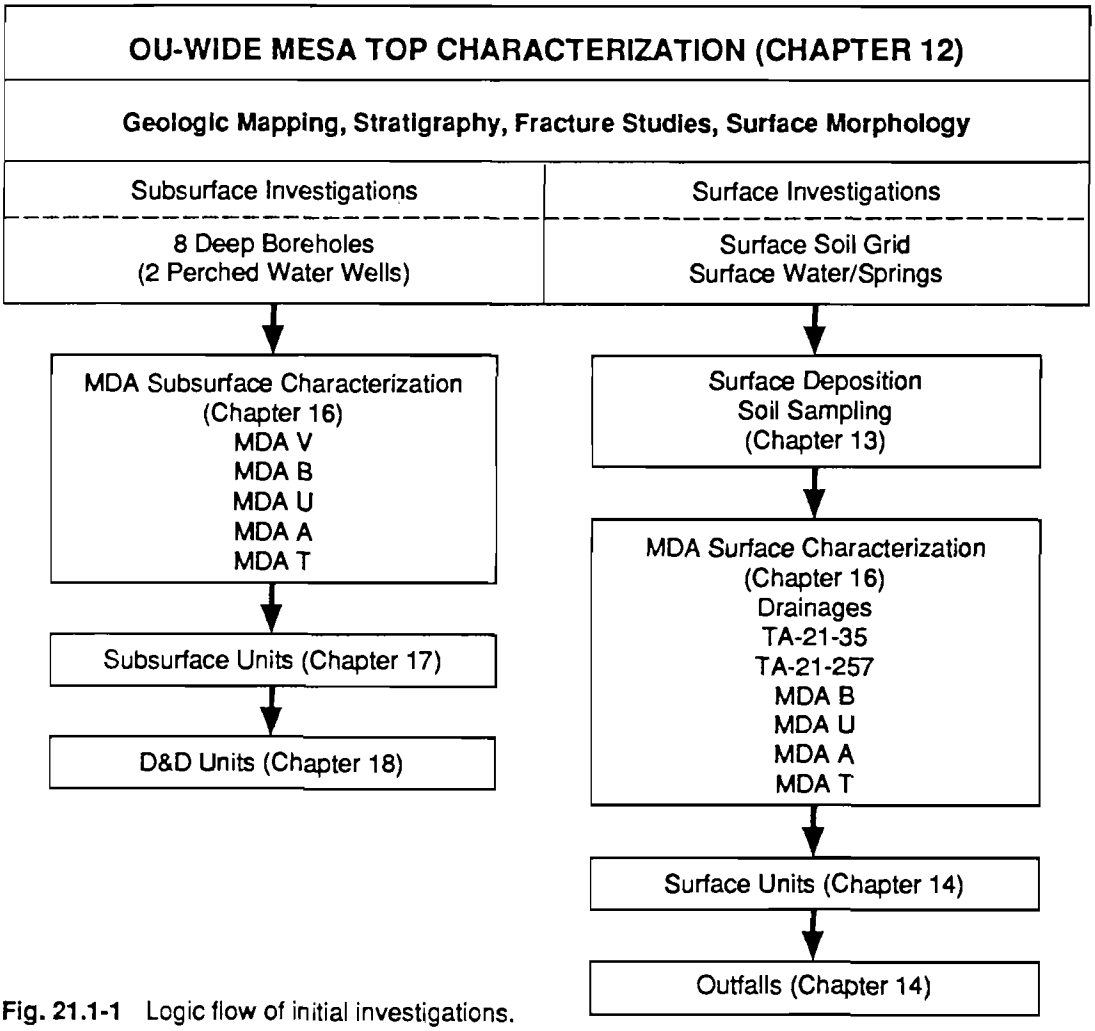


Fig. 21.1-1 Logic flow of initial investigations.

- development of a geologic base map, measuring stratigraphic sections, geomorphic characterization, and joint and fracture mapping;
- characterization of the hydrogeology of the vadose zone beneath the OU, focusing on parameters of importance in assessing the potential for subsurface migration; and
- measurement of contaminant levels in surface soils across the entire OU, as a basis for determining if low levels of contaminants detected at individual SWMUs are indicative of releases from individual SWMUs or only represent the presence of the OU-wide contamination.

Two relatively independent investigation paths are a part of the schedule logic and the investigation rationale. As shown in Fig. 21.1-1, subsurface investigations form one line of investigation, while surface investigations form another.

Surface Investigations. The surface investigation path begins with the OU-wide surface soil characterization. The SWMU-specific surface investigations begin with investigation of contaminant deposition from stack releases and other airborne release SWMUs, as described in Chapter 13. This investigation is done at the same locations as the OU-wide surface investigation (Chapter 12) and at the same time. The difference between the two is the sample interval. The OU-wide characterization uses a 0- to 6-in. soil sample interval to provide data comparable to the soil sample data to be acquired at individual SWMUs. The contaminant deposition investigation focuses on a "deposition layer" (0- to 1-in.) sample to evaluate surficial deposits.

The surface investigation path continues with investigations of drainages in proximity to the five MDAs, and surface sampling in the immediate vicinity of the MDAs (Chapter 16). Subsequently, the investigations target SWMUs that have primarily surface or near-surface contamination (Chapters 14 and 15).

Subsurface Investigations. The subsurface investigation path begins with the OU-wide investigation, which includes eight deep boreholes for characterizing the hydrogeology and the variability of the hydrogeology throughout the TA-21 OU (Chapter 12). Three of the holes are in close proximity to liquid waste MDAs. Two of the holes are targeted for identifying the presence of perched water beneath Los Alamos and DP Canyons.

The subsurface investigations continue at the MDAs. The rationale for the MDA investigations differs for liquid waste and solid waste MDAs. At the liquid MDAs, source term characterization and defining the depth of contaminant migration are priorities. The sequence of the investigations at MDAs V, U, and then T allows for knowledge gained at MDAs V and U to be applied to the investigation at MDA T, which is likely to have the largest source term and greatest extent of

contaminant migration.

At the solid waste MDAs (A and B), the focus is on confirming the absence of contaminant migration from the disposal pits. Only if evidence of migration is identified will consideration be deemed necessary for conducting source term characterization and more detailed investigations at those two MDAs.

The subsurface investigation path continues with SWMUs that have primarily subsurface releases, described in Chapters 17 and 18. Most of these units are related to the liquid waste handling system at TA-21. The investigation of these SWMUs occurs between the initial and subsequent investigations at the MDAs.

Priorities. The management priorities that generated the above described sequence of investigations have the following three primary aspects:

- Basic information and data obtained from the OU-wide characterization are needed as a basis for comparison and must be available before evaluations can be made of the SWMU-specific data.
- Investigations at the MDAs are the most likely to require extensive subsequent investigations and should be scheduled early to allow time for additional work.
- Existing assessments of exposure risks (Sec. 6.6, Current Risk Estimates) do not identify significant risks from surface contamination present at the OU. Thus characterization of surface contamination SWMUs can be secondary to the other priorities.

21.2 Schedule

The schedule for the entire RFI/CMS process at TA-21 was set in the IWP's Program Management Plan (Annex I, Table I-3) and detailed in the IWP's Appendix S, through the completion of the final CMS report. That schedule is provided here in Table 21.2-I.

A detailed schedule for the implementation of the TA-21 OU RFI is presented in Fig. 21.2-1. The schedule is organized by section of each sampling plan chapter (Chapters 12–18) and explicitly shows subsequent investigations where they are expected to be needed.

Implementation of RFI activities is contingent upon regulatory review and approval of this TA-21 OU Work Plan and upon available funding. The assumptions used to generate this schedule include the following:

TABLE 21.2-I

PROJECTED SCHEDULE FOR CORRECTIVE ACTION PROCESS[a]

Activity	Date
Start OU-1106 Draft RFI Work Plan	2 Oct 89
Finish OU-1106 Draft RFI Work Plan	22 May 91
Finish OU-1106 Final RFI Work Plan	16 Aug 91
Start OU-1106 RFI	29 Oct 91
Start OU-1106 Draft RFI Report	29 Jun 95
Finish OU-1106 RFI	11 Dec 96
Finish OU-1106 Draft RFI Report	11 Dec 96
Finish OU-1106 Final RFI Report	28 May 97
Start OU-1106 Draft CMS Plan	28 May 97
Finish OU-1106 Draft CMS Plan	21 Aug 97
Start OU-1106 CMS	21 Aug 97
Start OU-1106 Draft CMS Report	13 Jan 98
Finish OU-1106 Final CMS Plan	10 Feb 98
Finish OU-1106 CMS	12 Feb 99
Finish OU-1106 Draft CMS Report	12 Feb 99
Finish OU-1106 Final CMS Report	21 Jul 99

[a]IWP APPENDIX S, (EPA 1990).

FIGURE 21.2-1. TA-21 OU RFI SCHEDULE

Chapter and Section	Start Date	Duratn (Days)	End Date
12 INITIAL INVESTIGATION	15/Oct/91	467	20/Aug/93
12.3 GEOMORPHOLOGY	15/Oct/91	158	29/May/92
12.4 SURFACE SOIL CHARACT.	16/Dec/91	168	12/Aug/92
12.4 ROUND 2 SURFACE SOIL CHAR	15/Mar/93	113	20/Aug/93
12.5 VADOSE ZONE CHARACT.	25/Mar/92	258	2/Apr/93
12.6 YEAR 1: SPRING SAMPLING	15/Oct/91	287	3/Dec/92
12 SUBSEQUENT INVESTIGATIONS	20/Nov/92	997	8/Nov/96
12.5 VADOSE ZONE CHARACT.	20/Jul/94	186	17/Apr/95
12.6 YEAR 2: WATER SAMPLING	20/Nov/92	997	8/Nov/96
12.6 YEAR 3-5: WATER SAMPLING	29/Nov/93	742	8/Nov/96
13 INITIAL INVESTIGATION	12/Mar/92	387	22/Sep/93
13.2 AIRBORNE EMISSIONS	12/Mar/92	147	7/Oct/92
13.2 ROUND 2 AIRBORNE EMISSION	15/Jan/93	174	22/Sep/93
13 SUBSEQUENT INVESTIGATIONS	10/Jan/94	141	29/Jul/94
13.2 AIRBORNE EMISSIONS	10/Jan/94	141	29/Jul/94
14 INITIAL INVESTIGATION	10/Mar/94	106	8/Aug/94
14.2 PCB CTR STORAGE	24/Mar/94	59	15/Jun/94
14.3 ABOVE GROUND TANKS	31/Mar/94	61	24/Jun/94
14.4 ACTIVE CTR STORAGE	5/Apr/94	47	9/Jun/94
14.5 DP TANK FARM	5/Apr/94	68	11/Jul/94
14.6 INACTIVE CTR STORAGE	11/Apr/94	46	14/Jun/94
14.7 SURFACE DISP AREAS	10/Mar/94	106	8/Aug/94
14.8 SEWAGE TREATMENT PLANT	22/Apr/94	71	2/Aug/94
14 SUBSEQUENT INVESTIGATIONS	8/May/95	108	10/Oct/95
14.2 PCB CTR STORAGE	8/May/95	107	6/Oct/95
14.6 INACTIVE CTR STORAGE	13/Jul/95	56	29/Sep/95
14.7 SURFACE DISPOSAL AREAS	17/Jul/95	60	10/Oct/95
15 INITIAL INVESTIGATION	20/Apr/94	126	18/Oct/94
15.2 UNKNOWN LOCATIONS	20/Apr/94	85	18/Aug/94
15.3 SEPTIC SYSTEM	29/Apr/94	77	17/Aug/94
15.4 DIRECT DISCHARGE	11/May/94	56	29/Jul/94
15.5 DRNG S TA-21-3	17/May/94	61	11/Aug/94
15.6 SEPTIC TANKS	16/May/94	64	15/Aug/94
15.7 S T A 21-155	23/May/94	45	26/Jul/94
15.8 S T A 21-155	23/May/94	69	29/Aug/94
15.9 SPECIAL CASES	25/May/94	65	25/Aug/94
15.10 NPDES	31/May/94	98	18/Oct/94

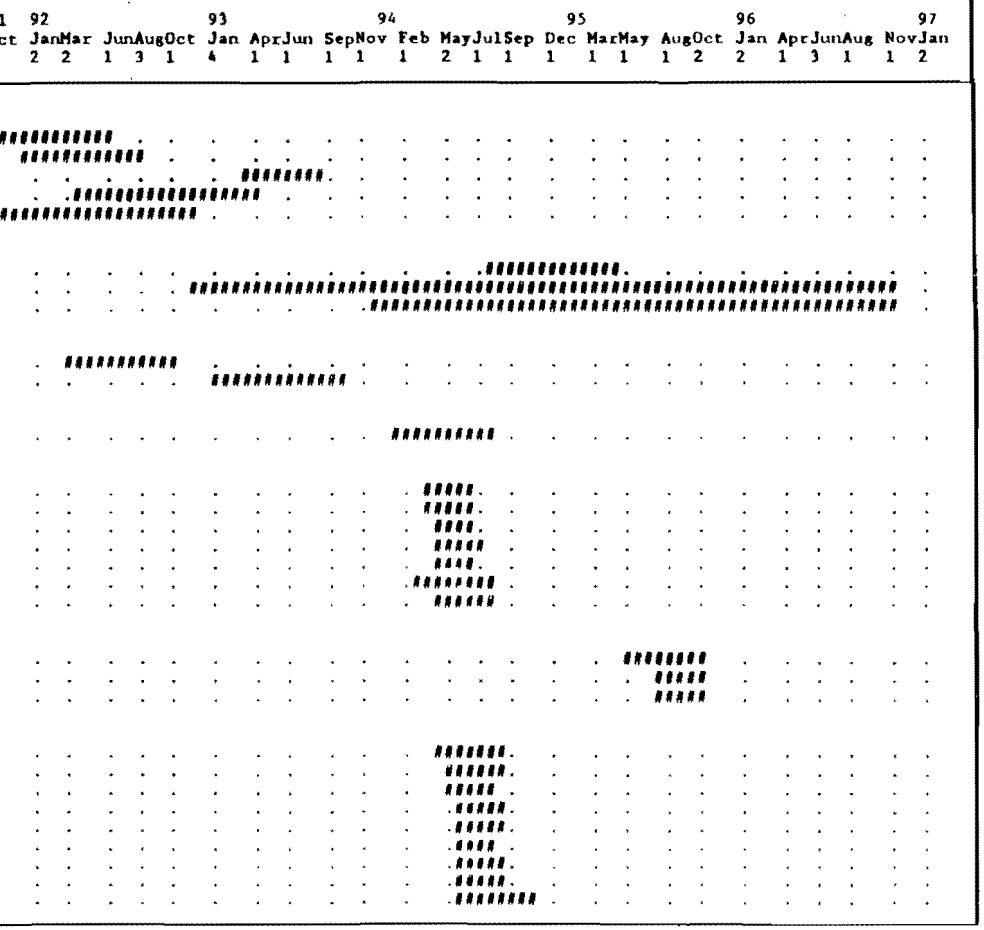
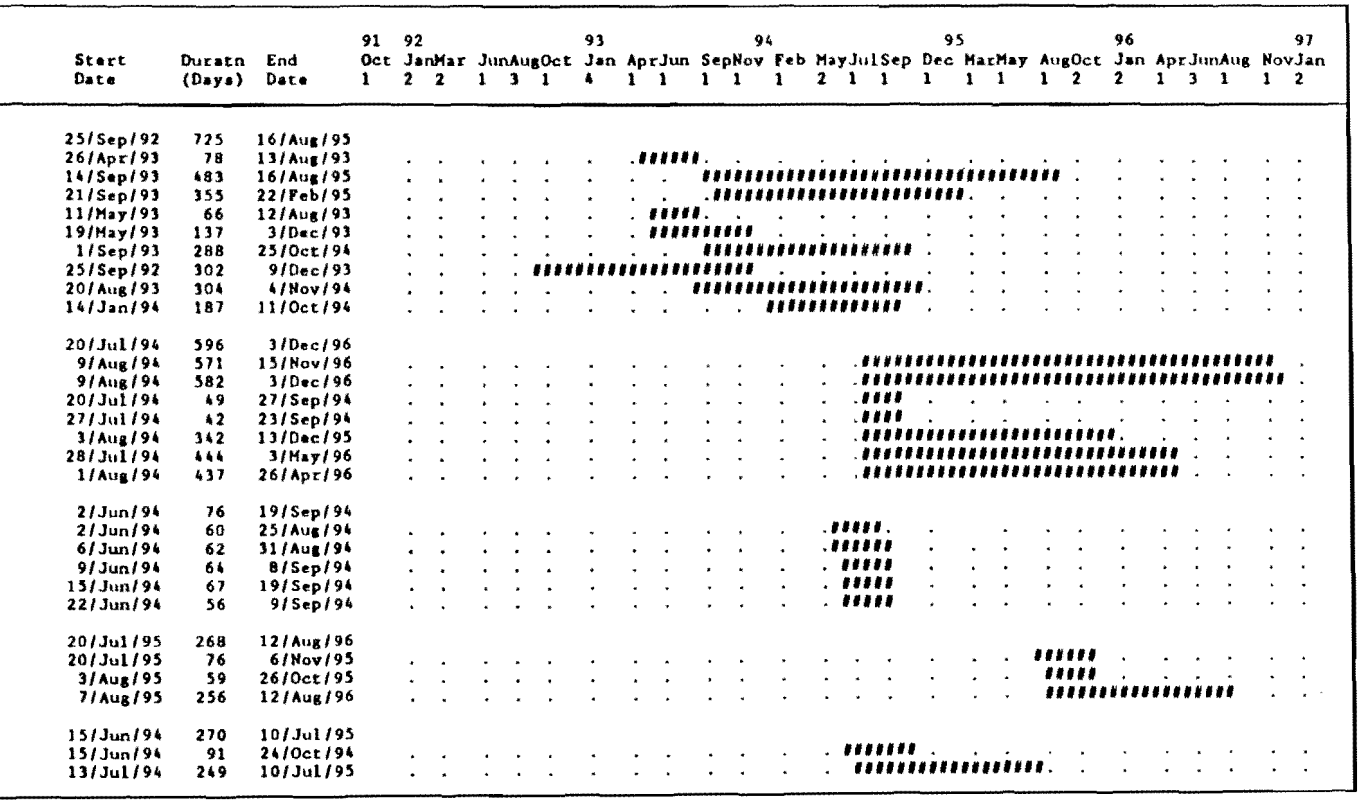


FIGURE 21.2-1. TA-21 OU RFI SCHEDULE (CONTINUED)

Chapter and Section	Start Date	Duratn (Days)	End Date
16 INITIAL INVESTIGATION	25/Sep/92	725	16/Aug/95
16.1 MDA GENERAL	26/Apr/93	78	13/Aug/93
16.2 MDA B	14/Sep/93	483	16/Aug/95
16.3 MDA T	21/Sep/93	355	22/Feb/95
16.4 BLDG TA21-35	11/May/93	66	12/Aug/93
16.5 BLDG TA21-257	19/May/93	137	3/Dec/93
16.6 MDA U	1/Sep/93	288	25/Oct/94
16.7 MDA V	25/Sep/92	302	9/Dec/93
16.8 MDA A	20/Aug/93	304	4/Nov/94
16.X MDA'S SURFACE STUDY	14/Jan/94	187	11/Oct/94
16 SUBSEQUENT INVESTIGATIONS	20/Jul/94	596	3/Dec/96
16.2 MDA B	9/Aug/94	571	15/Nov/96
16.3 MDA T	9/Aug/94	582	3/Dec/96
16.4 BLDG TA21-35	20/Jul/94	49	27/Sep/94
16.5 BLDG TA21-257	27/Jul/94	42	23/Sep/94
16.6 MDA U	3/Aug/94	342	13/Dec/95
16.7 MDA V	28/Jul/94	444	3/May/96
16.8 MDA A	1/Aug/94	437	26/Apr/96
17 INITIAL INVESTIGATION	2/Jun/94	76	19/Sep/94
17.2 SEEPAGE PITS	2/Jun/94	60	25/Aug/94
17.3 WASTE TRT LAB	6/Jun/94	62	31/Aug/94
17.4 DRY WELLS	9/Jun/94	64	8/Sep/94
17.5 ACID WST SUMPS	15/Jun/94	67	19/Sep/94
17.6 ACID PIT	22/Jun/94	56	9/Sep/94
17 SUBSEQUENT INVESTIGATION	20/Jul/95	268	12/Aug/96
17.2 SEEPAGE PITS	20/Jul/95	76	6/Nov/95
17.3 WASTE TRT LAB	3/Aug/95	59	26/Oct/95
17.5 ACID WST SUMPS	7/Aug/95	256	12/Aug/96
18 INTITIAL INVESTIGATION	15/Jun/94	270	10/Jul/95
18.8 ACID WASTE SUMPS	15/Jun/94	91	24/Oct/94
18.9 EQUIP ROOM SUMPS	13/Jul/94	249	10/Jul/95



- Review and approval of the TA-21 OU RFI work plan, and supporting project plans, by regulatory agencies is scheduled to be completed by October 28, 1991 (see Table 21.2-I).

- Certain tasks (e.g., mesa top characterization) may be initiated before the regulatory agencies grant final approval of the work plan.

- The schedule assumes that an adequate number of support personnel (e.g., HSE technicians, trained drilling contractors) will be available for conducting necessary tasks.

- EPA approval of technical memoranda/work plan modifications (including EPA comments, Laboratory revision, and final EPA approval) is assumed to take 2.5 months, of which one month is allowed for EPA review and comment, and one and a half months for revisions.

- SWMUs expected to require subsequent investigations have been scheduled earlier in the RFI to allow time for data assessment and subsequent investigations.

- The work scheduled in the first two investigation years is constrained by planned DOE budgets for the TA-21 OU for fiscal years 1992 and 1993.

- Where possible, field work has not been scheduled between November 15 and March 15 each year, to allow for inclement weather.

21.3 Reporting

Results of RFI field work will be presented in three principal documents: quarterly technical progress reports, technical memoranda/work plan modifications, and the RFI Report. The purpose of each of these reports is detailed below. A schedule for submission of draft and final reports is presented in Table 21.3-I.

21.3.1 Quarterly Technical Progress Reports

As the TA-21 OU RFI is implemented, technical progress will be summarized in quarterly technical progress reports, as required by the HSWA module of the Laboratory's RCRA Part B operating permit (Task V, C, page 46). Detailed technical assessments will be provided in technical memoranda/work plan modifications.

21.3.2 Technical Memoranda/Work Plan Modifications

Technical memoranda/work plan modifications will be submitted for work conducted on aggregates of SWMUs or on individual SWMUs. These documents will function as interim reports on portions of the RFI effort because of both the large number of SWMUs addressed in this work plan and the five-year time frame required for completion of RFI field work. In other words, these technical memoranda will serve as partial RFI Phase I reports summarizing the results of initial site characterization activities and as partial RFI Phase II work plans describing the follow-on activities being planned (including any modifications to field sampling plans suggested by initial findings).

The standard outline for a technical memorandum/work plan modification, is given in Table 21.3-II. This outline may be modified as needed for a given technical memorandum/work plan modification.

21.3.3 RFI Report

The RFI report will summarize all field work conducted during the five-year duration of the RFI. As required by the HSWA module of the Laboratory's RCRA Part B operating permit (Task V, D, page 46), the Laboratory will submit an RFI report within 60 days of completion of the RFI. As stated in the IWP Sec. 3.5.7 (LANL 1990), the RFI Report will describe the procedures, methods, and results of field investigations and will include information on the type and extent of contamination, sources and migration pathways, and actual and potential receptors. The report will also contain adequate information to support delisting of sites that require no further action and corrective action decisions.

21.4 Budget

The schedule presented above is based on fixed budgets for the first two years of the RFI. The fixed budgets in fiscal years 1992 and 1993 (FY 92 and FY 93) are based on expected DOE funding levels. DOE funding requests are set two years in advance; thus the first year in which the TA-21 OU RFI is not constrained by past budget estimates will be FY 94. Funding requests for FY 94 and beyond will reflect the cost and schedule that most efficiently complete the RFI plans. Table 21.4-I presents a summary cost estimate for the TA-21 RFI, with costs broken down by section for each sampling plan chapter (Chapters 12 –18). The cost estimates reflect DOE guidance regarding appropriate contingency assumptions.

TABLE 21.3-I REPORTS PLANNED FOR THE TA-21 OU RFI

Report Type and Subject	Draft Date	Final Date
Quarterly Technical Progress Reports		
Summary of Technical Activities/Data		15 Feb, Yearly 15 May, Yearly 15 Aug, Yearly 15 Nov, Yearly
Technical Memoranda/Work Plan Modifications		
1. Subsurface Investigations Mesa Top and MDA V (Initial)[a]	20 Sep 93	10 Dec 93
2. Surface Investigations Mesa Top and MDAs (Initial)	22 Jul 94	12 Oct 94
3. Surface/Subsurface Investigations MDAs Surface (Subsequent)[b] All Non-MDA Units (Initial)	20 Apr 95	11 Jul 95
4. Subsurface Investigations MDA A, MDA B (Initial)	30 May 95	17 Aug 95
5. Surface/Subsurface Investigations Non-MDA Units (Subsequent)	3 May 96	24 Jul 96
6. Subsurface Investigations MDA T, MDA U, MDA V (Initial and Subsequent)	12 Sep 96	4 Dec 96
7. Subsurface Investigations MDA A, MDA B (if needed)	27 Aug 96	18 Nov 96
RFI Report		
Final RFI Report	11 Dec 96	28 May 97

[a] Initial: Report of results from the planned initial investigation.

[b] Subsequent: Report of results from subsequent investigations, if any.

TABLE 21.3-I I OUTLINE OF TECHNICAL MEMORANDA/WORK PLAN MODIFICATION

1. Executive Summary
2. Introduction
3. SWMU Descriptions
4. Summary of Investigation
5. Methods and Procedures
5. Data Assessment
   - 5.1 Data Quality Summary
   - 5.2 Source Term
   - 5.3 Nature and Extent of Contamination
   - 5.4 Contaminant Migration
6. Subsequent Investigation Sampling Plans
7. Permit Modification

21.5 TA-21 OU Organization and Responsibility

The organizational structure for the ER Program is presented in Sec. 2.0 of the LANL ER Program Quality Program Plan (QPP) (Annex II of the IWP, LANL 1990). ER Program personnel are identified to the Technical Team Leader and OU Project Leader level in Fig. 11-1 of the QPP, which is reproduced here as Fig. 21.5-1. Section 2.0 of the QPP identifies line authority and personnel responsibilities for each position identified in the figure.

This section details the management organization for the TA-21 OU RFI, as shown in Fig. 21.5-2. Each person currently assigned to the positions shown in the figure is identified in Table 21.5-I. Records of qualifications and training of all personnel working on the TA-21 OU RFI field work will be kept as ER Records [see Appendix C, Records Management Plan (RMP)]. Contributors to the TA-21 OU RFI Work Plan are given in Appendix E.

The following are the responsibilities of the positions identified in Fig. 21.5-2:

TA-21 OU Project Leader

- oversees day-to-day operations, including planning, scheduling, and reporting technical and related administrative activities;
- ensures preparation of scientific investigation planning documents and procedures;
- prepares monthly and quarterly reports for the Project Manager (PM);
- oversees subcontractors, as appropriate;
- coordinates with technical team leaders;
- conducts technical reviews of the milestones and final reports;
- Interfaces with the ER Quality Program Project Leader (QPPL) to resolve quality concerns and to coordinate with the QA staff for audits;
- complies with the LANL ER Program Health and Safety (H&S), records management, and community relations requirements;
- oversees RFI field work and manages the field teams manager; and
- complies with the Laboratory's technical and QA requirements for the LANL ER Program.

TABLE 21.4-I TA-21 OU RFI ESTIMATED BUDGET

Chapter and Section	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
12 INITIAL INVESTIGATION						
12.3 GEOMORPHOLOGY	203,700					
12.4 SURFACE SOIL CHARACT.	378,735					
12.4 ROUND 2 SURFACE SOIL CH		330,055				
12.5 VADOSE ZONE CHARACT.	1,343,579	504,538				
12.6 YEAR 1: SPRING SAMPLIN	85,818	8,617				
	2,011,832	843,209				
12 SUBSEQUENT INVESTIGATIONS						
12.5 VADOSE ZONE CHARACT.			787,158	744,876		
12.6 YEAR 2: WATER SAMPLING		62,070	310,827	7,029	7,057	1,319
12.6 YEAR 3-5: WATER SAMPLIN			58,765	67,924	66,647	9,631
		62,070	1,156,750	819,830	73,704	10,950
13 INITIAL INVESTIGATION						
13.2 AIRBORNE EMISSIONS	281,804	3,373				
13.2 ROUND 2 AIRBORNE EMISSI		419,120				
	281,804	422,493				
13 SUBSEQUENT INVESTIGATIONS						
13.2 AIRBORNE EMISSIONS			326,751			
			326,751			
14 INITIAL INVESTIGATION						
14.2 PCB CTR STORAGE			110,534			
14.3 ABOVE GROUND TANKS			51,426			
14.4 ACTIVE CTR STORAGE			30,586			
14.5 DP TANK FARM			78,562			
14.6 INACTIVE CTR STORAGE			31,650			
14.7 SURFACE DISP AREAS			374,868			
14.8 SEWER TREATMENT PLANT			123,936			
			801,562			
14 SUBSEQUENT INVESTIGATIONS						
14.2 PCB CTR STORAGE				43,968	4,256	
14.6 INACTIVE CTR STORAGE				29,154		
14.7 SURFACE DISPOSAL AREAS				49,834	4,256	
				122,956	8,512	
15 INITIAL INVESTIGATION						
15.2 UNKNOWN LOCATIONS			229,546			
15.3 SEPTIC SYSTEM			188,542			
15.4 DIRECT DISCHARGE			120,438			
15.5 DRNG S TA-21-3			78,486			
15.6 SEPTIC TANKS			71,088			
15.7 S TA-21-155			28,490			
15.8 N TA-21-155			111,218			
15.9 SPECIAL CASES			91,586			
15.10 NPDES			276,266	59,360		
			1,195,660	59,360		

TABLE 21.4-I TA-21 OU RFI ESTIMATED BUDGET (CONTINUED)

	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
16 INITIAL INVESTIGATION						
16.1 MDA GENERAL		163,560				
16.2 MDA B		60,523	1,141,946	731,307		
16.3 MDA T		11,865	785,447	289,880		
16.4 BLDG TA21-35		90,592				
16.5 BLDG TA21-257		126,274	87,016			
16.6 MDA U		47,489	559,489	86,452		
16.7 MDA V	37,219	1,139,389	44,520			
16.8 MDA A		94,929	858,948	129,679		
16.X MDO'S SURFACE DATA			511,305	8,095		
	37,219	1,734,622	3,988,672	1,245,413		
16 SUBSEQUENT INVESTIGATIONS						
16.2 MDA B			84,029	10,640	965,998	43,171
16.3 MDA T			91,686	1,557,820	1,380,375	44,520
16.4 BLDG TA21-35			80,230			
16.5 BLDG TA21-257			94,665			
16.6 MDA U			86,883	474,913	243,824	
16.7 MDA V			90,377	1,128,201	515,312	
16.8 MDA A			85,808		661,206	
			613,678	3,171,574	3,766,715	87,691
17 INITIAL INVESTIGATION						
17.2 SEEPAGE PITS			43,398			
17.3 WASTE TRT LAB			40,502			
17.4 DRY WELLS			54,986			
17.5 ACID WST SUMPS			128,036			
17.6 ACID PIT			17,686			
			284,608			
17 SUBSEQUENT INVESTIGATION						
17.2 SEEPAGE PITS				181,660	14,364	
17.3 WASTE TRT LAB				33,448	2,394	
17.5 ACID WST SUMPS				264,353	318,935	
				479,461	335,693	
18 INITIAL INVESTIGATION						
18.8 ACID WASTE SUMPS			261,586	15,960		
18.9 EQUIP ROOM SUMPS			102,200	527,114		
			363,786	543,074		
TOTAL	2,330,855	3,062,394	8,731,467	6,441,668	4,184,624	98,641
CONTINGENCY (25%)	582,714	765,599	2,182,867	1,610,417	1,046,156	24,660
Management & MDA Pilot Study	970,000	970,000	970,000	970,000	970,000	
TOTAL ESTIMATE	3,883,569	4,797,993	11,884,334	9,022,085	6,200,780	123,301

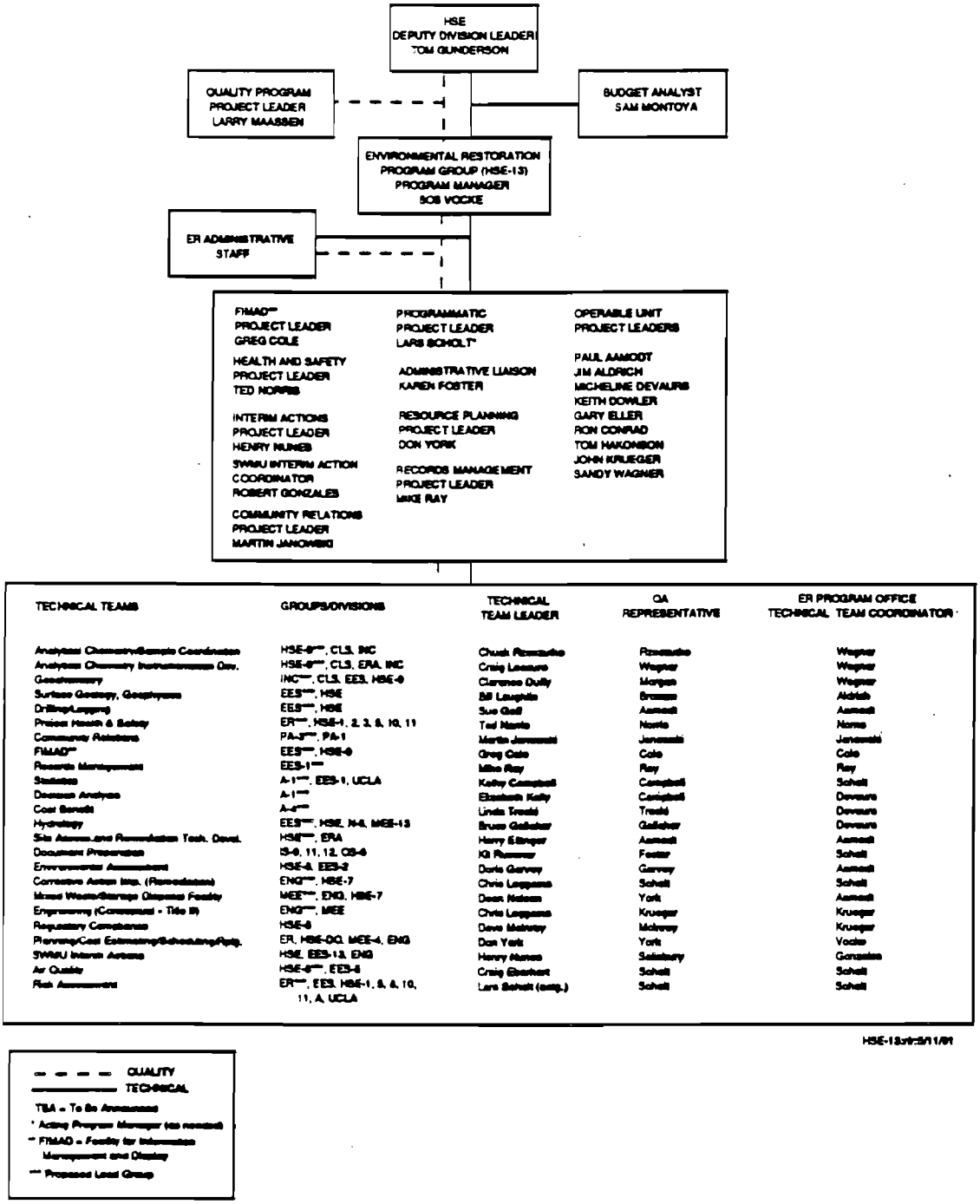


Fig. 21.5-1. Organization of the Environmental Restoration Program at Los Alamos National Laboratory.

TABLE 21.5-I TA-21 OU RFI PERSONNEL[a]

OPERABLE UNIT PROJECT LEADER	Micheline Devaurs, HSE-13
ASSISTANT TO OUPL	Karen West (Assistant), EES-1
FIELD TEAMS MANAGER	Ward Hawkins, EES-1
FIELD TEAM LEADERS	TBD[b]
FIELD TEAM MEMBERS	TBD[b]
TECHNICAL TEAM MEMBERS	Dave Broxton (geology), EES-1
	Elizabeth Kelly (statistics), EES-1
	W. John Smith (radiation ecology), R.F. Weston, Inc.
	TBD[b] (Hydrology)
	TBD[b] (Geochemistry)

[a]Current as of May 1, 1991. All personnel are located at the Laboratory, unless otherwise indicated. Note that additional laboratory and contractor personnel will be added as needed to implement the RFI.

[b]TBD - To be determined.

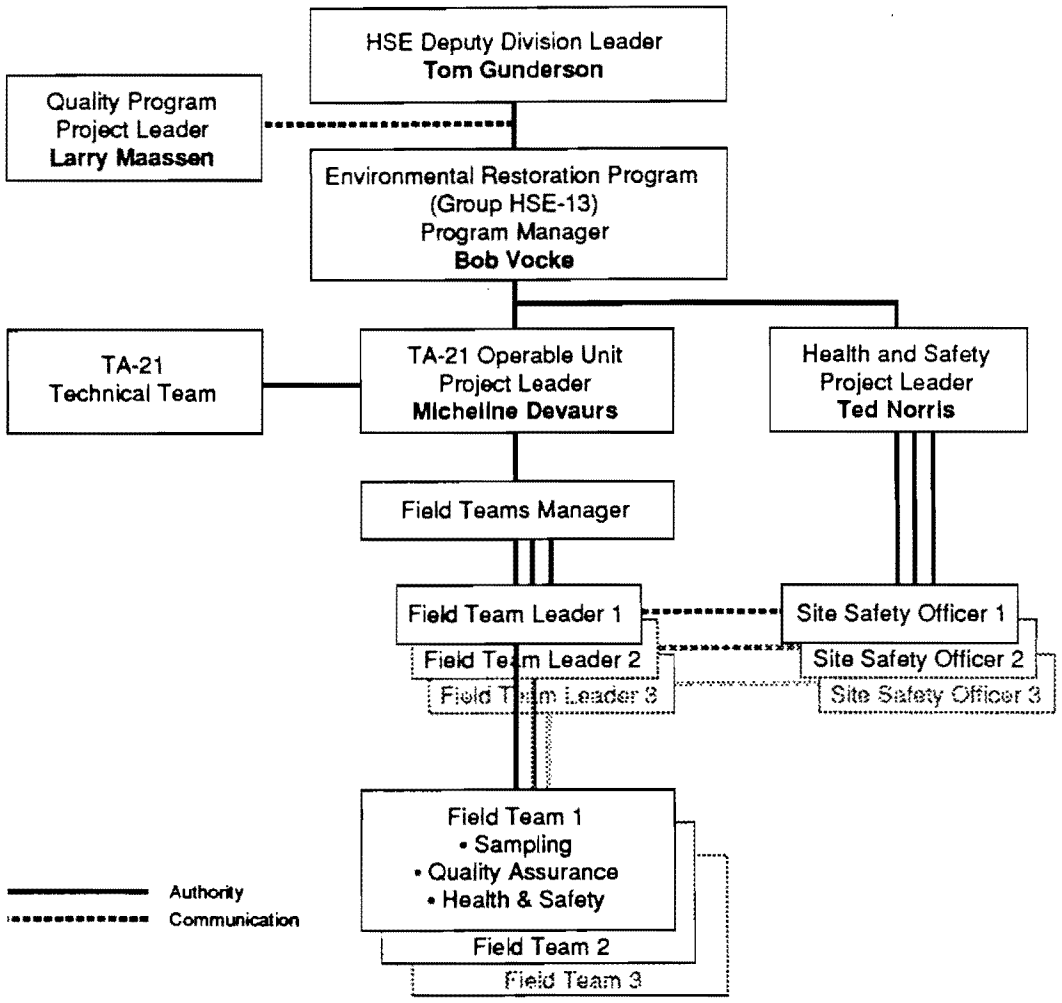


Fig. 21.5-2 TA-21 Operable Unit field work organization chart showing health and safety and quality assurance responsiblity.

Technical Team Members

Technical team members are responsible for providing technical input for their discipline throughout the RFI/CMS process. During the TA-21 OU RFI, they have participated in the development of this work plan and the individual field sampling plans and will participate in the field work, data analysis, report preparation, work plan modifications, and planning of subsequent investigations as necessary.

The primary disciplines currently represented on the TA-21 OU technical team are hydrogeology, statistics, geochemistry, and health physics. The composition of the technical team may change with time as the technical expertise needed to implement the TA-21 OU RFI changes.

TA-21 Field Teams Manager

- oversees day-to-day field operations;
- conducts planning and scheduling for the implementation of the RFI field activities detailed in Chapters 12 through 19; and
- manages field team members.

Field Team Leader

The Field Teams Manager will assign field work to Field Team Leaders for implementation in the field. Each Field Team Leader will direct the execution of field sampling activities, using crews of field team members as appropriate for the activity. Field Team Leaders may be contractor personnel.

Field Team Member(s)

Field Team Members may include, as appropriate

- sampling personnel,
- site safety officer,
- geologists,
- hydrologists,
- health physicists, and
- other applicable disciplines.

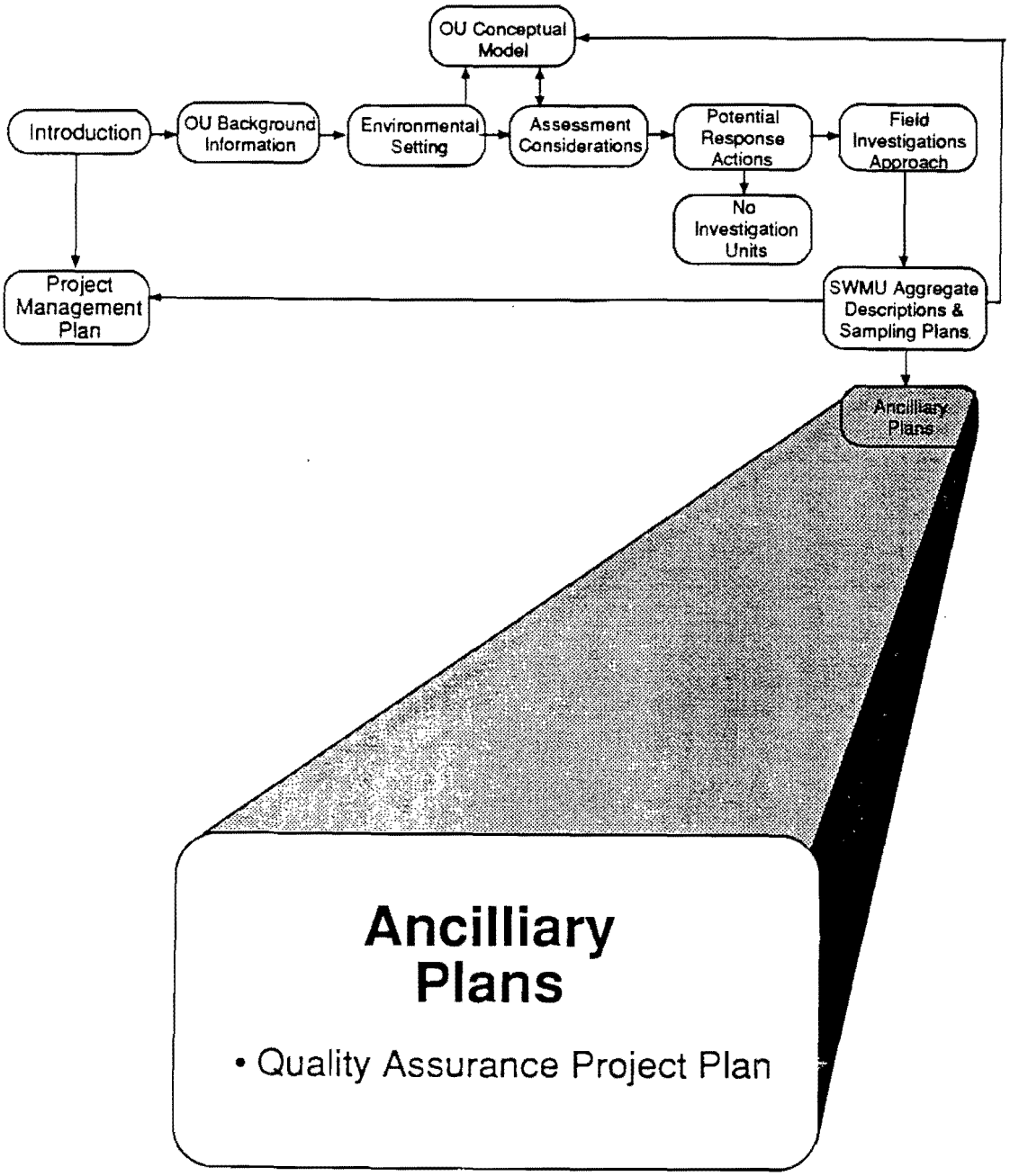
All teams will have, at a minimum, a site safety officer and a qualified field sampler. They are responsible for conducting the work detailed in field sampling plans, under the direction of the field team leader. Field team members may be contractor personnel.

References

EPA (US Environmental Protection Agency)1990. RCRA Permit No. NM0890010515, EPA Region VI, issued to Los Alamos National Laboratory, Los Alamos, New Mexico, effective May 23, 1990, Dallas, Texas.

LANL (Los Alamos National Laboratory), November 1990. "Installation Work Plan for Environmental Restoration," Los Alamos National Laboratory Report LA-UR-90-3825, Los Alamos, New Mexico.

APPENDIX A


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
Ancilliary Plans
Ancilliary Plans
• Quality Assurance Project Plan

APPENDIX A

TECHNICAL AREA 21 Operable Unit
QUALITY ASSURANCE PROJECT PLAN

for the
LOS ALAMOS NATIONAL LABORATORY
ENVIRONMENTAL RESTORATION PROGRAM

I. APPROVAL FOR IMPLEMENTATION

1. NAME: Robert Vocke
   TITLE: ER Program Manager, Los Alamos National Laboratory

   SIGNATURE:_____ DATE:_____

2. NAME: Larry Maassen
   TITLE: Quality Assurance Project Leader, ER Program, Los Alamos National Laboratory

   SIGNATURE:_____ DATE:_____

3. NAME: Craig Leasure
   TITLE: Group Leader, Health and Environmental Chemistry Group (HSE-9)

   SIGNATURE:_____ DATE:_____

4. NAME: Margaret Gautier
   TITLE: Quality Assurance Officer, Health and Environmental Chemistry Group (HSE-9)

   SIGNATURE:_____ DATE:_____

5. NAME: Micheline Devaurs
   TITLE: Project Leader, Los Alamos National Laboratory

   SIGNATURE:_____ DATE:_____

6. NAME: Charles Ritchey
   TITLE: Acting Chief of Office of Quality Assurance, Region VI Environmental Protection Agency

   SIGNATURE:_____ DATE:_____

Attachment A. Data Quality Objective Example Scenario A-1

Attachment B. Quality Assurance/Quality Control Definitions B-1

Distribution of Official Copies
A list of the recipients of the official copies of this plan, and any subsequent revisions, will be developed and maintained as a document control activity.

LIST OF ACRONYMS

AP	-	Administrative Procedure
ASA	-	American Society of Agronomy, Inc.
ASTM	-	American Society for Testing and Materials
COE	-	U.S. Army Corp of Engineers
DOE	-	U.S. Department of Energy
DQO	-	Data Quality Objective
EPA	-	U.S. Environmental Protection Agency
ER	-	Environmental Restoration
FIMAD	-	Facility for Information Management, Analysis and Display
H&S	-	Health and Safety
HSE	-	Health, Safety and Environment Division
ICPMS	-	Inductively Coupled Plasma Mass Spectroscopy
IWP	-	Installation Work Plan
LANL	-	Los Alamos National Laboratory
OU	-	Operable Unit
PCB	-	Polychlorinated biphenyl
PL	-	Project Leader
PM	-	Program Manager
QA	-	Quality Assurance
QAP	-	Quality Assurance Plan
QAPjP	-	Quality Assurance Project Plan
QA/QC	-	Quality Assurance/Quality Control
QC	-	Quality Control
QP	-	Quality Procedure
QPP	-	Quality Program Plan
QPPL	-	Quality Program Project Leader
RCRA	-	Resource Conservation and Recovery Act
RFI	-	RCRA Facility Investigation
RMP	-	Records Management Plan
SMF	-	Sample Management Facility
SOP	-	Standard Operating Procedure
SSSA	-	Soil Science Society of America, Inc.
SW	-	Solid Waste
SWMU	-	Solid Waste Management Unit
USATHAMA	-	U.S. Army Toxic and Hazardous Materials Agency

3.0. Project Description

3.1. Introduction

This Technical Area (TA)-21 RFI [Resource Conservation and Recovery Act (RCRA) Facility Investigation] Operable Unit (OU) Quality Assurance Project Plan (QAPjP) is tiered to the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) Program Generic QAPjP (LANL 1991b). Information that is specific to the TA-21 OU RFI QAPjP is presented in detail in this document. Information that is covered by the LANL ER Program Generic QAPjP, or is presented elsewhere, has been referenced to that specific document chapter.

This TA-21 OU RFI QAPjP integrates the U.S. Environmental Protection Agency (EPA) 16-point QAMS-005/80 guidance (EPA 1980), as well as the ASME NQA-1-1989 edition of "Quality Assurance Program Requirements for Nuclear Facilities (ASME 1989) (as specified in DOE Order 5700.6B). The integration is described in Sec. 3, Quality Assurance Program, of the LANL ER Quality Program Plan (QPP),which was published as Annex II of the Laboratory's Installation Work Plan (IWP) (LANL 1990).

A description of the TA-21 OU RFI and tasks is presented in Chapter 2 of the TA-21-OU Work Plan.

3.2. Facility Description

A facility description of Los Alamos National Laboratory is presented in Sec. 2.0 of the LANL Installation Work Plan (IWP)(LANL 1990). Additional historical information on TA-21 is presented in Chapter 3 of the TA-21 OU RFI Work Plan.

3.3. Environmental Restoration Program

A description of the ER Program is presented in Sec. 3.0 of the LANL IWP (LANL 1990).

3.4. Project Description

3.4.1. Project Objectives

Information regarding the TA-21 OU RFI project objectives is presented in Sec. 2.3.2 and Tables 9.1-I and 9.1-II in Chapter 9 of the TA-21 OU RFI Work Plan.

3.4.2. Project Schedule

Project activity dates are presented in Sec. 21.2 of the TA-21 OU RFI Work Plan.

3.4.3. Project Scope

This information is presented in Sec. 2.2 of the TA-21 OU RFI Work Plan.

3.4.4. Background Information

This information is presented in various sections of Chapter 3 of the TA-21 OU RFI Work Plan.

3.4.5. Data Usage

Information regarding data usage and data users is presented in Chapter 9 and Tables 9.1-I and 9.1-II of the TA-21 OU RFI Work Plan. Data collected during the RFI at the TA-21 OU will be used to define the presence or absence of contamination at Solid Waste Management Units (SWMUs) or SWMU aggregates, as detailed in the field sampling plans in Chapters 12 through 19 of the TA-21 OU RFI Work Plan. Section 11.9 of the TA-21 OU RFI Work Plan provides an overview of important aspects of data analysis for the TA-21 OU. Data collected during the RFI will be input into the Facility for Information Management, Analysis and Display (FIMAD) following the ER Records Management Procedure [see TA-21 OU RFI Work Plan, Appendix C, Records Management Plan (RMP)], and analyzed, as appropriate, using statistical techniques, kriging, 2- and 3-dimensional modeling or other appropriate methods (see IWP Annex IV (LANL 1990) and IWP updates for additional detail as FIMAD develops).

4.0. Project Organization and Responsibility

The overall organizational structure of the ER Program is presented in Sec. 2.0 of the LANL ER Program QPP (IWP Annex II, LANL 1990). Therein, ER program personnel are identified down to the technical team leader and operable unit project leader level, and personnel responsibilities and line authority are detailed. In addition, the Quality Assurance (QA) organizational structure is presented, and personnel qualifications are detailed.

Detailed information pertinent to the management organization for TA-21 OU RFI is provided in Chapter 21 of the TA-21 OU RFI Work Plan. Records of qualifications and training of all personnel working on the TA-21 OU RFI field work will be kept as ER Records (see Appendix C, RMP) of the TA-21 OU RFI Work Plan). Additional information on general responsibilities of personnel is also in the Management Plan, Chapter 21 of the TA-21 OU RFI Work Plan.

The following details QA responsibilities of personnel:

TA-21 Operable Unit Project Leader

- oversees day-to-day operations, including planning, scheduling, and reporting technical and related administrative activities;
- ensures preparation of scientific investigation planning documents and procedures;
- prepares monthly and quarterly reports for the Project Manager (PM);
- oversees subcontractors, as appropriate;
- coordinates with technical team leaders;
- conducts technical reviews of the milestones and final reports;
- interfaces with the ER Quality Program Project Leader (QPPL) to resolve quality concerns and to coordinate with the QA staff for audits;
- complies with the LANL ER Program health and safety, records management, and community relations procedures;
- oversees RFI field work and manages the field teams manager; and
- complies with the Laboratory's technical and QA requirements for the LANL ER Program.

TA-21 Field Teams Manager

- oversees day-to-day field operations, including planning, scheduling and implementation of RFI field activities detailed in Chapters 12-19 of the TA-21 OU RFI Work Plan; and
- manages field team members.

Field Team Member(s)

Field team members will include, depending upon the sampling activity being conducted, sampling personnel, a site safety officer, and staff members with technical knowledge of geology, hydrology, statistics, or other applicable disciplines.

The TA-21 OU RFI project management is presented in Chapter 21 of the TA-21 OU RFI Work Plan.

5.0. Quality Assurance Objectives for Measurement Data in terms of Precision, Accuracy, Representativeness, Completeness, and Comparability

5.1. Level of Quality Control

5.1.1. Field Sampling

A discussion of quality control samples for the ER Program is presented in Sec. 6.1 of the LANL ER Program Generic QAPjP (LANL 1991b). The frequency and type of field quality control samples identified in the LANL ER Program Generic QAPjP will be followed for chemical analyses of samples during the TA-21 OU RFI. The TA-21 OU RFI exception to the LANL ER Program Generic QAPjP level of field quality control samples is reagent blanks. Reagent blanks, both for soil and water sampling activities, will not be collected.

Soil samples for geotechnical analyses will be collected during the TA-21 OU RFI. These analyses will use either conventional laboratory procedures [e.g., American Society for Testing and Materials (ASTM)] or SOPs. In contrast to samples submitted for chemical analyses, field quality control samples are not routinely associated with geotechnical samples. Quality control for geotechnical sample analysis results is prescribed in the specific laboratory procedure. An additional measure of quality control for geotechnical samples is achieved by the collection and submittal to the laboratory of a sufficient volume of sample. A large sample volume may provide for reanalysis of an individual sample in the event results from the initial aliquot did not meet specific method requirements.

5.1.2. Field Measurements

The quality control level of effort for field measurements performed during the TA-21 OU RFI will follow the recommendations presented in Table V.1 in Sec. 5.1.2 of the LANL ER Program Generic QAPjP (LANL 1991b).

5.1.3. Analytical Laboratory

The analytical laboratory quality control level of effort for the TA-21 OU RFI will follow the recommendations specified in the U.S. EPA methods or the frequency presented in Table V.2 of Sec. 5.1.3 of the LANL ER Program Generic QAPjP (LANL 1991b).

5.2. Precision, Accuracy, and Sensitivity of Analyses

The analytical laboratory quality control acceptance criteria for precision, accuracy, and sensitivity of analyses for the TA-21 OU RFI will use the methods and detection limits specified for the U.S. EPA and U.S. Department of Energy (DOE) methods presented in Sec. 5.2 of the LANL ER Program Generic QAPjP (LANL 1991b). Specifically, the following will be used (or excluded from use) at the TA-21 OU:

- Table V.3 for volatile organic compounds
- Table V.4 for semivolatiles
- Tables V.5 and V.6 for polychlorinated biphenyls (PCBs) except that organochlorine pesticides are not included in the work at the TA-21 OU
- Table V.7 for inorganics
- Table V.8 for radionuclides
- Table V.9 for miscellaneous analytes
- Table V.10, for high explosives, is excluded from the work planned at the TA-21 OU

Any specific analyte identified in the tables listed above may be included in the RFI investigations at the TA-21 OU. Broad categories not included for work at the TA-21 OU are the pesticides (included in Tables V.5 and V.6), and high explosives (Table V.10), as noted above.

The analytical laboratory quality control acceptance criteria for precision, accuracy, and sensitivity of analyses that are to be used are not specific to the TA-21 OU RFI. The table numbers cited in the sections below correspond to the table numbers in the LANL ER Program Generic QAPjP (LANL 1991b), and include the analytes specific to TA-21.

5.3. Quality Assurance Objectives for Precision

The quality assurance objectives for precision of laboratory analyses for TA-21 OU RFI samples will follow the U.S. EPA guidance specified in Sec. 5.3 and Table V.11 of the LANL ER Program Generic QAPjP (LANL 1991b).

5.4. Quality Assurance Objectives for Accuracy

The quality assurance objectives for accuracy of laboratory analyses for TA-21 OU RFI samples will follow the U.S. EPA guidance specified in Sec. 5.4 and Tables V.11 and V.12 of the LANL ER Program Generic QAPjP (LANL 1991b).

5.5. Representativeness, Completeness, and Comparability

The field sampling plans in Chapters 12 through 19 of the TA-21 OU RFI Work Plan were developed to meet the sample representativeness criteria described in Sec. 14.3 of the ER Program Generic QAPjP (LANL 1991b).

Completeness of analytical data from the TA-21 OU RFI will be calculated according to the formula presented in Sec. 14.4 of the ER Program Generic QAPjP (LANL 1991b). The quality assurance objective for analytical data completeness for the LANL ER Program is 90%, which is also the objective for the TA-21 OU RFI.

Data comparability for the TA-21 OU RFI will be achieved through the use of standard sampling and analytical techniques. Sampling will be performed according to LANL ER Program Standard Operating Procedures (SOPs) (LANL 1991a). Sample analyses will be performed according to analytical methods referenced in the LANL ER Program Generic QAPjP (LANL 1991b) or this TA-21 OU RFI QAPjP. Data results will be reported in appropriate units consistent with existing site data and applicable regulatory levels.

5.6. Field Measurements

Field laboratory measurements for the TA-21 OU RFI will be performed according to Quality Assurance/Quality Control (QA/QC) procedures described in LANL ER Program SOPs (LANL 1991a). Adherence to the LANL ER Program SOPs will ensure the accuracy, precision, and completeness of the field measurement data.

5.7. Data Quality Objectives

All Data Quality Objective (DQO) elements are covered in various sections of the TA-21 OU RFI Work Plan and the LANL ER Program Generic QAPjP (LANL 1991b).

DQOs and the development process for the TA-21 OU RFI are described in Chapter 9 of the TA-21 OU RFI Work Plan. Tables 9.1-I and 9.1-II in Chapter 9 of the TA-21 OU RFI Work Plan

present specific objectives for each investigation unit. Each sampling plan chapter (Chapters 12–19 of the TA-21 OU RFI Work Plan) also contains a list of data needs, location figures, and sampling and analytical requirement tables that are specific to each SWMU.

Data analysis, interpretation, statistical representativeness, and applicability to the conceptual model are discussed in Chapters 6, 9, and 11 of the TA-21 OU RFI Work Plan.

TA-21 OU RFI budget and schedule information relative to anticipated field and laboratory activities is presented in Secs. 21.2 and 21.3 of the TA-21 OU RFI Work Plan.

6.0. Sampling Procedures

Procedures for collecting soil and aqueous samples will be selected, as appropriate, from the LANL ER Program SOPs (LANL 1991a). A general description of all types of field investigations is also presented in Chapter 11 of the TA-21 OU RFI Work Plan.

Information on required sample containers, volume, preservation, and holding times is presented in LANL ER Program SOP, "Containers, Sampling and Preservation" (LANL 1991a) and in Sec. 6 of the LANL ER Program Generic QAPjP (LANL 1991b).

Sample coordination is described in Sec. 6.0 of the LANL ER Program Generic QAPjP (LANL 1991b). Instructions for handling, packaging, and shipping of samples are described in general in Sec. 6.0 and Sec. 7.5 of the LANL ER Program Generic QAPjP and in detail in LANL ER Program SOP, "Guide to Handling, Packaging and Shipping of Samples" (LANL 1991a).

6.1. Quality Control Samples

A discussion of quality control samples for the ER Program is presented in Sec. 6.1 of the LANL ER Program Generic QAPjP (LANL 1991b). The frequency and type of field quality control samples identified in the LANL ER Program Generic QAPjP will be followed for chemical analyses of samples during the TA-21 OU RFI.

Soil samples for geotechnical analyses will be collected during the TA-21 OU RFI. In contrast to samples submitted for chemical analyses, field quality control samples are not routinely associated with geotechnical samples. Quality control for geotechnical sample analysis results is prescribed in the specific laboratory procedure. An additional measure of quality control for geotechnical samples is achieved by the collection and submittal to the laboratory of a sufficient volume of sample. A large sample volume may provide for reanalysis of an individual sample in the event results from the initial aliquot did not meet specific method requirements.

6.2. Sample Preservation During Shipment

Information on sample preservation during shipment is presented in LANL ER Program SOP, "Containers, Sampling and Preservation" (LANL 1991a) and in Sec. 6.2 of the LANL ER Program Generic QAPjP (LANL 1991b).

6.3. Equipment Decontamination

Equipment decontamination is described in Sec. 6.3 of the LANL ER Program Generic QAPjP (LANL 1991b), and in LANL ER Program SOP, "General Equipment Decontamination" (LANL 1991a). LANL ER Program SOP, "RFI Generated Waste Management" (LANL 1991a), provides information for proper handling and disposition of wash water and other materials generated during equipment decontamination.

6.4. Sample Designation

Samples will be assigned a unique alphanumeric identifier to provide chain of custody control during the transfer of samples from the time of collection through analysis and reporting. This information is detailed in LANL ER Program SOP "Sample Control and Documentation" (LANL 1991a).

7.0. SAMPLE CUSTODY

7.1. Overview

Field and laboratory sample chain of custody procedures are described in Sec. 7 of the LANL ER Program Generic QAPjP (LANL 1991b). These procedures will be followed for sampling activities conducted during the TA-21 OU RFI. The LANL ER Program SOP, "Sample Control and Documentation" (LANL 1991a), also provides the guidance for chain of custody procedures, including example chain of custody records and tags.

7.2. Field Documentation

A sample numbering system developed for the LANL ER Program uniquely identifies each boring location, monitor well, and sample collected. The LANL ER Program numbering system, including standard sample identifiers, identifiers for quality control samples, and the code system to be used is detailed in LANL ER Program SOP, "Sample Control and Documentation" (LANL 1991a).

Section 7.2 of the LANL ER Program Generic QAPjP (LANL 1991b) provides sample documentation guidance for field personnel involved with sample collection activities. The LANL ER program numbering system will be followed for all sampling activities conducted during the TA-21 OU RFI. All field data collection forms will be reviewed by the TA-21 Field Teams Manager, or a technical reviewer designee, before being submitted to the LANL ER Records Processing Facility. Incorrect entries will be crossed out with a single line and signed and dated by the person originating the entry and the TA-21 field teams manager or a technical reviewer designee.

7.3. Sample Management Facility

Section 7.3 of the LANL ER Program Generic QAPjP (LANL 1991b) provides a discussion of the ER Program activities coordinated by the LANL ER Program Sample Management Facility (SMF). The activities described will be accomplished for the TA-21 OU RFI effort.

7.4. Laboratory Documentation

Laboratory custody procedures associated with sample receipt, storage, preparation, analysis, and general security are described in Sec. 7.4 of the LANL ER Program Generic QAPjP (LANL 1991b). These procedures will be followed by all laboratories participating in chemical analysis of samples generated during the TA-21 OU RFI.

Laboratories providing radiological and geotechnical analyses of TA-21 OU RFI samples also will follow chain-of-custody and record-keeping procedures as described in Sec. 7.4 of the LANL ER Program Generic QAPjP (LANL 1991b). Sample storage for these samples will be according to requirements described in the analysis procedure or in the QA Plan of the laboratory. Sample tracking of these samples will be according to requirements described in the QA Plan of the laboratory.

Acquisition of appropriate QA manuals for all TA-21 OU RFI participating laboratories, including LANL HSE-9, is the responsibility of the LANL SMF.

7.5 Sample Handling, Packaging, and Shipping

Sample handling, packaging, and shipping procedures are described in Sec. 7.5 of the LANL ER Program Generic QAPjP (LANL 1991b) and in LANL ER Program SOP, "Guide to Handling, Packaging and Shipping of Samples" (LANL 1991a).

7.6 Final Evidence File Documentation

Final evidence file documentation is described in Sec. 7.6 of the LANL ER Program Generic QAPjP (LANL 1991b) and in the Records Management Plan, Annex IV of the IWP (LANL 1990).

TA-21 OU RFI activities will follow these ER Program-wide procedures. SOPs will be developed, reviewed, and approved if needed.

8.0. Calibration Procedures and Frequency

8.1. Overview

Section 8 of the ER Program Generic QAPjP (LANL 1991b) contains information on the calibration procedures and frequency of calibration for both field and laboratory equipment. As appropriate, additional information is also referenced to the ER Program SOPs (LANL 1991a) and the manufacturer's equipment manual.

8.2. Field Equipment

Field equipment that will be used during the TA-21 OU RFI includes those instruments described in Chapter 11 of the TA-21 OU RFI Work Plan. Specific information regarding calibration procedures and frequency of calibration for field equipment is presented in the applicable LANL ER Program SOPs (LANL 1991a) and the manufacturer's equipment manual.

8.3. Laboratory Equipment

Section 8.3 of the ER Program Generic QAPjP (LANL 1991b) contains general information on the calibration procedures and frequency of calibration for laboratory equipment. Specific instrument calibration procedures for various analytical instruments are described in detail in the QA manuals of the participating laboratories. Acquisition of appropriate QA manuals for all TA-21 OU RFI participating laboratories, including LANL HSE-9, is the responsibility of the LANL SMF.

The LANL ER Program SOPs (LANL 1991a) have been provided to U.S. EPA Region VI under separate submittal and are not attached to this TA-21 OU RFI QAPjP.

9.0. Analytical Procedures

9.1. Overview

Field and laboratory analytical measurements for TA-21 OU RFI samples will be performed according to LANL ER Program SOPs (LANL 1991a).

9.2. Field Testing and Screening

Field testing and screening of samples during the TA-21 OU RFI will follow LANL ER Program SOPs (LANL 1991a).

9.3. Laboratory Methods

The analytical methods to be used for the TA-21 OU RFI for aqueous and soil/sediment samples are those presented in Sec. 9.3 of the ER Program Generic QAPjP (LANL 1991b). All of the analytical methods presented there are applicable to the TA-21 OU RFI with the exceptions noted in Sec. 5.2 above; pesticides will not be analytes in this investigation and analyses for high explosives are not required for this investigation. Where those analytes appear in Tables IX.1 and IX.2 of Sec. 9 of the LANL ER Program Generic QAPjP, they do not apply to the TA-21 OU RFI.

Additional QA/QC information for the methods applicable to this investigation is presented in Sec. 5 of this TA-21 OU RFI QAPjP.

10.0. Data Reduction, Validation, and Reporting

10.1. Data Reduction

Field and laboratory data reduction for the TA-21 OU RFI will follow the protocols described in Sec. 10.1 of the LANL ER Program Generic QAPjP (LANL 1991b).

10.2. Data Validation

Field and laboratory data validation for the TA-21 OU RFI will follow the protocols described in Sec. 10.2 of the LANL ER Program Generic QAPjP (LANL 1991b), except no reagent blanks are planned.

10.3. Data Reporting

Field and laboratory data reporting for the TA-21 OU RFI will be as described in Sec. 10.3 of the LANL ER Program Generic QAPjP (LANL 1991b).

11.0. Internal Quality Control Checks

11.1. Field Sampling Quality Control Checks

A discussion of field quality control samples for the ER Program is presented in Sec. 6.1 of the LANL ER Program Generic QAPjP (LANL 1991b). The frequency and type of field quality control samples identified in the LANL ER Program Generic QAPjP will be followed, in general, for chemical analyses of samples during the TA-21 OU RFI.

11.2. Laboratory Analytical Activities

The types and frequency of internal quality control samples that apply to TA-21 OU RFI laboratory activities will follow those that are presented in Sec. 11.2 of the ER Program Generic QAPjP (LANL 1991b).

12.0. Peformance and System Audits

Performance and system audits for field and laboratory operations will be conducted during the TA-21 OU RFI. These audits will be performed as identified and referenced in Sec. 12 of the LANL ER Program Generic QAPjP (LANL 1991b).

13.0. Preventive Maintenance

13.1. Field Equipment

Preventive maintenance requirements for TA-21 OU RFI field equipment will follow specifications described in Sec. 13.1 of the LANL ER Program Generic QAPjP (LANL 1991b). Additional information is detailed in the ER Program SOPs (LANL 1991a), which define the required equipment checks for each type of field equipment. LANL ER Program SOPs have been provided to U.S. EPA Region VI under separate submittal and are not attached to this TA-21 OU RFI QAPjP.

13.2. Laboratory Equipment

TA-21 OU RFI preventive maintenance requirements for laboratory equipment will follow the specifications described in Sec. 13.2 of the LANL ER Program Generic QAPjP (LANL 1991b). The elements of the LANL HSE-9 Analytical Laboratory preventive maintenance program are discussed in Chapters 12 and 14 of the Health and Environmental Chemistry Laboratory Quality Assurance Program Plan (Gladney and Gautier 1991).

14.0. Specific Routine Procedures used to Assess Data Precision, Accuracy, Representatives, and Completeness

14.1. Precision

Analytical precision for TA-21 OU RFI data will be calculated according to the formula presented in Sec. 14.1 of the ER Program Generic QAPjP (LANL 1991b).

14.2. Accuracy

Analytical accuracy of TA-21 OU RFI data will be calculated according to the formula presented in Sec. 14.2 of the ER Program Generic QAPjP (LANL 1991b).

14.3. Sample Representativeness

The field sampling plans in Chapters 12 through 19 of the TA-21 OU RFI Work Plan were developed to meet the sample representativeness criteria described in Sec. 14.3 of the ER Program Generic QAPjP (LANL 1991b).

14.4. Completeness

Completeness of analytical data from the TA-21 OU RFI will be calculated according to the formula presented in Sec. 14.4 of the ER Program Generic QAPjP (LANL 1991b).

The quality assurance objective for analytical data completeness for the LANL ER Program is 90%, which will also be the objective for the TA-21 OU RFI.

15.0. Corrective Action

15.1. Overview

The procedures, reporting requirements, and authority for initiating corrective action during the TA-21 OU RFI will follow those defined in Sec. 15 of the ER Program Generic QAPjP (LANL 1991b) and in LANL-ER-QP-01.3Q, "Deficiency Reporting."

15.2. Field Corrective Action

Field corrective actions required during the TA-21 OU RFI will follow the process defined in Sec. 15.2 of the ER Program Generic QAPjP (LANL 1991b).

15.3. Laboratory Corrective Action

Laboratory corrective actions required during the TA-21 OU RFI will follow the process defined in Sec. 15.3 of the ER Program Generic QAPjP (LANL 1991b).

16.0. Quality Assurance Reports to Management

16.1. Field Quality Assurance Reports to Management

The TA-21 Field Teams Manager or a designee will provide a monthly field progress status report to the LANL ER Program Manager. This report will consist of the information identified in Sec. 16.1 of the ER Program Generic QAPjP (LANL 1991b).

16.2. Laboratory Quality Assurance Reports to Management

The laboratory QA reports identified in Sec. 16.2 of the ER Program Generic QAPjP (LANL 1991b) will be prepared during the TA-21 OU RFI.

16.3. Internal Management Quality Assurance Reports

The internal management QA reports identified in Sec. 16.3 of the ER Program Generic QAPjP (LANL 1991b) will be prepared during the TA-21 OU RFI.

Attachment A — Data Quality Objective —Example Scenario

Data Quality Objectives and the development process for the TA-21 OU RFI are described in Chapter 9 of the TA-21 OU RFI Work Plan. Tables 9.1-I and 9.1-II in Chapter 9 of the TA-21 OU RFI Work Plan also present specific objectives for each investigation unit. Each sampling plan chapter (Chapters 12–19 of the TA-21 OU RFI Work Plan) contains a list of data needs, location figures, and sampling and analytical requirement tables that are specific to each SWMU.

Data analysis, interpretation, statistical representativeness, and applicability to the conceptual model are discussed in Chapters 6, 9, and 11 of the TA-21 OU RFI Work Plan.

Attachment B —Quality Assurance/Quality Control Definitions

Quality Assurance/Quality Control definitions presented in Appendix B of the LANL ER Program Generic QAPjP (LANL 1991b) are applicable to activities described in this TA-21 OU RFI QAPjP.

References

ANSI/ASME (American National Standards Institute/American Society of Mechanical Engineers)1989. "Quality Assurance Requirements for Nuclear Facilities," NQA-1-1989, 345 East 47th Street, New York, New York.

EPA (US Environmental Protection Agency) 1980. "Interim Guidelines and Specifications for Preparing Quality Assurance Program Plans," QAMS-004/80, Washington, DC.

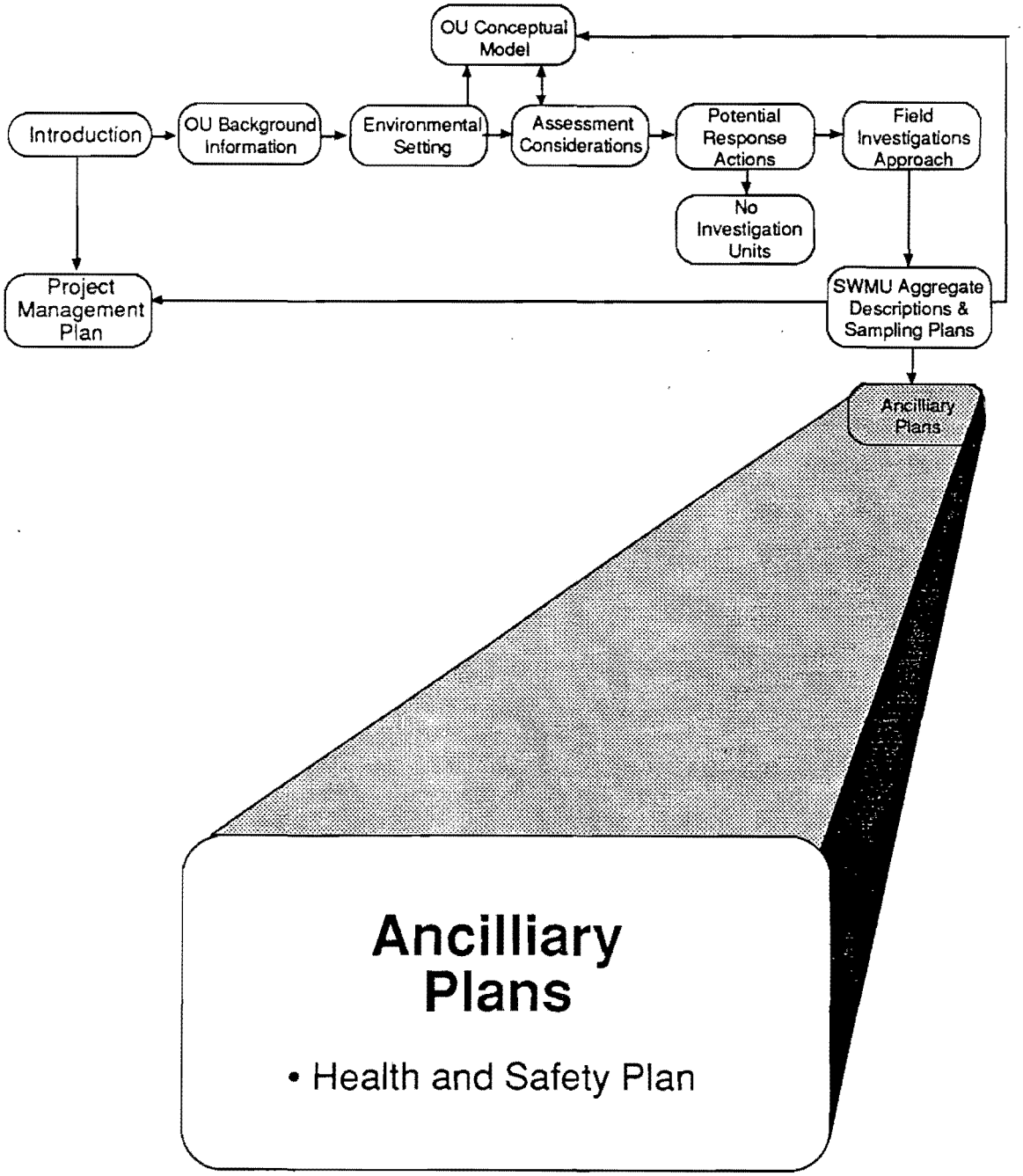
Gladney, E. S., and M. A. Gautier, January 1991. "Health and Environmental Chemistry Quality Assurance Program Plan," Los Alamos National Laboratory, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), November 1990. "Installation Work Plan for Environmental Restoration," Los Alamos National Laboratory Report LA-UR-90-3825, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), May 1991a. "Environmental Restoration Standard Operating Procedures," Vols. I, II, and III, Los Alamos, New Mexico.

LANL (Los Alamos National Laboratory), May 1991b. "Generic Quality Assurance Project Plan," Rev. 0, Environmental Restoration Program, Los Alamos, New Mexico.

APPENDIX B


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
Ancilliary Plans
Ancilliary Plans
• Health and Safety Plan

APPENDIX B – HEALTH AND SAFETY PLAN

1.0 Introduction

This OU-specific Health and Safety (H&S) Plan has been developed for the field investigations at TA-21. This plan includes an assessment of potential hazards, justification for personnel protection requirements, and site specific emergency response procedures. This document is tiered to the Installation Work Plan (IWP), Annex III, H&S Plan (LANL 1990). A copy of this plan must be kept on site at all times.

The specific purpose of this plan is to establish guidelines for field personnel involved in the OU-wide and SWMU-specific investigations at the TA-21 OU. This plan only applies to the field investigations associated with the TA-21 OU. A new plan must be initiated for any corrective actions. In addition to following the general guidance in the IWP, the following regulations and standards were used to develop the procedures set forth in this plan: Laboratory policies, LANL H&S Manual, DOE Orders, Occupational Safety and Health Administration (OSHA) regulations, National Institute for Occupational Health (NIOSH) standards, American Conference of Governmental Industrial Hygienists (ACGIH) recommendations, Nuclear Regulatory Commission (NRC) regulations, and Environmental Protection Agency (EPA) guidance. These standards and regulations have been established for the protection of workers on hazardous waste and radiation sites. The areas of concern at TA-21 are considered to have both hazardous waste and radioactively contaminated materials. Therefore, adherence to this plan is essential to the health and safety of workers as well as the general public.

The responsibilities of personnel with regard to the TA-21 OU health and safety as detailed herein do not distinguish whether Laboratory or contractor personnel are implementing this plan. If, at a later time, who implements this plan (i.e., contractor or Laboratory personnel) affects how it is implemented, this plan will be modified. EPA will be notified of any such modifications.

2.0 Site History

In 1945, plutonium purification operations were transferred to TA-21. The main purpose of DP West was to produce metal and alloys of plutonium and other transuranic elements from the nitrate solution feedstock provided by other national laboratories. Plutonium purification generated solid and liquid wastes principally disposed of in TA-21 MDAs. These plutonium-processing activities were transferred to TA-55 in 1977, and TA-21 buildings were remodeled for other uses.

DP East began operation in 1947. Facilities were used to process polonium and actinium and to produce initiators. In addition, a Tritium Systems Test Assembly is housed at DP East. Chapter 3 of the TA-21 work plan presents a more detailed operational history of TA-21. Additionally, specific historical information by SWMU is presented in field sampling plans in Chapters 13 through 20, as appropriate.

For a specific listing of the chemical and radiological contaminants, see Sec. 4 of this Appendix.

3.0 Policy and Standards

The following information describes policies and standards set forth in this plan. It includes: specific line of responsibility, standards and regulations, and requirements for audits and variances of health and safety policies.

3.1. General Responsibilities

The general responsibilities are contained in Sec. 5.0 of the IWP, Annex III, H&S Plan. Listed below are specific responsibilities for personnel involved in this OU investigation.

3.2. Individual Responsibilities

Within line management of the ER Program activities, there are certain employees and contractors with specific health and safety responsibilities. Listed in Fig. B-I is the field work organization chart showing the responsibilities of the line organization.

Los Alamos HSE Deputy Division Leader

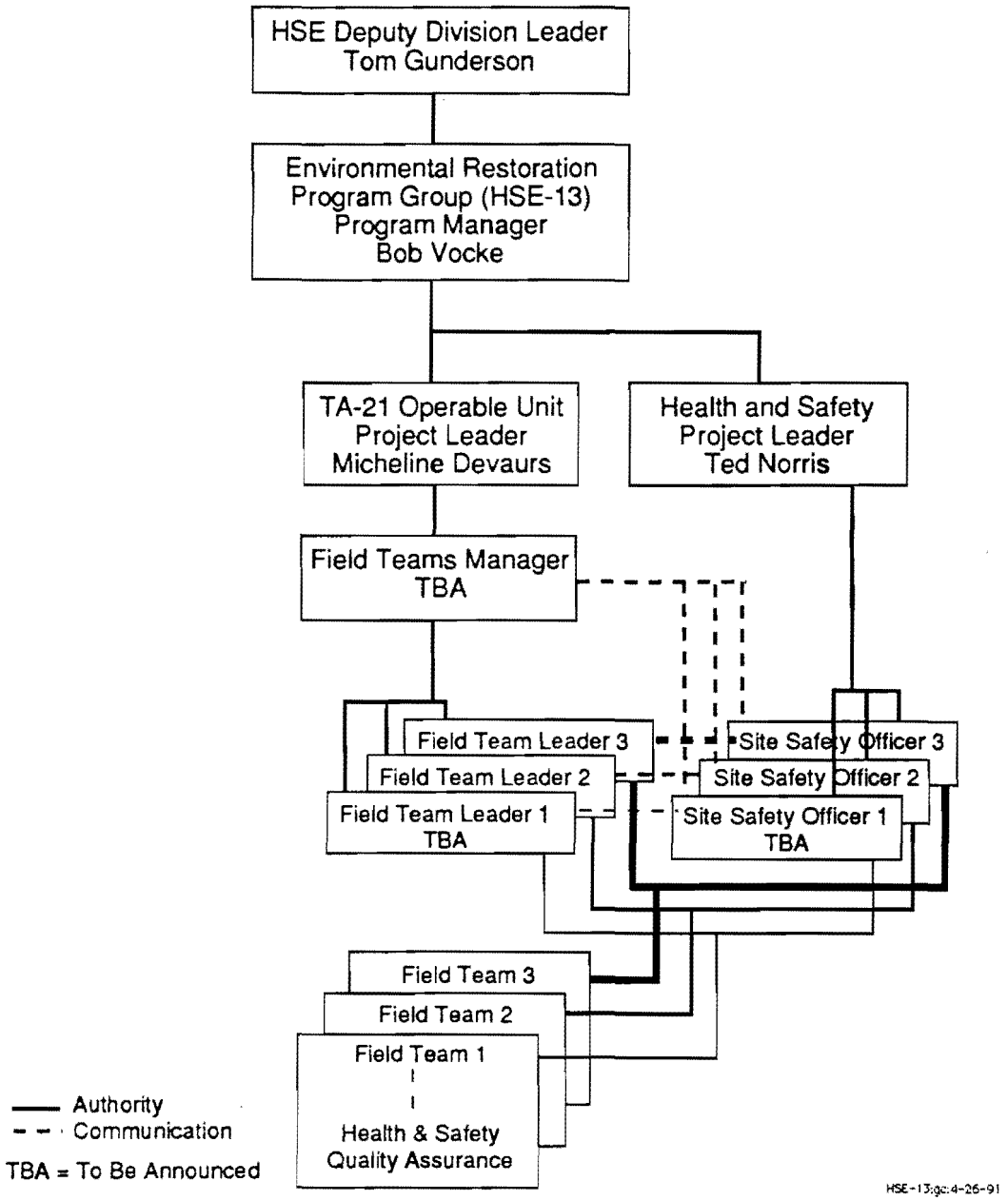
The Deputy Division Leaders are responsible for ensuring that programmatic health and safety concerns are addressed. They are also responsible for promoting a comprehensive health and safety program that will cover special fields such as radiation protection, occupational medicine, industrial safety, industrial hygiene, criticality safety, waste management, and environmental protection and preservation.

ER Program Manager

The ER Program Manager is responsible for the overall health and safety program for ER Program activities. He/she must ensure that the health and safety programs are established, implemented, and supported.

FIGURE B-1

TA-21 Operable Unit Field Work Organization, Showing Health and Safety Responsibility



Health and Safety Project Leader

The H&S Project Leader (PL) is responsible for updating and implementing the ER Program H&S Plan (LANL 1990) and for reviewing operable unit H&S Plans. He/she is also responsible for interfacing and coordinating with Laboratory personnel to use resources appropriate for the ER H&S program, and to ensure ER Program compliance with all applicable H&S policies and regulations. In conjunction with the Field Teams Manager, the H&S PL oversees day-to-day health and safety activities in the field.

Operable Unit Project Leader

The OU PL is responsible for

- preparation, review, implementation, and revision of OU health and safety documents;
- interface with H&S PL to resolve health and safety concerns.

Field Teams Manager

The Field Teams Manager is responsible for

- compliance with the OU health and safety plan and responsibility for the health and safety of the field team members;
- assignment of a site safety officer to ensure compliance with this site OU health and safety plan;
- familiarity with emergency response procedures and notification requirements and their implementation;
- acting as a backup to the site safety officer in the event of an emergency; and
- coordination of field activities with Laboratory personnel and contractors, as needed.

Field Team Leader

The Field Team Leader is responsible for

- reading and complying with this OU health and safety plan and
- ensuring day-to-day compliance of the health and safety procedures set forth in this plan.

Site Safety Officer

The following responsibilities apply to the Site Safety Officer:

- reading, complying, and enforcing this OU health and safety plan;
- performing and documenting initial inspections for all onsite equipment;
- evaluating the potential hazards at a site;
- being informed about the results of sample analysis pertaining to health and safety as the ER site investigation and remediation work progresses;
- concurring with the field team leader about the location of exclusion area boundaries;
- presenting safety briefings to workers;
- determining protective clothing requirements for workers;
- determining personal dosimetry requirements for workers;
- maintaining a current list of telephone numbers for emergency situations;
- having an operating radio transmitter/receiver in case telephone service is not available;
- maintaining an up-to-date copy of the H&S plan for work at the site;
- maintaining an up-to-date copy of the emergency plan and procedure for the site;
- establishing the safety requirements to be followed by visitors;
- providing visitors with a safety briefing;
- maintaining a logbook of workers and visitors within the exclusion area at a site;
- determining whether workers can perform their jobs safely under prevailing weather conditions;
- taking control in the event of an emergency situation;
- ensuring all personnel have been trained in the appropriate safety procedures, have read and understood this OU health and safety plan, and that these requirements are followed during OU activities;
- conducting daily health and safety briefings for field team leaders and field team members; and

- having authority and requiring that field work be terminated if unsafe conditions develop or an imminent hazard is perceived.

Field Team Members

The specific responsibilities for Field Team Members may be found in Sec. 5.0 of the IWP Annex III, H&S Plan.

3.3 Health and Safety Audits

Health and safety audits will be performed during activities associated with this plan to ensure compliance. The frequency of these audits will be at least quarterly with a minimum of one audit during TA-21 remedial investigation. Audits will be conducted by the H&S PL, or a competent designee and documented in Health and Safety Audit Reports. The LANL HSE Deputy Division Leader, ER Program Manager, ER H&S PL, and OU PL will receive copies of this report. The individuals responsible for health and safety deficiencies noted in the audit findings will provide written responses describing corrective actions that have been implemented to resolve the findings.

The LANL HSE Division may also conduct health and safety audits separately or concurrently with the internal ER audits to ensure compliance with the Los Alamos Environmental Safety and Health Manual.

3.4. Variances from Health and Safety Requirements

Where special conditions exist, a written request for a variance from a specific health and safety requirement may be submitted by the Site Safety Officer to the Field Teams Manager and H&S PL. If the Field Teams Manager and H&S PL agree with the request, the request will be reviewed by the OU PL or his/her designee. As appropriate, higher levels of management may be consulted. The condition of the request will be evaluated and, if appropriate, a variance specifying the conditions under which the requirement may be modified will be granted in writing.

4.0 Hazard Assessment and Personnel Protection Requirements

The following section is designed to identify potential hazards associated with the field activities at the TA-21 OU. Due to the number of SWMUs involved in this RFI, hazards associated with all SWMUs will be listed first. The hazards unique to one or more areas of concern will be identified

by SWMU or building numbers. These areas of specific hazards will be reviewed again before work is performed at that particular location.

1. Identification of Hazards and Risk Analysis

The site safety officer will monitor field conditions and personnel exposure to physical, chemical, biological, and radiological hazards. If a previously unidentified hazard is discovered, the site safety officer will contact the Field Teams Manager and the H&S PL and address the hazard. A safety analysis will be performed on the hazard identifying the potential harm, the likelihood of occurrence, and measures to reduce the risk. It will then be written up and added to this plan in the form of an amendment. The amendment must be reviewed and approved by the H&S PL and OU PL and signed by appropriate field team leaders and field team members, showing they have knowledge of the newly identified hazard.

4.1.1. Physical Hazards

Injuries occur most often from exposure to physical hazards. These injuries range from minor cuts and bruises to fatalities caused by serious unexpected events. The severity of these events may be controlled using sound inspection and monitoring practices. Therefore, this section is dedicated to outlining the potential physical hazards, as well as some preventative measures, for this RFI.

Noise

The constant exposure to noise may have an adverse affect on the ability of personnel to hear and understand normal speech. Prior to 1979, the medical profession had defined hearing impairment as an average hearing threshold level in excess of 25 decibels (dB) at 500, 1,000, 2,000, and 3,000 hertz (Hz). Therefore, limits have been established to prevent hearing loss in excess of this level (ACGIH 1990).

Many of the activities for this RFI have the ability to exceed these levels. Drill rigs and backhoes are a few examples of machinery that can produce noise levels above the established standards.

The following are standards established by ACGIH for noise exposure:

Duration/day in hours	Sound level dBA
16	80
8	85
4	90
2	95
1	100
.5	105
.25	110
.125	115

Because decibels are logarithmic units, they cannot be added or subtracted. In fact, if the intensity of a noise is doubled, there will only be a corresponding increase of three decibels. The following are examples of some common noises and the associated levels: an average residence is approximately 50 dB, conversational speech is 60 dB, a very noisy restaurant is 80 dB, a subway is 90 db, and a jet plane is 120 dB (National Safety Council 1971).

If a sound level meter is not available for monitoring noise, a simple test will identify levels above 85 db. If at an arms length (3 ft) normal conversation is not possible, engineering controls, administrative controls, or personnel protective equipment should be implemented.

Pinch Points

Pinch points are generally associated with activities utilizing tools or equipment with turning or moving parts such as a drill rig, backhoe, or even small hand tools. The moving parts may even be equipped with guards. If this is the case, periodic inspections must be performed to assure the guards have not been removed. The guards are generally removed by field personnel when it slows the progress of the operator or makes it difficult to use. When inspections show that guards have been removed, the tool or equipment should be tagged and not used until such time as the guard has been replaced.

In larger equipment, hydraulics mechanisms and tools are encountered more often. Guarding of these hazardous areas is more difficult. Additionally, the severity of injury is much greater with hydraulics due to amount of force created with hydraulically driven machinery. Initial inspections become more important, identifying areas of concern and informing field team members of the

potential hazards. The most efficient and comprehensive procedure for inspections is that they be performed by a competent person who has experience with that particular piece of machinery. Most equipment can be inspected in less than 30 minutes using a check list. The Site Safety Officer will obtain a check list before the start of field activities.

OSHA requires that most equipment be inspected on a yearly basis. This inspection is generally conducted by the manufacturer, representative, or dealer. These inspections are to be documented and kept with the piece of equipment. This ensures that the equipment is properly maintained and free of any parts which could potentially become hazardous to the operator or bystanders.

Slip, Trip, and Fall

Injuries from slip, trip, and fall hazards are the most common around drill rigs, backhoe operations, and uneven terrain. They occur due to either poor housekeeping, bad weather conditions, or the uneven terrain caused by soil excavation. Procedures may be developed to reduce the likelihood of slip, trip, and fall injuries. The Site Safety Officer must ensure that good housekeeping practices are followed. This includes the following: keeping tools stored in an accessible but out of the way place; keeping the work area free of soil piles to as great a degree as possible; reminding personnel to be aware of uneven terrain; keeping personnel 5 ft from the mesa edge; and marking trench and borehole boundaries.

Explosion/Fire/Oxygen Deficiency

The potential for flammable, or combustible, and oxygen deficient atmospheres is anticipated during drilling, trenching, and tank sampling. This would also include any unanticipated activity where flammable or combustible gases could collect in an enclosed area.

Flammable work will be done according to LANL Administrative Requirement 6-5, Flammable and Combustible Liquids, and Technical Bulletins 601, Flammable Liquids, 602, Flammable Gases, 603, Solvents, 604, Epoxies. ER Program SOP, Health and Safety Monitoring of Combustible Gas Levels will also be followed.

Measurements of explosion potential will be made in the enclosed space or downhole for drilling using a combustible gas indicator (CGI)/oxygen meter. If the CGI indicator shows concentrations greater than 20 of the LEL (lower explosive limit), all activities in the area will cease. The work area will be evacuated and the appropriate safety measures will be implemented. Continued CGI

readings will be made by the site safety officer to determine the appropriate time for return to the area.

Oxygen levels will be performed in enclosed or confined spaces and in areas that are not ventilated frequently. If oxygen levels fall below 19.5%, the area must be evacuated or supplied air respirators must be furnished to field personnel. Oxygen rich atmospheres create an increased potential for fires. Therefore, if levels exceed 25%, the area will also be evacuated. If an evacuation becomes necessary, the area will be ventilated, and the site safety officer will continue monitoring oxygen levels. The site safety officer will determine when it is safe for personnel to return and resume work.

CGI/O_2 readings will be performed according to ER Program SOP, Health and Safety Monitoring of Combustible Gas Levels.

Heat Stress

Heat stress occurs when the body's physiological processes fail to maintain a normal body temperature because of excess heat. This failure is enhanced when impervious clothing is worn during hot summer months. The best cure for heat stress is by prevention. Acclimation to heat is the most effective method, but drinking plenty of water, avoiding alcohol consumption, and frequent cooling breaks are also effective. When the body cooling system starts failing, a number of symptoms begin occurring. Listed below are the physical reactions that can occur, ranging from mild to fatal.

Heat stress monitoring will be performed according to ER Program SOP, Heat Stress Monitoring.

Heat-Related Illness

- Heat Rash—caused by exposure to heat and humid air aggravated by changing clothes. Decreases the ability to tolerate heat and becomes a nuisance. If heat rashes occur, it is best to keep the area cool and dry.
- Heat Cramps—caused by profuse sweating with inadequate fluid intake and chemical replacement (especially salts and potassium). Signs: muscle spasms and pain in the extremities and abdomen. If heat cramps occur, it is best to drink plenty of fluids, (water is best), add slightly more salt to food, and replace potassium by eating bananas.
- Heat Exhaustion—caused by an increased heat stress to the body and an inability of various organs to meet the increased demand to cool the body. Signs: shallow breathing; pallor; cool, moist skin; profuse sweating; dizziness; and lassitude. If heat exhaustion occurs it is best to get the person to

a cool shady area (not in air conditioning) and allow the body to slowly cool and give plenty of fluids. Depending on the severity, one should wait a certain period of time before returning to the hot area.

- Heat Stroke—the most severe of the heat-related injuries. This is where the body's cooling system shuts down completely. Signs: red, hot, dry skin; lack of perspiration; nausea; dizziness and confusion; strong rapid pulse; coma. The body must be cooled immediately and sent to the nearest hospital for immediate medical attention to prevent severe injury and/or death.

Work Rest Schedule

When working in protective clothing, the following guidelines for calculating work/rest schedules should be used.

Calculate the adjusted temperature as follows:

T(adjusted) = T(actual) + (13 x sunshine fraction)

100% sunshine =	no cloud cover	= 1.00
75% sunshine =	25% cloud cover	= 0.75
50% sunshine =	50% cloud cover	= 0.50
25% sunshine =	75% cloud cover	= 0.25
0% sunshine =	100% cloud cover	= 0.00

Adjusted Temperature	Active Work Time (min/hr)
75° or less	50
80	45
85	40
90	35
95	30
100	20
105	10
110	0

Cold Exposure

Persons working outdoors in temperatures at or below freezing can suffer from cold-related injuries. Exposure to extreme cold for a short periods of time can cause severe injury to the body surface or can result in profound generalized cooling, causing death. Body areas that have high-surface, area-to-volume ratios, such as fingers, toes, and ears, are the most susceptible.

Cold Stress Monitoring will be performed according to ER Program SOP, Cold Stress Monitoring.

Cold Related Illness

- Frost nip or incipient frostbite—characterized by a sudden whitening of the skin. If this occurs warm hands slowly and get person into warm dry clothes.
- Superficial frost bite—causes skin to become very waxy or white and superficially firm but flexible underneath. If frostbite occurs, get the victim indoors and place the hands in warm 100–105°) water. Do not rub the affected part. Get the victim to medical attention as soon as possible after the affected part has been warmed.
- Deep frostbite—characterized by cold, pale, solid skin tissue, also may be blistered. Blisters should not be popped, and victim should be warmed in the same manner as above.
- Systemic hypothermia—caused by exposure to freezing or rapidly dropping temperatures. Symptoms are usually exhibited in five stages: 1) shivering; 2) apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95° F; 3) unconsciousness, glassy stare, slow pulse , and slow respirations; 4) freezing of the extremities; and 5) death. Get the victim to warmth as soon as possible, get them into warm dry clothing, and transfer to medical attention as soon as possible.

The best cure for cold-related injuries is prevention, which includes dressing in warm, insulated garments. If the potential exists for getting wet, wear wool clothing; take frequent warming breaks.

Electric Shock

Personnel working at TA-21 have the potential for exposure to electrical shock during drilling, trenching, and sampling activities. The source of this hazard may be from overhead and underground utilities, use of portable equipment, and digging and/or hand augering into underground utilities. In addition to the following requirements, ER Program SOPs Hollow Stem Auger and Trenching will be followed. Compliance with these requirements will significantly reduce the chance of personnel exposure to electrical shock.

1. Only qualified and licensed personnel will be allowed to operate this equipment.

2. Heavy equipment and energized tools will be inspected by a competent person before use and will meet all applicable local, state, and federal standards.

3. Overhead electrical power lines will conform to the table below. While in use, drill rigs will maintain a 35-ft minimum distance from overhead power lines.

4. In transit, with the boom lowered, the closest approach to a power line will be 16 ft.

5. All areas to be drilled will be cleared through the LANL utilities manager before drilling activities begins.

6. Any cord with the grounding stem removed will be taken out of service and repaired or thrown away.

7. Ground fault interrupters will be used on all portable electrical equipment.

4.1.2. Chemical Hazards

Chemical hazards that may arise at the Laboratory during the TA-21 RFI include inhalation, ingestion, or dermal absorption of heavy metals, PCBs, solvents, hydrocarbons, acids, beryllium, and other chemicals. Although field personnel should not have a need to enter buildings, asbestos may be present in some of the MDAs. This section is developed to identify and provide information on those specific chemical contaminants that are known to be present at TA-21. Information is presented for assistance in the identification of known contaminants via field-screening techniques. These same screening tools may identify some of the unknowns. When the unknowns are identified, they will be added to the plan's chemical contaminants of concern, Table B-I. The site safety officer will be responsible for adding chemicals to this table and for notifying field personnel as needed.

The information provided for the known contaminants will include the following: threshold limit value (TLV); immediately dangerous to life and health (IDLH) concentrations; exposure symptoms; ionization potential and relative response factor for commonly used instruments (note: this should be re-evaluated when the particular instrument is selected); and the best instrument for screening. The TLV (ACGIH) refers to a concentration of a chemical in which nearly all personnel may work for 40 hours/week over a lifetime without suffering any adverse health affects. Permissible exposure limits (PEL) are regulated standards by OSHA and are very similar to TLVs. The IDLH concentration is a concentration at which nearly all workers may be exposed for 30 minutes without suffering any irreversible health effects or escape impairing symptoms. The ionization

TABLE B-I
CHEMICAL CONTAMINANTS OF CONCERN

CONTAMINANT	EXPOSURE LIMIT	IDLH	SYMPTOMS OF EXPOSURE	ROUTE OF EXPOSURE	IP(eV)	MONITORING INSTRUMENT	RELATIVE RESPONSE
Polychlorinated Biphenols	0.2 ppm 1 mg/m^3	300 mg/m^3	Irritation of eyes; headache; nausea; fatigue; numb limbs; liver damage: chlor-acne	Inhalation Ingestion Contact	N/A	RAM[1]	Based on concentration in soil
Kerosene	N/A	N/A		Inhalation Ingestion Contact	N/A	PID FID	100% 150%
Benzene	1 ppm	Ca	Nose, eye, respiratory system irritation; giddy; headache; nausea; staggered gait, fatigue; anorexia; lassitude; dermatitis; abdominal pain	Inhalation Absorption Ingestion Contact	9.25	PID FID Dreager tube	100% 100%
Methanol	200 ppm	800 ppm	Eye irritation; headache; drowsy; light headed; nausea; vomiting; visual distortion; eyes burn; failure of vision	Inhalation Ingestion Contact	10.84	PID FID Dreager tube	10% 12%
Nitric acid	2 ppm	100 ppm	Mucous membrane, eye and	Inhalation	N/A	pH paper	

[1]Ca = Potential Human Carcinogens
PID = Photoionization Detector
RAM = Real Time Aerosol Monitor
FID = Flame Ionization Detector
IDLH = Immediately dangerous to life and health
IP = Ionization Potential in Electron Volts (eV)
N/A = Not Available

TABLE B-I
CHEMICAL CONTAMINANTS OF CONCERN

CONTAMINANT	EXPOSURE LIMIT	IDLH	SYMPTOMS OF EXPOSURE	ROUTE OF EXPOSURE	IP(eV)	MONITORING INSTRUMENT	RELATIVE RESPONSE
Nitric acid (continued)			skin irritation; delayed pulmonary edema; pneuitis; bronchitis; dental erosion	Ingestion Contact			
Ethyl benzene	100 ppm	2000 ppm	Eye, mucous membrane irritation; headache; dermatitis; narcosis coma	Inhalation Ingestion Contact	8.76	PID FID	100% 100%
Toluene	100 ppm	2000 ppm	Fatigue; weakness; confusion; euphoria; dizziness; headache; dilated pupils; lacrimation; nervous muscle fatigue; insomnia; dermatitis; photophobia	Inhalation Absorption Ingestion Contact	8.82	PID	100%
Xylene	100 ppm	10,000 ppm	Dizziness; excitement; eye, throat, nose irritation; corneal vacuolization; drowsiness; incoherence; anorexia; staggering gait; vomiting; abdominal pain; dermatitis	Inhalation Ingestion Contact	8.56 Absorption	PID	113% FID 114%
Acetone	250 ppm	20,000 ppm	Eye, nose, throat irritation; headache; dizziness; dermatitis	Inhalation Ingestion Contact	9.69	PID FID	63% 60%

TABLE B-I
CHEMICAL CONTAMINANTS OF CONCERN

CONTAMINANT	EXPOSURE LIMIT	IDLH	SYMPTOMS OF EXPOSURE	ROUTE OF EXPOSURE	IP(eV)	MONITORING INSTRUMENT	RELATIVE RESPONSE
1,1,2-Trichloro-ethane	10 ppm	Ca	Eye, nose irritation; CNS depression; liver and kidney damage	Inhalation Absorption Ingestion Contact	N/A	FID	85%
Trichloroethylene	50 ppm	Ca	Headache; vertigo; visual distortion; tremors; nausea; somnolence; vomiting; eye irritation; dermatitis; cardiac arrythmia	Inhalation Ingestion Contact	9.47	PID FID	89% 70%
Iodine	0.1 ppm	10 ppm	Eye, nose irritation; tight chest; lacrimation; headache skin burns; rash; vomiting; cutaneous hypersensitivity; burns mouth; abdominal pain; diarrhea		9.37	PID	45%
Tetrachloro-ethylene	50 ppm	Ca	Eye, nose, throat irritation; nausea; flush face and neck; vertigo; dizziness; incoherence; headache; somnolence; erythema	Inhalation Ingestion Contact	9.32	FID	100%
Sodium hydroxide	2 mg/m^3	250 mg/m^3	Eye irritation; pneumonitis; burns eyes and skin; temporary loss of hair	Inhalation Ingestion Contact	N/A	pH paper	

TABLE B-1
CHEMICAL CONTAMINANTS OF CONCERN

CONTAMINANT	EXPOSURE LIMIT	IDLH	SYMPTOMS OF EXPOSURE	ROUTE OF EXPOSURE	IP(eV)	MONITORING INSTRUMENT	RELATIVE RESPONSE
Cadmium	0.05 mg/m^3	Ca	Pulmonary edema; dyspnea; coughing; tight chest; chills; substernal pain; headache; muscle achne; nausea; diarrhea; anosmia; emphysema; proteinurea	Inhalation Ingestion	N/A	Miniram	
Lead	0.05 mg/m^3	Ca	Lassitude; insomnia; pallor; eye grounds; anorexia; low weight; malnutrition; anemia constipation; abdominal pain; hypotension; tremors	Inhalation Ingestion	N/A Contac	Miniram	
Chromium	1.0 mg/m^3	500 mg/m^3	Histologic fibrosis of lungs	Inhalation Ingestion	N/A	Miniram	
Beryllium	0.5 ug/m3	Ca	Respiratory systems; fatigue; weakness; weight loss		Inhalation		N/A Miniram
Mercury	0.1 mg/m^3	28 mg/m^3	Coughing; dyspnea; bronchial pneumonia; tremors; insomnia, irritability; indecision; fatigue; anorexia; weakness; stomatitis; low weight; salivation; eye and skin irritation; proteinurea	Inhalation Absorption	N/A Contac	Miniram	

TABLE B-I
CHEMICAL CONTAMINANTS OF CONCERN

CONTAMINANT	EXPOSURE LIMIT	IDLH	SYMPTOMS OF EXPOSURE	ROUTE OF EXPOSURE	IP(eV)	MONITORING INSTRUMENT	RELATIVE RESPONSE
Hydrofluoric acid	3 ppm	30 ppm	Eye, nose, and throat irritation; pulmonary edema; skin and eye burns	Inhalation Absorption, Ingestion Contact	NA	Air sampling	NA

potential is a characteristic of chemicals and is used in photoionization detectors to determine if the instrument may see the compound. The relative response factor reflects the percentage of the compound that an instrument will see. There are relative response factors for both photoionization and flame ionization detectors. The Site Safety Officer will be responsible for having available general reference (NIOSH 1985a) with chemical specific information for compounds that are discovered during the RFI.

Table B-II describes the suspected chemical(s) for each individual SWMU or groups of similar SWMUs and TA-21- OU-wide contaminants. Also listed in this table are the initial levels of protection. Figures B-2 to B-4 show the major features of the TA-21 OU and the associated SMWU locations.

4.1.3. Radiological Hazard

Radionuclides that might be present at TA-21 sites include ^{238}Pu, $^{239/240}Pu$, ^{238}U, tritium, ^{241}Am, curium, ^{227}Ac, and ^{90}Sr, $^{230/232}Th$; and others are suspected. There are three principal pathways where individuals may be exposed to radioactivity during field investigations as follows:

- inhalation or ingestion of radionuclide particulates or vapors;
- dermal absorption of radionuclide particulates or vapors through wounds; and
- exposure to direct gamma radiation from contaminated materials.

Soils will be screened in accordance with the SOP, Near Surface and Soil Sample Screening for Low Energy Gamma Radiation. The specific properties of the above radionuclides, including type of emission and half life, are provided in Table B-III. As concentrations of these radionuclides are determined, and as new radionuclides are discovered, Table B-III will be updated. The site safety officer will be responsible for adding radionuclides to this table and for notifying field personnel as needed. Table B-II describes the suspected radionuclides for each individual SWMU or groups of similar SWMUs and TA-21-OU-wide contaminants.

4.1.4. Biological Hazards

Biological hazards will likely be encountered in some of the areas of TA-21. Rattlesnakes may be encountered in the areas near the mesa in high grass. This includes the outfalls (see Chapter 15 of TA-21 work plan) and the sewage treatment plant (see Chapter 14 of the TA-21 work plan). If

TABLE B-II
SUSPECTED CHEMICAL AND RADIOLOGICAL CONTAMINANTS AT
TA-21 OU AND INDIVIDUALS SWMUS

SWMU Number	Suspected Chemical Contaminants	Suspected Radiological Contaminants	Activity	Initial Level of Protection
All DP West and DP East		Pu, U	1) Surface soil sampling 2) Drilling	Dependent upon SWMU location
DP West	Flourine, iodine, lead cadmium, beryllium, mercury, sodium, nitrates, chlorine, solvents such as: acetone TCE, TCA, xylene, toluene and benzene	Pu, U, Th, ^{3}H, Ac, Am, Sr, Cm, Ba	1) Surface soil sampling 2) Drilling	Dependent upon SWMU location
DP East	Metals such as: lead, cadmium, beryllium	Po, Ac	1) Surface soil sampling 2) Drilling	Dependent upon SWMU location
SWMU 001	Metals, solvents	Pu, U, ^{3}H, and other various radionuclides	1) Surface soil sampling 2) Near surface soil sampling	Level D Level D
SWMU 002	Solvents	^{3}H	1) Near surface sampling	Level D
SWMU 003	Kerosene, toluene xylene, PCBs, copper		1) Near surface 2) Surface 3) Drilling	Level D Level D Level D
SWMU 004 (intrusive)		Assorted radionuclides	1) Surface 2) Tank	Level D Level D (remote) Level B
SWMU 005 (intrusive)	Nitric acid		1) Drilling 2) Trenching	Level D Level D (remote) Level B
SWMU 006	Fluorine	Pu, U, and other radionuclides from DP West	1) Drilling	Level D
SWMU 007	Oils and fats (petroleum products)	Radionuclides from DP West could be any of them	1) Drilling	Level D
SWMU 008	Ethyl ether, fluorine, nitric acid, aluminum nitrate,sulfur hydroxide, tributyl phosphate	Assorted radionuclides from DP West	1) Drilling	Level D
SWMU 009	None	None		Level D

TABLE B-II (continued)

SWMU Number	Suspected Chemical Contaminants	Suspected Radiological Contaminants	Activity	Initial Level of Protection
SWMU 010 and 011	Fluorine, iodine, lead ethyl ether, nitric acid, cadmium, mercury, beryllium, sodium, nitrates, chlorine, solvents, petroleum residues, hydrocarbons	Pu, U, Th, ^{3}H, Ac, Am, Sr, Cm, Ba	1) Surface 2) Near surface 3) Drilling	Level D Level C Level C
SWMU 012	Chromium		1) Drilling	Level D
SWMU 013(d)	1,1,1, TCA and other solvents	Potential radioactive debris		Level D
SWMU 014	Metals (lead, beryllium), solvents (acetone, TCE), organics	Pu, Am, and Po	1) Surface 2) Near surface 3) Drilling	Level D Level D Level C
SWMU 015	Organics, solvents, perchlorates, ethers, corrosives	Pu, U, Am, Cm, and Ac	1) Surface 2) Near surface 3) Drilling	Level D Level D Level C
SWMU 016	Lead, mercury, flourine, cadmium, nitric acid, ammonium citrate, citric acid, chlorine, solvents	Pu, Am, transuranic waste, ^{3}H, and others suspected	1) Surface 2) Near surface 3) Drilling	Level D Level D Level C
SWMU 017	Beryllium, PCBs, oil, petroleum, organics, solvents	Ac, Pu, Am, Po, and others suspected	1) Surface 2) Near surface 3) Drilling	Level D Level D Level C
SWMU 018	Solvents such as TCE, acetone, TCA, and others suspected	^{89}Sr, ^{90}Sr, ^{140}Ba, ^{140}La, ^{239}Pu, ^{3}H, and U	1) Surface 2) Near surface 3) Drilling	Level D Level D Level D
SWMU 019	Metals	(a ,c) ^{235}U (b) Pu and mixed fission products (d,g,h,i,j,k,l,m) Pu (e,f) tritium gas, tritium oxide	1) Surface	Level D
SWMU 020	Hydrofloric acid	Pu and others suspected		Level D
SWMU 021	Metals	Pu and Sr	1) Surface	Level D
SWMU 022	Nitric acid and metals	Pu and ^{2}H	1) Drilling	Level D

TABLE B-II (continued)

SWMU Number	Suspected Chemical Contaminants	Suspected Radiological Contaminants	Activity	Initial Level of Protection
SWMU 023	Metals, solvents possible	Possible radioactive waste	1) Surface 2) Near surface	Level D
SWMU 024	(a)Sulfite, copper salts, fuels, lead, mercury, zinc, and copper	Pu, ^{3}H, and U	1) Surface 2) Near surface	Level D Level D
	(b) Lead	^{241}Am, ^{239}Pu, and ^{3}H	1) Surface 2) Near surface	Level D Level D
	(c) Chromium, copper, lead, mercury, oil and grease, dichloromethane	^{241}Am, ^{238}Pu, $^{239,240}Pu$, ^{3}H, $^{234,235}U$, ^{238}U	1) Surface 2) Near surface	Level D Level D
	(d) Lead, mercury, oils	^{241}Am, ^{238}Pu, $^{239,240}Pu$, and ^{3}H	1) Surface 2) Near surface	Level D Level D
	(e) Lead, mercury, zinc, and oils	^{3}H, and $^{234,235}U$, and ^{238}U	^{241}Am, ^{238}Pu, $^{239,240}Pu$, 2) Near surface	1) Surface Level D Level D
	(f) Solvents, mercury, and lead	^{239}Pu and ^{3}H	1) Surface 2) Near surface	Level D Level D
	(g) TCE and arsenic		1) Surface 2) Near surface	Level D Level D
	(h) Organics, inorganics Level D		^{3}H, ^{227}Ac, and ^{210}Po 2) Near surface	1) Surface Level D
	(i) Arsenic, barium, beryllium, copper, cadmium, lead, mercury, selenium, vanadium, zinc	^{239}Pu, ^{236}Ra, $^{234,235}U$, ^{238}U and ^{3}H	1) Surface 2) Near surface	Level D Level D
	(j) Organics, metals, solvents		1) Surface 2). Near surface	Level D Level D
	(k) Organics, metals, solvents		1) Surface 2) Near surface	Level D Level D
	(l) Zinc	^{241}Am, ^{239}Pu, ^{3}H, and U	1) Surface 2) Near surface	Level D Level D
	(m) Organics, inorganics Level D		Possible radionuclides 2) Near surface	1) Surface Lev el D

TABLE B-II (continued)

SWMU Number	Suspected Chemical Contaminants	Suspected Radiological Contaminants	Activity	Initial Level of Protection
	(n) Petroleum		1) Surface 2) Near surface	Level D Level D
	(o) PCBs, organics, lead, and solvents		1) Surface 2) Near surface	Level D Level D
SWMU 025		^{3}H and ^{2}H	1) Surface	Level D
SWMU 026	Nitrates, solvents, and possible organics	Pu, U, Am and ^{3}H	1) Surface 2) Near surface 3) Subsurface	Level D Level D Level D
SWMU 027	(a) None identified (b) Chromium (c) Metals and acids (d) Fuel oils and solvents (B,E,T,X)	Various radionuclides	1) Surface 1) Surface 1) Surface 1) Surface	Level D Level D Level D Level D
SWMU 028	Solvents	^{3}H	1) Surface 2) Near surface	Level D Level D
SWMU 029	Fuel oil, kerosene, diesel, (B,E,T,X)		1) Near surface 2) Drilling	Level D Level D
Building 3 (West Side)	Hydrofluoric acid[a]		1) Near surface 2) Drilling	Level D Level D

[a] Note: Exposure to hydrofluoric acid requires special medical procedures which are found in Sec. 5.2.2, Personnel Injuries.

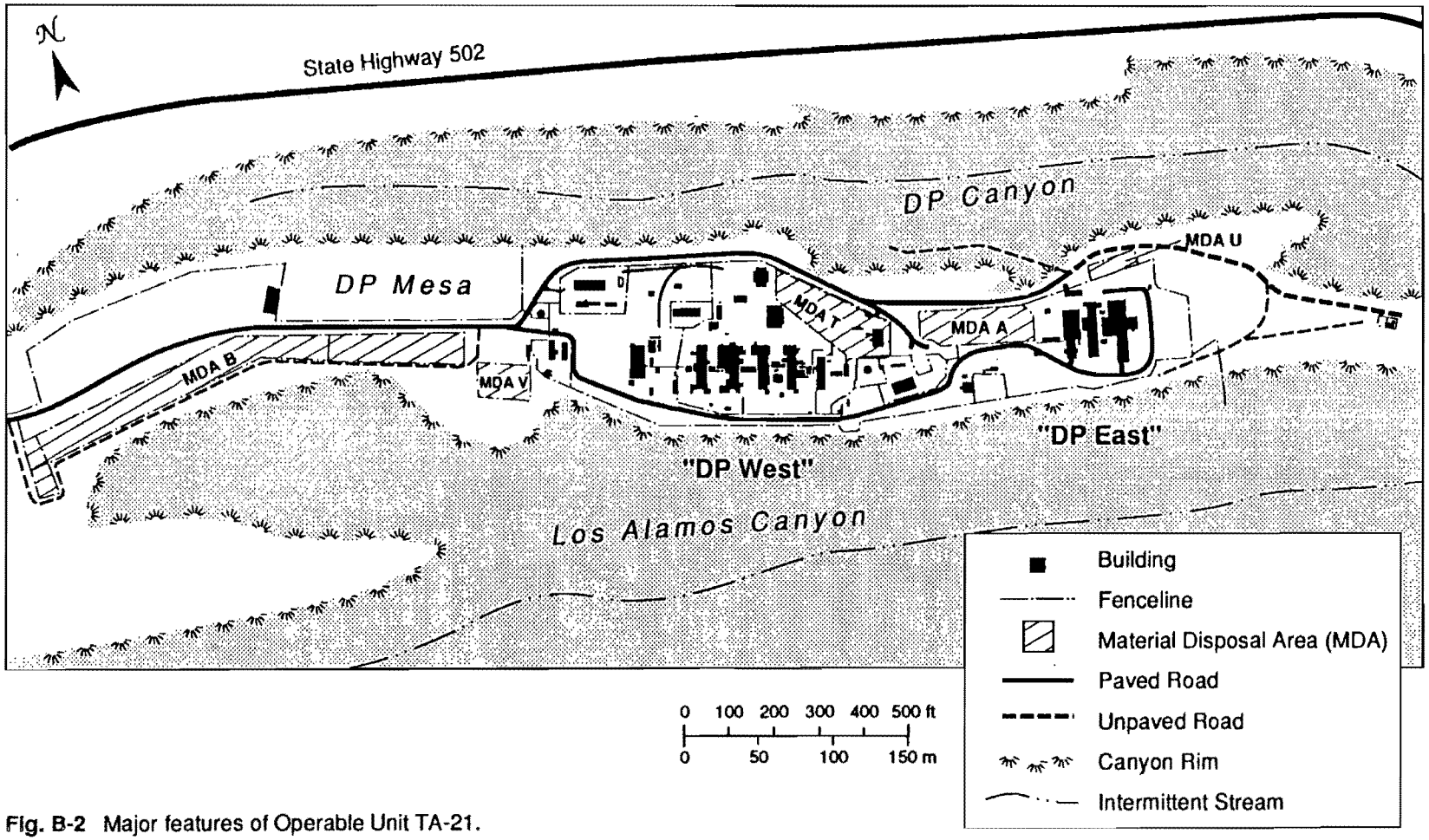


Fig. B-2 Major features of Operable Unit TA-21.

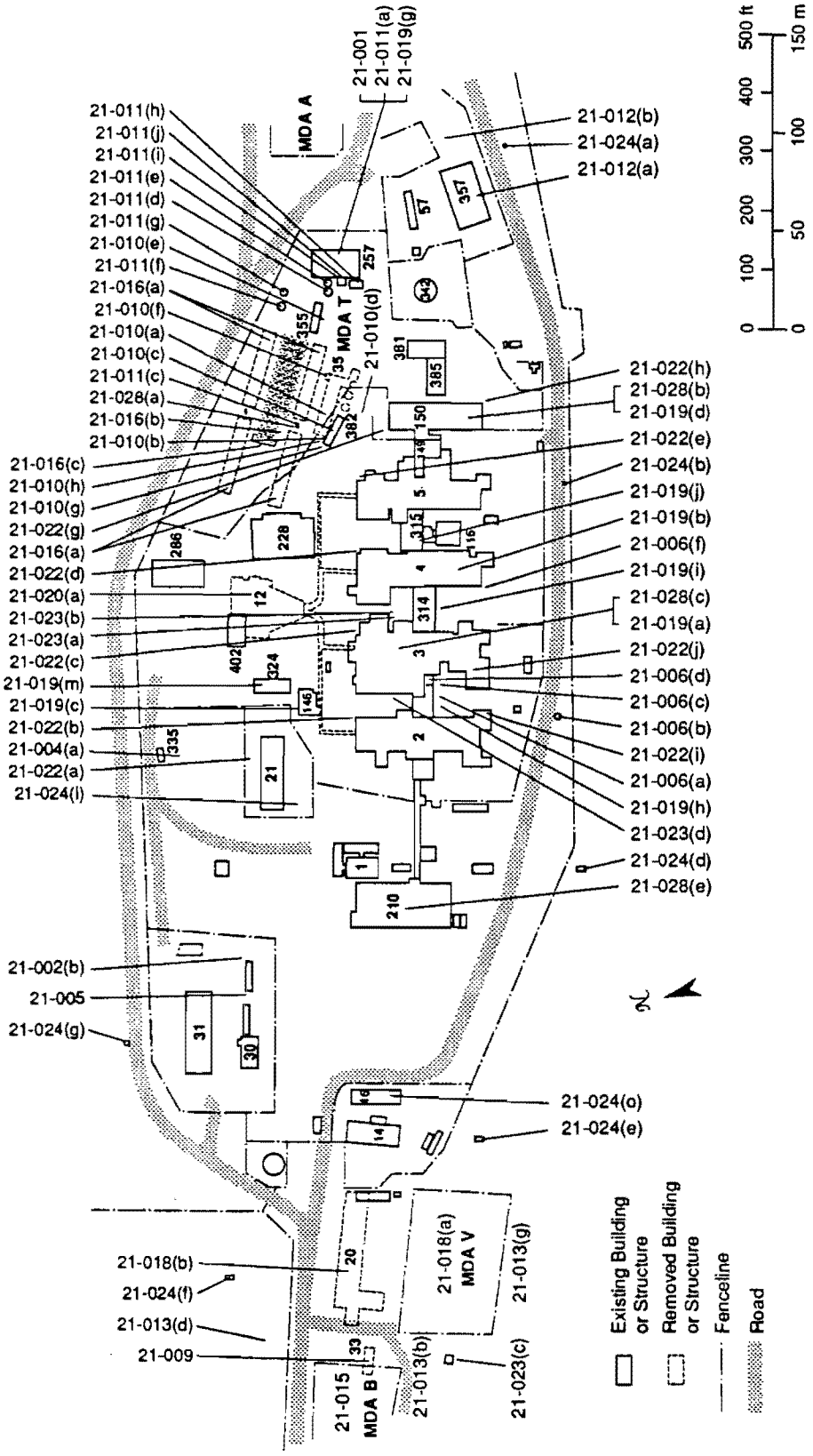


Fig. B-3 Location of SWMUs at DP West.

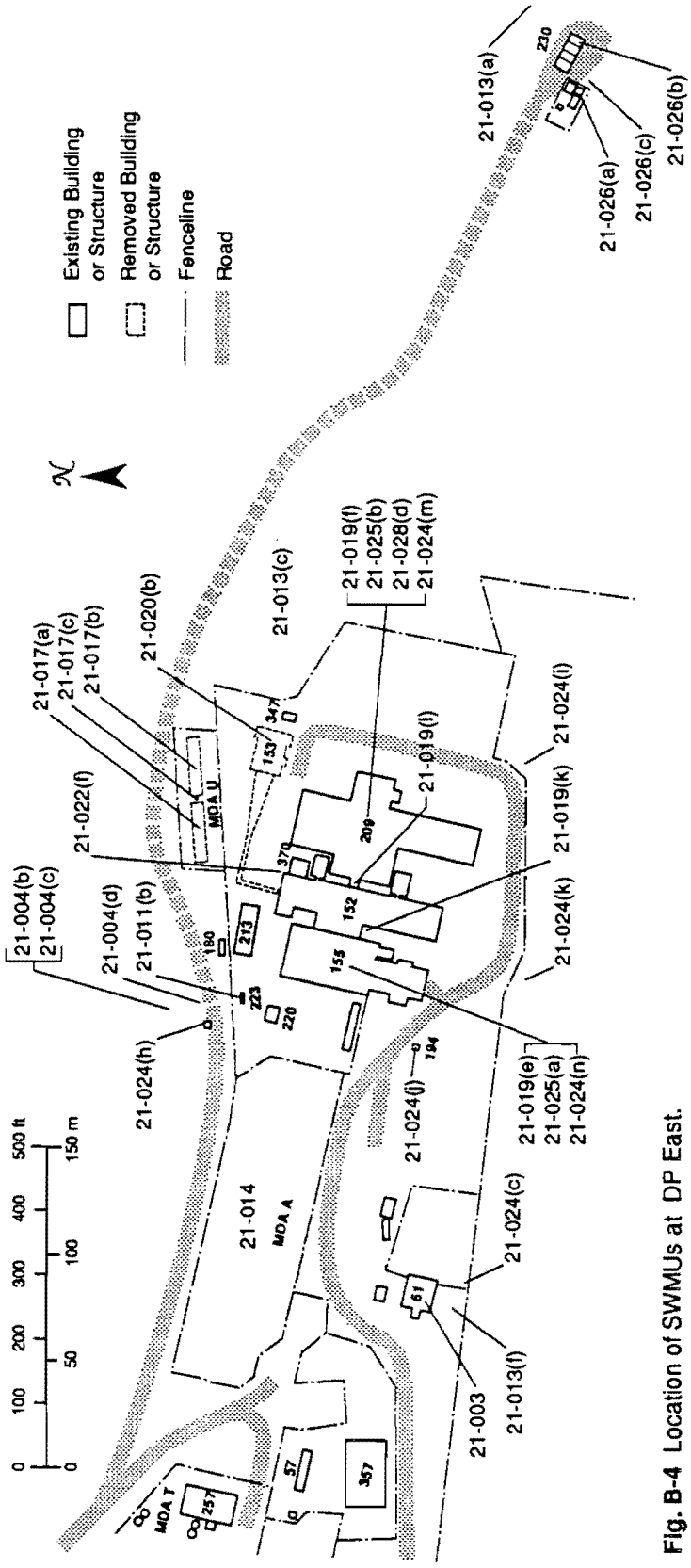


Fig. B-4 Location of SWMUs at DP East.

TABLE B-III. RADIONUCLIDES OF CONCERN

Radionuclide	Major Radiations	DAC (≤Ci/mL)	Critical Organ	Radioactive Half-Life	Monitoring Instrument
Plutonium-238	Alpha, gamma	3×10^{-12}	Bone	87.7 yrs	Alpha scintillometer FIDLER
Plutonium-239	Alpha, gamma	2×10^{-12}	Bone	2.4×10^{4} yrs	Alpha scintillometer FIDLER
Plutonium-240	Alpha, gamma	2×10^{-12}	Bone	6537 yrs	Alpha scintillometer FIDLER
Tritium	Beta	3×10^{-5}	Total body tissue	12.26 yrs	Liquid scintillation
Actinium-227	Beta, gamma	7×10^{-13}	Total body	21.6 yrs	GM, NaI
Thorium-229	Alpha, gamma	4×10^{-13}	Lung, bone	7340 yrs	Alpha scintillometer
Thorium-230	Alpha, gamma	3×10^{-12}	Lung, bone	8×10^{4} yrs	Alpha scintillometer
Thorium-232	Alpha, gamma	5×10^{-13}	Lung, bone	1.41×10^{10} yrs	Alpha scintillometer, NaI
Uranium-234	Alpha, gamma	2×10^{-11}	Lung, GI	2.47×10^{5} yrs	FIDLER, alpha scintillometer
Americium-241	Alpha	2×10^{-12}	Bone	432 yrs	Alpha scintillometer
Polonium-210	Alpha, gamma	3×10^{-10}	Total body	138.4 days	Alpha scintillometer
Curium-244	Alpha	4×10^{-12}	Bone	18.1 yrs	Alpha scintillometer
Barium-140	Beta, gamma	6×10^{-7}	Total body	12.79 days	GM
Strontium-90	Beta	8×10^{-9}	Bone	29 yrs	GM

DAC - derived air concentration (DOE draft Order 5480.11)
Critical organ - that part of the body that is most susceptible to radiation damage under the specific conditions being considered.
GI - gastrointestinal tract
GM - Geiger-Müller detector
NaI - sodium iodide scintillometer

field personnel are in these areas, workers should wear snake leggings or have the grass mowed. If a snake bite does occur, the Emergency Medical System (EMS) should be notified immediately. The only first aid treatment that should be administered is that ice or a cold pack should be placed just above the affected area to slow blood flow.

In addition to snakes, mosquitoes, ticks, spiders, and rodents, including mice and rats, may be encountered. If workers are bitten by insects, first aid creams should be applied by the site safety office to ease the symptoms caused by the bite. If personnel are bit by a rodent, attempts should be made to obtain the animal, and medical assistance should be sought as soon as possible.

4.2. Task-by-task Risk Analysis

According to OSHA 1910.120, a task-by-task risk analysis is required. These tasks are related to specific operations or activities in the field investigation. The preceding section identifies the physical, chemical, radiological, and biological hazards known or suspected to be present at the TA-21 OU. This section is designed to take each of the proposed tasks and identify which of the hazards apply and estimate the likelihood of exposure. Sections 4.3, 4.4, and 4.5 of this Appendix identify methods for eliminating or reducing the potential exposure to the hazards associated with these tasks.

Task: Drilling

Likelihood of Exposure: High

Associated Hazards: In drilling, there is a great possibility for physical injury. The injuries may range from bruised and cut fingers to death. Working around a drill rig allows for entanglement and pinch points in many parts of the rig. These injuries are generally minor but have the potential for amputating fingers. Other severe injuries may occur from failure of wire rope under extreme stress. If the rope breaks under high tension, it will act as a whip, which could decapitate workers in the area.

Chemical and radiological hazards occur when drilling disturbs or penetrates a contaminated pocket of soil. This happens quite frequently during the drilling process. The rig will stir some dust and will generate heat, which will volatilize organics in the soil. These factors combine greatly to enhance the possibility of exposure to field personnel.

Task: Hand Augering

Likelihood of Exposure: Moderate

Associated Hazards: The hazards for hand augering are similar to that of drilling. The potential for contact with contaminated soils is enhanced, and this operation will have a tendency to stir more dust. Using a powered hand auger may still present the operator entanglement and pinch point hazards but to a lesser degree. With a nonpowered hand auger, the probability of physical injury is reduced greatly.

Task: Trenching

Likelihood of Exposure: High

Associated Hazards: The physical hazards associated with trenching operations are based on two main factors. The use of heavy equipment and potential excavation cave-ins on personnel in the trench. Operators of heavy equipment are trained to be aware of personnel around the area. However, sometimes the operator gets distracted or loses concentration. Therefore, personnel must be alert while the backhoe is operating. Cave-ins occur when the wall of the excavation cannot bear the load and collapse. Cave-ins can occur in trenches of all depths. Physical injuries, as a result of cave-ins, range in severity with the most severe being death.

Chemical/radiological hazards are likely to be encountered while trenching is in progress. The hazards include inhalation of airborne dusts, volatiles, and alpha particles. Although these hazards may be present at all times, higher levels should be excepted at certain times. During the actual excavation of the trench, the most concentrated personnel exposure may occur from the stirring of dust and radioactive particles. Whereas, the accumulation of vapors inside the trench will conceivably occur after the trench has been completed. Monitoring of the hazards at these times is critical.

Task: Tank Sampling

Likelihood of Exposure: Moderate

Associated Hazards: The above-ground tanks that are proposed for sampling were designed for overflow collection. Background information indicates that these tanks have not been necessary and are empty. However, until the tanks have been opened, it must be assumed they contain contaminated material. Tanks that contain toxic or radioactive materials are a hazard to

the field team member tasked with the opening of the tanks. Tanks are considered confined spaces and allow for a build-up of dangerous levels of vapors and gasses.

There are also physical hazards that are associated with this activity. The most common injury related to tank sampling is from falling from the tank. The sampling crew should not climb or sit on a tank without the proper safety equipment and should be aware of unsecured permanent ladders and railings. Hand tools and tank covers may also cause injury if not properly handled.

4.3. Engineering Controls

OSHA regulations state that when possible, engineering controls should be utilized as the first line of defense for protecting workers from hazards. Engineering controls are mechanical means for reducing the hazard to workers such as the guarding of moving parts on machinery and tools or utilizing a ventilation hood in a lab to remove contaminant vapors. Unfortunately, engineering controls are not as easily accomplished in an uncontrollable environment, such as outdoors. However, the following are some possibilities that should be utilized, if possible, while working in the field.

Engineering Controls For Airborne Dust

Airborne dust can be a hazard in two situations: 1) nuisance dust for which standards have been established at 10 mg/m^3; and 2) attachment of radionuclides and/or hazardous substances to soil particles. In either case, engineering controls may have limited use when airborne dust becomes a hazard.

During drilling or any other activity where localized dust is being generated, a small garden sprayer of water may be used to wet the soil enough to suppress the dust. This has been effective in the past, however, these sprayers do not discharge a large amount of water and must be repeated often to maintain moist soils.

Where there are high winds in an area of little or no vegetation, and a large, dusty area, small quantities of water are not effective. In this instance, a water truck may be used to wet the area enough to suppress the dust. This will also require frequently repeated applications to be effective.

Engineering Controls For Airborne Volatiles

Drilling, trenching, soil and tank sampling activities may produce gases, fumes or mists. These may be easily inhaled or ingested by workers with no protection. Engineering controls may be implemented to reduce the exposure to these hazards. Even nature provides some engineering controls that may be utilized to assist in the dissipation of vapors. The wind can be used to remove toxic vapors from the work area. This can be accomplished by careful position of the equipment, such as a drill rig. The most effective means would be to establish a crosswind or position the rig where the wind is blowing towards the side of the rig. This allows the vapors to be blown away from personnel behind the rig and prevents them from collecting under the rig; and allows for an upwind approach of workers not performing duties directly related to the drilling (i.e., a geologist).

Another method is the use of ventilation by mechanical means. This may not be as effective as wind in open areas but may be more desirable in closed or confined spaces. Fans may be used to remove vapors or even to supplement a gusting wind. The most effective use of ventilation using mechanical equipment is for sampling tanks or performing confined space work. The fan or other mechanical device may be attached to a large hose to either push, or more effectively pull, the contaminant from the confined space. Each has its advantages. Pulling the air from the space is more effective at removing the vapors, whereas forcing air into the confined area provides for better assurance of acceptable oxygen levels from ambient air. This procedure has been used effectively by fire departments, and they should be consulted for information on the most effective method for each situation.

Engineering Controls For Noise

Engineering controls for noise are difficult to design for an uncontrolled environment. Drilling and trenching is likely to produce the highest range of noise levels. Fortunately, noise produced from drilling is generated by the engine itself. On most rigs, the highest range of noise is encountered on the side of the rig while drillers perform a majority of their work behind the rig. This is because the front and rear of the rig's engine is covered, whereas the sides are left open to allow cooling of the engine. This demonstrates that barriers seem to work as effective noise reduction. If noise levels reach 90 dB, barriers should be utilized, if possible, to reduce excessive noise exposure.

4.3.4. Engineering Controls For Trenching

Trenching often presents field personnel with hazards associated with slip, trip, fall, and crushing type hazards. In most cases, entry into an excavation deeper than 5 ft is avoided whenever possible. However, it is sometimes necessary to enter these trenches to obtain the needed information. OSHA has developed regulations for trenches and excavations. Included in the regulations are engineering controls for the prevention of cave-ins. These controls include the addition of shoring, sloping, and benching to the excavation. Benching is a systematic series of steps dug around the excavation at a specified angle of repose. The angle of repose is based on the type of soil present. Benching will normally be found in very large excavations, such as surface mining operations. Sloping is a similar system of stabilizing soil but is performed without the steps. Again the angle of repose is determined by the type of soil. This method is generally used for medium-sized excavations, such as a tank removal. In general, neither of these soil stabilization methods are convenient techniques for exploratory trenches. The last method that OSHA suggests is shoring. Shoring is available in many different varieties, but the principle theory is the same. The sides of the excavation are supported by some type of wall that is braced to prevent cave-ins. This method is used most often in deep, narrow trenches for installing water pipe or drainage systems and exploratory trenching. One drawback to utilizing shoring is that it is expensive and time-consuming especially for a trench that is only scheduled to be open for 1 or 2 days. There are administrative controls and personnel protective systems that are more desirable and realistic for the work at TA-21.

4.3.5. Engineering Controls For Drilling

Working with and around drill rigs presents workers with a great number of hazards. This is due to the number of moving parts and the power associated with the equipment. Engineering controls for this apparatus include the installation of guarding where possible to prevent crushing injuries and, more importantly, an inspection program to insure replacement of worn or broken parts. As stated earlier, this should be performed at the beginning of the job and periodically during the project.

4.3.6. Engineering Controls For Tank Sampling

One important aspect of tank sampling was discussed earlier in Engineering Controls for Airborne Volatiles. Removal of the potentially toxic environment in the tank's headspace is critical. In addition, lock-out/tag-out and other confine-space entry procedures should be followed to insure

zero energy is reached. Zero energy means that there is no potential for energizing or engaging any mechanical or electrical system that may potentially affect workers in the confined space. This is important even if there will be no personnel entry into that space. It has been proposed that all tank sampling be performed remotely (no personnel entry); however, workers will have to place a sampling tool inside the tanks that may be caught by mechanical devices inside the tank, such as mixers. Lock-out/tag-out and confined-space procedures will follow the Laboratory's administrative requirements (AR) 8-1_X and AR 8-6.

Personnel should also be aware that the potential for slip trip and fall hazards may exist. Ladders, railings, and walkways are a form of engineering controls. If these are not available, then Administrative controls or personnel protective equipment should be utilized.

4.4. Administrative Controls

Administrative controls are necessary when hazards are present and engineering controls are not feasible. Administrative controls are a method for controlling the degree to which personnel are exposed to a hazard. One example would be the amount of time or the proximity to a hazardous area a worker is allowed to remain. These may be instituted easily in most cases and are effective measures in decreasing personnel exposure.

4.4.1. Administrative Controls For Airborne Chemical and Radiological Hazards

Chemical and radiological hazards are to be monitored during the performance of duties in the contaminated zone. If concentration of radionuclides or toxic materials exceeds the limits established in this plan, personnel may be removed from the area until natural or mechanical ventilation brings the levels to background. This method would prevent the necessity of using personnel protective equipment. In addition, all nonessential personnel should only enter the contaminated zone when they are required. This not only lowers the exposure but complies with DOE's policy of exposures being As Low As Reasonably Achievable (ALARA).

Because the exposure limits consider the average amount of exposure during an 8-hr day, personnel exposed at a higher concentration for a portion of the day may conduct tasks in an uncontaminated area to lower the average for the day. For chemical contaminants, those higher concentrations must be lower than the Immediately Dangerous to Life and Health (IDLH) concentration and the TLV Ceiling limits.

4.4.2. Administrative Controls for Noise

Administrative controls for noise include both time and distance. The principle is very much like the controls used for both airborne chemical and radiological hazards. In Sec. 4.1.1, noise is discussed, and the guidelines established by ACGIH are listed. In the table, you can see that ACGIH has formally established administrative controls. The basic idea is the louder the noise the more distance you must put between the noise and yourself or you must spend less time at the source. Although the principle of sound reduction by distance was not discused earlier, it is an effective method of reducing noise intensity. Sound pressure or intensity follows the inverse square law where, as the distance from the source increases, the sound level decreases as the square of the distance. For example, if sound levels at 10 ft from the source are 100 dB and the person doubles the distance or is 20 ft from the source, the sound level drops to 94 dB; 30 ft, or triple the distance to the source, the sound level drops to 90 dB.

Distance is probably the better of the two methods for lowering the level of noise. If neither of these methods is possible, personnel protective equipment must be donned to protect workers.

4.4.3. Administrative Controls for Trenching

Administrative controls are the most effective method for reducing the hazards of the trench investigations proposed for TA-21. These administrative controls were established by OSHA during the development of the regulations. The basic philosophy behind the administrative controls for trenching is not to create a hazardous condition to begin with. Trenches less than 5-ft deep do not require protective systems (sloping, benching , or shoring). All trenches should be excavated to a depth less than 5 ft, where possible. However, monitoring inside the trench and means of egress (every 25 ft) must be implemented at a depth of 4 ft. Soil piles, tools, and other debris must be stored at least 2 ft from the edge of the excavation. All excavations must be marked when the area is not occupied to restrict access.

One important factor is that even though these standards are followed, accidents may still occur. Human error always plays a role in the causation of an accident. A backhoe operator may not see or know if there are workers in the trench. Therefore, any time there are personnel in the trench the operator must shut down the equipment until the excavation has been evacuated. Inspections should be made by a competent person before any field team member is allowed to enter the excavation. Additionally, personnel are required to be aware of conditions inside the trench as well as the activities going on outside the excavation.

4.4.4. Administrative Controls for Tank Sampling

Chemical, radiological, and physical hazards may be encountered during tank sampling. The physical hazards are often ignored when obtaining this type of sample. The administrative controls for prevention of physical hazards during tank sampling include the following:

- make sure to check the tank's integrity;
- do not climb on a tank that does not have steps and hand rails;
- inspect stairs and hand rails for stability and condition before using them; and
- if sampling a tank with no stairs or handrails higher than 4 ft, ladders and personnel protective equipment (fall protection) are to be used.

The administrative control designed for chemical/radiological hazards associated with the proposed tank sampling is that sampling should be performed as remotely as possible. This places personnel at a distance from inhalation, ingestion, or direct contact with the sampled substance.

4.4.5. Administrative Controls for Working Near the Mesa Edge

Slip, trip, and fall hazards will exist around the mesa edge. These hazards may be avoided by good housekeeping around the work area near the edge of the mesa. Additionally, personnel working around the mesa will not get closer than 5 ft to the edge. If necessary, bannerguard will be used to delineate this restricted area. One exception to this requirement is for the outfall sampling. In that instance, the worker taking the sample will be required to be tied off before he/she is allowed to descend over the edge.

4.5. Personnel Protective Equipment and Systems

In the event engineering and administrative controls are not suitable, personnel protective equipment should be used as a last line of defense against hazards. This equipment may be used alone or as a supplement to existing safety systems and to enhance the degree of safety for workers. Personnel protective equipment is a garment or apparatus that is worn by field team members to protect them from a certain type or group of hazards. Some examples of personal protective equipment are, tyvek, hard hat, gloves, safety harness, respirator, etc. The maintenance, inspection, procedures and training for personal protective equipment usage will follow the H&S Program of the organization that implements this plan. The following sections will discuss

the protective equipment or systems to be used in certain situations.

4.5.1. Protection Levels and Protective Clothing

The U.S. Environmental Protection Agency (EPA) has established four levels of protection for workers entering potentially hazardous sites. At many of the SWMUs at the TA-21 OU, the contaminants have been identified. Therefore, an assessment has been made based on each of the contaminants, investigation activities, and the areas to be investigated. The action levels for upgrades in levels of protection have been selected based on those factors and are given in Sec. 4.5.2, Action Levels for Upgrade in Protection.

The majority of site characterization will begin in modified level D protection. In certain cases, Levels C and B may be prescribed due to the amount or toxicity of the contaminants present. Personnel entering the contaminated zone are required to meet the level of protection designated for that area. The levels of protection and the minimum equipment allowed for each of the levels of protection are listed below.

Level B Protection will include the following:

- a full face, positive pressure, self-contained breathing apparatus (MSHA/ NIOSH-approved);
- chemical-resistant disposable clothing suitable for protection against the hazards of concern;
- inner glove (pvc, latex, or nitrile);
- rubber outer gloves providing the best barrier between the wearer and contamination;
- steel-toed safety boots made of rubber or leather when disposable boot covers are donned; and
- hard hat, safety glasses, and hearing protection as needed.

Level C protection will include the following:

- full face, air purifying respirator (MSHA/NIOSH-approved) with cartridges or canisters capable of filtering contaminants of concern;
- contaminant-resistant clothing suitable for protection against the hazards of concern;
- inner glove (pvc, latex, or nitrile);

- rubber outer gloves providing the best barrier between the wearer and contamination;
- steel-toed safety boots made of rubber or leather when disposable boot covers are donned; and
- hard hat, safety glasses, and hearing protection as needed.

Modified Level D protection will include the following:

- cloth or tyvek coveralls, or work uniform;
- rubber or leather outer gloves providing the best protection for the activity being performed;
- steel-toed safety boots and optional boot covers as needed; and
- hard hat, safety glasses, and hearing protection as needed.

The field team leaders are required to provide this equipment to each of their field team members.

TA-21 RFI activities will be conducted according to LANL Administrative Requirement 12-1, Personal Protective Equipment; and LANL Technical Bulletins 1201, Eye and Face Protection; 1202, Protective Clothing; and 1203, Respiratory Protective Equipment.

4.5.2. Action Levels for Upgrade in Protection

Monitoring instruments are to be used in conjunction with lab analysis to establish the exposure levels of field team members. These instruments will monitor for radiation, volatile organics, corrosives, flammable vapors, and particulates. The action levels established below are based on the results obtained during SWMU-specific monitoring. In some instances, analytical lab screening with quick turn around and lab analysis will be necessary to determine the actual level of the specific chemical contaminant in air. For instance, there are no direct reading instruments for PCBs, but there is a real time aerosol monitor (RAM) that determines the amount of respirable dust present in the breathing zone. A PCB soil concentration will be obtained from the lab and plugged into a formula, which will determine the total PCB concentration in air, based on a total particulate reading from the RAM. This data may also be confirmed with air sampling. Air sampling will be used exclusively for determining alpha contamination in air. As of the writing of this plan, the organization implementing this plan has not been selected. The selected organization must supply the method of maintenance and calibration for the specific instruments to be used.

The monitoring instruments to be used during this investigation are as follows:

Photoionization Detector (PID)

A description of the PID may be found in Sec. 9.3 of the IWP, Annex III, H&S Plan.

Flame Ionization Detectors (FID)

Flame ionization detectors are also used to monitor total organic vapors. However, this instrument uses a flame to ionize the contaminant. It reads in ppm of methane, which is the calibration gas. The FID is more effective at reading lower-chain compounds.

Combustible Gas Indicator (CGI)

A description of the CGI may be found in Sec. 9.3 of the IWP, Annex III, H&S Plan.

Oxygen Meter

A description of the oxygen meter may be found in Sec. 9.3 of the IWP, Annex III, H&S Plan.

Real Time Aerosol Monitor

The real time aerosol monitor is designed to monitor respirable particulates (<10 microns). The instrument uses reflective light, which is converted to units of mg/m^3. This is useful if there are known concentrations in soil of alpha radiation, particulates, metals, and PCBs. Soil samples will be submitted to the lab, and the analysis will be used to determine action levels for the contaminants that are present.

Colormetric Detector Tubes

A description of the colormetric detector tubes may be found in Sec. 9.3 of the IWP, Annex III, H&S Plan.

High- and Low-Volume Air Samplers

A description of the high- and low-volume air samplers may be found in Sec. 9.3 of the IWP, Annex III, H&S Plan.

Radiation Survey Meters

A variety of radiation survey meters will be used in this OU specific investigation to determine the levels of radiation workers are exposed to. Alpha scintillometers will be used to screen cores and personnel leaving the contaminated zone. A μR meter or a Gieger-Muller tube detector will be used to establish gamma exposure to field team members. In addition, Thermoluminescent Dosimeters (TLDs) will be worn by all personnel while at TA-21.

Action Levels

The following guidelines are to be used at each of the SWMU locations of the TA-21 OU. Readings are to be taken according to ER Program SOPs. They describe procedures and frequency of monitoring.

Volatiles

Contaminants at TA-21 are estimated from the historical information that has been gathered for the preparation of this plan. If present, most of these chemicals are expected to be at or near background levels. Therefore, the concentration ranges for each level of protection prescribed below are based on known contaminants.

Benzene has the most restrictive exposure limit of all the chemicals currently known to be present at TA-21. The limit for benzene is 1 ppm and is detected by the PID and the FID with a response factor of 100%. However, benzene does not have the adequate warning properties required for respirator use. Therefore, when PID or FID readings reach 1 unit (ppm as to methane) above background, benzene specific colormetric tubes will be used to determine benzene levels. If benzene levels are below 1 ppm, level D protective equipment is adequate. If benzene levels are above 1 ppm, Level B must be donned or personnel will be evacuated, and engineering controls will be implemented to reduce airborne concentrations. Work may be resumed when benzene levels return to background.

If benzene is determined not to be present, the action level for engineering controls, or level C protection is 8.5 units above background. This is based on the chemical with the second most restrictive exposure limit, which is 1,1,2-trichloroethane. The PEL for 1,1,2-trichloroethane is 10 ppm and has a PID relative response factor of 85%.

The maximum concentration for respirator use is 50 ppm. At this time, Level B will be donned or personnel will be evacuated, and engineering controls will be implemented to lower the concentration of airborne contamination.

Combustible Vapors

The CGI will be used to monitor for combustible atmospheres during drilling, trenching, and tank sampling. A one-minute downhole reading will be used for drilling, a one-minute reading at different levels will be used for trenching, and a one-minute reading inside the tanks will be used for tank sampling. This will give the instrument time to fully equilibrate. At 20% of the LEL, personnel will be evacuated and engineering controls will be utilized to reduce the concentration of combustible vapors. Personnel may resume work when levels drop below 10% of the LEL.

Particulates, Metals, PCBs, and Alpha Contamination

A real-time aerosol monitor will be used in conjunction with lab data to determine the concentration of contaminants in air. A sample will be obtained to determine the amount of one or more of these contaminants in soil and an action level will be calculated for that particular work area.

4.5.3. Safety Systems and Equipment

A variety of safety equipment will be used to protect personnel from physical hazards and to minimize exposure to hazardous chemicals and radionuclides during field activities at TA-21.

Hearing protection—If noise levels are above 85 dB and both engineering and administrative controls are not practical, hearing protection will be required. There are two basic types of hearing protection that are available: 1) disposable and reusable ear plugs, and 2) ear muffs. Ear plugs may reduce noise levels 25–30 dB and ear muffs 35–40 db if worn properly. The specific protective device utilized should be inspected for information on the effective noise reduction rating.

Trench protection—The one protection device that has been developed for trench operations where shoring, benching, and sloping are not feasible is the trench box or trench shield. A trench box or shield is a box constructed from a strong metal or wood wide enough for workers to move about inside and perform their duties. OSHA regulations require certain specifications be met for the trench box to be safe. The trench box is placed in the trench and attached to the backhoe so that it may be pulled along as the workers progress. This type of system is used mostly in the installation of water systems. It would not be as useful to trench investigations because the walls of the trench may not be viewed from the box, and the protection is voided when workers leave the it.

Tank sampling—Aboveground tank sampling generally has to be performed from a sampling or filling cap on top of the tank. Therefore, some type of fall protection is required for personnel on a tank over 4-ft high. This would include a safety harness or belt and a teather line which is attached to the tank. If a fall were to occur the worker would not fall to the ground. These may also be used on permanent ladder and railing systems. Sampling from a bucket of a backhoe or from a forklift is not acceptable.

The same type of system will be used when hand augering is performed by the mesa edge.

In addition to these personnel protective devices, other safety equipment may be used as needed. LANL Administrative Requirement 12-2, Seatbelts, will be followed. Warming and cooling equipment may be necessary to minimize stress from climatic conditions. Emergency equipment will also be necessary for immediate response and emergency treatment. Additionally, the location of such equipment must be clearly marked and personnel should know the location and be trained in its use.

Fire extinguishers are classed by the type of fire it was designed to extinguish. However, they may be effective for more than one class of fire.

Class A—ordinary combustible materials (wood, paper, and textiles)

Class B—flammable liquids (oil, grease, and paint)

Class C—electrical fires

Class D—metals capable of rapid oxidation (magnesium, sodium, zinc, aluminum, uranium, and zirconium)

4.5.4. General Safety Practices and Mitigation Measures

Some hazards can be minimized by implementing specific safety procedures, work practices, special equipment, training of personnel, and emergency response equipment in case of an accident. They are listed in Sec. 9.4 of the IWP, Annex III, H&S Plan. In addition, the following measures will also be taken:

- Daily planning and/or pre-activity meetings will be held for all personnel involved in field activities. These meetings will discuss health and safety concerns and refresh personnel on the emergency response plans.
- Workers will shower as soon as possible after field work.
- Regulated areas will be established according to the field activity and level of protection. This control zone will be at least 25 ft in diameter and will be established for safety considerations, as well as to control contamination.

The actual dimensions of the control zone should include the space required for any Laboratory security requirements.

- If dust persists during augering or drilling activities, water will be used for dust suppression. This action is for the protection of field personnel.

4.6. SITE-ACCESS CONTROL

4.6.1. Restricted-Access and Exclusion Zones

Restricted-access or exclusion zones will be established before work begins at contaminated sites to protect workers from unnecessary exposure to toxic materials and to prevent the spread of contamination. A description of these zones may be found in Sec. 7.0 of the IWP, Annex III, H&S plan.

4.6.2. Decontamination

Personnel, equipment, and vehicles that have been in contaminated areas may carry residual contamination. Although protective clothing, respirators, and good work practices can help reduce contamination, decontamination may be necessary to prevent exposure of personnel and the migration of contaminants.

All vehicles and equipment that are suspected of being contaminated must be steam-cleaned using high-pressure washers. Vehicles and equipment suspected of being contaminated with alpha particles must be screened with an alpha scintillometer before being released from the site.

Personnel decontamination should be performed in all levels of protection. Disposable protective equipment need not be decontaminated but disposed of as a hazardous waste. Reusable protective equipment must be decontaminated using a soap and water wash and two successive rinses. Visual inspections of the equipment will help determine the effectiveness of the decontamination process. As with the equipment, personnel will be screened with an alpha scintillometer when working with or near alpha contaminated material. ER Program SOPs have been established to guide the decontamination process. They are to be onsite and followed at all times. Decontamination of personnel will follow procedures outlined in ER SOP, Personnel Decontamination. Equipment decontamination will follow ER SOP, General Equipment Decontamination, and Radiological Decontamination. LANL Administrative Requirements for Waste Management are 10.1, Radioactive Liquid Waste; 10.2, Low-Level Radioactive Solid Waste;

10.3, Chemical, Hazardous and Mixed Waste; 10.4, Polychlorinated Biphenyls; and 10.5, Transuranic Solid Waste.

In addition to the following, Sec. 10.0 of the IWP, Annex III, H&S Plan contains information on decontamination:

1. The level of decontamination required will depend on the nature and magnitude of contamination and the type of protective clothing worn. Disposable clothing (i.e., TYVEK) will not be washed because water may transport contamination through the paper garment to the skin.

2. Waste water and materials used during decontamination will be contained for appropriate disposal. Arrangements will be made with LANL for acquisition and disposal of drums containing soapy water, rinse water, methanol, and trash.

4.7. WORKER TRAINING

Worker training will follow the requirements set forth in Sec. 11.0 of the IWP, Annex III H&S Plan.

4.8. Employee Medical Program

In addition to the guidance provided in Sec. 12.0 of the IWP, Annex III H&S Plan, the following paragraph details specific program requirements.

Field team members who are exposed to contaminated materials during ER remedial investigations shall participate in a medical examination program provided by the Laboratory according to 29 CFR Part 1910 or DOE Order 5480.1B Chapter VIII Requirements. Suitability of field team members for conducting field sampling activities, including respirator use, shall be evaluated and documented by a physician. Medical programs must comply with the requirements of DOE Order 5480.1B Chapter VIII or 29 CFR Part 1910, as appropriate. LANL Administrative Requirements 2-1, Occupational Medicine Program, 3-6, Biological Monitoring for Radioactive Materials, and 6-4, Biological Monitoring for Hazardous Materials, and LANL Technical Bulletin 606, Biological Sample Monitoring, shall be followed.

4.9. Records and Reporting Requirements

The ER H&S PL, working the OU PL and Field Teams Manager will ensure that health and safety records are maintained within the appropriate LANL group as required by DOE orders. The reports are as follows:

- DOE-AL Order 5000.3A, Unusual Occurrence Reporting
- DOE Form 5484.3, Supplementary Record of Occupational Injuries and Illnesses, Attachment 1.
- DOE Form 5484.4, Tabulation of Property Damage Experience, Attachment 2.
- DOE Form 5485.5, Report of Property Damage or Loss, Attachment 4.
- DOE Form 5484.6, Annual Summary of Whole Body Exposures to Ionizing Radiation, Attachment 13.
- DOE Form 5484.1, Summary of Exposures Resulting in Internal Body Depositions of Radioactive Materials for CY 19____, Attachment 14.
- DOE Form 5484.8, Termination Occupational Exposure Report, Attachment 10.
- DOE Form OSHA-200, Log of Occupational Injuries and Illnesses, Attachment 7.
- DOE Form EV-102A, Summary of Department of Energy and Department of Energy Contractor Occupational Injuries and Illnesses, Attachment 8.
- DOE Form 5821.1, Unplanned Releases Form, Attachment 15.

Copies of these reports will be stored with the appropriate LANL group. Specific reporting responsibilities are given in the following sections and in Chapter 1, General Administrative Requirements of the LANL H&S Manual.

4.9.1. Exposure and Medical Records

Confidential records of the medical status of each field team member, obtained through the employee medical program, will be maintained with the appropriate Laboratory group and, as necessary, coordinated with the ER Program office. The requirements established below must be met in addition to the requirements set forth in Sec. 13.1 of the IWP, Annex III H&S Plan. Field team members will be issued a radiation dosimeter by LANL, according to Administrative Requirement 3-1, Personnel Radiation Exposure Control.

DOE Forms 5484.1, Summary of Exposures Resulting in Internal Body Depositions of Radioactive Materials for CY 19___, and 5484.6, Annual Summary of Whole Body Exposures to Ionizing Radiation, will be submitted annually by March 31 for monitored employees. Preparation of these reports will be coordinated with the HSE-1 Radiation Protection Group.

4.9.2. Unusual Occurrence

All unusual occurrences must be reported by the site safety officer to the H&S PL, Field Teams Manager, TA-21 OU PL, and building managers in accordance with Sec. 13.2 of the IWP, Annex III, H&S Plan.

4.9.3. Accident/Incident Reports

The LANL principal investigator will submit a completed DOE Form F 5484.X for any of the following accidents/incidents, according to LANL Administrative Requirement 1-1.

1. OCCUPATIONAL INJURY is any injury such as a cut, fracture, sprain, or amputation that results from a work accident or from an exposure involving a single incident in the work environment.

   NOTE: Conditions resulting from animal bites, such as insect or snake bites, or from one-time exposure to chemicals are considered injuries.

2. OCCUPATIONAL ILLNESS of an employee is any abnormal condition or disorder, other than one resulting from an occupational injury, caused by exposure to environmental factors associated with employment. It includes acute and chronic illnesses or diseases that may be caused by inhalation, absorption, ingestion, or direct contact with a toxic material.

3. PROPERTY DAMAGE LOSSES of $1,000 or more must be reported. Accidents that cause damage to DOE property, regardless of fault, or accidents wherein DOE may be liable for damage to a second party, are reportable where damage is $1,000 or more. Include damage to facilities, inventories, equipment, and property parked motor vehicles. Exclude damage resulting from a DOE-reported vehicle accident.

4. GOVERNMENT MOTOR VEHICLE ACCIDENTS resulting in damages of $150 or more or involving an injury, unless the government vehicle is not at fault; damage of less than $150 is sustained by the government vehicle; and no injury is inflicted on the government vehicle occupants. Accidents are also reportable to DOE if

   - damage to a government vehicle not properly parked is greater than or equal to $250;
   - damage to DOE property is greater than or equal to $500 and the driver of a government vehicle is at fault;
   - damage to any private property or vehicle is greater than or equal to $250 and the driver of a government vehicle is at fault; and
   - any person is injured and the driver of a government vehicle is at fault.

4.10. Employee Information

The site safety officer shall ensure that the following DOE and LANL forms are posted where field team leaders and field team members can easily read them:

- Form F 5480.2, Occupational Safety and Health Protection
- Form F 5480.4, Occupational Safety and Health Complaint Form
- LANL Special Work Permit
- OSHA Job Safety and Health Protection Form

The LANL health and safety standard concerning employees' right-to-know shall also be posted at the work site. Additionally, employees will be required to sign the form in Table B-IV prior to initiation of field work.

5. Emergency Response and Notification

This section provides information on responding to emergency situations. LANL Administrative Requirement 1-2, Emergency Preparedness, Administrative Requirement 1–8, Working Alone, and Technical Bulletin 101, Emergency Preparedness, was used in developing an emergency response plan.

5.1. Emergency Contacts

The names of persons and services to contact in case of emergencies are given in Table B-V. This emergency contact form will be copied and posted in prominent locations at the work site. Two-way radio communication will be maintained at remote sites when possible.

The emergency contact number at the Laboratory is 9-911. However, 911 will work but takes longer than dialing 9-911 on Laboratory phones.

5.2. Contingency Plans

This section considers contingency plans for specific types of emergencies. The site safety officer, with assistance from the field teams manager and, if needed, the field team leader, shall have responsibility and authority for coordinating all emergency-response activities until the proper authorities arrive and assume control. A copy of pre-existing TA-21 emergency response plans shall be available at the work site at all times, and all personnel working at the site shall be

TABLE B-IV
FIELD PERSONNEL SIGNATURE PAGE

I understand and have been informed of the contents of this Plan.

Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date
Name	Signature	Date

TABLE B-V

EMERGENCY CONTACTS

Site Safety Officer

Name TBD Call TBD

Environmental Restoration Health and Safety Project Leader

Name Ted Norris Call 665-5136

24-hr LANL Health/Safety Coordinator

Call 9-911

FIRE

Call 9-911

AMBULANCE

Call 9-911

POISON CENTER

Call 9-911

SECURITY

Call 9-911 OR 74673

POLICE

Call 9-911 OR 7-4437 (Protective Force) OR 9-662-8222

(City)

YOU ARE LOCATED AT

TBD

THE NEAREST TELEPHONE IS LOCATED AT

TBD

THE NEAREST EMERGENCY MEDICAL SERVICES ARE LOCATED AT

Los Alamos County Medical Center

3917 West Road, Los Alamos, NM

DIRECTIONS TO HOSPITAL: EXIT TA-21 THROUGH THE WEST GATE. FOLLOW TRINITY DRIVE TO THE INTERSECTION OF TRINITY DRIVE AND DIAMOND DRIVE. HOSPITAL IS ON THE RIGHT.

TRAVEL TIME FROM TA-21 OU (minutes): approx. 10

DISTANCE TO HOSPITAL (miles): 3

familiar with the plans. Evacuation plans and routes may be found in Sec. 5.2.3, Emergency Response Plan.

5.2.1. Fire/Explosion

In the event of a fire, the work area will be evacuated and the LANL Fire Department will be notified. In the event of an explosion, all personnel will be evacuated, and no one will enter the work area until it has been cleared by Laboratory explosives safety personnel.

If a combustible gas meter indicates gas concentrations at levels of 20% of the lower explosive limit, personnel will be evacuated. The site safety officer will continue monitoring to determine when equipment should be removed or when personnel may re-enter the area and resume work.

5.2.2. Personnel Injuries

In case of serious injuries, the victim should be transported to a medical facility as soon as possible. The LANL Fire Department provides emergency transport services. Minor injuries may be treated by trained personnel in the work area. All injuries should be reported to HSE-2 Occupational Medicine Group. In the event that an injured person has been contaminated with chemicals, decontamination will be performed to prevent further exposure only if it will not aggravate the injury (as outlined in Subsec. 4.6.2). Treatment of life-threatening or serious injuries will always be undertaken first. If exposure occurs to hydrofluoric acid, special treatment is required. The hospital must be notified immediately and a special paste will be obtained and applied to the effected area. This paste is currently located at HSE-2.

5.2.3 Emergency Response Plan

For general emergencies that require evacuation (i.e., fire, medical, security, releases, etc.) an emergency response plan specific to TA-21 is required (OSHA 1986). This section will establish evacuation routes for personnel to follow in the event of an emergency. In a worst case, an evacuation of all personnel from TA-21 would be required; in most instances a safe distance may be established to protect personnel.

If a major fire or explosion were to occur, site personnel with fire extinguishers would be of no use. The signal for an evacuation will be two long blasts on an air horn. The crew would gather at a specified location (normally at the vehicles) and proceed away from the fire. One person should find the nearest phone at a safe distance and call the fire department at 9-911. The

phone and the evacuation route used by field personnel should be in the direction away from the fire and toward the TA-21 exit. There is only one exit from TA-21, and that is the gate at the west end of DP West. At the gate, all personnel will wait until every person in the field crew has been accounted for. The site safety officer will determine the next course of action.

A major release or fire involving hazardous or radioactive materials may warrant a different approach. This will be signaled by two short blasts on an air horn. If the signal is heard, personnel will meet at a predetermined area, which will be determined based on wind conditions. A portable wind sock or streamer will be positioned at each work location and personnel notified of the location. If the horn is sounded, all personnel will move in an upwind direction as much as possible without entering a plume. If the source of the fire or release is directly upwind, personnel will move to the exit or gate side and away from the plume (if visible). Once a safe distance is reached, all personnel are to be accounted for. The field team manager and the site safety officer will be responsible for this task. At that time, the site safety officer will determine the next course of action.

For a less severe accident, such as a minor release or small fire, a full evacuation may not be necessary. This will be signaled by one long blast. All personnel will meet at a designated area (i.e., the vehicles) and all personnel will be accounted for. The field team manager and the site safety officer will be responsible for this task, and will be given instructions by the site safety officer.

In the case of a security problem, one short blast will be sounded and personnel will stay in place and wait for instruction from a Laboratory guard.

These will be reviewed at least once per week to remind field personnel of the procedures and the signals. Listed below are the signals for easy reference. This page should also be posted at prominent locations at each work location.

- **Major fire**—two long blasts on the air horn
- **Major release**—two short blasts on the air horn
- **Minor fire or release**—one long blast on the air horn
- **Security problem**—one short blast on the air horn

5.2.4. Additional Emergencies

For information on accidental release of hazardous materials into the environment, unusual events, site alerts, site emergencies and general emergencies, see Chapter 7 if the IWP, Annex III, H&S Plan.

5.3. Notification Requirements

The reporting of emergency situations will follow the flow diagram provided in Fig. B-1. Field team members will notify the health safety officer. The site safety officer's responsibility is to notify the appropriate emergency assistance personnel (e.g., fire, police, ambulance), the field teams manager and the LANL HSE Division Office according to DOE Order 5500.2 and DOE-AL Order 5500.2B and 5000.3A. The LANL HSE Division Office is responsible for implementing notification and reporting requirements according to DOE Order 5484.1A, DOE Order 5484.2, and DOE AL Order 5484.2.

References

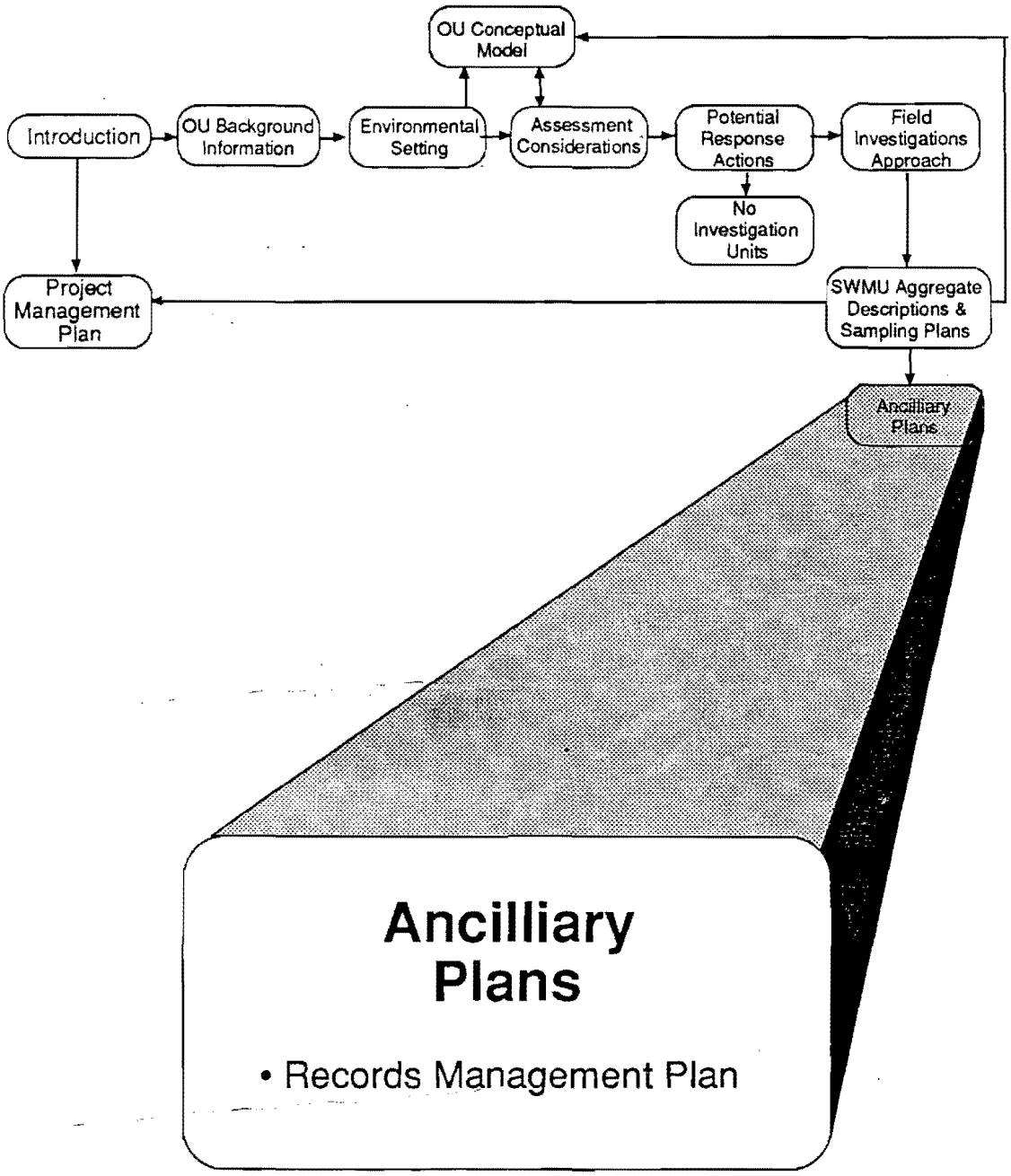
American Conference of Governmental Industrial Hygienists 1990.

LANL (Los Alamos National Laboratory), November 1990. "Installation Work Plan for Environmental Restoration," Los Alamos National Laboratory Report LA-UR-90-3825, Los Alamos, New Mexico.

NIOSH (National Institute for Occupational Safety and Health), Occupational Safety and Health Administration, US Coast Guard, and US Environmental Protection Agency, October 1985. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," Report 85-115, Washington DC.

National Safety Council 1971. Fundamentals of Industrial Hygiene, Chicago, Illinois.

APPENDIX C


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
Ancillary Plans
Ancilliary Plans
• Records Management Plan

APPENDIX C. RECORDS MANAGEMENT PLAN

The Records Management Plan (RMP) for the Environmental Restoration (ER) Program is described in Annex IV of the Installation Work Plan (IWP). The purposes of the RMP are to meet requirements for protecting and managing records (including technical data), to provide an ongoing tool to support the technical efforts of the Laboratory ER activities, and to function as a support system for management decisions throughout the life of the ER program. The RMP establishes general guidelines for managing records, regardless of their physical form or characteristics, that are generated and/or used by the ER Program at the Laboratory. The RMP will be implemented consistently to meet Quality Program requirements and provide an audited and legally defensible system for records management. The following statutory definition of a record will be used (44USC 3301):

> Records are defined as "...books, papers, maps, photographs, machine readable materials, or other documentary materials, regardless of physical form or characteristics ...appropriate for preservation...because of the informational value of the data in them."

Section 2 of IWP Annex IV describes the implementation of the RMP. Activities at the TA-21 OU will follow those procedures, which are summarized briefly below. As the RMP is developed further to support OU needs, additional detail will be provided in annual updates to the IWP.

The RMP incorporates a threefold approach based on records control and commitment to Quality Program guidelines: a structured work flow for record packages, the use of approved procedures, and the compilation of a referable information base. ER record packages will consist of records that are specifically identified in QP, AP, SOP, or ER work plans; or records identified at the discretion of ER personnel as being essential to the program. Record packages are handled through a structured work flow and processing scheme. All stages of records management, including records identification, review, indexing, submittal, correction, retrieval, access, and retention, are governed by the records management procedure (LANL-ER-AP-02.1, R0). Additionally, the document control procedures exist (LANL-ER-AP-01.3, R0; LANL-ER-AP-01.4, R0; LANL-ER-AP-01.5, R0).

Record packages and data will be protected in, and accessed through, the referable information base. The referable information base is comprised of two parts as follows: the records processing facility (RPF) and the Facility for Information Management, Analysis, and Display (FIMAD). The RPF assigns record package identifiers upon request from the originator and serves as the

facility for receiving and processing ER Program record packages to prepare them for delivery to the FIMAD. The RPF also functions as an ER Program reference library for information that either is not feasible or not desirable to store in the FIMAD. The FIMAD will provide the hardware and software necessary for data capture, display, and analysis. Configuration management will be the means of accounting for, controlling, and reporting the planned and actual design components of the FIMAD. Specific details about the structure and use of the FIMAD are given in IWP Annex IV, Sec. 3.0.

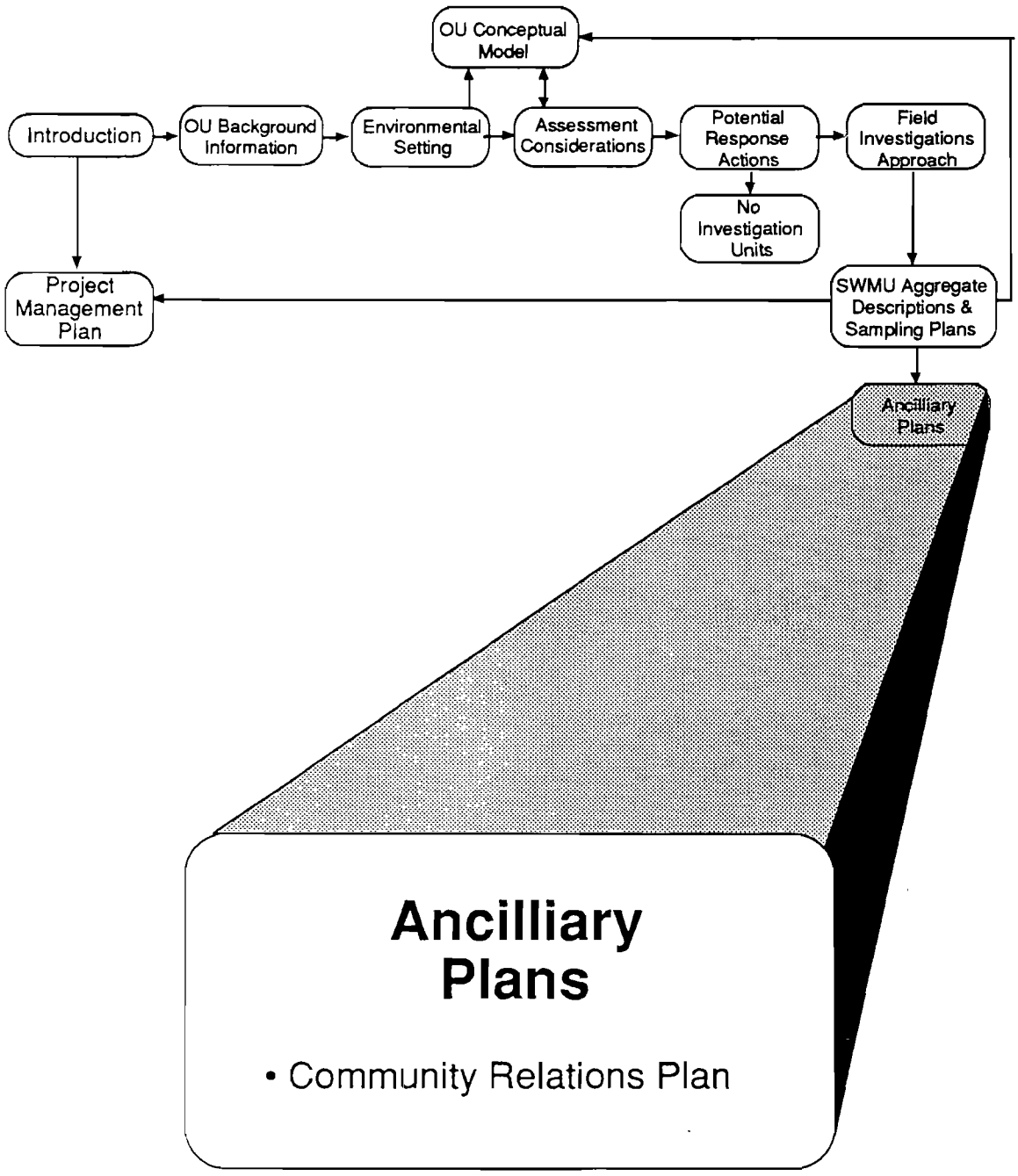
Records will be protected throughout all stages of the process, as described in Sec. 4.0 of IWP Annex IV and in LANL-ER-AP-02.1, R0. The originator is responsible for protecting records until they are submitted to the RPF. Protection by the originator will be commensurate with the value of the information contained in the record. Upon receipt of a record package, the RPF will store the original of the record package in 1-hour, fire-rated equipment and send a copy of the package to the FIMAD. The FIMAD will electronically capture the record package and return the copy of the record package to the RPF. The RPF will then send the original record package to a dual storage area for long-term storage.

Section 5.0 Of IWP Annex IV notes two exceptions to the records storage process. Because of their confidential nature, medical information will be maintained by the Laboratory's Occupational Medicine Group (HSE-2). For convenience, training records will be maintained by the Safety and Risk Assessment Group (HSE-3); the FIMAD will only contain information about the completion of training, the dates of required refresher training, and the location of training records.

Regulatory requirements for reporting, including data types and report frequency, will be delineated. A records retention schedule will also be developed.

RCRA requires that records be made available to the public. The following two complementary approaches are being implemented: hard copy and electronic access. Hard copies of relevant records will be retained in a reading room accessible to the public. A work station or optical reading device will also allow public access to the FIMAD data base.

APPENDIX D


OU Conceptual Model
Introduction
OU Background Information
Environmental Setting
Assessment Considerations
Potential Response Actions
Field Investigations Approach
No Investigation Units
Project Management Plan
SWMU Aggregate Descriptions & Sampling Plans
Ancilliary Plans
Ancilliary Plans
• Community Relations Plan

APPENDIX D. COMMUNITY RELATIONS PLAN FOR THE TA-21 OPERABLE UNIT

1.0 Overview of Community Relations Plan

The Community Relations Plan specific to the TA-21 OU follows the directives, goals, and regulatory requirements set forth in the Community Relations Program Plan (Annex V, Volume I, IWP for ER). This appendix details the community relations activities for the TA-21 OU during the RFI. They are based on current knowledge of public information needs and resources available to the Laboratory's ER Program staff.

As shown in Fig. D-1, public participation is required by regulation during the CMS. However, the Laboratory will provide opportunities for public participation during the five-year RFI process as detailed in Fig. D-2 and in this Appendix.

All information concerning ER program activities at the TA-21 OU will originate with, or be provided to the public, through the Community Relations Project Leader as follows:

Martin J. Janowski
Community Relations Project Leader
Environmental Restoration Program
Los Alamos National Laboratory
P.O. Box 1663, MS M314
Los Alamos, New Mexico 87545
(505) 665-2127

2.0 Community Relations Activities

The following is a brief description of community relations activities to be conducted at TA-21 during RFI activities. Each activity can be expanded or diminished in response to public information needs.

2.1 Mailing List

Community Relations will enhance the ER Program mailing list to include residents and business owners near TA-21, as well as current and former workers at TA-21, to keep them informed of meetings, activities, and schedules pertaining to the TA-21 OU.

Figure D-1. Regulatorily Mandated Opportinities for Public Participation During the RCRA Corrective Action Process

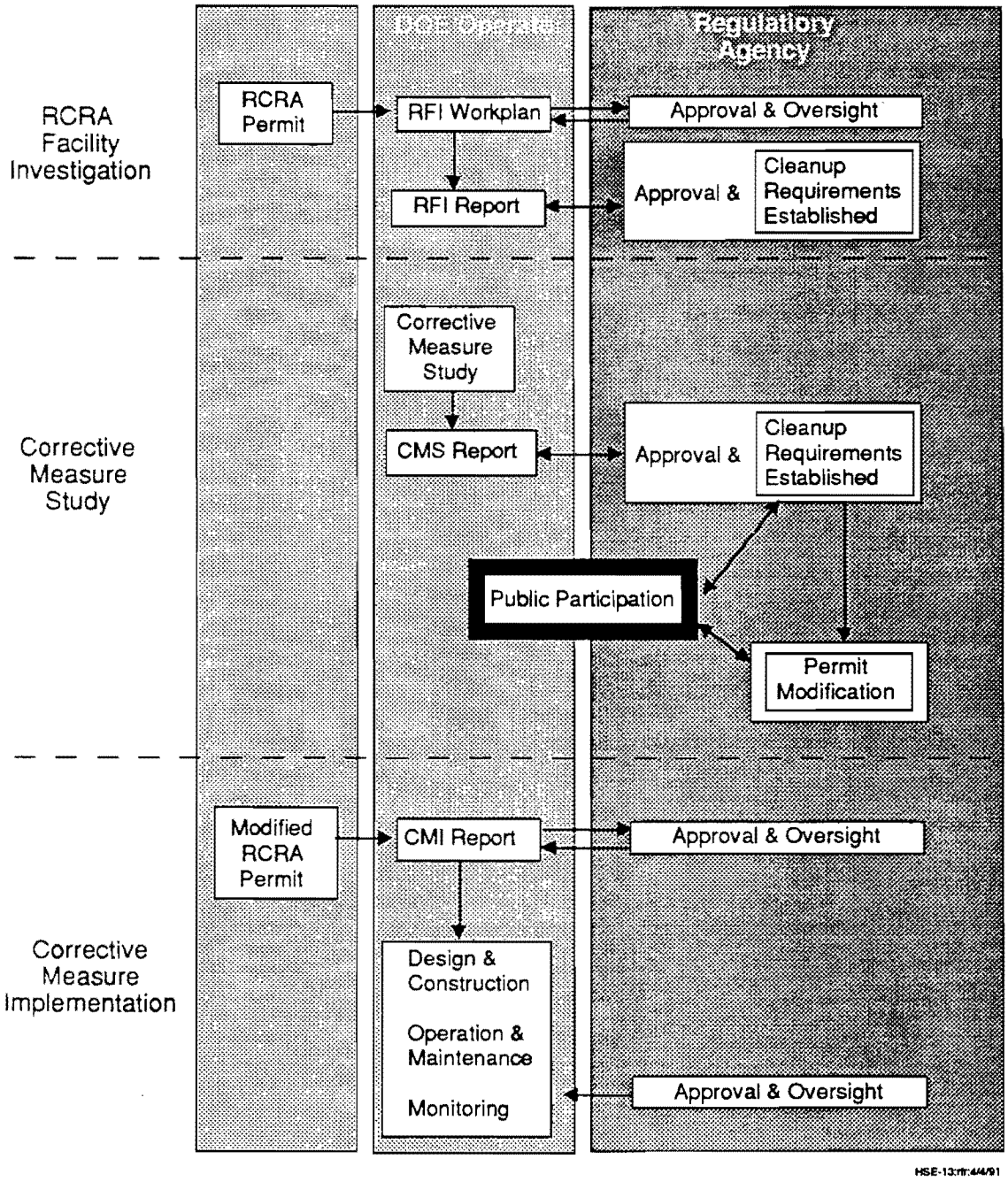
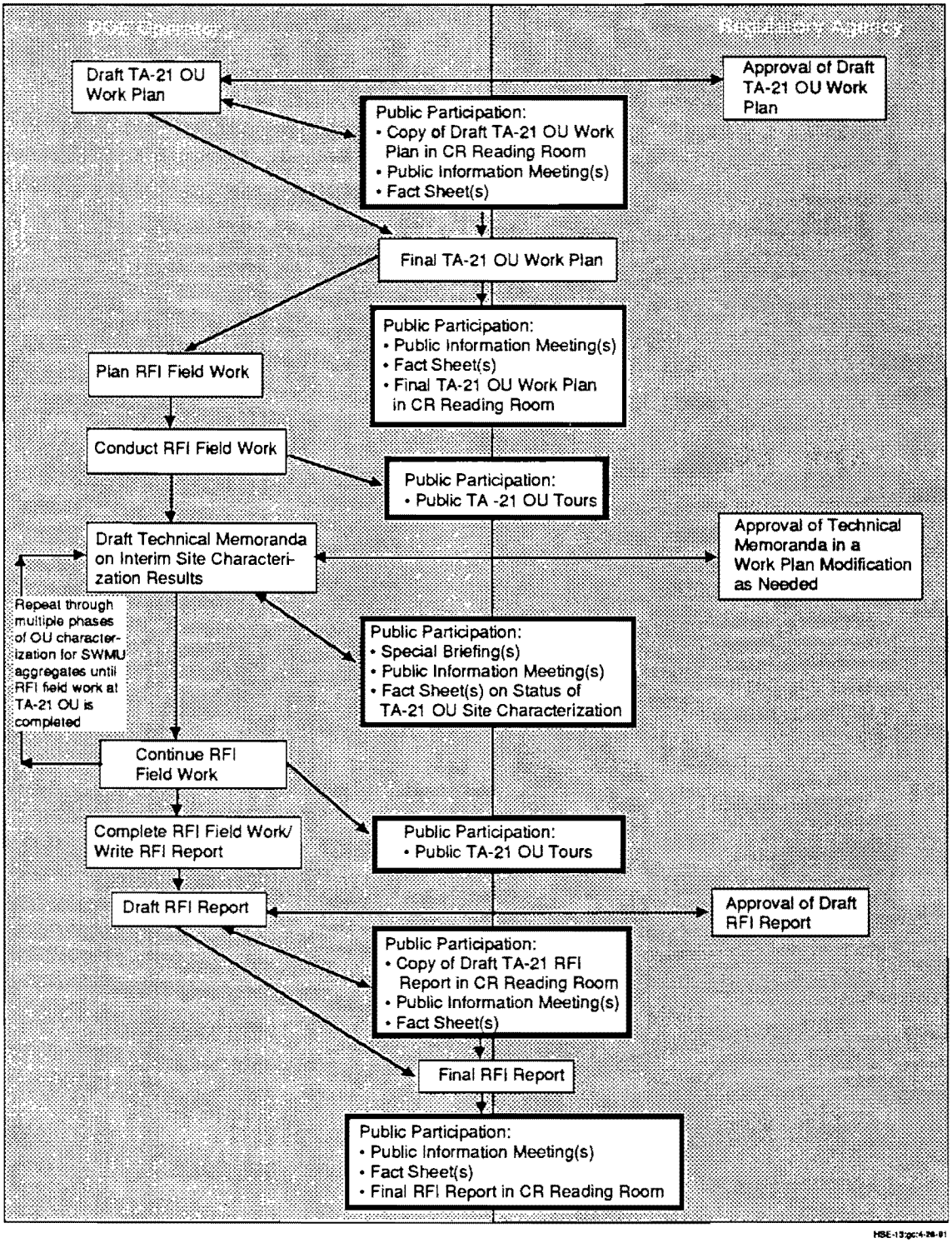


Figure D-2. Opportunities for Public Participation During the TA-21 OU RFI



2.2 Fact Sheets

Community Relations will develop a fact sheet with a simple map inset, which shows the boundaries of the site and summarizes site history and use, known contaminants of concern, and planned activities. The initial fact sheet will be available in June 1991. Additional fact sheets updating progress at TA-21 will be developed based on progress and public information needs.

2.3 Community Relations Reading Room

As they are developed, documents and data associated with the TA-21 OU, such as the TA-21 OU RFI Work Plan, technical memoranda, the RFI report, and other reports will be available to the public at the Community Reading Room located at TriSquare, 2101 Trinity Drive, Suite 20, in downtown Los Alamos from 9 a.m. to 4 p.m. on Laboratory business days. A copy of the TA-21 OU RFI Draft Work Plan will be available at the Reading Room in June 1991.

2.4 Public Information Meetings/Briefings/Response to Inquiries

Once initial information has been gathered and a specific mailing list developed, there will be a public information meeting held in Los Alamos to introduce the public to the ER Program and forthcoming activities described in the work plan for the TA-21 OU. The TA-21 OU Project Leader, with the assistance of the Community Relations Project Leader, will present information and respond to questions and concerns raised by the public. Additional public information meetings will be held as needed or when significant milestones within the RFI process are reached.

If a limited interest issue of concern is raised at a public information meeting, it may be necessary to hold a special briefing or to respond on a one-to-one basis to the inquiry. These inquiries will be coordinated by the Community Relations Project Leader and the TA-21 OU Project Leader.

2.5 Informal Public Review and Comment on the Draft TA-21 OU RFI Work Plan

Public input regarding the field sampling proposed in the draft TA-21 OU RFI Work Plan (during EPA formal review of this document in forthcoming months) is encouraged. As appropriate, public input regarding numbers of samples, types of samples, and quality assurance samples (e.g., duplicate samples) will be incorporated into the final TA-21 OU RFI Work Plan.

APPENDIX E

TA-21 OPERABLE UNIT WORK PLAN CONTRIBUTORS:

EDUCATION AND RELEVANT EXPERIENCE

I. Administrative Management

NAME AND AFFILIATION	EDUCATION/EXPERTISE	ER PROGRAM ASSIGNMENT
Bob Vocke, HSE-13	Ph.D. Water Resources • 15 years experience in hazardous waste site assessment, including waste management, regulatory compliance, and program management	Program Manager; HSE-13 Group Leader
Lars Soholt, HSE-13	Ph.D. Biology • 20 years experience in assessment of energy and waste management systems, including project management experience	Programmatic Project Leader
Micheline Devaurs, HSE-13	M.S. Hydrology • 8 years experience in environmental contamination evaluation, hydrologic modeling and field sampling, and project management	Operable Unit Project Leader
Karen West, EES-13	B.S. Chemical Engineering • 5 years experience working on the Yucca Mountain Site Characterization Project	Assistant to OUPL
Larry Maassen, HSE-13	M.S. Exploration Geology • 12 years experience in exploration geology and 5 years in radioactive waste programs quality assurance and management	Quality Project Leader
Ted Norris, HSE-13	Ph.D. Chemistry • 12 years experience in radionuclide migration; 3 years experience in atmospheric pollutant transport; and 3 years experienceas health and safety officer	Health and Safety Project Leader

II. Technical Contributors

NAME AND AFFILIATION	EDUCATION/EXPERTISE	DOCUMENT SECTIONS
Laboratory Personal		
David Bish, EES-1	Ph.D. Mineralogy–Petrology • 17 years experience in clay and zeolite mineralogy, including 10 years experience in site characterization and waste isolation	Chapters 4,12,16
Dave Broxton, EES-1	M.S. Geology • 14 years experience in geosciences, including geochemical exploration for uranium, petrologic studies of ash-flow tuffs and site characterization for nuclear waste disposal	Chapters 4, 12, 16
Micheline Devaurs, HSE-13	M.S. Hydrology • 8 years experience in environmental contamination evaluation, hydrologic modeling and field sampling, and project management	Entire Document
Barry Drennon, EES-15	14 years analytical chemistry, 3 years records management and archive investigations	Archiving
Fraser Goff, EES-1	Ph.D. Earth Science • 21 years of experience in geology and geochemistry with emphasis on field geology, volcanology, hydrogeochemistry, geothermal exploration, geothermal research, exploration drilling, research drilling of high temperature wells, and integration of geologic, geophysical, and hydrogeochemical data into geologic and hydrologic models	Chapters 4,12,16
Tom Hakonson, EES-15	Ph.D. Radiation Ecology • 18 years experience in radioecological work on environmental processes leading to transport of radioactive and hazardous materials, and management experience	Chapter 16

NAME AND AFFILIATION	EDUCATION/EXPERTISE	DOCUMENT SECTIONS
Charles Harrington, EES-1	Ph.D. Geology • 21 years experience in geosciences research including experience in geomorphic and neotectonic site characterization for nuclear waste disposal and environmental and hazardous waste site assessment	Chapters 4,12,16
Ward Hawkins, EES-1	B.S. Geology •14 years experience in geosciences including hydrogeologic site characterization and operations geology, and management	Chapters 4,12,16
Grant Heiken, EES-1	Ph.D. Geology • 27 years of experience in geology, with an emphasis on pyroclastic rocks, geothermal research, and planetology	Chapters 4,12,16
Martin Janowski, PA-3	B.A. Journalism • 10 years experience in public relations with 4 years in hazardous/radioactive waste communications and community relations	Chapter 1, Appendix D
Elizabeth J. Kelly, A-1	Ph.D. Biostatistics • 3 years experience in devising sampling plans and data analysis techniques for environmental studies including surface covers, site integrity, and decision analysis for ER programs	Chapters 12,16
Sallie McNulty, University of Kansas	Ph.D Statistics • 2 years experience in devising sampling plans and data analysis techniques for environmental studies including surface covers and site integrity for ER programs • Area of expertise in statistical sampling, modeling, and statistical computing.	Chapters 16
Linda Nonno, A-1	B.A. Anthropology • Currently completing B.S. in Computer Science • 3.5 years experience in computer graphics, researching new computer technologies and administration	Chapters 16

NAME AND AFFILIATION	EDUCATION/EXPERTISE	DOCUMENT SECTIONS
Steven Reneau, EES-1	Ph.D. Geology • 5 years experience in geosciences, including evaluation of geologic hazards, surficial erosion, and mass wasting	Chapter 16
Everett P. Springer, EES-13	Ph.D. Watershed Science • 9 years experience in research on environmental systems including simulation of contaminant transport by surface and subsurface hydrologic flow systems	Chapters 4,7,16
Lawrence O. Ticknor, A-1	M.S. Statistics • 4 years experience in environmental sampling, data analysis, and modeling for site characterization, integrity, and surface cover	Chapter 16
David Vaniman, EES-1	Ph.D. Geology 17 years experience in geosciences, including petrology, mineralogy, waste isolation, and site characterization	Chapters 4,12,16
Kenneth Wohletz, EES-1	Ph.D. Geology • 17 years experience in geology with emphasis on physical properties of volcanic rocks and numerical/experimental hydrodynamics	Chapters 4,12,16
Contractor Support		
Christopher A. Aas	M.S. Environmental Engineering and Water Chemistry • 8 years experience in technical activities and project management of multidisciplinary environmental studies, including RCRA and CERCLA investigations at radioactive mixed waste sites	
Robert H. Gilkeson	M.S. Earth Science • 18 years experience as a research/service and supervising hydrogeologist with diverse experience in design and conduct of geophysical programs	

Contractor Support

Mark D. Hansen	M.A. Biology • 17 years experience in environmental sciences, including project manager, office manager, and field team leader on numerous environmental programs for federal and state agencies, and private industry
William M. Little	M.S. Civil Engineering M.S. Hydrology • Over 18 years of diversified experience in a consulting environment for federal agencies and private firms in the fields of earth and environmental sciences with emphasis on environmental consequences of hazardous waste disposal; technical director for multiple hazardous waste site investigations
Michael D. McVey	M.S. Hydrogeology B.S. Geological Engineering • 3 years experience in geological engineering and hydrogeological studies; planned and implemented field programs in variety of geologic settings; coordinated and participated in activities related to CERCLA investigations
Jeffrey D. Slater	B.S. Industrial Safety • 6 years experience in environmental science, with emphasis on industrial hygiene, toxicology, personnel safety training, hazardous waste site investigation, hazardous materials incident emergency response and control, and contingency planning; Regional Safety Officer, US EPA Technical Assistance Team and US DOE ER Program
Miles Clay Smith	M.S. Health Physics • 2 years health physics, experience in environmental monitoring, occupational monitoring, quality assurance/control, implementation of health and safety plans, microdosimetry; 2 years experience as an assistant radiation safety officer; 5 years as a nuclear, biological, and chemical safety officer in the Oklahoma Army National Guard

Contractor Support

W. John Smith, II	Ph.D. Radiation Ecology M.S. Radiation Health • 17 years experience in environmental radiation problems, uranium mill tailings, CERCLA and RCRA investigations at mixed waste sites

III. Administrative Support

NAME AND AFFILIATION	EDUCATION/EXPERIENCE	CONTRIBUTION
E.B. Barnett, IS-11	B.A. Language • 21 years experience in environmental work; 11 years experience writer-editor	Consulting editor
Gracia Coffin, HSE-13	B.S. Anthropology/Environmental Studies • 10 years experience in word processing and computers	Word processing, flow charts
Andrea Kron, contractor	B.A. Geology • 15 years experience cartography, geology, and technical illustration	Illustrations, flow charts
Patricia Leyba, IS-5	B.B.A. (Business Administration) • 9 years experience in office/information management systems	Document layout and production
Janice Lynn, IS-11	M.A. English • 14 years combined experience in journalism and public relations; 5 years experience in environmental field as technical writer-editor	Editor
Nathan McCranie, contractor	B.S. Mathematics • 3 years experience applied environmental radiation studies; uranium mill tailings, RCRA, CERCLA, mixed waste site investigation/ cleanup experience	Analytical tables
Robin Roybal, HSE-13	A.A.S. Word Processing • 7 years experience in word processing	Word processing

APPENDIX F
ANALYTICAL TABLES

This appendix contains detailed tables identifying the sample screening and analysis required for each investigation planned at the MDAs addressed in Chapter 16. Due to the large number of pages, these tables are placed herein. Tables for each MDA are found in Appendix F as follows:

MDA	Chapter 16 Section	Location of Appendix F Analytical Tables
B	16.2	F.2
T	16.3	F.3
U	16.6	F.6
V	16.7	F.7
A	16.8	F.8

Table F.2-1

SCREENING AND ANALYSIS FOR
INITIAL SURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moisture	Field Laboratory Measurements:	Field Laboratory Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: *Strontium 90*	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 8010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals	Laboratory Analysis:	Laboratory Analysis:
Surface Sampling at MDA B																																		
Surface Soil Sample	1	0.0 - 6.0 in		X	X		X	X	X						X							X	X	X	X	X	X	X	X	X			
	2	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	3	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	4	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	5	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	6	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	7	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
Trip Blank	8	0.0 - 6.0 in						X														X	X	X	X	X	X	X	X	X			
Field Duplicate	9	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	10	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	11	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	12	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	13	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	14	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	15	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	16	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
	17	0.0 - 6.0 in						X	X						X							X	X	X	X	X	X	X	X	X			
Rinsate Blank																						X	X	X	X	X	X	X	X	X			
Field Blank	18	0.0 - 6.0 in						X	X													X	X	X	X	X	X	X	X	X			
	19	0.0 - 6.0 in						X	X													X	X	X	X	X	X	X	X	X			
	20	0.0 - 6.0 in						X	X													X	X	X	X	X	X	X	X	X			

Table F.2-1

SCREENING AND ANALYSIS FOR
INITIAL SURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
	21	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	22	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	23	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	24	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	25	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	26	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Field Duplicate																						X	X	X	X		X		X	X				
	27	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	28	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	29	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	30	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	31	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	32	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	33	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	34	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	35	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	36	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																						X	X	X	X		X		X	X				
Field Blank																													X	X				
	37	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	38	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	39	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	40	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	41	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	42	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	43	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				

Table F.2-1

SCREENING AND ANALYSIS FOR
INITIAL SURFACE INVESTIGATIONS AT MDA B.

Sample Identification	Interval	Sampling Location	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
	0.0 - 6.0 in	44																															
	0.0 - 6.0 in	45								X	X	X																					
	0.0 - 6.0 in	46								X	X	X																					
			Field Duplicate																														
	0.0 - 6.0 in	47																															
	0.0 - 6.0 in	48																															
	0.0 - 6.0 in	49																															
	0.0 - 6.0 in	50																															
	0.0 - 6.0 in	51																															
	0.0 - 6.0 in	52																															
	0.0 - 6.0 in	53																															
	0.0 - 6.0 in	54																															
	0.0 - 6.0 in	55																															
			Rinsate Blank																														
			Field Blank																														
	0.0 - 6.0 in	56																															
	0.0 - 6.0 in	57																															
	0.0 - 6.0 in	58																															
	0.0 - 6.0 in	59																															
	0.0 - 6.0 in	60																															
	0.0 - 6.0 in	61																															
	0.0 - 6.0 in	62																															
	0.0 - 6.0 in	63																															
	0.0 - 6.0 in	64																															
			Replicate Surface Soil Sample																														
	0.0 - 6.0 in	1																															
		2																															

Table F.2-1

SCREENING AND ANALYSIS FOR
INITIAL SURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium		Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)		PCB (SW 8080)		TCLP Metals				
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X								
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X								
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X								
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X								
Field Duplicate																						X	X	X	X		X		X	X								
Contingency Surface Soil	1	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	2	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	3	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	4	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	5	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	6	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	7	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	8	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	9	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
	10	0.0 - 6.0 in						C	C													C	C	C	C		C		C	C								
Rinsate Blank																						C	C	C	C		C		C	C								
Field Blank																													C	C								

Table F.2-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
Surface Sampling at MDA B																																	
Surface Soil Sample	1	0.0 - 6.0 in		X	X			X	X													X	X	X	X		X	X	X			
	2	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	3	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	4	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	5	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
Rinsate Blank																						X	X	X	X		X	X	X			
Field Blank																						X	X	X	X		X	X	X			
	6	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	7	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	8	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
Field Duplicate																						X	X	X	X		X	X	X			
	9	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	10	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	11	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	12	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	13	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	14	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	15	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	16	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	17	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	18	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	19	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	20	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			
	21	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X			

Table F.2-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals					
	22	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	23	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	24	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
Rinsate Blank																							X	X	X	X		X		X	X							
Field Blank																														X	X							
	25	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	26	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	27	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
Field Duplicate																							X	X	X	X		X		X	X							
	28	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	29	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
	30	0.0 - 6.0 in						X	X														X	X	X	X		X		X	X							
Rinsate Blank																							X	X	X	X		X		X	X							
Field Blank																														X	X							

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA B																																			
Angled Borehole 10 degrees	1	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements									Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals				
		105.0 – 110.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		110.0 – 115.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
Field Duplicate																							X	X	X	X		X	X	X	X						
Trip Blank																													X								
		115.0 – 120.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		120.0 – 125.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		125.0 – 130.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		130.0 – 135.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		135.0 – 140.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		140.0 – 145.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		145.0 – 150.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		150.0 – 155.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		155.0 – 160.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		160.0 – 165.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		165.0 – 170.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		170.0 – 175.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
		175.0 – 180.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X						
Fracture Sampling Contingency								C	C		C	C	C						C				C	C	C	C		C	C	C	C						
								C	C		C	C	C						C				C	C	C	C		C	C	C	C						
								C	C		C	C	C						C				C	C	C	C		C	C	C	C						
								C	C		C	C	C						C				C	C	C	C		C	C	C	C						
								C	C		C	C	C						C				C	C	C	C		C	C	C	C						
Rinsate Blank																							X	X	X	X		X	X	X	X						
Field Blank																													X	X	X						
Field Duplicate																							X	X	X	X		X	X	X	X						
Trip Blank																													X								

Table F.2–III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low–Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Angled Borehole 10 degrees	2	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals			
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																											X							
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
Angled Borehole 10 degrees	3	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals			
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
Angled Borehole 20 degrees	4	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Laboratory Field Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 - 30.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		80.0 - 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		85.0 - 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		90.0 - 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		95.0 - 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
			Rinsate Blank																														
			Field Blank																														
		100.0 - 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		105.0 - 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		110.0 - 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
			Field Duplicate																			X	X	X	X		X	X	X	X			
		115.0 - 120.0 ft	Trip Blank																			X	X	X	X		X	X	X	X	X		
		120.0 - 125.0 ft																															

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	
		125.0 – 130.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		130.0 – 135.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		135.0 – 140.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		140.0 – 145.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		145.0 – 150.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		150.0 – 155.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		155.0 – 160.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		160.0 – 165.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		165.0 – 170.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		170.0 – 175.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		175.0 – 180.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Rinsate Blank																					X	X	X	X		X	X	X	X			
		180.0 – 185.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		185.0 – 190.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		190.0 – 195.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		195.0 – 200.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
Field Blank																										X	X	X			
Field Duplicate																					X	X	X	X		X	X	X	X			
Trip Blank																											X					
Angled Borehole 20 degrees	5	0.0 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements								Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 9010)	PCB (SW 8080)	TCLP Metals		
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Rinsate Blank																						X	X	X	X		X	X	X	X			
		180.0 – 185.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		185.0 – 190.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		190.0 – 195.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		195.0 – 200.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
Field Blank																											X	X	X				
Field Duplicate																						X	X	X	X		X	X	X				
Trip Blank																											X						

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	6	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Field Duplicate																						X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						
Vertical Borehole	7	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				

Table F.2-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements									Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Field Duplicate																						X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Trip Blank																												X							
Vertical Borehole	8	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X					
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
								C	C		C	C	C						C			C	C	C	C		C	C	C	C					
Field Duplicate																						X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Trip Blank																												X							

Table F.2-IV

MDA B GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Identification	Sample Interval	Sampling Location	Sample Type
MDA B			
Ang Borehole 10 deg		1	
	0.0 – 5.0 ft		
	5.0 – 10.0 ft		
	10.0 – 15.0 ft		
	15.0 – 20.0 ft		
	20.0 – 25.0 ft		
	25.0 – 30.0 ft		
	30.0 – 35.0 ft		
	35.0 – 40.0 ft		
	40.0 – 45.0 ft		
	45.0 – 50.0 ft		
	50.0 – 55.0 ft		
	55.0 – 60.0 ft		
	60.0 – 65.0 ft		
	65.0 – 70.0 ft		
	70.0 – 75.0 ft		
	75.0 – 80.0 ft		
	80.0 – 85.0 ft		
	85.0 – 90.0 ft		
	90.0 – 95.0 ft		
	95.0 – 100.0 ft		
	100.0 – 105.0 ft		
	105.0 – 110.0 ft		
	110.0 – 115.0 ft		
	115.0 – 120.0 ft		
	120.0 – 125.0 ft		
	125.0 – 130.0 ft		
	130.0 – 135.0 ft		
	135.0 – 140.0 ft		
	140.0 – 145.0 ft		
	145.0 – 150.0 ft		
	150.0 – 155.0 ft		
	155.0 – 160.0 ft		
	160.0 – 165.0 ft		
	165.0 – 170.0 ft		
	170.0 – 175.0 ft		
	175.0 – 180.0 ft		
Fracture Contingency Sample			

	Gravemetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph		Chloride–35/Chloride–37	Carbon–12/Carbon–13	Strontium–86/Strontium –87	Hydrogen/Deuterium	Oxygen–16/Oxygen–18	Tritium	Carbon–14	Chloride–36		In Situ Permeability	VOA's – Pore Gas	CO2 – Pore Gas	CH4 – Pore Gas	C–12/C–13 – Pore Gas	Relative Humidity – Pore Gas	SF6		Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM–39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium–252)	Side Scan Video
									X	X	X	X	X	X	X	X																													

Table F.2-IV

MDA B GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (Fire Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Illitic Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Sulfur, Pb	Environmental Isotopes: Chloride-36/Chloride-37	Calcium-41/Calcium-41	Strontium-90/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-18	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SP-8	Open Hole Tests: Geophysics: Thermal Neutron (Moisture)	Gamma Gamma (density)	Caliper	Azimuthal Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Neutron Neutron	Geochemical (Californium-252)	Side Scan Video
												C	C	C	C	C	C	C	C																											
Ang Borehole 10 deg	2	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																											
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																											
		10.0 - 15.0 ft																																											
		15.0 - 20.0 ft																																											
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																											
		30.0 - 35.0 ft																																											
		35.0 - 40.0 ft																																											
		40.0 - 45.0 ft																																											
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																											
		50.0 - 55.0 ft																																											
		55.0 - 60.0 ft																																											
		60.0 - 65.0 ft																																											
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																											
		70.0 - 75.0 ft																																											
		75.0 - 80.0 ft																																											
		80.0 - 85.0 ft																																											
		85.0 - 90.0 ft										X	X	X	X	X	X	X	X																											
		90.0 - 95.0 ft																																											
		95.0 - 100.0 ft																																											
		100.0 - 105.0 ft																																											
		105.0 - 110.0 ft										X	X	X	X	X	X	X	X																											
		110.0 - 115.0 ft																																											
		115.0 - 120.0 ft																																											
		120.0 - 125.0 ft																																											
		125.0 - 130.0 ft										X	X	X	X	X	X	X	X																											
		130.0 - 135.0 ft																																											
		135.0 - 140.0 ft																																											
		140.0 - 145.0 ft																																											
		145.0 - 150.0 ft										X	X	X	X	X	X	X	X																											
		150.0 - 155.0 ft																																											
		155.0 - 160.0 ft																																											
		160.0 - 165.0 ft																																											

Table F.2-IV

MDA B GEOPHYSICAL
MINERALOGICAL DETERMINATIONS

| Sample Type | Sampling Location | Interval | Sample Identification | Hydrogeological and Geochemical | | |

Table F.2-IV

MDA B GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Grain-mount Water Content	Bulk Density	Dry Density	Porosity	Porosity (Hg injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry PH	Environmental Isotopes: Chlorine-36/Chloride-37	Carbon-13/Carbon-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-18	Tritium	Carbon-14	Chlorine-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-13/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (Moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		135.0 – 140.0 ft																																												
		140.0 – 145.0 ft																																												
		145.0 – 150.0 ft		X								X		X		X		X	X																											
		150.0 – 155.0 ft																																												
		155.0 – 160.0 ft																																												
		160.0 – 165.0 ft																																												
		165.0 – 170.0 ft		X								X		X		X		X	X																											
		170.0 – 175.0 ft																																												
		175.0 – 180.0 ft																																												
Fracture Contingency Sample												C	C	C	C	C	C	C	C		C	C	C	C	C	C	C																		
												C	C	C	C	C	C	C	C		C	C	C	C	C	C	C																		
												C	C	C	C	C	C	C	C		C	C	C	C	C	C	C																		
												C	C	C	C	C	C	C	C		C	C	C	C	C	C	C																		
												C	C	C	C	C	C	C	C		C	C	C	C	C	C	C																		
Ang Borehole 20 deg	5	0.0 – 5.0 ft																																												
		5.0 – 10.0 ft										X		X		X		X	X																											
		10.0 – 15.0 ft																																												
		15.0 – 20.0 ft																																												
		20.0 – 25.0 ft																																												
		25.0 – 30.0 ft										X		X		X		X	X																											
		30.0 – 35.0 ft																																												
		35.0 – 40.0 ft																																												
		40.0 – 45.0 ft										X		X		X		X	X																											
		45.0 – 50.0 ft																																												
		50.0 – 55.0 ft																																												
		55.0 – 60.0 ft																																												
		60.0 – 65.0 ft										X		X		X		X	X																											
		65.0 – 70.0 ft																																												
		70.0 – 75.0 ft																																												
		75.0 – 80.0 ft																																												
		80.0 – 85.0 ft																																												
		85.0 – 90.0 ft										X		X		X		X	X																											
		90.0 – 95.0 ft																																												
		95.0 – 100.0 ft																																												
		100.0 – 105.0 ft																																												

Table F.2-IV

MDA B GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Identification	Sampling Location	Interval	Sample Type	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry PH	Environmental Isotope: Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-18/Oxygen-16	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		105.0 - 110.0 ft										X	X	X	X	X	X	X	X																									
		110.0 - 115.0 ft										X	X	X	X	X	X	X	X																									
		115.0 - 120.0 ft																																										
		120.0 - 125.0 ft																																										
		125.0 - 130.0 ft										X	X	X	X	X	X	X	X																									
		130.0 - 135.0 ft																																										
		135.0 - 140.0 ft																																										
		140.0 - 145.0 ft																																										
		145.0 - 150.0 ft										X	X	X	X	X	X	X	X																									
		150.0 - 155.0 ft																																										
		155.0 - 160.0 ft																																										
		160.0 - 165.0 ft																																										
		165.0 - 170.0 ft										X	X	X	X	X	X	X	X																									
		170.0 - 175.0 ft																																										
		175.0 - 180.0 ft																																										
		180.0 - 185.0 ft																																										
		185.0 - 190.0 ft										X	X	X	X	X	X	X	X																									
		190.0 - 195.0 ft																																										
		195.0 - 200.0 ft																																										
Fracture Contingency Sample			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
			C									C	C	C	C	C	C	C	C																									
Ang Borehole 20 deg	6	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																									
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft																																										
		15.0 - 20.0 ft																																										
		20.0 - 25.0 ft																																										
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									
		30.0 - 35.0 ft																																										
		35.0 - 40.0 ft																																										
		40.0 - 45.0 ft																																										
		45.0 - 50.0 ft																																										
		50.0 - 55.0 ft																																										

Table F.2-IV

MDA B GEOPHYSICAL

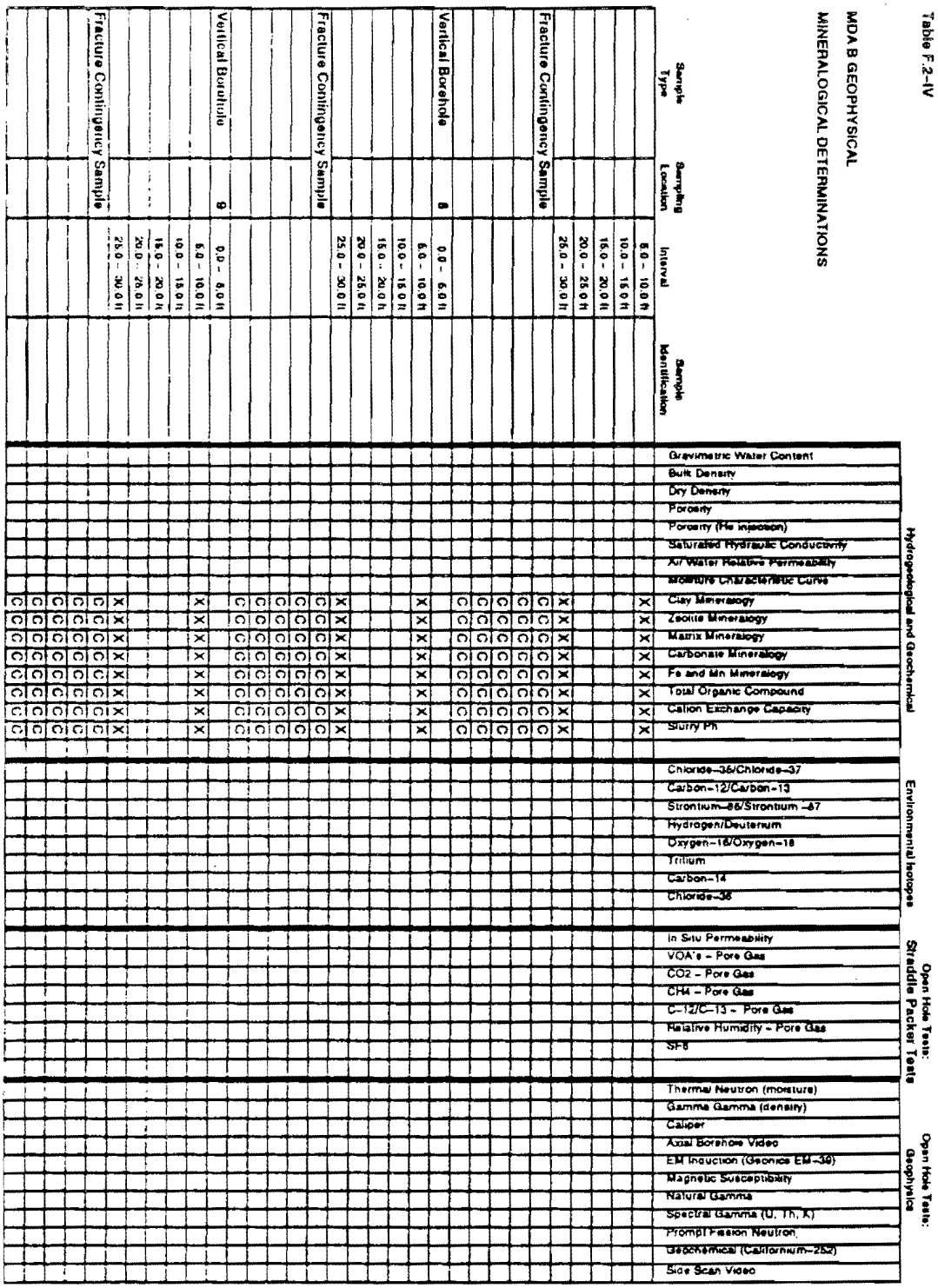
MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (Hg Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Mafic Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Sturm Frit	Environmental Isotopes: Chloride-36/Chloride-37	Calcite-12/Calcite-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-13	Tritium	Carbon-14	Chlorine-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-13/C-12 - Pore Gas	Relative Humidity - Pore Gas	SP's	Open Hole Tests: Geophysics: Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		55.0 – 60.0 ft																																													
		60.0 – 65.0 ft																																													
		65.0 – 70.0 ft		X								X	X	X	X	X	X	X	X																												
		70.0 – 75.0 ft																																													
		75.0 – 80.0 ft																																													
		80.0 – 85.0 ft																																													
		85.0 – 90.0 ft		X								X	X	X	X	X	X	X	X																												
		90.0 – 95.0 ft																																													
		95.0 – 100.0 ft																																													
		100.0 – 105.0 ft																																													
		105.0 – 110.0 ft		X								X	X	X	X	X	X	X	X																												
		110.0 – 115.0 ft																																													
		115.0 – 120.0 ft																																													
		120.0 – 125.0 ft																																													
		125.0 – 130.0 ft		X								X	X	X	X	X	X	X	X																												
		130.0 – 135.0 ft																																													
		135.0 – 140.0 ft																																													
		140.0 – 145.0 ft																																													
		145.0 – 150.0 ft		X								X	X	X	X	X	X	X	X																												
		150.0 – 155.0 ft																																													
		155.0 – 160.0 ft																																													
		160.0 – 165.0 ft																																													
		165.0 – 170.0 ft		X								X	X	X	X	X	X	X	X																												
		170.0 – 175.0 ft																																													
		175.0 – 180.0 ft																																													
		180.0 – 185.0 ft																																													
		185.0 – 190.0 ft		X								X	X	X	X	X	X	X	X																												
		190.0 – 195.0 ft																																													
		195.0 – 200.0 ft																																													
Fracture Contingency Sample												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
Vertical Borehole		0.0 – 5.0 ft																																													
	7																																													

Table F.2-IV

MDA B GEOPHYSICAL

MINERALOGICAL DETERMINATIONS



Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Environmental Isotopes: Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-18/Oxygen-18	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft																																											
		15.0 - 20.0 ft																																											
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	8	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																									
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft										C	C	C	C	C	C	C	C																									
		15.0 - 20.0 ft										C	C	C	C	C	C	C	C																									
		20.0 - 25.0 ft										C	C	C	C	C	C	C	C																									
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	9	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																									
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft										C	C	C	C	C	C	C	C																									
		15.0 - 20.0 ft										C	C	C	C	C	C	C	C																									
		20.0 - 25.0 ft										C	C	C	C	C	C	C	C																									
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Fracture Contingency Sample		15.0 - 20.0 ft										X	X	X	X	X	X	X	X																									
		20.0 - 25.0 ft										X	X	X	X	X	X	X	X																									
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									

Table F.2-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Subsurface samples at MDA B																																
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Field Duplicate																					X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Rinsate Blank																					X	X	X	X		X	X	X	X			
Field Blank																											X	X	X			
Trip Blank																											X					
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			

Table F.2-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		25.0 - 30.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			Rinsate Blank																														
			Field Blank																														
			Trip Blank																														
	3	0.0 - 5.0 ft	Vertical Borehole					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		5.0 - 10.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		10.0 - 15.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		15.0 - 20.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		30.0 - 35.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			

Table F.2-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
Rinsate Blank																			X			X	X	X	X	X	X	X	X							
Field Blank																											X	X	X							
Trip Blank																											X									
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
Field Duplicate																						X	X	X	X	X	X	X	X							
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X							
Rinsate Blank																						X	X	X	X	X	X	X							
Field Blank																											X	X							
Trip Blank																											X								

Table F.2-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA B.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	5	0.0 – 5.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X	X	X				X			X	X	X	X	X	X	X	X	X			
Field Duplicate																																	
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Rinsate Blank																						X	X	X	X	X	X	X	X				
Field Blank																												X	X	X			
Trip Blank																												X	X	X			

Table F.3-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Surface Sampling at MDA T																																	
Surface Soil Sample	1	0.0 - 6.0 in		X	X		X	X	X													X	X	X	X		X		X	X			
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			
Field Blank																													X	X			
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	11	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	12	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	13	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	14	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	15	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	16	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	17	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	18	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	19	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	20	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	21	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			

Table F.3-1

SCREENING AND ANALYSIS FOR INITIAL
SURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Survey: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
	22	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	23	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	24	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			
Field Blank																						X	X	X	X		X		X	X			
	25	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	26	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	27	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	28	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	29	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	30	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	31	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	32	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	33	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	34	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	35	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	36	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	37	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	38	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	39	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	40	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Replicate Surface Soil Sample	1	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			

Table F.3-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals			
Field Blank																												X	X					
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Field Duplicate																						X	X	X	X		X		X	X				
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Contingency Surface Soil	1	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	2	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	3	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	4	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	5	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	6	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	7	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	8	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	9	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
	10	0.0 - 6.0 in																				C	C	C	C		C	C	C	C				
Trip Blank																												C						

Table F.3-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moisture	Field Laboratory Measurements:	Field Laboratory Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals		
Surface Sampling at MDA T																																			
Surface Soil Sample	1	0.0 - 6.0 in		X																															
	2	0.0 - 6.0 in		X				X	X													X	X	X	X		X	X	X						
	3	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	4	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	5	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
Rinsate Blank																																			
Field Blank																																			
	6	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	7	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	8	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
Field Duplicate																																			
	9	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	10	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	11	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	12	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	13	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	14	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	15	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	16	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	17	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	18	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	19	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	20	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						
	21	0.0 - 6.0 in						X	X													X	X	X	X		X	X	X						

Table F.3-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 9010)	PCB (SW 8080)	TCLP Metals			
	22	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	23	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	24	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			
Field Blank																													X	X			
	25	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	26	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	27	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	28	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	29	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	30	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Contingency Surface Soil	1	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	2	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	3	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	4	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	5	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	6	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	7	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	8	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	9	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	10	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
Trip Blank																												C					

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements									Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
Absorption Bed 1																																					
Vertical Borehole	1	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
Field Duplicate																						X	X	X	X		X	X	X	X							
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X							

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
		100.0 - 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		105.0 - 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		110.0 - 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							
		115.0 - 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		120.0 - 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		125.0 - 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		130.0 - 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		135.0 - 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		140.0 - 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		145.0 - 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		150.0 - 155.0 ft						X	X		X	X	X			X			X																
		155.0 - 160.0 ft						X	X		X	X	X			X			X																
		160.0 - 165.0 ft						X	X		X	X	X			X			X																
		165.0 - 170.0 ft						X	X		X	X	X			X			X																
		170.0 - 175.0 ft						X	X		X	X	X			X			X																
		175.0 - 180.0 ft						X	X		X	X	X			X			X																
		180.0 - 185.0 ft						X	X		X	X	X			X			X																
		185.0 - 190.0 ft						X	X		X	X	X			X			X																
		190.0 - 195.0 ft						X	X		X	X	X			X			X																
		195.0 - 200.0 ft						X	X		X	X	X			X			X																
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C					

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C						
								C	C		C	C	C						C			C	C	C	C		C	C	C	C						
								C	C		C	C	C						C			C	C	C	C		C	C	C	C						
								C	C		C	C	C						C			C	C	C	C		C	C	C	C						
Trip Blank																											X									
Vertical Borehole	2	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
Field Duplicate																						X	X	X	X		X	X	X	X						
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Trip Blank																												X						
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Absorption Bed 2																																		

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements						Laboratory Analysis														
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	3	0.0 – 2.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		2.5 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		5.0 – 7.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		7.5 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		10.0 – 12.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		12.5 – 15.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
Field Duplicate																					X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C		C	C	C	C		C	C	C	C				
								C	C		C	C	C						C		C	C	C	C		C	C	C	C				
								C	C		C	C	C						C		C	C	C	C		C	C	C	C				
								C	C		C	C	C						C		C	C	C	C		C	C	C	C				
								C	C		C	C	C						C		C	C	C	C		C	C	C	C				
Rinsate Blank																					X	X	X	X		X	X	X	X				

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Blank																											X	X	X				
Trip Blank																											X						
Vertical Borehole	4	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Field Duplicate																						X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Rinsate Blank											C											X	C	C			X	C	C	C			
Field Blank											C	C																					
Trip Blank																											X	X	X				
Absorption Bed 3																																	
Vertical Borehole	5	0.0 - 2.5 ft		X	X	X	X	X	X		C	C	C						C			X	C	C	C		C	C	C	C			
		2.5 - 5.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		5.0 - 7.5 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		7.5 - 10.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		10.0 - 12.5 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		12.5 - 15.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		15.0 - 20.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		20.0 - 25.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		25.0 - 30.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
Field Duplicate		30.0 - 35.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		35.0 - 40.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		40.0 - 45.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		45.0 - 50.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		50.0 - 55.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		55.0 - 60.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		60.0 - 65.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
		65.0 - 70.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			
Fracture Sampling Contingency		70.0 - 75.0 ft		X	X	X	X	X	X		C	C	C									X	C	C	C		C	C	C	C			

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
								C	C		C	C	C							C			C	C	C	C		C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
Rinsate Blank																							X	X	X	X		X	X	X	X				
Field Blank																													X	X	X				
Trip Blank																													X						
Adsorption Bed 4																																			
Vertical Borehole	6	0.0 - 2.5 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		2.5 - 5.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		5.0 - 7.5 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		7.5 - 10.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		10.0 - 12.5 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		12.5 - 15.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		15.0 - 20.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		20.0 - 25.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		25.0 - 30.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
Field Duplicate																							X	X	X	X		X	X	X	X				
		30.0 - 35.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		35.0 - 40.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		40.0 - 45.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		45.0 - 50.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		50.0 - 55.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		55.0 - 60.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		60.0 - 65.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				

Table F.3-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	
		65.0 – 70.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
Rinsate Blank																					X	X	X	X		X	X	X	X			
Field Blank																											X	X	X			
Trip Blank																											X					

Table F.3-IV

MDA T GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-16	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SPS	Thermal Neutron (Moisture)	Gamma Gamma (density)	Caliper	Azimuthal Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
MDA T				Hydrogeological and Geochemical																Environmental Isotopes								Open Hole Tests: Straddle Packer Tests							Open Hole Tests: Geophysics										
Vertical Borehole	1	0.0 – 5.0 ft																																										
		5.0 – 10.0 ft										X	X	X	X	X	X	X	X																										
		10.0 – 15.0 ft										X	X	X	X	X	X	X	X																										
		15.0 – 20.0 ft																																										
		20.0 – 25.0 ft																																										
		25.0 – 30.0 ft										X	X	X	X	X	X	X	X																										
		30.0 – 35.0 ft																																										
		35.0 – 40.0 ft																																										
		40.0 – 45.0 ft																																										
		45.0 – 50.0 ft										X	X	X	X	X	X	X	X																										
		50.0 – 55.0 ft																																										
		55.0 – 60.0 ft																																										
		60.0 – 65.0 ft																																										
		65.0 – 70.0 ft										X	X	X	X	X	X	X	X																										
		70.0 – 75.0 ft																																										
		75.0 – 80.0 ft																																										
		80.0 – 85.0 ft										X	X	X	X	X	X	X	X																										
		85.0 – 90.0 ft																																										
		90.0 – 95.0 ft																																										
		95.0 – 100.0 ft										X	X	X	X	X	X	X	X																										
		100.0 – 105.0 ft																																										
		105.0 – 110.0 ft										X	X	X	X	X	X	X	X																										
		110.0 – 115.0 ft																																										
		115.0 – 120.0 ft																																										
		120.0 – 125.0 ft																																										
		125.0 – 130.0 ft										X	X	X	X	X	X	X	X																										
		130.0 – 135.0 ft																																										
		135.0 – 140.0 ft																																										
		140.0 – 145.0 ft																																										
		145.0 – 150.0 ft										X	X	X	X	X	X	X	X																										
		150.0 – 155.0 ft																																										
		155.0 – 160.0 ft										X	X	X	X	X	X	X	X																										
		160.0 – 165.0 ft																																										
		165.0 – 170.0 ft										X	X	X	X	X	X	X	X																										
		170.0 – 175.0 ft																																										
		175.0 – 180.0 ft										X	X	X	X	X	X	X	X																										
		180.0 – 185.0 ft																																										
		185.0 – 190.0 ft										X	X	X	X	X	X	X	X																										
		190.0 – 195.0 ft																																										

Table F.3-IV

MDA T GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical										Environmental Isotopes								Open Hole Tests: Straddle Packer Tests								Open Hole Tests: Geophysics									
				Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-35/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
Fracture Contingency Sample		190.0 - 200.0 ft										X	X	X	X	X	X	X	X																					
Vertical Borehole	2	0.0 - 5.0 ft										C	C	C	C	C	C	C	C																					
		5.0 - 10.0 ft										X	X	C	C	C	C	C	C																					
		10.0 - 15.0 ft																																						
		15.0 - 20.0 ft																																						
		20.0 - 25.0 ft																																						
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																					
		30.0 - 35.0 ft																																						
		35.0 - 40.0 ft																																						
		40.0 - 45.0 ft										X	X	X	X	X	X	X	X																					
		45.0 - 50.0 ft																																						
		50.0 - 55.0 ft																																						
		55.0 - 60.0 ft																																						
		60.0 - 65.0 ft																																						
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																					
		70.0 - 75.0 ft																																						
		75.0 - 80.0 ft																																						
		80.0 - 85.0 ft																																						
		85.0 - 90.0 ft										X	X	X	X	X	X	X	X																					
		90.0 - 95.0 ft																																						
		95.0 - 100.0 ft																																						
		100.0 - 105.0 ft																																						
		105.0 - 110.0 ft										X	X	X	X	X	X	X	X																					
		110.0 - 115.0 ft																																						
		115.0 - 120.0 ft																																						
		120.0 - 125.0 ft																																						
		125.0 - 130.0 ft										X	X	X	X	X	X	X	X																					
		130.0 - 135.0 ft																																						
		135.0 - 140.0 ft																																						
		140.0 - 145.0 ft																																						
		145.0 - 150.0 ft										X	X	X	X	X	X	X	X																					

Table F.3-IV

MDA T GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Environmental Isotopes: Chlorine-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-16	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (Porosity)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
Fracture Contingency Sample												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
Vertical Borehole	3	0.0 – 5.0 ft																																									
		5.0 – 10.0 ft										X	X	X	X	X	X	X	X																								
		10.0 – 15.0 ft																																									
		15.0 – 20.0 ft																																									
		20.0 – 25.0 ft																																									
		25.0 – 30.0 ft										X	X	X	X	X	X	X	X																								
		30.0 – 35.0 ft																																									
		35.0 – 40.0 ft																																									
		40.0 – 45.0 ft																																									
		45.0 – 50.0 ft										X	X	X	X	X	X	X	X																								
		50.0 – 55.0 ft																																									
		55.0 – 60.0 ft																																									
		60.0 – 65.0 ft																																									
		65.0 – 70.0 ft										X	X	X	X	X	X	X	X																								
		70.0 – 75.0 ft																																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
Vertical Borehole	4	0.0 – 5.0 ft																																									
		5.0 – 10.0 ft										X	X	X	X	X	X	X	X																								
		10.0 – 15.0 ft																																									
		15.0 – 20.0 ft																																									
		20.0 – 25.0 ft																																									
		25.0 – 30.0 ft										X	X	X	X	X	X	X	X																								
		30.0 – 35.0 ft																																									
		35.0 – 40.0 ft																																									
		40.0 – 45.0 ft																																									
		45.0 – 50.0 ft										X	X	X	X	X	X	X	X																								

Table F.3-IV

MDA T GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-35/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
				Hydrogeological and Geochemical																Environmental Isotopes								Open Hole Tests: Straddle Packer Tests							Open Hole Tests: Geophysics										
		50.0 - 55.0 ft																																											
		55.0 - 60.0 ft																																											
		60.0 - 65.0 ft																																											
		65.0 - 70.0 ft											X	X	X	X	X	X	X	X																									
		70.0 - 75.0 ft																																											
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	5	0.0 - 5.0 ft																																											
		5.0 - 10.0 ft										X			C	C	C	C	C	X																									
		10.0 - 15.0 ft										X			C	C	C	C	C	X																									
		15.0 - 20.0 ft																																											
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft										X			X	X	X	X	X	X																									
		30.0 - 35.0 ft										X			X	X	X	X	X	X																									
		35.0 - 40.0 ft																																											
		40.0 - 45.0 ft																																											
		45.0 - 50.0 ft										X			X	X	X	X	X	X																									
		50.0 - 55.0 ft																																											
		55.0 - 60.0 ft																																											
		60.0 - 65.0 ft																																											
		65.0 - 70.0 ft										X			X	X	X	X	X	X																									
		70.0 - 75.0 ft																																											
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	6	0.0 - 5.0 ft																																											
		5.0 - 10.0 ft										X			C	C	C	C	C	X																									
		10.0 - 15.0 ft										X			C	C	C	C	C	X																									
		15.0 - 20.0 ft																																											
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft										X			X	X	X	X	X	X																									
		30.0 - 35.0 ft										X			X	X	X	X	X	X																									
		35.0 - 40.0 ft																																											
		40.0 - 45.0 ft																																											
		45.0 - 50.0 ft										X			X	X	X	X	X	X																									
		50.0 - 55.0 ft																																											
		55.0 - 60.0 ft																																											
		60.0 - 65.0 ft																																											
		65.0 - 70.0 ft										X			X	X	X	X	X	X																									
		70.0 - 75.0 ft																																											
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	8	0.0 - 5.0 ft																																											
		5.0 - 10.0 ft										X			C	C	C	C	C	X																									
		10.0 - 15.0 ft										X			C	C	C	C	C	X																									
		15.0 - 20.0 ft																																											
		20.0 - 25.0 ft																																											

Table F.3-IV

MDA T GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

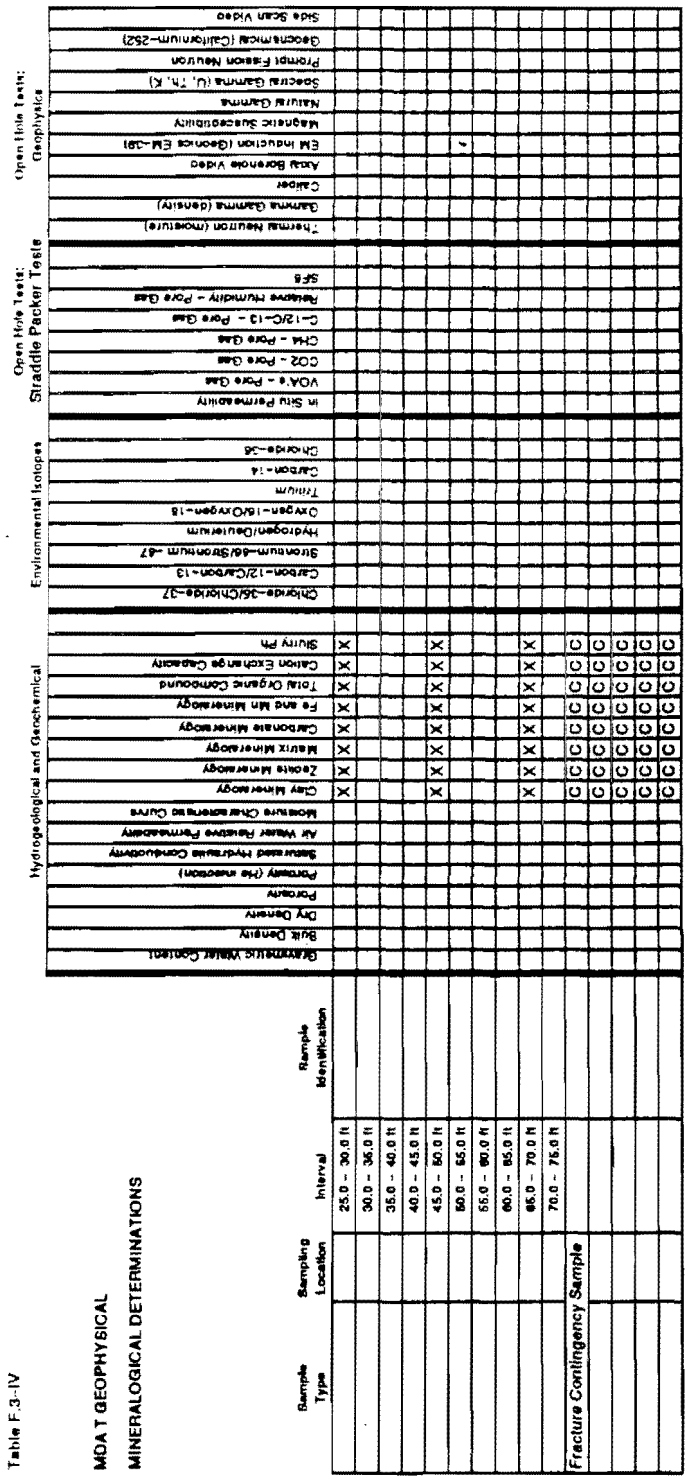


Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA T																																		
Angled Borehole 60 degrees	1	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals	
		105.0 – 110.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		110.0 – 115.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Field Duplicate																					X	X	X	X		X	X	X	X			
Trip Blank																										X						
		115.0 – 120.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		120.0 – 125.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		125.0 – 130.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		130.0 – 135.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		135.0 – 140.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		140.0 – 145.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		145.0 – 150.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		150.0 – 155.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		155.0 – 160.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		160.0 – 165.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		165.0 – 170.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		170.0 – 175.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		175.0 – 180.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Rinsate Blank																					X	X	X	X		X	X	X	X			
		180.0 – 185.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		185.0 – 190.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		190.0 – 195.0 ft						X	X		X	X	X	X	X		X		X		X	X	X	X		X	X	X	X			
		195.0 – 200.0 ft						X	X		X	X	X	X	X		X		X		X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			
								C	C		C	C	C						C		C	C	C	C		C	C	C	C			

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis										
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
								C	C		C	C	C						C		C	C	C	C	C	C	C	C				
Field Blank																										X	X	X				
Field Duplicate																					X	X	X	X		X	X	X	X			
Trip Blank																											X					
Angled Borehole 80 degrees	2	0.0 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Field Duplicate																					X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		75.0 – 80.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		80.0 – 85.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		85.0 – 90.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		90.0 – 95.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
		95.0 – 100.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X			
Rinsate Blank																					X	X	X	X		X	X	X	X			

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Blank																											X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Field Duplicate																						X	X	X	X		X	X	X	X			
Trip Blank																											X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Rinsate Blank																						X	X	X	X		X	X	X	X			
		180.0 – 185.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		185.0 – 190.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		190.0 – 195.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X			
		195.0 – 200.0 ft						X	X		X	X	X	X	X		X		X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification		
				Gross Gamma	Field Surveys
				Low-Energy Gamma	
				Electromagnetic	
				Land Survey	
			C C C	Gross Gamma	Field Screening
			C C C	Gross Alpha	
			C C C	Organic Vapor	
			C C C	Combustible Gas/Oxygen	
			C C C	Lithological Logging	
				Gross Alpha	Field Laboratory Measurements
				Gamma Spectrometry	
				Tritium	
				Volatile Organics	
				PCB	
			C C C	Soil Moisture	
	X		C C C	Gamma Spectrometry	Laboratory Analysis
	X		C C C	Tritium	
	X		C C C	Total Uranium	
	X		C C C	Isotopic Plutonium	
				Isotopic Uranium	
	X		C C C	Strontium 90	
X	X	X	C C C	VOA (SW 8240)	
	X	X	C C C	Semivolatiles (SW 8270)	
	X	X	C C C	Metals (SW 6010)	
				PCB (SW 8080)	
				TCLP Metals	

Trip Blank
Field Duplicate
Field Blank

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture	Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Subsurface samples at MDA T																														
Angled Borehole 60 degrees	3	0.0 – 5.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
Field Duplicate																			X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				
Rinsate Blank																			X	X	X	X		X	X	X	X				
Field Blank																									X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X		X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Trip Blank																																		
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X		X	X	X	X	X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X		X	X	X	X	X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Angled Borehole 90 degrees	4	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Field Blank								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																						X	X	X	X		X	X	X	X				

Table F.3–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low–Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Subsurface samples at MDA T																															
Vertical Borehole	5	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Field Duplicate																					X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Rinsate Blank																					X	X	X	X		X	X	X	X			
Field Blank																											X	X	X			
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals			
		105.0 – 110.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		110.0 – 115.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
Field Duplicate																							X	X	X	X		X	X	X	X					
Trip Blank																													X							
		115.0 – 120.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		120.0 – 125.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		125.0 – 130.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		130.0 – 135.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		135.0 – 140.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		140.0 – 145.0 ft						X	X		X	X	X		X	X	X	X		X			X	X	X	X		X	X	X	X					
		145.0 – 150.0 ft						X	X		X	X	X		X	X	X	X		X			X	X	X	X		X	X	X	X					
Fracture Sampling Contingency								C	C		C	C	C							C			C	C	C	C		C	C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C	C					
								C	C		C	C	C							C			C	C	C	C		C	C	C	C					
Rinsate Blank																							X	X	X	X		X	X	X	X					
Field Blank																													X	X	X					
Field Duplicate																							X	X	X	X		X	X	X	X					
Trip Blank																													X							
Vertical Borehole	6	0.0 – 5.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X					

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		135.0 – 140.0 ft								X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X		
		140.0 – 145.0 ft								X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X		
		145.0 – 150.0 ft								X	X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X	X	X		
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C	C	C	C	C	C		
								C	C		C	C	C						C			C	C	C	C	C	C	C	C	C		
								C	C		C	C	C						C			C	C	C	C	C	C	C	C	C		
								C	C		C	C	C						C			C	C	C	C	C	C	C	C	C		
								C	C		C	C	C						C			C	C	C	C	C	C	C	C	C		
Rinsate Blank											C	C	C						C			C	C	C	C	C	C	C	C	C		
Field Blank																																	
Field Duplicate																						C	C	C	C	C	C	C	C	C		
Trip Blank																																	
Vertical Borehole	7	0.0 – 5.0 ft		X	X	X	X																										
		5.0 – 10.0 ft		X	X	X	X																										
		10.0 – 15.0 ft		X	X	X	X																										
		15.0 – 20.0 ft		X	X	X	X																										
		20.0 – 25.0 ft		X	X	X	X																										
		25.0 – 30.0 ft		X	X	X	X																										
Field Duplicate																																	
		30.0 – 35.0 ft		X	X	X	X																										
		35.0 – 40.0 ft		X	X	X	X																										
		40.0 – 45.0 ft		X	X	X	X																										
		45.0 – 50.0 ft		X	X	X	X																										
		50.0 – 55.0 ft		X	X	X	X																										
		55.0 – 60.0 ft		X	X	X	X																										
		60.0 – 65.0 ft		X	X	X	X																										

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 9010)	PCB (SW 8080)	TCLP Metals			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																					X	X	X	X		X	X	X	X				
Field Blank																											X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																					X	X	X	X		X	X	X	X				
Trip Blank																											X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
Rinsate Blank																						X	X	X	X		X	X	X	X			
Field Blank																											X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X			
Trip Blank																											X						
Vertical Borehole	8	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Field Duplicate																						X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Rinsate Blank																						X	X	X	X		X	X	X	X			

Table F.3–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

				Field Surveys				Field Screening					Field Laboratory Measurements								Laboratory Analysis															
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Field Blank																											X								
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
Field Duplicate																						X	X	X	X	X	X	X	X						
Trip Blank																											X								
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X						
		140.0 – 145.0 ft						X	X		X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X						
		145.0 – 150.0 ft						X	X		X	X	X	X	X	X	X	X	X			X	X	X	X	X	X	X	X						
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C	C	C	C	C						
								C	C		C	C	C						C			C	C	C	C	C	C	C	C						
								C	C		C	C	C						C			C	C	C	C	C	C	C	C						
								C	C		C	C	C						C			C	C	C	C	C	C	C	C						
								C	C		C	C	C						C			C	C	C	C	C	C	C	C						
Rinsate Blank																						X	X	X	X	X	X	X						
Field Blank																											X	X	X						
Field Duplicate																						X	X	X	X	X	X	X	X						
Trip Blank																											X								

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Subsurface samples at MDA T																																		
Angled Borehole 80 degrees	0	0.0 - 5.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		5.0 - 10.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		10.0 - 15.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		15.0 - 20.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		20.0 - 25.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		25.0 - 30.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
Field Duplicate		30.0 - 35.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		80.0 - 85.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		85.0 - 90.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		90.0 - 95.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
		95.0 - 100.0 ft						X	X		X	X	X									X	X	X	X	X	X	X	X	X	X			
Rinsate Blank								X	X													X	X	X	X	X	X	X	X	X	X			
Field Blank																											X	X	X	X	X	X		
		100.0 - 105.0 ft																									X	X	X	X	X	X		

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Angled Borehole 80 degrees	10	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		55.0 - 60.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		60.0 - 65.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		65.0 - 70.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		70.0 - 75.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		75.0 - 80.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		80.0 - 85.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		85.0 - 90.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		90.0 - 95.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		95.0 - 100.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 - 105.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		105.0 - 110.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		110.0 - 115.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		115.0 - 120.0 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				
		120.0 - 125.0 ft						X	X		X	X	X		X	X	X	X		X			X	X	X	X		X	X	X	X				
		125.0 - 130.0 ft						X	X		X	X	X		X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
								C	C		C	C	C							C			C	C	C	C		C	C	C	C				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																													X					
Angled Borehole 20 degrees	11	00 - 50 ft						X	X		X	X	X							X			X	X	X	X		X	X	X	X				

Table F.3–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																			
				Gross Gamma	Low–Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals									
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
Field Duplicate																						X	X	X	X		X	X	X	X										
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
Rinsate Blank																						X	X	X	X		X	X	X	X										
Field Blank																												X	X	X										
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X										
Field Duplicate																						X	X	X	X		X	X	X	X										
Trip Blank																												X											

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Identification	Interval	Sampling Location	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
			Fracture Sampling Contingency					C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			
								C	C		C	C	C						C			C	C	C	C		C	C	C	C			

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																											X	X	X					
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Field Blank																											X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Subsurface samples at MDA T																																		
Vertical Borehole	13	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis														
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 9010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	14	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
Vertical Borehole	15	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveye				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
		5.0 - 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 - 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 - 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																											X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																											X						
Vertical Borehole	16	0.0 - 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 - 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																			
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals								
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
Field Duplicate																						X	X	X	X		X	X	X	X									
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X									
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X	X	X			X	X	X	X		X	X	X	X									
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C									
								C	C		C	C	C						C			C	C	C	C		C	C	C	C									
								C	C		C	C	C						C			C	C	C	C		C	C	C	C									
								C	C		C	C	C						C			C	C	C	C		C	C	C	C									
								C	C		C	C	C						C			C	C	C	C		C	C	C	C									
Rinsate Blank																						X	X	X	X		X	X	X	X									
Field Blank																												X	X	X									
Field Duplicate																						X	X	X	X		X	X	X	X									
Trip Blank																												X											
Angled Borehole 60 degrees	17	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
								C	C		C	C	C						C			C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				

Table F.3-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA T.

Sample Type	Sampling Location	Interval	Sample Identification	Field Survey	Field Screening	Field Laboratory Measurements	Laboratory Analysis
				Gross Gamma	Gross Gamma	Gross Alpha	
				Low-Energy Gamma	Gross Alpha	Gamma Spectrometry	
				Electromagnetic		Tritium	
				Land Survey	Organic Vapor	Volatile Organics	
					Combustible Gas/Oxygen	PCB	
					Lithological Logging	Soil Moisture	
						Gamma Spectrometry	
						Tritium	
						Total Uranium	
						Isotope Plutonium	
						Isotope Uranium	
						Strontium 90	
Trip Blank						VOA (SW 8240)	X
						Semivolatiles (SW 8270)	
						Metals (SW 6010)	
						PCB (SW 8080)	
						TCLP Metals	

Table F.6-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Surface Sampling at MDA U																																	
Surface Soil Sample	1	0.0 - 6.0 in		X	X		X	X	X													X	X	X		X		X	X			
	2	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	3	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	4	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	5	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
Rinsate Blank																																	
Field Blank																																	
Field Duplicate	8	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	7	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	6	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	9	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	10	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	11	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	12	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	13	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	14	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	15	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	16	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	17	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	18	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	19	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	20	0.0 - 6.0 in						X	X													X	X	X		X		X	X			
	21	0.0 - 6.0 in						X	X													X	X	X		X		X	X			

Table F.6-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
	22	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	23	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	24	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
Rinsate Blank																					X	X	X	X		X		X	X				
Field Blank																												X	X				
	25	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	26	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	27	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
Field Duplicate																					X	X	X	X		X		X	X				
	28	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	29	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	30	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	31	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	32	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	33	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	34	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	35	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	36	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	37	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	38	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	39	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	40	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
Replicate Surface Soil Sample	1	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	2	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
	3	0.0 - 6.0 in						X	X												X	X	X	X		X		X	X				
Rinsate Blank																					X	X	X	X		X		X	X				

Table F.6-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moistura	Field Laboratory Measurements:	Field Laboratory Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals		
Field Blank																																			
	4	0.0 - 6.0 in						X	X																										
Field Duplicate																																			
	5	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
	6	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
	7	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
	8	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
	9	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
	10	0.0 - 6.0 in						X	X						X	X						X	X	X	X		X		X	X					
Contingency Soil Sample																																			
	1	0.0 - 6.0 in													C	C						X	X	X	X		X		X	X					
	2	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	3	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	4	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	5	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	6	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	7	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	8	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	9	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
	10	0.0 - 6.0 in													C	C						C	C	C	C		C		C	C					
Trip Blank																						C	C	C	C		C	C	C	C					

Field Surveys | Field Screening | Field Laboratory Measurements | Laboratory Analysis

Table F.6-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Surface Sampling at MDA U																																		
Surface Soil Sample	1	0.0 - 6.0 in		X	X			X	X													X	X	X	X		X		X	X			
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			
Field Blank																													X	X			
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	11	*0.0 - 6.0 in*						X	X													X	X	X	X		X		X	X			
	12	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	13	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	14	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	15	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	16	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	17	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	18	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	19	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	20	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			

Table F.6–II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging		Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)		Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals				
Field Blank																												X	X							
Field Duplicate																						X	X	X	X		X		X	X						
Contengency Surface Soil	1	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	2	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	3	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	4	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	5	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	6	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	7	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	8	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	9	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
	10	0.0 – 6.0 in																				C	C	C	C		C	C	C	C						
Trip Blank																												C								

Table F.6–III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA U																																			
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
		50.0 – 55.0 ft						X	X		X	X	X			X			X																
		55.0 – 60.0 ft						X	X		X	X	X			X			X																
		60.0 – 65.0 ft						X	X		X	X	X			X			X																
		65.0 – 70.0 ft						X	X		X	X	X			X			X																
		70.0 – 75.0 ft						X	X		X	X	X			X			X																
		75.0 – 80.0 ft						X	X		X	X	X			X			X																
		80.0 – 85.0 ft						X	X		X	X	X			X			X																
		85.0 – 90.0 ft						X	X		X	X	X			X			X																
		90.0 – 95.0 ft						X	X		X	X	X			X			X																
		95.0 – 100.0 ft						X	X		X	X	X			X			X																
Fracture Sampling Contingency																					C	C	C	C		C	C	C	C					
																					C	C	C	C		C	C	C	C					
																					C	C	C	C		C	C	C	C					

Table F.6-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals		
Rinsate Blank																						C	C			C	C	C	C				
Field Blank																						C	C			C	C	C	C				
Trip Blank																												C	C				
Vertical Borehole	2	0.0 - 5.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		5.0 - 10.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		10.0 - 15.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		15.0 - 20.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		20.0 - 25.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		25.0 - 30.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
Field Duplicate		30.0 - 35.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		35.0 - 40.0 ft						X	X		X	X	X		X	X			X							X	X	X	X				
		40.0 - 45.0 ft						X	X		X	X	X	X	X	X			X							X	X	X	X				
		45.0 - 50.0 ft						X	X		X	X	X	X	X	X			X							X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C	C	C	C	C				
Rinsate Blank																						C	C	C	C	C	C	C	C				
Field Blank																						C	C	C	C	C	C	C	C				
Trip Blank																												C	C				
Vertical Borehole	3	0.0 - 5.0 ft		X	X			X	X		X	X	X	X	X	X			X			C	C	C	C	C	C	C	C				
		5.0 - 10.0 ft		X	X			X	X		X	X	X	X	X	X			X			C	C	C	C	C	C	C	C				

Table F.6-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements									Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium		Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)		PCB (SW 8080)		TCLP Metals				
		10.0 – 15.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		15.0 – 20.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		20.0 – 25.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		25.0 – 30.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
Field Duplicate																							X	X	X	X			X	X	X	X							
		30.0 – 35.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		35.0 – 40.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		40.0 – 45.0 ft						X	X		X	X	X	X	X	X	X		X				X	X	X	X			X	X	X	X							
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X		X				X	X	X	X			X	X	X	X							
Fracture Sampling Contingency																							C	C	C	C			C	C	C	C							
																							C	C	C	C			C	C	C	C							
																							C	C	C	C			C	C	C	C							
																							C	C	C	C			C	C	C	C							
																							C	C	C	C			C	C	C	C							
Rinsate Blank																							X	X	X	X			X	X	X	X							
Field Blank																														X	X	X							
Trip Blank																														X									
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		5.0 – 10.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		10.0 – 15.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		15.0 – 20.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		20.0 – 25.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		25.0 – 30.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
Field Duplicate																							X	X	X	X			X	X	X	X							
		30.0 – 35.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							
		35.0 – 40.0 ft						X	X		X	X	X						X				X	X	X	X			X	X	X	X							

Table F.6-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA U.

	Sample Type	Sampling Location	Interval	Sample Identification
			40.0 - 45.0 ft	
			45.0 - 50.0 ft	
	Fracture Sampling Contingency			
	Rinsate Blank			
	Field Blank			
	Trip Blank			

Field Surveys	Gross Gamma											X	X	
	Low-Energy Gamma											X	X	
	Electromagnetic											X	X	
	Land Survey											X	X	
Field Screening	Gross Gamma											X	X	
	Gross Alpha											X	X	
	Organic Vapor											X	X	
	Combustible Gas/Oxygen											X	X	
	Lithological Logging											X	X	
Field Laboratory Measurements	Gross Alpha											X	X	
	Gamma Spectrometry											X	X	
	Tritium											X	X	
	Volatile Organics											X	X	
	PCB													
	Soil Moisture											X	X	
Laboratory Analysis	Gamma Spectrometry			X	C	C	C	C	C	C	C	X	X	
	Tritium			X	C	C	C	C	C	C	C	X	X	
	Total Uranium			X	C	C	C	C	C	C	C	X	X	
	Isotopic Plutonium			X	C	C	C	C	C	C	C	X	X	
	Isotopic Uranium													
	Strontium 90			X	C	C	C	C	C	C	C	X	X	
	VOA (SW 8240)	X	X	X	C	C	C	C	C	C	C	X	X	
	Semivolatiles (SW 8270)		X	X	C	C	C	C	C	C	C	X	X	
	Metals (SW 6010)		X	X	C	C	C	C	C	C	C	X	X	
	PCB (SW 8080)													
	TCLP Metals													

Table F.6-IV

MDA U GEOPHYSICAL

MINIERALOGIC DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-18/Oxygen-16	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
MDA U				Hydrogeological and Geochemical																Environmental Isotopes								Open Hole Tests: Straddle Packer Tests							Open Hole Tests: Geophysics										
Vertical Borehole	1	0.0 – 5.0 ft																																										
		5.0 – 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 – 15.0 ft																																										
		15.0 – 20.0 ft																																										
		20.0 – 25.0 ft																																										
		25.0 – 30.0 ft										X	X	X	X	X	X	X	X																									
		30.0 – 35.0 ft																																										
		35.0 – 40.0 ft																																										
		40.0 – 45.0 ft																																										
		45.0 – 50.0 ft										X	X	X	X	X	X	X	X																									
		50.0 – 55.0 ft																																										
		55.0 – 60.0 ft										X	X	X	X	X	X	X	X																									
		60.0 – 65.0 ft																																										
		65.0 – 70.0 ft										X	X	X	X	X	X	X	X																									
		70.0 – 75.0 ft																																										
		75.0 – 80.0 ft										X	X	X	X	X	X	X	X																									
		80.0 – 85.0 ft																																										
		85.0 – 90.0 ft										X	X	X	X	X	X	X	X																									
		90.0 – 95.0 ft																																										
		95.0 – 100.0 ft										X	X	X	X	X	X	X	X																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									
Vertical Borehole	2	0.0 – 5.0 ft																																										
		5.0 – 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 – 15.0 ft																																										
		15.0 – 20.0 ft																																										
		20.0 – 25.0 ft																																										
		25.0 – 30.0 ft										X	X	X	X	X	X	X	X																									
		30.0 – 35.0 ft																																										
		35.0 – 40.0 ft																																										
		40.0 – 45.0 ft																																										
		45.0 – 50.0 ft										X	X	X	X	X	X	X	X																									
Fracture Contingency Sample												C	C	C	C	C	C	C	C																									
												C	C	C	C	C	C	C	C																									

Table F.6-IV

MDA U GEOPHYSICAL

MINERALOGIC DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	
				Gravimetric Water Content
				Bulk Density
				Dry Density
				Porosity
				Porosity (He injection)
				Saturated Hydraulic Conductivity
				Air Water Relative Permeability
				Moisture Characteristic Curve
				Clay Mineralogy
				Zeolite Mineralogy
				Matrix Mineralogy
				Carbonate Mineralogy
				Fe and Mn Mineralogy
				Total Organic Compound
				Cation Exchange Capacity
				Slurry Ph
				Chloride-35/Chloride-37
				Carbon-12/Carbon-13
				Strontium-86/Strontium -87
				Hydrogen/Deuterium
				Oxygen-16/Oxygen-18
				Tritium
				Carbon-14
				Chloride-36
				In Situ Permeability
				VOA's - Pore Gas
				CO2 - Pore Gas
				CH4 - Pore Gas
				C-12/C-13 - Pore Gas
				Relative Humidity - Pore Gas
				SF6
				Thermal Neutron (moisture)
				Gamma Gamma (density)
				Caliper
				Axial Borehole Video
				EM Induction (Geonics EM-39)
				Magnetic Susceptibility
				Natural Gamma
				Spectral Gamma (U, Th, K)
				Prompt Fission Neutron
				Geochemical (Californium-252)
				Side Scan Video
Vertical Borehole	3	0.0 - 5.0 ft		
		5.0 - 10.0 ft		C C C

Table F.6-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA U																																			
Vertical Borehole	1	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							

Table F.6–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis																			
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals								
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
Field Duplicate																						X	X	X	X		X	X	X	X									
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X									
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X									
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C									
																						C	C	C	C		C	C	C	C									
																						C	C	C	C		C	C	C	C									
																						C	C	C	C		C	C	C	C									
																						C	C	C	C		C	C	C	C									
Rinsate Blank																						X	X	X	X		X	X	X	X									
Field Blank																												X	X	X									
Field Duplicate																						X	X	X	X		X	X	X	X									
Trip Blank																												X											
Angled Borehole 20 degrees	3	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X									

Table F.6-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis										
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Field Duplicate																						X	X	X	X		X	X	X	X			
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
Rinsate Blank																						X	X	X	X		X	X	X	X			
Field Blank																												X	X	X			
Trip Blank																												X					

Table F.6-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Survey: Gross Gamma	Field Survey: Low-Energy Gamma	Field Survey: Electromagnetic	Field Survey: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Measurements: Gross Alpha	Field Measurements: Gamma Spectrometry	Field Measurements: Tritium	Field Measurements: Volatile Organics	Field Measurements: PCB	Field Measurements: Soil Moisture	Field Measurements:	Field Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals	Laboratory Analysis:	Laboratory Analysis:
Angled Borehole 20 degrees																																		
	4	0.0 – 5.0 ft						X	X		X	X	X						X															
		5.0 – 10.0 ft						X	X		X	X	X						X															
		10.0 – 15.0 ft						X	X		X	X	X						X															
		15.0 – 20.0 ft						X	X		X	X	X						X															
		20.0 – 25.0 ft						X	X		X	X	X						X															
		25.0 – 30.0 ft						X	X		X	X	X						X															
Field Duplicate		30.0 – 35.0 ft						X	X		X	X	X						X															
		35.0 – 40.0 ft						X	X		X	X	X						X															
		40.0 – 45.0 ft						X	X		X	X	X						X															
		45.0 – 50.0 ft						X	X		X	X	X						X															
		50.0 – 55.0 ft						X	X		X	X	X						X															
		55.0 – 60.0 ft						X	X		X	X	X						X															
		60.0 – 65.0 ft						X	X		X	X	X						X															
		65.0 – 70.0 ft						X	X		X	X	X						X															
		70.0 – 75.0 ft						X	X		X	X	X						X															
		75.0 – 80.0 ft						X	X		X	X	X						X															
		80.0 – 85.0 ft						X	X		X	X	X						X															
		85.0 – 90.0 ft						X	X		X	X	X						X															
Fracture Sampling Contingency																						C	C	C	C	C	C	C	C	C	C		
Rinsate Blank																						C	C	C	C	C	C	C	C	C	C		
																						C	C	C	C	C	C	C	C	C	C		
																						C	C	C	C	C	C	C	C	C	C		
																						C	C	C	C	C	C	C	C	C	C		
																						C	C	C	C	C	C	C	C	C	C		
Field Blank																						C	C	C	C	C	C	C	C	C	C		

Table F.6–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low–Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Trip Blank																											X							
Angled Borehole 15 degrees	5	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						
Angled Borehole 15 degrees	6	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.6-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA U.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						

Table F.7-1

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Surface Sampling at MDA V																																			
Surface Soil Sample	1	0.0 - 6.0 in		X	X		X	X	X													X	X	X	X		X		X	X				
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																						X	X	X	X		X		X	X				
Field Blank																													X	X				
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Field Duplicate																						X	X	X	X		X		X	X				
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	11	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	12	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	13	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	14	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	15	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	16	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	17	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	18	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	19	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	20	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																						X	X	X	X		X		X	X				

Table F.7-1

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moisture	Field Laboratory Measurements:	Field Laboratory Measurements:	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals		
Field Blank															X							C	C	C	C									
Field Duplicate															X							C	C	C	C									
Contingency Soil Sample	1	0.0 - 6.0 in													X							C	C	C	C									
	2	0.0 - 6.0 in																				C	C	C	C									
	3	0.0 - 6.0 in																				C	C	C	C									
	4	0.0 - 6.0 in																				C	C	C	C									
	5	0.0 - 6.0 in																				C	C	C	C									
	6	0.0 - 6.0 in																				C	C	C	C									
	7	0.0 - 6.0 in																				C	C	C	C									
	8	0.0 - 6.0 in																				C	C	C	C									
	9	0.0 - 6.0 in																				C	C	C	C									
	10	0.0 - 6.0 in																				C	C	C	C									
Trip Blank																											C							

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA V																																			
Vertical Borehole	1	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X				X		X															
		80.0 – 85.0 ft						X	X		X	X	X				X		X															
		85.0 – 90.0 ft						X	X		X	X	X				X		X															
		90.0 – 95.0 ft						X	X		X	X	X				X		X															
		95.0 – 100.0 ft						X	X		X	X	X				X		X															

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		100.0 – 105.0 ft						X	X		X	X	X			X			X														
		105.0 – 110.0 ft						X	X		X	X	X			X			X														
		110.0 – 115.0 ft						X	X		X	X	X			X			X														
		115.0 – 120.0 ft						X	X		X	X	X			X			X														
		120.0 – 125.0 ft						X	X		X	X	X			X			X														
Fracture Sampling Contingency																				C	C	C	C	C									
																				C	C	C	C	C									
																				C	C	C	C	C									
Rinsate Blank																				C	C	C	C	C									
Field Blank																				C	C	C	C	C									
Trip Blank																												X					
Vertical Borehole	2	0.0 – 2.5 ft						X	X		X	X	X			X			X														
		2.5 – 5.0 ft						X	X		X	X	X			X			X														
		5.0 – 7.5 ft						X	X		X	X	X			X			X														
		7.5 – 10.0 ft						X	X		X	X	X			X			X														
		10.0 – 12.5 ft						X	X		X	X	X			X			X														
		12.5 – 15.0 ft						X	X		X	X	X			X			X														
		15.0 – 20.0 ft						X	X		X	X	X			X			X														
		20.0 – 25.0 ft						X	X		X	X	X			X			X														
		25.0 – 30.0 ft						X	X		X	X	X			X			X														
Field Duplicate		30.0 – 35.0 ft						X	X		X	X	X			X			X														
		35.0 – 40.0 ft						X	X		X	X	X			X			X														
		40.0 – 45.0 ft						X	X		X	X	X			X			X														

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture		Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		45.0 – 50.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X		X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X		X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																					C	C	C	C		C	C	C	C				
																					C	C	C	C		C	C	C	C				
																					C	C	C	C		C	C	C	C				
																					C	C	C	C		C	C	C	C				
																					C	C	C	C		C	C	C	C				
Rinsate Blank																					X	X	X	X		X	X	X	X				
Field Blank																											X	X	X				
Trip Blank																											X						
Vertical Borehole	3	0.0 – 2.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		2.5 – 5.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		5.0 – 7.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		7.5 – 10.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		10.0 – 12.5 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		12.5 – 15.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
Field Duplicate																					X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X		X	X	X	X		X	X	X	X				

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						
Vertical Borehole	4	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						
Vertical Borehole	5	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X						
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X						
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
Rinsate Blank																						X	X	X	X		X	X	X	X						
Field Blank																												X	X	X						
Trip Blank																												X								
Vertical Borehole	6	0.0 – 2.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		2.5 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		5.0 – 7.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		7.5 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		10.0 – 12.5 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		12.5 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						

Table F.7-II

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Duplicate																						X	X	X	X		X	X	X	X			
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
Rinsate Blank																						X	X	X	X		X	X	X	X			
Field Blank																												X	X	X			
Trip Blank																												X					

Table F.7-III

MDA V GEOPHYSICAL
MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-35/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
				Hydrogeological and Geochemical																Environmental Isotopes								Open Hole Tests: Straddle Packer Tests								Open Hole Tests: Geophysics								
MDA V																																												
Vertical Borehole																																												
	1	0.0 - 5.0 ft																																										
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft																																											
		15.0 - 20.0 ft																																										
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																									
		30.0 - 35.0 ft																																											
		35.0 - 40.0 ft																																											
		40.0 - 45.0 ft																																											
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																									
		50.0 - 55.0 ft																																											
		55.0 - 60.0 ft																																											
		60.0 - 65.0 ft																																											
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																									
		70.0 - 75.0 ft																																											
		75.0 - 80.0 ft										X	X	X	X	X	X	X	X																									
		80.0 - 85.0 ft																																											
		85.0 - 90.0 ft										X	X	X	X	X	X	X	X																									
		90.0 - 95.0 ft																																											
		95.0 - 100.0 ft										X	X	X	X	X	X	X	X																									
		100.0 - 105.0 ft																																											
		105.0 - 110.0 ft										X	X	X	X	X	X	X	X																									
		110.0 - 115.0 ft																																											
		115.0 - 120.0 ft										X	X	X	X	X	X	X	X																									
		120.0 - 125.0 ft																																											
Fracture Contingency Sample										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
										C	C	C	C	C	C	C	C			C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
Vertical Borehole	2	0.0 - 5.0 ft																																											
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																									
		10.0 - 15.0 ft																																											
		15.0 - 20.0 ft																																										
		20.0 - 25.0 ft																																											
		25.0 - 30.0 ft																																											
		30.0 - 35.0 ft																																											

Table F.7-III

MDA V GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (Fire Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-88/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-16	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	Sr-8		Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Cadmium-262)	Slide Scan Video
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft										X	X	X	X	X	X	X	X																												
		45.0 - 50.0 ft		X	X							X	X	X	X	X	X	X	X																												
		50.0 - 55.0 ft																																												
		55.0 - 60.0 ft																																												
		60.0 - 65.0 ft																																												
		65.0 - 70.0 ft		X	X							X	X	X	X	X	X	X	X																												
		70.0 - 75.0 ft																																												
Fracture Contingency Sample				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
Vertical Borehole	3	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																												
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																												
		10.0 - 15.0 ft																																												
		15.0 - 20.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																												
		30.0 - 35.0 ft																																												
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																												
		50.0 - 55.0 ft																																												
		55.0 - 60.0 ft																																												
		60.0 - 65.0 ft																																												
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																												
		70.0 - 75.0 ft																																												
Fracture Contingency Sample				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
				C	C							C	C	C	C	C	C	C	C																												
Vertical Borehole	4	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																												
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																												

Table F.7-III

MDA V GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

| Sample Type | Sampling Location | Interval | Sample Identification | Hydrogeological and Geochemical | | |

Table F.7-III

MDA V GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

| Sample Type | Sampling Location | Interval | Sample Identification | Hydrogeological and Geochemical | | |

Table F.7-iV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Subsurface samples at MDA V																																	
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 - 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 - 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 - 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements										Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Trip Blank																											X									
Vertical Borehole	2	0.0 - 5.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		5.0 - 10.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		10.0 - 15.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		15.0 - 20.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		20.0 - 25.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		25.0 - 30.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
Field Duplicate																							X	X	X	X		X	X	X	X					
		30.0 - 35.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		35.0 - 40.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		40.0 - 45.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		45.0 - 50.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		50.0 - 55.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		55.0 - 60.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		60.0 - 65.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		65.0 - 70.0 ft						X	X		X	X	X	X	X	X	X	X	X				X	X	X	X		X	X	X	X					
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X	X	X				X	X	X	X		X	X	X	X					
Rinsate Blank																							X	X	X	X		X	X	X	X					
Field Blank																													X	X	X					
Field Duplicate																							X	X	X	X		X	X	X	X					
Trip Blank																													X							
Fracture Sampling Contingency																							C	C	C	C		C	C	C	C					
																							C	C	C	C		C	C	C	C					
																							C	C	C	C		C	C	C	C					
																							C	C	C	C		C	C	C	C					
																							C	C	C	C		C	C	C	C					

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	3	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
Field Duplicate																						X	X	X	X		X	X	X	X						
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X						
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X						
Rinsate Blank																						X	X	X	X		X	X	X	X						
Field Blank																												X	X	X						
Field Duplicate																						X	X	X	X		X	X	X	X						
Trip Blank																												X								
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
																						C	C	C	C		C	C	C	C						
Angled Borehole 10 degrees	5	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Identification	Sampling Location	Sample Type	Interval	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
			10.0 - 15.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			15.0 - 20.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			20.0 - 25.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			25.0 - 30.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Field Duplicate																																	
			30.0 - 35.0 ft					X	X			X	X						X			X	X	X	X	X	X	X	X	X			
			35.0 - 40.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			40.0 - 45.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			45.0 - 50.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			50.0 - 55.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			55.0 - 60.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			60.0 - 65.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			65.0 - 70.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			70.0 - 75.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			75.0 - 80.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			80.0 - 85.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			85.0 - 90.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			90.0 - 95.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			95.0 - 100.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Rinsate Blank																						X	X	X	X	X	X	X	X			
Field Blank																						X	X	X	X	X	X	X	X			
			100.0 - 105.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			105.0 - 110.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
			110.0 - 115.0 ft					X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Field Duplicate																						X	X	X	X	X	X	X	X			
Trip Blank																						X	X	X	X	X	X	X	X			

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
		180.0 – 185.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		185.0 – 190.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		190.0 – 195.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		195.0 – 200.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						

Table F.7–IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements							Laboratory Analysis												
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Angled Borehole 10 degrees	6	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		105.0 – 110.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		110.0 – 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
		180.0 – 185.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		185.0 – 190.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		190.0 – 195.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		195.0 – 200.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
Field Blank																												X	X	X					

Table F.7-iV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis															
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
Field Duplicate																						X	X	X	X		X	X	X	X						
Trip Blank																												X								
Angled Borehole 30 degrees	7	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
Field Duplicate																						X	X	X	X		X	X	X	X						
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						
Rinsate Blank																						X	X	X	X		X	X	X	X						
Field Blank																												X	X	X						
		100.0 – 105.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X						

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

| Sample Type | Sampling Location | Interval | Sample Identification | Field Surveys | | | | Field Screening | | | | | | Field Laboratory Measurements | | | | | | | | Laboratory Analysis | | | | | | | |

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		5.0 - 10.0 ft																	X														
		10.0 - 15.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		15.0 - 20.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Field Duplicate																																		
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		80.0 - 85.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		85.0 - 90.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		90.0 - 95.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		95.0 - 100.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Rinsate Blank																						X	X	X	X	X	X	X	X			
Field Blank																						X	X	X	X	X	X	X	X			
		100.0 - 105.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		105.0 - 110.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
		110.0 - 115.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X	X			
Field Duplicate																						X	X	X	X	X	X	X	X			

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

				Field Surveys				Field Screening					Field Laboratory Measurements							Laboratory Analysis											
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Trip Blank																											X						
		115.0 – 120.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		120.0 – 125.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		125.0 – 130.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
																						C	C	C	C		C	C	C	C			
Rinsate Blank																						X	X	X	X		X	X	X	X			
Field Blank																												X	X	X			
Field Duplicate																						X	X	X	X		X	X	X	X			
Trip Blank																												X					
Angled Borehole 10 degrees	9	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		30.0 - 35.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		80.0 - 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		85.0 - 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		90.0 - 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		95.0 - 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		100.0 - 105.0 ft	Rinsate Blank																														
		105.0 - 110.0 ft	Field Blank																														
		110.0 - 115.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		115.0 - 120.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X		X	X	X	X			
		120.0 - 125.0 ft	Trip Blank																														

Table F.7-IV

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA V.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements										Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals				
		125.0 – 130.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		130.0 – 135.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		135.0 – 140.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		140.0 – 145.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		145.0 – 150.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		150.0 – 155.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		155.0 – 160.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		160.0 – 165.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		165.0 – 170.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
		170.0 – 175.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X					
Fracture Sampling Contingency																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							

Table F.8-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
Surface Sampling at MDA A																																			
Surface Soil Sample	1	0.0 - 6.0 in		X	X		X	X	X													X	X	X	X		X		X	X				
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																						X	X	X	X		X		X	X				
Field Blank																													X	X				
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Field Duplicate																						X	X	X	X		X		X	X				
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	11	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	12	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	13	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	14	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	15	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	16	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	17	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	18	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	19	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	20	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	21	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				

Table F.8-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha	Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 8010)	PCB (SW 8080)	TCLP Metals			
	22	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	23	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	24	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																					X	X	X	X		X		X	X				
Field Blank																												X	X				
	25	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	26	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	27	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Field Duplicate																					X	X	X	X		X		X	X				
	28	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	29	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	30	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	31	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	32	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	33	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	34	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	35	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	36	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	37	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	38	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	39	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	40	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Replicate Surface Soil Sample	1	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X				
Rinsate Blank																					X	X	X	X		X		X	X				

Table F.8-1

SCREENING AND ANALYSIS FOR INITIAL SURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Blank																												X	X				
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Contingency Surface Sample	1	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	2	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	3	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	4	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	5	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	6	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	7	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	8	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	9	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
	10	0.0 - 6.0 in																				C	C	C	C		C	C	C	C			
Trip Blank																											C						

Table F.8-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA A.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Surface Sampling at MDA A																																	
Surface Soil Sample	1	0.0 - 6.0 in		X	X			X	X													X	X	X	X		X		X	X			
	2	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	3	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	4	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	5	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			
Field Blank																													X	X			
	6	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	7	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	8	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Field Duplicate																						X	X	X	X		X		X	X			
	9	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	10	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	11	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	12	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	13	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	14	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	15	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	16	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	17	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	18	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	19	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
	20	0.0 - 6.0 in						X	X													X	X	X	X		X		X	X			
Rinsate Blank																						X	X	X	X		X		X	X			

Table F.8-II

SCREENING AND ANALYSIS FOR SUBSEQUENT SURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Field Blank															X																		
Field Duplicate															C							C	C	C	C	C	C	C	C				
Contingency Surface Sample	1	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	2	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	3	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	4	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	5	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	6	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	7	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	8	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	9	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
	10	0.0 - 6.0 in													C							C	C	C	C	C	C	C	C				
Trip Blank																												C					

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements										Laboratory Analysis																	
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals							
Subsurface samples at MDA A																																								
Angled Borehole 15 degrees	1	0.0 – 5.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		5.0 – 10.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		10.0 – 15.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		15.0 – 20.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		20.0 – 25.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		25.0 – 30.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
Field Duplicate																							X	X	X	X		X	X	X	X									
		30.0 – 35.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		35.0 – 40.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		40.0 – 45.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		45.0 – 50.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		50.0 – 55.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		55.0 – 60.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		60.0 – 65.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		65.0 – 70.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		70.0 – 75.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		75.0 – 80.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		80.0 – 85.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		85.0 – 90.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		90.0 – 95.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
		95.0 – 100.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									
Rinsate Blank																							X	X	X	X		X	X	X	X									
Field Blank																													X	X	X									
		100.0 – 105.0 ft						X	X		X	X	X						X				X	X	X	X		X	X	X	X									

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		105.0 – 110.0 ft																																
Field Duplicate		110.0 – 115.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
Trip Blank		115.0 – 120.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
		120.0 – 125.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
		125.0 – 130.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
		130.0 – 135.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
		135.0 – 140.0 ft						X	X		X	X	X	X	X	X			X			X	X	X			X							
Fracture Contingency Sampling																																		
Rinsate Blank														X	C	C	C	C				X	C	C	C	C	C							
Field Blank														X	C	C	C	C				X	C	C	C	C	C							
Trip Blank																												X						
Angled Borehole 30 degrees	2	0.0 – 5.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		5.0 – 10.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		10.0 – 15.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		15.0 – 20.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		20.0 – 25.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		25.0 – 30.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
Field Duplicate																																		
	2	30.0 – 35.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							
		35.0 – 40.0 ft						X	X		X	X	X	X	C	C	C	C				X	C	C	C	C	C							

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		65.0 – 70.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		70.0 – 75.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		75.0 – 80.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		80.0 – 85.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		85.0 – 90.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		90.0 – 95.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		95.0 – 100.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Field Duplicate																						X	X	X	X		X	X	X	X					
Trip Blank																												X							
Fracture Contingency Sampling																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
Angled Borehole 30 degrees	3	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Identification	Sampling Location	Interval	Sample Type	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		25.0 - 30.0 ft	Field Duplicate					X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		70.0 - 75.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		75.0 - 80.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		80.0 - 85.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		85.0 - 90.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		90.0 - 95.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		95.0 - 100.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
			Rinsate Blank																			X	X	X	X	X	X	X	X			
			Field Blank																			X	X	X	X	X	X	X	X			
		100.0 - 105.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		105.0 - 110.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		110.0 - 115.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
			Field Duplicate																			X	X	X	X	X	X	X	X			
			Trip Blank																									X					
		115.0 - 120.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		120.0 - 125.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			
		125.0 - 130.0 ft						X	X		X	X	X						X			X	X	X	X	X	X	X	X			

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis													
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
		130.0 – 135.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		135.0 – 140.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		140.0 – 145.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		145.0 – 150.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		150.0 – 155.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		155.0 – 160.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		160.0 – 165.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		165.0 – 170.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		170.0 – 175.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		175.0 – 180.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		180.0 – 185.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		185.0 – 190.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		190.0 – 195.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		195.0 – 200.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Fracture Contingency Sampling																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
Trip Blank																												X						
Vertical Borehole	4	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Identification	Sample Type	Sampling Location	Interval	Field Surveys: Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Field Screening: Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Field Laboratory Measurements: Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
			15.0 - 20.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
			20.0 - 25.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
	Field Duplicate		25.0 - 30.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
			30.0 - 35.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
			35.0 - 40.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
			40.0 - 45.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
			45.0 - 50.0 ft					X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X	X	X	X	X			
	Fracture Contingency Sampling																																	
	Rinsate Blank																					C	C	C	C	C	C	C	C	C				
	Field Blank																					C	C	C	C	C	C	C	C	C				
	Trip Blank																					C	C	C	C	C	C	C	C	C				
	Vertical Borehole	S	0.0 - 5.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			5.0 - 10.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			10.0 - 15.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			15.0 - 20.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			20.0 - 25.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			25.0 - 30.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
	Field Duplicate		30.0 - 35.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			35.0 - 40.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				
			40.0 - 45.0 ft	X	X	X	X	X	X	X	X	X	X			X	X		X			X	X	X	X	X	X	X	X	X				

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys				Field Screening						Field Laboratory Measurements									Laboratory Analysis														
				Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture				Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals			
		45.0 – 50.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
Fracture Contingency Sampling																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
																						C	C	C	C		C	C	C	C					
Rinsate Blank																						X	X	X	X		X	X	X	X					
Field Blank																												X	X	X					
Trip Blank																												X							
Vertical Borehole	6	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
																						X	X	X	X		X	X	X	X					
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X					
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X					
Fracture Contingency Sampling																						C	C	C	C		C	C	C	C					

Table F.8-III

SCREENING AND ANALYSIS FOR INITIAL SUBSURFACE INVESTIGATIONS AT MDA A.

	Sample Identification	Interval	Sampling Location	Sample Type	
Field Surveys	Gross Gamma				
	Low-Energy Gamma				
	Electromagnetic				
	Land Survey				
Field Screening	Gross Gamma				
	Gross Alpha				
	Organic Vapor				
	Combustible Gas/Oxygen				
	Lithological Logging				
Field Laboratory Measurements	Gross Alpha				
	Gamma Spectrometry				
	Tritium				
	Volatile Organics				
	PCB				
	Soil Moisture				
Laboratory Analysis	Gamma Spectrometry	X	C	C	C	C
	Tritium	X	C	C	C	C
	Total Uranium	X	C	C	C	C
	Isotopic Plutonium	X	C	C	C	C
	Isotopic Uranium					
	Strontium 90	X	C	C	C	C
	VOA (SW 8240)	X	C	C	C	C
	Semivolatiles (SW 8270)	X	C	C	C	C
	Metals (SW 6010)	X	C	C	C	C
	PCB (SW 8080)					
	TCLP Metals					

Sample Type	Sampling Location	Interval	Sample Identification	
Rinsate Blank				
Field Blank				
Trip Blank				

Table F.8-IV

MDA A GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (Hg injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Quartz Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Environmental Isotopes: Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-18/Oxygen-18	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Azdal Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
MDA A																																														
Ang Borehole 15 deg	1	0.0 - 5.0 ft										X	X	X	X	X	X	X	X																												
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																												
		10.0 - 15.0 ft																																												
		15.0 - 20.0 ft																																												
		20.0 - 25.0 ft										X	X	X	X	X	X	X	X																												
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																												
		30.0 - 35.0 ft																																												
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																												
		50.0 - 55.0 ft																																												
		55.0 - 60.0 ft																																												
		60.0 - 65.0 ft																																												
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																												
		70.0 - 75.0 ft																																												
		75.0 - 80.0 ft																																												
		80.0 - 85.0 ft										X	X	X	X	X	X	X	X																												
		85.0 - 90.0 ft										X	X	X	X	X	X	X	X																												
		90.0 - 95.0 ft																																												
		95.0 - 100.0 ft																																												
		100.0 - 105.0 ft										X	X	X	X	X	X	X	X																												
		105.0 - 110.0 ft										X	X	X	X	X	X	X	X																												
		110.0 - 115.0 ft																																												
		115.0 - 120.0 ft																																												
		120.0 - 125.0 ft										X	X	X	X	X	X	X	X																												
		125.0 - 130.0 ft										X	X	X	X	X	X	X	X																												
		130.0 - 135.0 ft																																												
		135.0 - 140.0 ft																																												
Fracture Contingency Sample												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
												C	C	C	C	C	C	C	C																												
Ang Borehole 30 deg	2	0.0 - 5.0 ft																																												
		5.0 - 10.0 ft										X	X	X	X	X	X	X	X																												

Table F.8-IV

MDA A GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Borehole Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-35/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		10.0 - 14.0 ft																																												
		15.0 - 20.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft										X																																		
		30.0 - 35.0 ft										X	X	X	X	X	X	X	X																											
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																											
		50.0 - 55.0 ft																																												
		55.0 - 60.0 ft																																												
		60.0 - 65.0 ft										X	X	X	X	X	X	X	X																											
		65.0 - 70.0 ft										X	X	X	X	X	X	X	X																											
		70.0 - 75.0 ft																																												
		75.0 - 80.0 ft																																												
		80.0 - 85.0 ft										X	X	X	X	X	X	X	X																											
		85.0 - 90.0 ft										X	X	X	X	X	X	X	X																											
		90.0 - 95.0 ft																																												
		95.0 - 100.0 ft																																												
Fracture Contingency Sample												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
												C	C	C	C	C	C	C	C																											
Ang Borehole 30 deg	3	0.0 - 6.0 ft																																												
		6.0 - 10.0 ft										X	X	X	X	X	X	X	X																											
		10.0 - 14.0 ft										X	X	X	X	X	X	X	X																											
		14.0 - 18.0 ft																																												
		18.0 - 20.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft										X	X	X	X	X	X	X	X																											
		30.0 - 35.0 ft																																												
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft										X	X	X	X	X	X	X	X																											
		50.0 - 54.0 ft																																												
		54.0 - 60.0 ft																																												

Hydrogeological and Geochemical

Environmental Isotopes

Open Hole Tests: Straddle Packer Tests

Open Hole Tests: Geophysics

Table F.8-IV

MDA A GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Hydrogeological and Geochemical: Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (Hg Injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compounds	Cation Exchange Capacity	Slurry Ph	Environmental Isotopes: Chloride-36/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium-87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	Open Hole Tests: Straddle Packer Tests: In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Open Hole Tests: Geophysics: Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		60.0 – 65.0 ft										X			X		X	X	X																									
		65.0 – 70.0 ft										X			X		X	X	X																									
		70.0 – 75.0 ft																																										
		75.0 – 80.0 ft																																										
		80.0 – 85.0 ft										X			X		X	X	X																									
		85.0 – 90.0 ft										X			X		X	X	X																									
		90.0 – 95.0 ft																																										
		95.0 – 100.0 ft																																										
		100.0 – 105.0 ft																																										
		105.0 – 110.0 ft										X			X		X	X	X																									
		110.0 – 115.0 ft																																										
		115.0 – 120.0 ft																																										
		120.0 – 125.0 ft																																										
		125.0 – 130.0 ft										X			X		X	X	X																									
		130.0 – 135.0 ft																																										
		135.0 – 140.0 ft																																										
		140.0 – 145.0 ft										X			X		X	X	X																									
		145.0 – 150.0 ft										X			X		X	X	X																									
		150.0 – 155.0 ft																																										
		155.0 – 160.0 ft																																										
		160.0 – 165.0 ft																																										
		165.0 – 170.0 ft										X			X		X	X	X																									
		170.0 – 175.0 ft																																										
		175.0 – 180.0 ft																																										
		180.0 – 185.0 ft																																										
		185.0 – 190.0 ft										X			X		X	X	X																									
		190.0 – 195.0 ft																																										
		195.0 – 200.0 ft																																										
Fracture Contingency Sample												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
												C	C	C	C	C	C	C	C																								
Vertical Borehole	4	0.0 – 5.0 ft																																									
		5.0 – 10.0 ft										X			X		X	X	X																									

Table F.8-IV

MDA A GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

Sample Type	Sampling Location	Interval	Sample Identification	Gravimetric Water Content	Bulk Density	Dry Density	Porosity	Porosity (He injection)	Saturated Hydraulic Conductivity	Air Water Relative Permeability	Moisture Characteristic Curve	Clay Mineralogy	Zeolite Mineralogy	Matrix Mineralogy	Carbonate Mineralogy	Fe and Mn Mineralogy	Total Organic Compound	Cation Exchange Capacity	Slurry Ph	Chloride-35/Chloride-37	Carbon-12/Carbon-13	Strontium-86/Strontium -87	Hydrogen/Deuterium	Oxygen-16/Oxygen-18	Tritium	Carbon-14	Chloride-36	In Situ Permeability	VOA's - Pore Gas	CO2 - Pore Gas	CH4 - Pore Gas	C-12/C-13 - Pore Gas	Relative Humidity - Pore Gas	SF6	Thermal Neutron (moisture)	Gamma Gamma (density)	Caliper	Axial Borehole Video	EM Induction (Geonics EM-39)	Magnetic Susceptibility	Natural Gamma	Spectral Gamma (U, Th, K)	Prompt Fission Neutron	Geochemical (Californium-252)	Side Scan Video
		15.0 - 18.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft																																												
		30.0 - 35.0 ft																																												
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft																																												
Fracture Contingency Sample																																														
Vertical Borehole	5	0.0 - 5.0 ft																																												
		5.0 - 10.0 ft																																												
		10.0 - 15.0 ft																																												
		15.0 - 20.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft																																												
		30.0 - 35.0 ft																																												
		35.0 - 40.0 ft																																												
		40.0 - 45.0 ft																																												
		45.0 - 50.0 ft																																												
Fracture Contingency Sample																																														
Vertical Borehole	6	0.0 - 5.0 ft																																												
		5.0 - 10.0 ft																																												
		10.0 - 15.0 ft																																												
		15.0 - 20.0 ft																																												
		20.0 - 25.0 ft																																												
		25.0 - 30.0 ft																																												
		30.0 - 34.0 ft																																												

Hydrogeological and Geochemical

Environmental Isotopes

Open Hole Tests: Straddle Packer Tests

Open Hole Tests: Geophysics

Table F.8-IV

MDA A GEOPHYSICAL

MINERALOGICAL DETERMINATIONS

| Sample Type | Sampling Location | Interval | Sample Identification | Hydrogeological and Geochemical | | |

Table F.8-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening:	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Laboratory Measurements: Gross Alpha	Laboratory Measurements: Gamma Spectrometry	Laboratory Measurements: Tritium	Laboratory Measurements: Volatile Organics	Laboratory Measurements: PCB	Field Measurements: Soil Moisture			Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals		
Subsurface samples at MDA A																																		
Vertical Borehole	1	0.0 - 5.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		5.0 - 10.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		10.0 - 15.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		15.0 - 20.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		20.0 - 25.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		25.0 - 30.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
Field Duplicate		30.0 - 35.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		35.0 - 40.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		40.0 - 45.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		45.0 - 50.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		50.0 - 55.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		55.0 - 60.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		60.0 - 65.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		65.0 - 70.0 ft						X	X		X	X	X						X			X	X	X		X	X	X	X				
		70.0 - 75.0 ft						X	X		X	X	X	X	X	X	X	X	X														
Fracture Contingency Sampling								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
								C	C		C	C	C	X	X	X	X	X	X			X	X	X	X	X	X	X	X				
Rinsate Blank																						X	X	X	X	X	X	X	X				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
																						C	C	C	C	C	C	C	C				
Field Blank																						X	X	X	X	X	X	X	X				
																						X	X	X	X	X	X	X	X				
																						X	X	X	X	X	X	X	X				
Trip Blank																						X	X	X	X	X	X	X	X				
																						X	X	X	X	X	X	X	X				

Table F.8–V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA A.

				Field Surveys				Field Screening						Field Laboratory Measurements								Laboratory Analysis											
Sample Type	Sampling Location	Interval	Sample Identification	Gross Gamma	Low-Energy Gamma	Electromagnetic	Land Survey	Gross Gamma	Gross Alpha		Organic Vapor	Combustible Gas/Oxygen	Lithological Logging	Gross Alpha	Gamma Spectrometry	Tritium	Volatile Organics	PCB	Soil Moisture			Gamma Spectrometry	Tritium	Total Uranium	Isotopic Plutonium	Isotopic Uranium	Strontium 90	VOA (SW 8240)	Semivolatiles (SW 8270)	Metals (SW 6010)	PCB (SW 8080)	TCLP Metals		
Vertical Borehole	2	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		10.0 – 15.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		15.0 – 20.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		20.0 – 25.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		25.0 – 30.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
Field Duplicate																						X	X	X	X		X	X	X	X				
		30.0 – 35.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		35.0 – 40.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		40.0 – 45.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		45.0 – 50.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		50.0 – 55.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		55.0 – 60.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		60.0 – 65.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		65.0 – 70.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
		70.0 – 75.0 ft						X	X		X	X	X	X	X	X	X		X			X	X	X	X		X	X	X	X				
Fracture Contingency Sampling																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
																						C	C	C	C		C	C	C	C				
Rinsate Blank																						X	X	X	X		X	X	X	X				
Field Blank																												X	X	X				
Trip Blank																												X						
Vertical Borehole	3	0.0 – 5.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				
		5.0 – 10.0 ft						X	X		X	X	X						X			X	X	X	X		X	X	X	X				

Table F.8-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA A.

| Sample Type | Sampling Location | Interval | Sample Identification | | |

Table F.8-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA A.

Sample Type	Sampling Location	Interval	Sample Identification	Field Surveys: Gross Gamma	Field Surveys: Low-Energy Gamma	Field Surveys: Electromagnetic	Field Surveys: Land Survey	Field Screening: Gross Gamma	Field Screening: Gross Alpha	Field Screening: Organic Vapor	Field Screening: Combustible Gas/Oxygen	Field Screening: Lithological Logging	Field Laboratory Measurements: Gross Alpha	Field Laboratory Measurements: Gamma Spectrometry	Field Laboratory Measurements: Tritium	Field Laboratory Measurements: Volatile Organics	Field Laboratory Measurements: PCB	Field Laboratory Measurements: Soil Moisture	Laboratory Analysis: Gamma Spectrometry	Laboratory Analysis: Tritium	Laboratory Analysis: Total Uranium	Laboratory Analysis: Isotopic Plutonium	Laboratory Analysis: Isotopic Uranium	Laboratory Analysis: Strontium 90	Laboratory Analysis: VOA (SW 8240)	Laboratory Analysis: Semivolatiles (SW 8270)	Laboratory Analysis: Metals (SW 6010)	Laboratory Analysis: PCB (SW 8080)	Laboratory Analysis: TCLP Metals
		20.0 – 25.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		25.0 – 30.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
Field Duplicate																				X	X	X	X	X	X	X	X		
		30.0 – 35.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		35.0 – 40.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		40.0 – 45.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		45.0 – 50.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		50.0 – 55.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		55.0 – 60.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		60.0 – 65.0 ft						X	X	X	X	X						X		X	X	X	X	X	X	X	X		
		65.0 – 70.0 ft						X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X		
		70.0 – 75.0 ft						X	X	X	X	X	X	X	X	X		X		X	X	X	X	X	X	X	X		
Fracture Contingency Sampling																			C	C	C	C		C	C	C	C		
																			C	C	C	C		C	C	C	C		
																			C	C	C	C		C	C	C	C		
																			C	C	C	C		C	C	C	C		
																			C	C	C	C		C	C	C	C		
Rinsate Blank																			X	X	X	X		X	X	X	X		
Field Blank																									X	X	X		
Trip Blank																									X				
Vertical Borehole	5	0.0 – 5.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		5.0 – 10.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		10.0 – 15.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		15.0 – 20.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		20.0 – 25.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		
		25.0 – 30.0 ft						X	X	X	X	X						X		X	X	X		X	X	X	X		

Table F.8-V

SCREENING AND ANALYSIS FOR SUBSEQUENT SUBSURFACE INVESTIGATIONS AT MDA A.

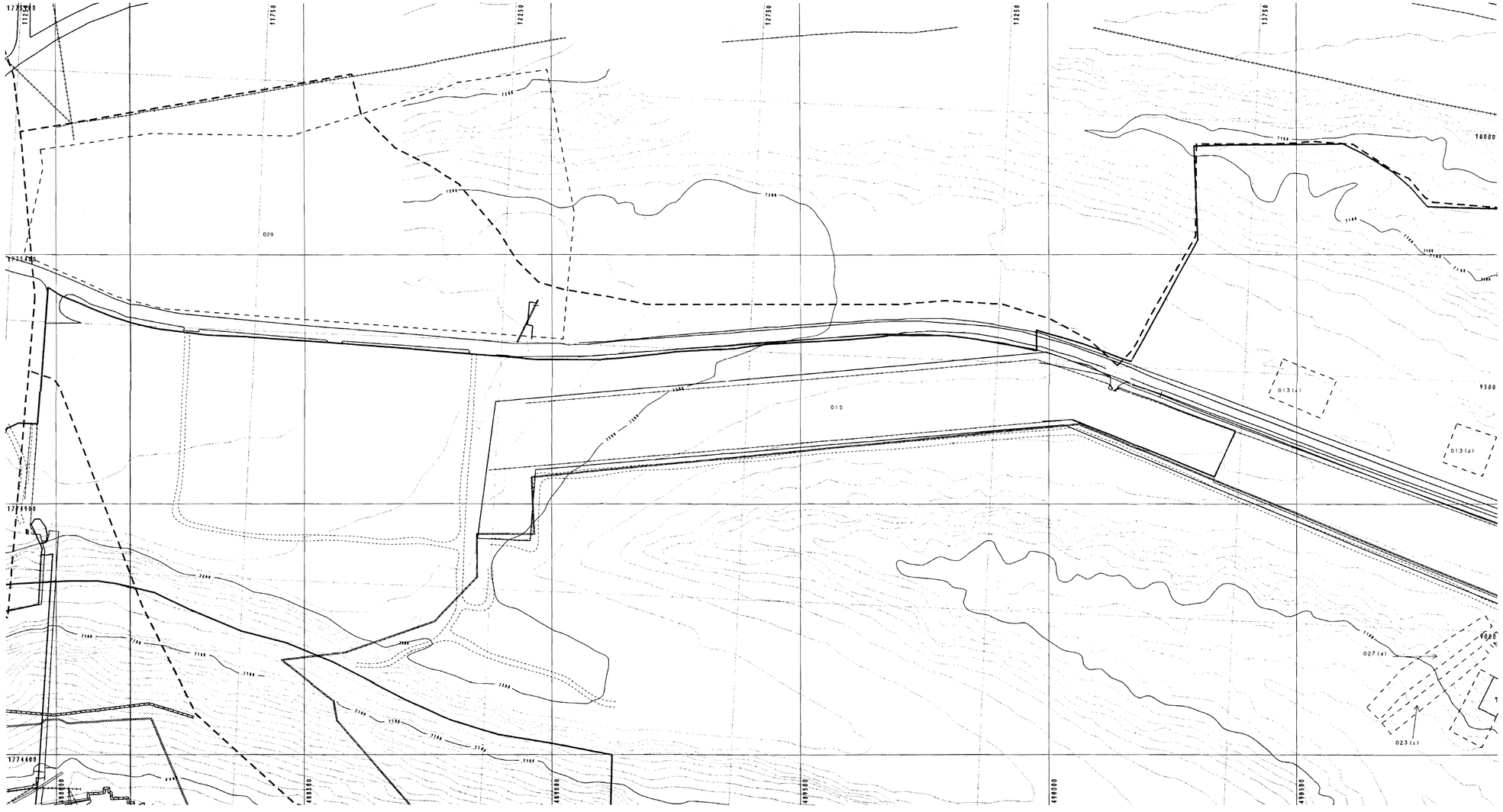
		Sample Type	Sampling Location	Interval	Sample Identification
		Field Duplicate			
				30.0 - 35.0 ft	
				35.0 - 40.0 ft	
				40.0 - 45.0 ft	
				45.0 - 50.0 ft	
				50.0 - 55.0 ft	
				55.0 - 60.0 ft	
				60.0 - 65.0 ft	
				65.0 - 70.0 ft	
				70.0 - 75.0 ft	
		Fracture Contingency Sampling			

APPENDIX G

DETAILED MAPS OF TA-21 OU AND OF ASSOCIATED SWMUS

This appendix contains four maps of the TA-21 OU. One shows the TA-21 OU at 1:2400 (i.e., 1 in. equals 200 ft) with a 1000-ft buffer around it. The remaining three maps show the western, central, and eastern portions of the TA-21 OU, respectively. All maps have TA-21 possible and probable SWMU boundaries labeled. Probable boundaries are defined as those areas where, from existing data, contamination is probably present. Possible boundaries are given for those SWMUs where contamination may or may not be present. SWMUs addressing surface soil contamination from stack emissions (21-007, -008, -019, -020, -021) are not specifically identified on these maps because they address possible contamination over the entire OU.

ADS 1106-WEST SWMUs



LAUT Data

- Cooling Lines
- Electrical ›13.2 kV
- Electrical ‹13.2 kV
- Gas Line
- LabNET Fiber Optic Cable
- Radioactive Liquid Waste
- Sewer Line
- Steam Line
- Storm Drain/Culvert
- Telephone Line
- Water Line

SLM Data

- 10 foot Contours
- 100 foot Contours
- Paved Roads
- Dirt Roads
- Parking Lot
- Industrial Fence
- Security Fence
- Gate
- Material Disposal Area
- SWMU (probable)
- SWMU (possible)
- LANL Boundary
- ADS Boundary
- TA Boundary

STRUCTURE TYPE

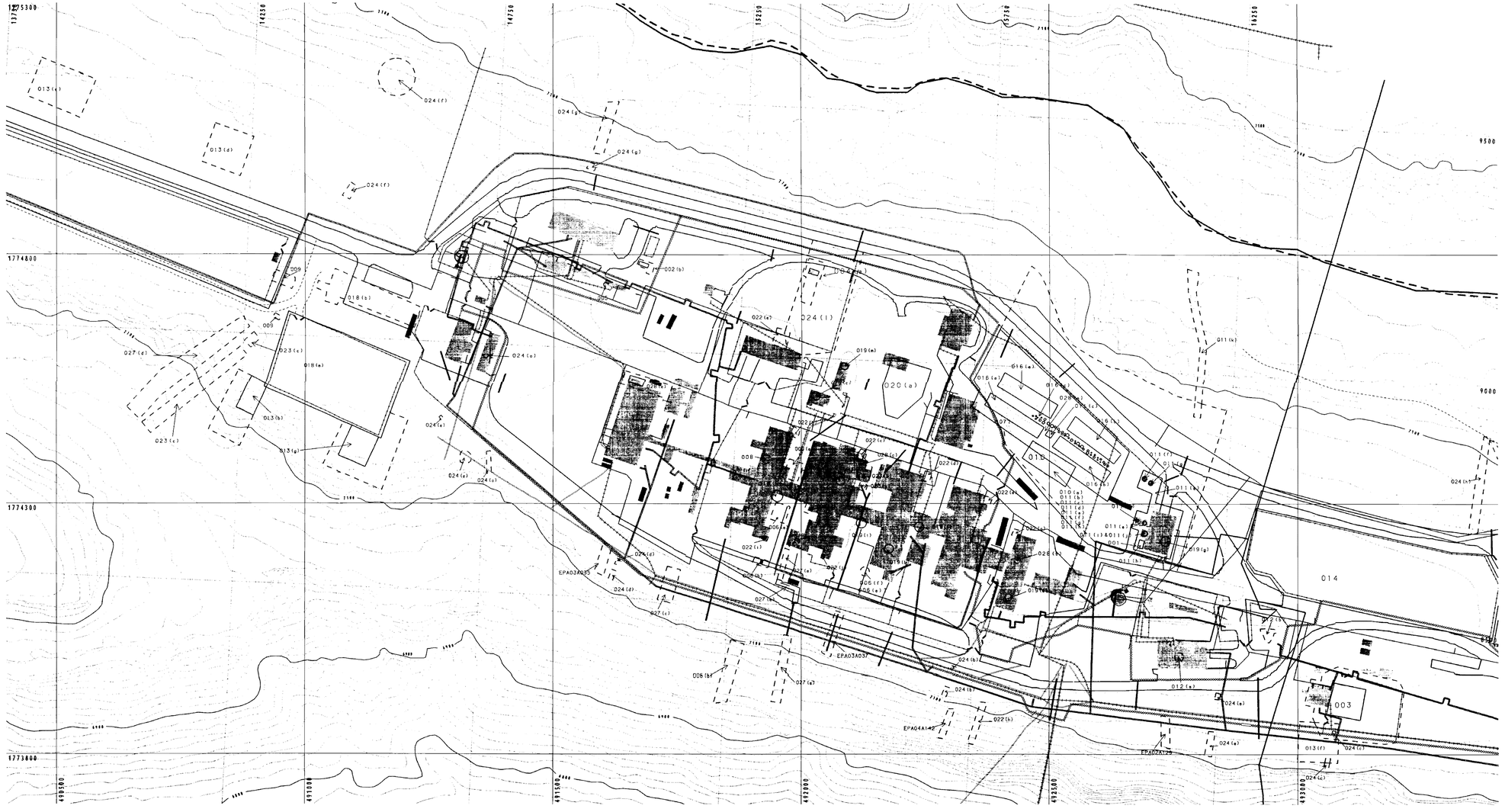
- Permanent Structure
- Temporary Structure
- Underground Structure

ADS 1106-WEST SWMUs

Scale 1:1200

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Earth & Environmental Sciences Division
FIMAD Facility for Information Management, Analysis and Display
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Date: 91-05-16

ADS 1106-CENTRAL SWMUs



LAUT Data

- Cooling Lines
- Electrical >13.2 kV
- Electrical <13.2 kV
- Gas Line
- LabNET Fiber Optic Cable
- Radioactive Liquid Waste
- Sewer Line
- Steam Line
- Storm Drain/Culvert
- Telephone Line
- Water Line

SLM Data

- 10 foot Contours
- 100 foot Contours
- Paved Roads
- Dirt Roads
- Parking Lot
- Industrial Fence
- Security Fence
- Gate
- Material Disposal Area
- SWMU (probable)
- SWMU (possible)
- LANL Boundary
- ADS Boundary
- TA Boundary

STRUCTURE TYPE

- Permanent Structure
- Temporary Structure
- Underground Structure

ADS 1106-CENTRAL SWMUs

Scale 1:1200

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ADS 1106-EAST SWMUs



LAUT Data

- Cooling Lines
- Electrical ›13.2 kV
- Electrical ‹13.2 kV
- Gas Line
- LabNET Fiber Optic Cable
- Radioactive Liquid Waste
- Sewer Line
- Steam Line
- Storm Drain/Culvert
- Telephone Line
- Water Line

SLM Data

- 10 foot Contours
- 100 foot Contours
- Paved Roads
- Dirt Roads
- Parking Lot
- Industrial Fence
- Security Fence
- Gate
- Material Disposal Area
- SWMU (probable)
- SWMU (possible)
- LANL Boundary
- ADS Boundary
- TA Boundary

STRUCTURE TYPE

- Permanent Structure
- Temporary Structure
- Underground Structure

ADS 1106-EAST SWMUs

Scale 1:1200

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ADS 1106 SWMUs WITH 1000-ft BUFFER



LAUT Data
- Cooling Lines
- Electrical -13.2 kV
- Electrical -13.2 kV
- Gas Line
- LabNET Fiber Optic Cable
- Radioactive Liquid Waste
- Sewer Line
- Steam Line
- Storm Drain/Culvert
- Telephone Line
- Water Line

SLM Data
- 10 foot Contours
- 100 foot Contours
- Paved Roads
- Dirt Roads
- Parking Lot
- Industrial Fence
- Security Fence
- Gate
- Material Disposal Area
- SWMU (probable)
- SWMU (possible)
- LANL Boundary
- ADS Boundary
- TA Boundary

STRUCTURE TYPE
- Permanent Structure
- Temporary Structure
- Underground Structure

ADS 1106 SWMUs
WITH 1000-ft BUFFER

Scale: 1:2400

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