

**Completion of Corrective Action
at Sites 54-013(b), 54-017, and 54-020
in PJ-SMA-19**

August 28, 2014

NPDES PERMIT NO. NM0030759

LA-UR-14-26475

**LOS ALAMOS NATIONAL LABORATORY
CERTIFICATION OF COMPLETION OF CORRECTIVE ACTION**

PF: J025

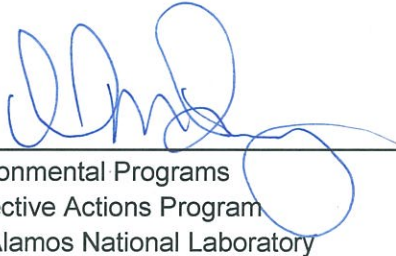
PJ-SMA-19

**Sites: 54-013(b)
54-017
54-020**

The following certification of completion of corrective action was performed in accordance with NPDES Permit No NM0030759, Part I.E.1(b), which requires the Permittees (i.e., DOE and LANS) to submit "certified as-built drawings, that such measures have been properly installed to perform their function to totally eliminate exposure of pollutants to storm water" at a Site or Sites.

CERTIFICATION STATEMENT OF AUTHORIZATION

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware there are significant penalties for submitting false information including the possibility of fine and imprisonment for knowing violations."



Environmental Programs
Corrective Actions Program
Los Alamos National Laboratory

8/27/14

Date



Los Alamos Field Office
National Nuclear Security Administration

8-28-2014

Date

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54-017
54-020****Introduction**

This certification documents the no exposure condition of Sites 54-013(b), 54-017, and 54-020 [known as Solid Waste Management Units (SWMUs) 54-013(b), 54-017, and 54-020 under the New Mexico Environment Department (NMED) Compliance Order on Consent (the Consent Order)] for completion of corrective action at site monitoring area (SMA) PJ-SMA-19 under Part 1.E.2(c) of the Individual Permit (hereafter, the Permit), issued by the U.S. Environmental Protection Agency (EPA) to the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS), collectively, the Permittees. Sites 54-013(b), 54-017, and 54-020, located within Technical Area 54 (TA-54), are listed as SWMUs in the 1990 SWMU Report (LANL 1990) based on the historical disposal of solid radioactive-, mixed-, and transuranic- (TRU-) contaminated waste. Sites 54-013(b), 54-017, and 54-020 are associated with PJ-SMA-19 and are listed as High Priority Sites in Part I.E.4(a) of the Permit. The requirement for corrective action in Part I.E.1 was triggered by analytical data from a storm water sample collected from PJ-SMA-19 on August 8, 2013, that showed exceedances of the target action levels (TALs) for aluminum, mercury, gross alpha radioactivity, radium-226 and radium-228 radioactivity, and polychlorinated biphenyls (PCBs).

The PJ-SMA-19 drainage area is located in the eastern area of Los Alamos National Laboratory's (the Laboratory's) Area G and overlies all or portions of 16 waste disposal pits (Pits 1, 4–8, 10, 12, 13, 17–22, and 24) that are included in Sites 54-013(b), 54-017, and 30 waste disposal shafts (Shafts 22, 35–37, 93 through 95, 114, 115, 119, 121, 122, 130–135, C1–C10, C12, and C13) that are included in Site 54-020. The 16 pits were closed and subsequently covered with crushed Bandelier Tuff between 1961 and 1980, and the 30 shafts were backfilled with crushed tuff and plugged with approximately 3 ft of concrete between 1982 and 1995, in accordance with DOE radiological protection requirements.

As a result of the placement of this cover material, the wastes within these pits and shafts are not exposed to storm water. Attachment 1, PJ-SMA-19 As-Built Drawing for Pits 1, 4–8, 10, 12, 13, 17–22, and 24 and Shafts 22, 35–37, 93–95, 114, 115, 119, 121, 122, 130–135, C1–C10, C12, and C13, presents documentation of the no exposure conditions. Maintenance of the cover material during ongoing surface activities to prevent exposure of the waste is required per DOE nuclear safety and radiological protection requirements until the final closure of Area G.

The PJ-SMA-19 portion of Area G is currently used for the active storage and handling of mixed wastes in accordance with the Laboratory's Hazardous Waste Facility Permit (HWFP). The Permit does not regulate storm water discharges associated with these current conventional industrial activities at the Laboratory (see Part I of the Permit). This distinction is important at Area G where storm water discharges from surface activities are permitted under Sector K of the EPA's National Pollutant Discharge Elimination System Storm Water Multi-Sector General Permit (MSGP No. NMR05GB21). Figure 1 is a 2011 aerial photograph of the area depicting developed conditions within PJ-SMA-19, the location of associated waste disposal pits and shafts within Sites 54-013(b), 54-017, and 54-020 and the collocated MSGP sampler location E248.5.

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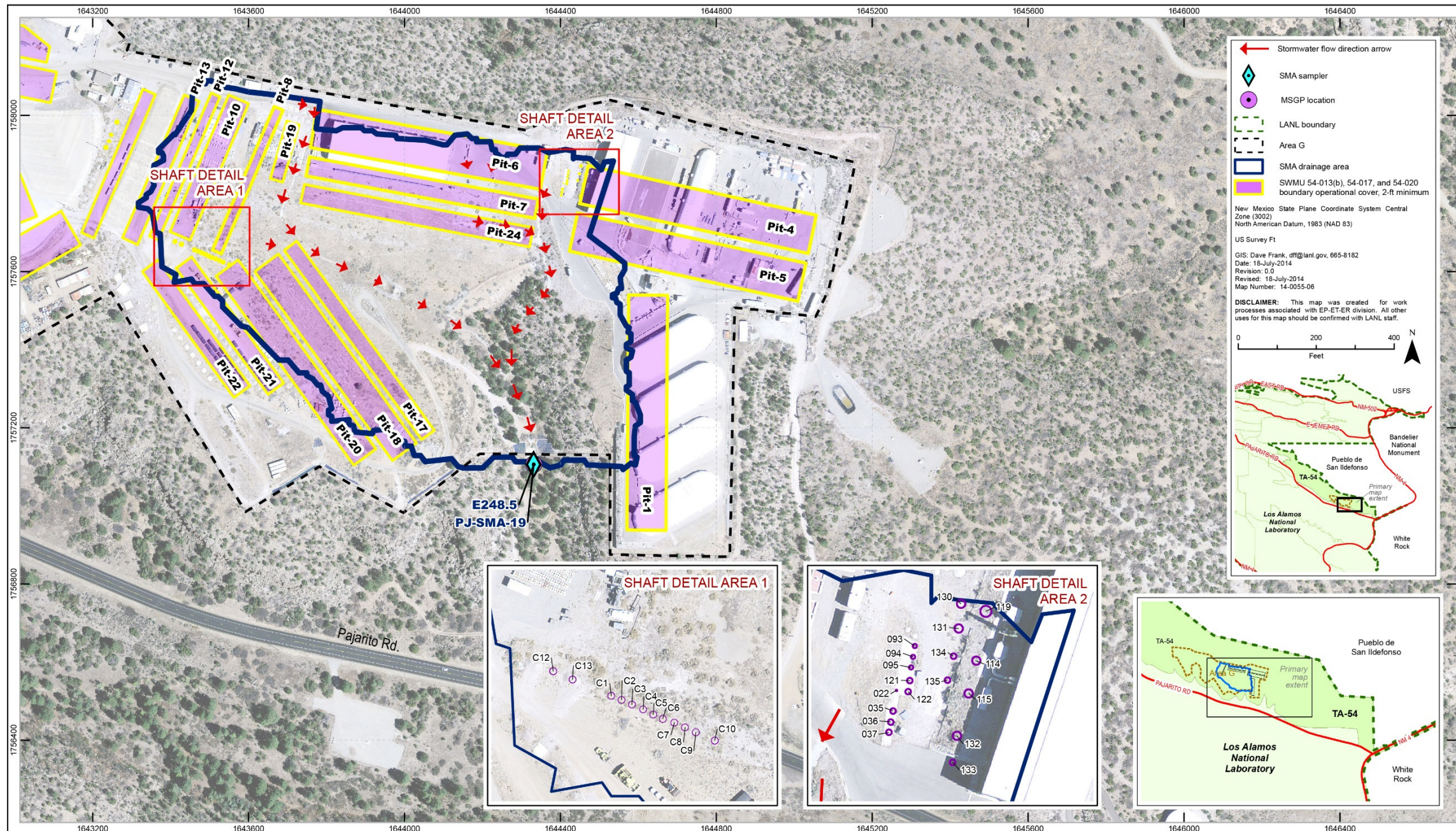


Figure 1 Location of PJ-SMA-19

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54-020****Site Description**

Three historical industrial activity areas are associated with Permitted Feature (PF) J025, PJ-SMA-19: Sites 54-013(b), 54-017, and 54-020.

Site 54-013(b) consists of a former truck monitoring/decontamination area. This Site was excavated in April 1971 specifically to be used as a decontamination (truck-washing) pit. The decontamination pit was converted to Pit 19 in November 1975 when truck-washing activities ceased and the pit began receiving low-level waste (LLW) for disposal as part of SWMU 54-017. Site 54-017 consists of 19 inactive subsurface radioactive waste disposal pits located within Area G in the eastern portion of the Laboratory immediately north of Pajarito Road, and Site 54-020 consists of 68 inactive subsurface radioactive waste disposal shafts also located within Area G. Area G is a 63-acre area that houses active radioactive and mixed waste container storage units and repackaging and characterization facilities, and active and inactive radioactive waste disposal pits and shafts. The disposal pits currently have a minimum of 3 ft of soil cover over the buried wastes. The disposal shafts, which range in size from 1 ft to 8 ft in diameter and 25 ft to 65 ft in depth, were typically filled with waste and/or crushed tuff to within 3 ft of the ground surface and then finished with a 3-ft-thick concrete plug, slightly rounded at the surface to form a dome and covered with soil (Rogers 1977b).

The PJ-SMA-19 drainage area overlies portions of 16 waste disposal pits (Pits 1, 4–8, 10, 12, 13, 17–22, and 24), and 30 waste disposal shafts (Shafts 22, 35–37, 93–95, 114, 115, 119, 121, 122, 130–135, C1–C10, C12, and C13) comprising Sites 54-013(b), 54-017, and 54-020. These waste disposal units operated between 1959 and 1995 and received solid radioactive, mixed, and TRU-contaminated waste.

Figure 2 shows the evolution of a typical subsurface disposal pit at Area G and Sites 54-013(b) and 54-017. Before the initial excavation of the first pits, Area G was an undeveloped mesa-top consisting of piñon-juniper woodlands. The mesa top was covered with a thin layer of soil underlain by Bandelier Tuff bedrock. The Bandelier Tuff was deposited during volcanic eruptions and is composed of pumice, minor rock fragments, and crystals supported in an ashy matrix. Pits were excavated into tuff, which was crushed and stockpiled separately from the pit area to prevent contact with the waste. While pits were open, construction guidelines mandated that runoff from rainfall from the surrounding mesa area did not enter the pit (Rogers 1997b). The pits were filled with alternating layers of waste and crushed tuff. First, waste was placed in the bottom of the pit. Following placement, the waste layer was covered with crushed tuff and compacted with heavy equipment, effectively filling void spaces within the waste and providing an even, consolidated surface for the placement of the next layer of waste. This practice ensured the waste was contained within the disposal pit, preventing storm water runoff during the operational life of each pit.

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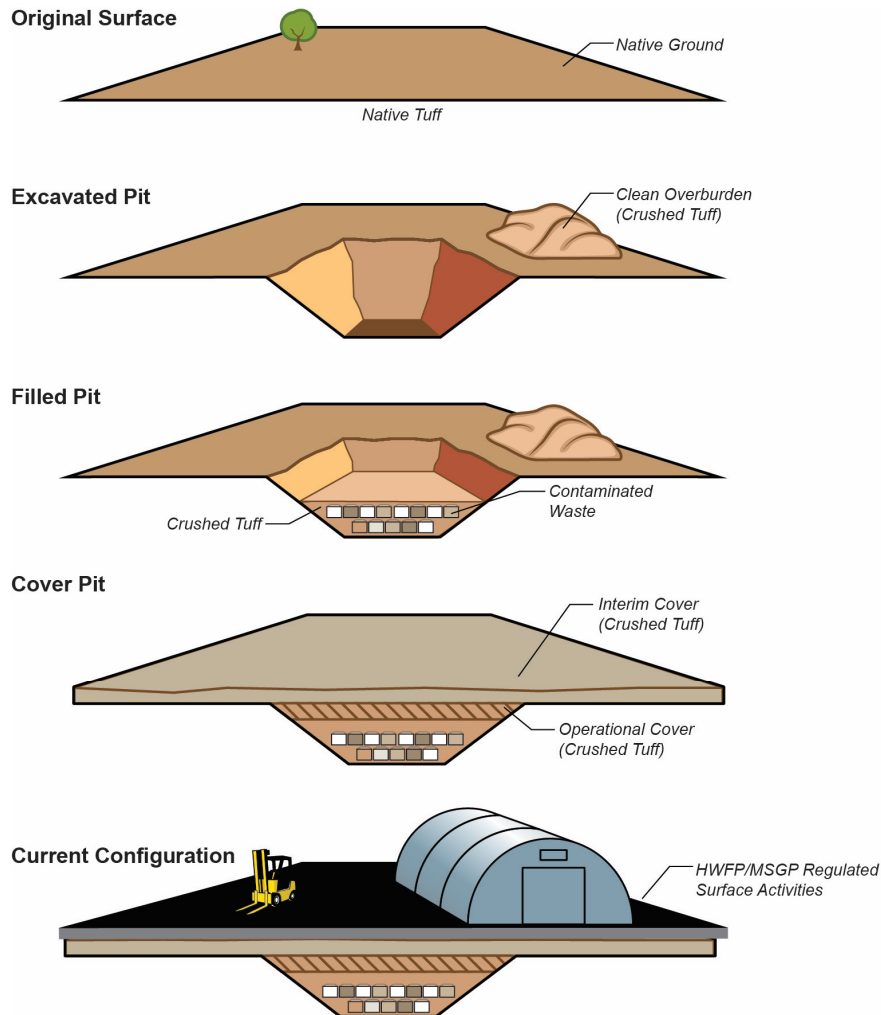


Figure 2. Typical pit evolution at Area G

Radioactive waste in shafts at Site 54-020 was disposed of to reduce exposure of personnel to external radiation and to provide for better isolation and containment and more secure disposal than in pits. Shafts were excavated into tuff, which was crushed and stockpiled separately from the shaft location to prevent contact with the waste. While shafts were open, operational guidelines mandated that steel covers be placed over the opening between waste placements to prevent runoff from the surrounding mesa area to enter the shafts (Rogers 1977b). The shafts were filled with alternating layers of waste and crushed tuff. First, waste was placed in the bottom of the pit. Following placement, the waste layer was covered with crushed tuff to reduce radiation levels before the next layer of waste was emplaced. This practice ensured the waste was contained within the disposal pit, preventing storm water runoff during the operational life of each pit.

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Present facility infrastructure within the boundary of PJ-SMA-19 has resulted in approximately 24% of the area above the corresponding pits and shafts being covered with impervious infrastructure.

Waste placement operation protocol for disposal pits at Sites 54-013(b) and 54-017 required wastes to be placed no closer than within 2 ft of the existing land surface (Rogers 1977b; LASL 1975). The remaining capacity of each pit was filled and compacted with crushed tuff. This final layer of fill/tuff is known as the operational cover. Waste disposal operations at disposal pits [i.e., that portion of Sites 54-013(b) and 54-017 within the PJ-SMA-19 drainage area] were complete and the pits covered by 1980. Following the closure of the waste pits, additional activities at Area G provided added cover thickness over the pits. This cover is identified as the interim cover and was the result of grading and stabilization activities for erosion control that began in the mid-1970s and the placement of additional fill over the area to support the more recent construction of facilities and infrastructure to support ongoing low-level waste disposal operations in Area G.

Waste placement operation protocol for disposal shafts at Site 54-020 required wastes to be placed no closer than within 5 ft of the existing land surface (Rogers 1977b). The remaining capacity of each shaft was filled with crushed tuff to within 3 ft of the ground surface and then finished with a 3-ft-thick concrete plug, after which clean soil was placed above the concrete cap. Waste disposal operations at disposal shafts (i.e., that portion of Site 54-020 within the PJ-SMA-19 drainage area) were complete and the shafts covered by 1995.

Storm Water Monitoring under the Permit

Storm water runoff from the area above portions of the subsurface pits and shafts comprising Sites 54-013(b), 54-017, and 54-020 is monitored within PJ-SMA-19. Following the installation of baseline control measures, one baseline storm water sample was collected on August 8, 2013. Analytical results received September 11, 2013, from this sample yielded five TAL exceedances:

**Table 1
TAL Exceedances in Storm Water Samples Collected at Sites 54-013(b), 54-017, and 54-020**

Analyte	Result	Maximum TAL	Exceedance Ratio	Date
Aluminum	761 µg/L	750 µg/L	1.01	8/8/2013
Mercury	1.67 µg/L	0.77 µg/L	2.2	8/8/2013
Gross-alpha Radioactivity	51.2 pCi/L	15 pCi/L	3.4	8/8/2013
Radium-226, Radium-228 Radioactivity	43.7 pCi/L	30 pCi/L	1.5	8/8/2013
PCBs	0.02 µg/L	0.0006 µg/L	32	8/8/2013

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The TAL exceedances for monitoring location PJ-SMA-19 were evaluated against the appropriate storm water background values, which consist of “Bandelier Tuff background” for undisturbed SMAs or “developed background” for SMAs in urban settings. Background values are expressed as upper tolerance limits (UTLs), which were determined using the recommendations provided in ProUCL 4.1, an EPA-developed statistical software package (available at <http://www.epa.gov/nerlesd1/databases/datahome.htm>). UTLs for undisturbed SMAs were derived from storm water runoff containing entrained sediments derived from Bandelier Tuff and are labeled “Bandelier Tuff Background” in Figures 3 and 4. UTLs developed for urban settings were derived from runoff from developed landscapes on the Pajarito Plateau, including buildings, parking lots, roads, and associated features, and are labeled “Developed Background” in Figures 3 and 4.

Figures 3 and 4 present the analytical results in a manner that allows direct comparison with the TALs as defined in the Permit. Data are presented in one or more plots. The first plot contains results for all metals, weak acid dissociable cyanide, gross-alpha radioactivity, and radium activity, and the second presents the results for organic compounds, if analyzed. The organic plot is presented only if one or more groups of organic compounds were analyzed in the storm water sample collected at the Site and associated SMA per the requirements set forth in Appendix B of the Permit.

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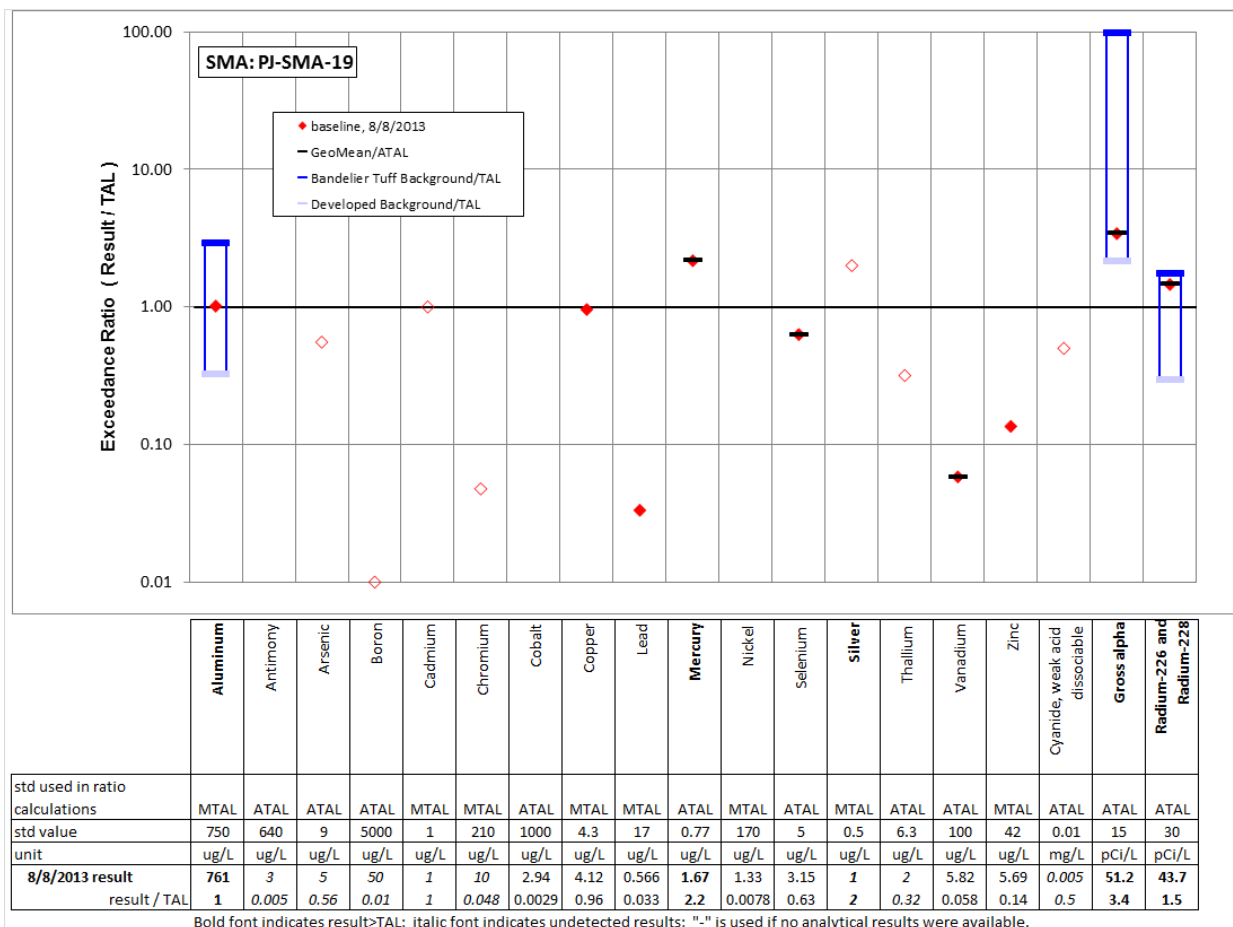


Figure 3 Inorganic analytical results summary plot for PJ-SMA-19

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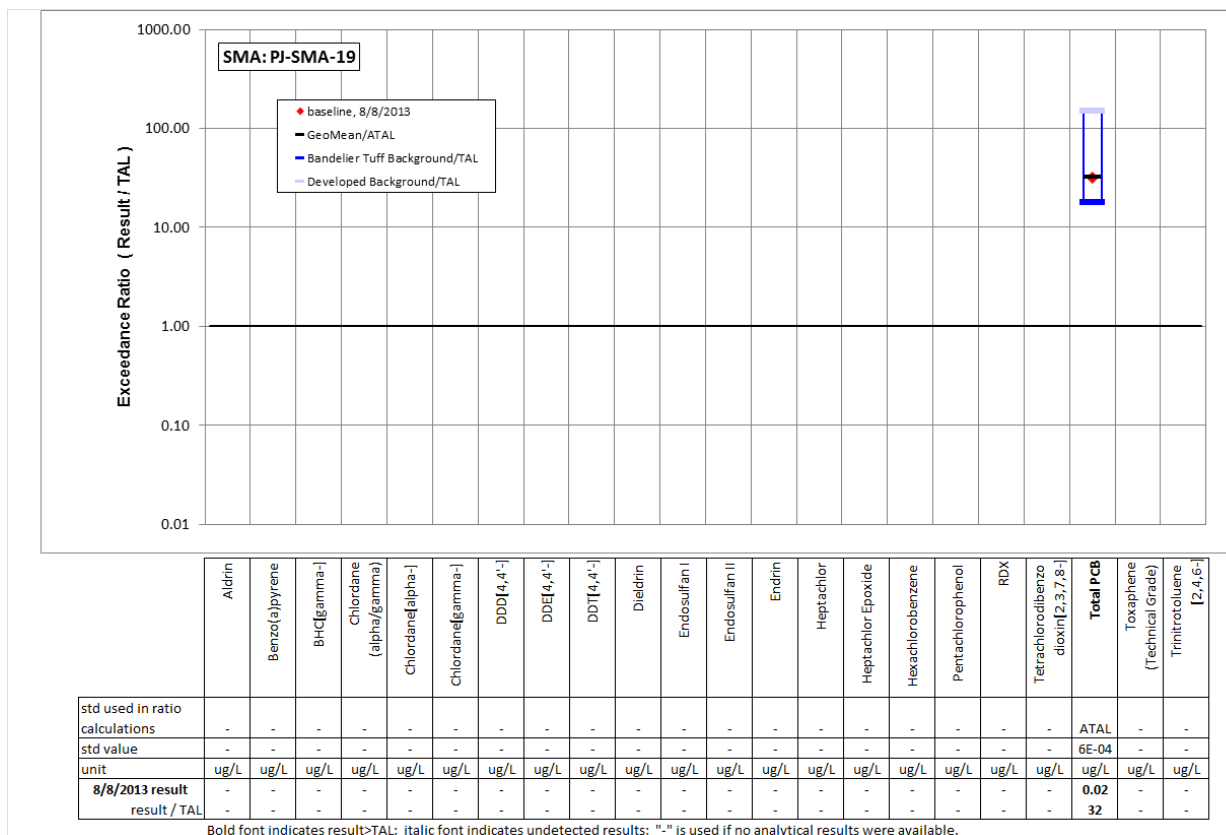


Figure 4 Organic analytical results summary plot for PJ-SMA-19

Analytical results for each analyte presented on the plots are normalized by calculating an exceedance ratio. This ratio is defined as the analytical result divided by applicable TAL. Thus, results exceeding the TAL will be greater than an exceedance ratio of 1.0. The exceedance ratios are plotted on a log scale to allow the viewing of a larger range of values. Each individual sample is represented by a symbol of a different color and shape. A solid symbol on the plot represents a result that is detected above the practical quantitation limit (PQL), while an empty symbol represents a value that is considered a nondetect. An empty symbol is a nondetect value represented graphically by the PQL.

Monitoring location PJ-SMA-19 receives runoff from developed areas (base-course– and asphalt-constructed parking lots and roads and buildings); from landscape consisting of Bandelier Tuff to backfill the inactive waste disposal pits and to provide additional cover over the subsurface pits and shafts; and from the undeveloped drainage directly upstream of the SMA sampler. Attachment 1 presents details of the surface cover within the SMA drainage area.

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The aluminum UTL from developed urban landscape storm water run-on is 245 µg/L; the aluminum UTL for background storm water containing sediment derived from Bandelier Tuff is 2210 µg/L. The detected levels of aluminum at PJ-SMA-19 are between these values and, therefore, are within the range of background values expected for these Sites.

The mercury UTLs from undisturbed Bandelier Tuff and from developed urban landscape background storm water run-on were not calculated because the number of detected values was not sufficient to permit calculation of the UTL values in the baseline metals background study. Therefore, no comparison to mercury BVs in storm water could be made.

Gross-alpha radioactivity in Bandelier Tuff is associated with naturally occurring radioactive uranium- and thorium-bearing minerals. The gross-alpha UTL for background storm water containing sediment derived from Bandelier Tuff is 1490 pCi/L, and the gross-alpha background storm water UTL for storm water run-on from a developed urban landscape is 32.5 pCi/L. The 2013 gross-alpha result is between these two values and, therefore, is within the range of background values expected for these Sites.

The radium-226 and radium-228 activity UTLs for background storm water containing sediment derived from Bandelier Tuff is 52.7 pCi/L, and radium-226 and radium-228 background storm water UTL for storm water run-on from a developed urban landscape is 8.94 pCi/L. The 2013 radium-226 and radium-228 result is between these values and, therefore, is within the range of background values expected for these Sites.

PCBs are ubiquitous and are found in precipitation, snowpack, and storm water in undeveloped watersheds and in urban runoff. The PCB UTL from developed urban landscape storm water run-on is 0.098 µg/L; the PCB UTL for background storm water containing sediment derived from Bandelier Tuff is 0.0117 µg/L. The PCB result from 2013 is between these values and, therefore, is within the range of background values expected for these Sites.

Corrective Action Control Measure Description

Because of the nature of the wastes disposed of at Sites 54-013(b), 54-017, and 54-020, no exposure has been a key element of radiological protection and nuclear safety requirements since disposal activities began. In addition to being SWMUs, the inactive subsurface disposal pits and shafts comprising Sites 54-013(b), 54-017, and 54-020 are regulated by DOE because of their radionuclide inventory. The radiological protection requirements established for these inactive pits and shafts essentially require no exposure to potential receptors (e.g., members of the public) to the radionuclides in the wastes disposed of in the pits. As explained in more detail below, these “no exposure” requirements under DOE regulations are fundamentally identical to the corrective action requirements for storm water control measures that prevent contamination of storm water by eliminating exposure to pollutants.

Sites 54-013(b), 54-017, and 54-020 are located within Area G at TA-54. Area G is an LLW disposal facility regulated by DOE under the Atomic Energy Act, as implemented by DOE Order 435.1, Radioactive Waste Management. DOE Order 435.1 contains specific performance objectives related to radiological

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protection of the public that all LLW disposal facilities must meet. These performance objectives include limits on radiological dose to members of the public during operation of the disposal facility and after closure. LLW disposal facilities must conduct a performance assessment and composite analysis to demonstrate performance objectives will be met during operation and for a period of 1000 yr after closure. The performance assessment evaluates the dose associated with LLW disposed of at the facility, and the composite analysis also considers all other sources of radioactive material that may contribute to dose to the public.

The performance assessment is used to develop a closure plan for the facility that specifies how the facility will be closed in a manner that ensures performance objectives will be met. DOE Order 435.1 and its implementing manual and guidance also require the facility to be operated in a manner that adheres to the requirements and limitations contained in and derived from the closure plan and performance assessment. Compliance with the performance objectives is predicated on isolation of the disposed waste from the accessible environment, which is fundamentally identical to storm water control measures that prevent contamination of storm water by eliminating exposure to pollutants. The LLW regulated by DOE under Order 435.1 is also the source of potential storm water pollutants regulated by EPA under the Permit. Therefore, actions taken by the Laboratory to meet DOE radiological protection requirements also satisfy the requirements for control measures that totally eliminate exposure of pollutants to storm water contained in Section E.2(c) of the Permit.

Preventing exposure to waste before final site closure is accomplished through implementation of various Laboratory procedures, including EP-AP-2202, Revision 2, Pit and Shaft Design, Construction, and Operational Closure; EP-DOP-2216, Revision 1.0, LLW Receipt, Storage, and Disposal to TA-54 Area G; and EP-AREAG-FO-DOP-0213, Revision 4, TA-54 Area G Inactive Pit and Shaft Quarterly SR and Shaft Quarterly ISI. Relevant requirements implemented through these procedures include the following:

- Preventing runoff from entering the pit while it is in use (EP-AP-2202, Section 7.1.2)
- Preventing operational LLW from being disposed higher than 3 m (9 ft 10 in.) below the rim of the pit (EP-DOP-2216, Section 3)
- Preventing low-activity bulk soils and debris from environmental restoration and decontamination and decommissioning activities from being disposed of higher than 0.3 m (1 ft) below the interface of site surface soils and the underlying intact tuff (EP-DOP-2216, Section 3)
- Performing quarterly inspections of inactive pits for signs of significant erosion, subsidence, or other signs of loss of cover and implementing corrective actions if deficiencies are noted (EP-AREAG-FO-DOP-0213)

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Attachment 1

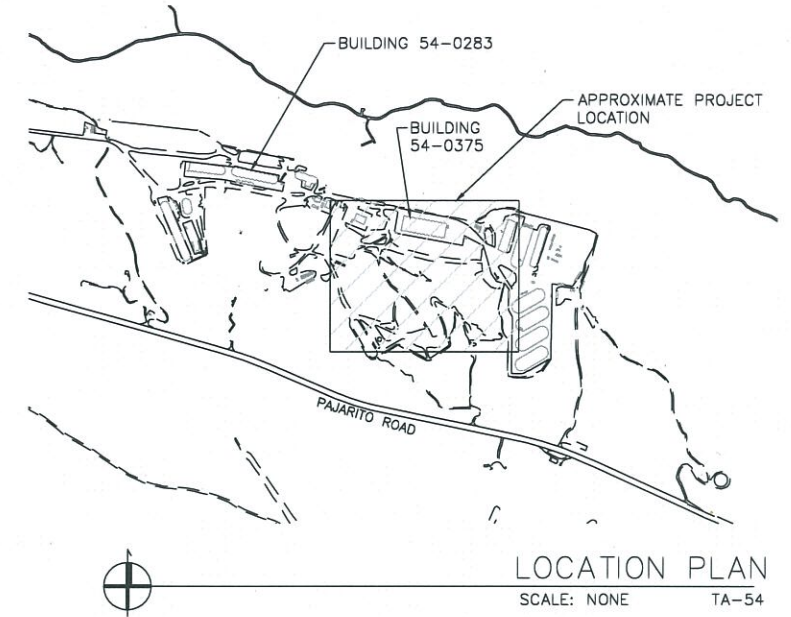
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PJ-SMA-19 AS-BUILT DRAWINGS


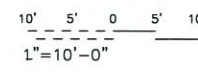









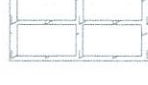

PITS 1,4-8,10,12,13,17-22 AND 24, SHAFTS 22,35-37,
93-95,114,115,119,121,122,130-135,C1-C10,C12 AND C13


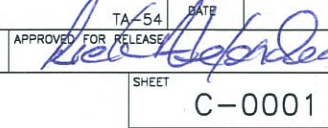


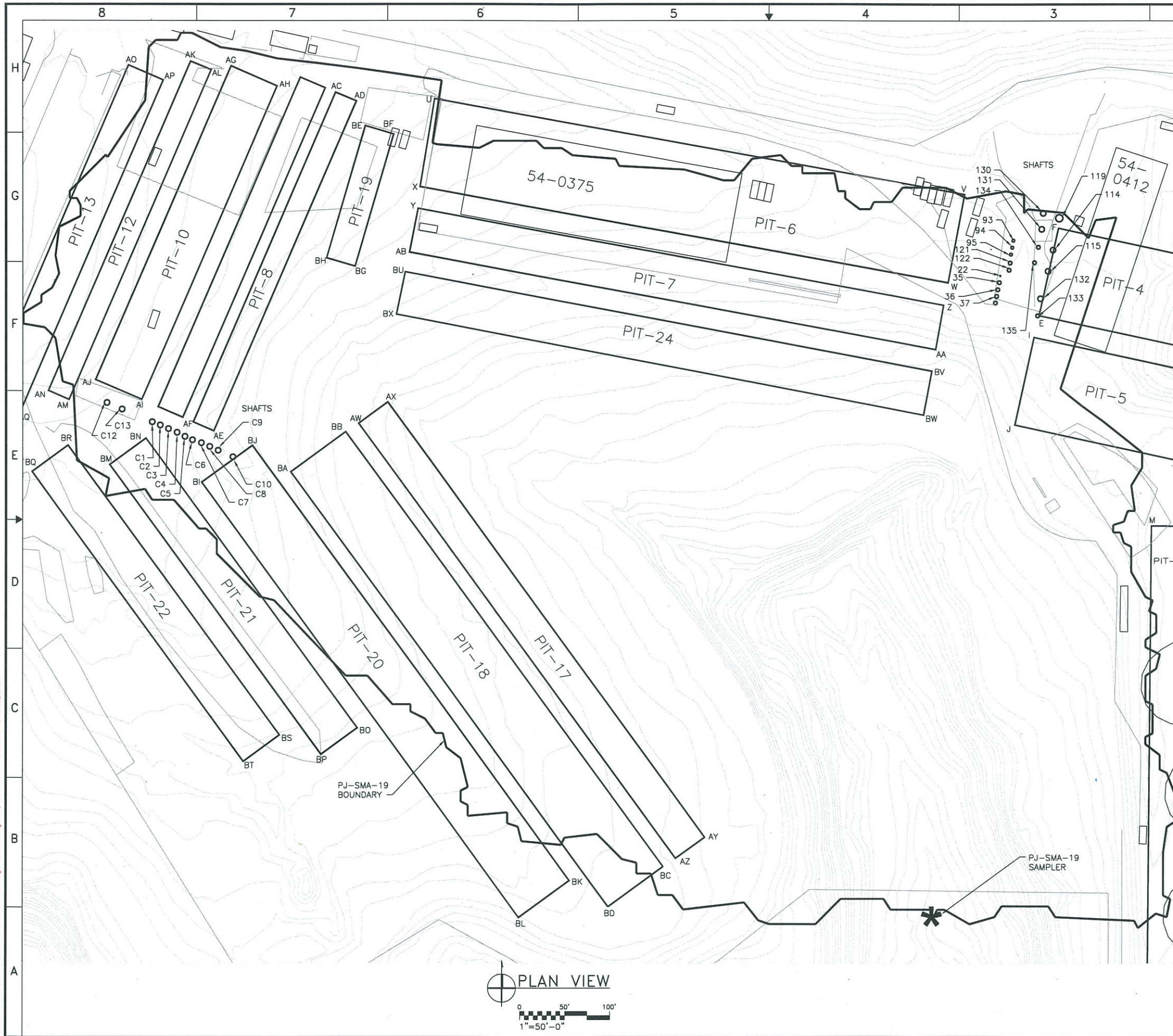
LIST OF DRAWINGS

REVISION NUMBER	SHEET NUMBER	DISCIPLINE SHEET NUMBER	DRAWING TITLE
0	1	G-0001	TITLE SHEET
0	2	C-0001	LEGEND, ABBREVIATIONS, AND GENERAL NOTES
0	3	C-1000	PLAN VIEW
0	4	C-1001	LAND CLASSIFICATION ABOVE PITS & SHAFTS WITHIN PJ-SMA-19
0	5	C-3000	PIT SECTION VIEW
0	6	C-3001	TRENCH SECTION VIEW

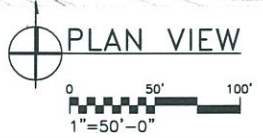
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PJ-SMA-19 AS-BUILT DRAWINGS					DRAWN	E. FERNANDEZ				
TITLE SHEET					DESIGN	G. FARHAM				
TITLE SHEET					CHECKED	T. KOSTRUBALA				
BLDG/NA SUBMITTED					DATE	8-19-14				
APPROVED FOR RELEASE					[Signature]					
[Signature]					SHEET					
[Signature]					G-0001					
[Signature]					1 OF 6					
[Signature]					Los Alamos NATIONAL LABORATORY					
[Signature]					PO Box 1663 Los Alamos, New Mexico 87545					
CLASSIFICATION			REVIEWER			DATE				
PROJECT ID			DRAWING NO			REV				
102891			C-57039			0				

	8	7	6	5	4	3	2	1	
H	LEGEND		ABBREVIATIONS		LIST OF REFERENCES			GENERAL NOTES	
G	 NORTH ORIENTATION SYMBOL		BLDG - BUILDING DWG - DRAWING E - EASTING EL - ELEVATION FT - FOOT OR FEET INV - INVERT LF - LINEAR FEET MAX - MAXIMUM MIN - MINIMUM N - NOTHING NAD - NORTH AMERICAN DATUM NGVD - NATIONAL GEODETIC VERTICAL DATUM NMDOT - NEW MEXICO DEPARTMENT OF TRANSPORTATION SMA - STORM WATER MANAGEMENT AREA TYP - TYPICAL		IFC KAISER ENGINEERS, INC., MARCH 1, 1994. "TA-54 AREA G BURIAL PITS - LAND SURVEY AND RESEARCH - FINAL REPORT." LOS ALAMOS, NM. (IFC KAISER ENGINEERS, INC. 1994, 218971) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977a. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 1, TA-54." ENGINEERING DRAWING R-5005, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977b. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 4, TA-54." ENGINEERING DRAWING R-5008, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977c. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 5, TA-54." ENGINEERING DRAWING R-5009, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977d. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 6, TA-54." ENGINEERING DRAWING R-5010, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977e. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 7, TA-54." ENGINEERING DRAWING R-5011, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977f. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 8, TA-54." ENGINEERING DRAWING R-5012, LOS ALAMOS, NEW MEXICO. (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977g. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 10, TA-54." ENGINEERING DRAWING R-5014, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977h. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 12, TA-54." ENGINEERING DRAWING R-5016, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977i. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 13, TA-54." ENGINEERING DRAWING R-5017, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977j. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 17, TA-54." ENGINEERING DRAWING R-5021, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977k. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 18, TA-54." ENGINEERING DRAWING 5022, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977l. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 19, TA-54." ENGINEERING DRAWING 5023, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977m. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 20, TA-54." ENGINEERING DRAWING 5024, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977n. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 21, TA-54." ENGINEERING DRAWING 5025, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977o. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 22, TA-54." ENGINEERING DRAWING 5026, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1977p. "MATERIALS DISPOSAL AREAS, AREA G PIT SECTIONS FOR PIT 24, TA-54." ENGINEERING DRAWING 5028, LOS ALAMOS, NEW MEXICO (LASL 1977, 76099) LASL (LOS ALAMOS SCIENTIFIC LABORATORY), JULY 27, 1965. "MATERIALS DISPOSAL AREAS, STANDARD PIT SPECIFICATIONS" ENGINEERING DRAWING C-25703, LOS ALAMOS, NEW MEXICO. (LASL 1965, 249234)			1. IF THIS SHEET IS NOT 24" X 36" IT IS A REDUCED SIZE PLOT.	
F	 GRAPHIC SCALE								
E	 SECTION TAG								
D	 SECTION END LINE								
C	 EXISTING CONTOUR								
B	 MISC EXISTING STRUCTURE								
A	 SWMU BOUNDARY								
	 SMA BOUNDARY								
	 EXISTING EARTH/TUFF								
	 INTERIM COVER								
	 OPERATIONAL COVER								
	 CONTAMINATED WASTE/CRUSHED TUFF LAYERS								
	 SOIL								

NO	DATE	CLASS REV	ADC	DESCRIPTION	OWN	DES	CHKD	SUB	APP
ENVIRONMENTAL PROGRAMS									
PJ-SMA-19 AS-BUILT DRAWINGS								DRAWN E. FERNANDEZ DESIGN G. FERNANDEZ CHECKED T. KOSTRUBALA DATE 8-19-14	
LEGEND, ABBREVIATION, AND GENERAL NOTES									
BLDG NA		SUBMITTED		TA-54		DATE			
				APPROVED FOR RELEASE					
SHEET								C-0001	
Los Alamos NATIONAL LABORATORY				PO Box 1663 Los Alamos, New Mexico 87545		2 OF 6			
CLASSIFICATION				REVIEWER		DATE		REV	
PROJECT ID				DRAWING NO		DATE		REV	
102891				C-57039				0	

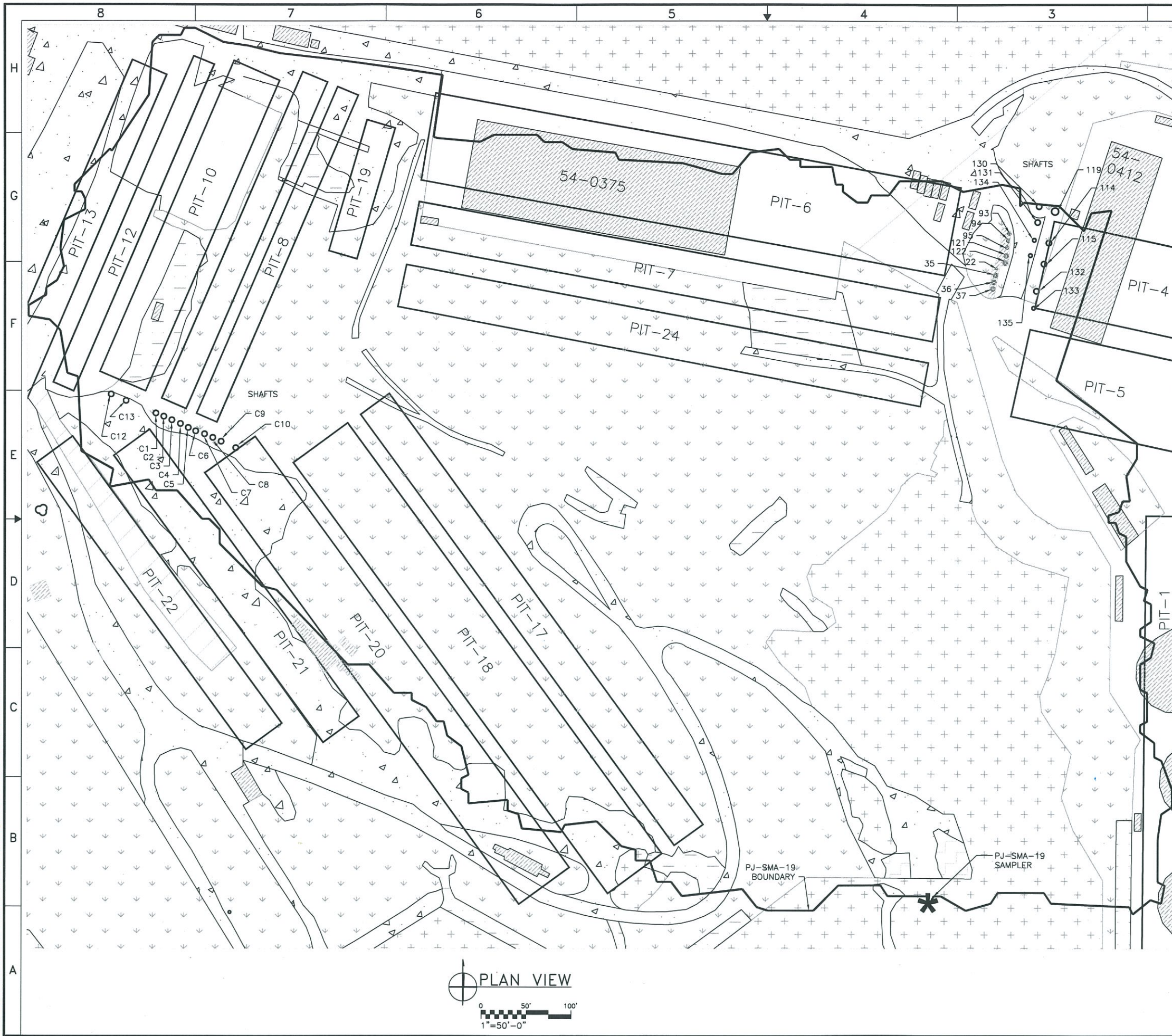


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J	1644423.3	1757652.6	BP	1643649.4	1757285.4
M	1644576.1	1757538.5	BQ	1643326.7	1757600.5
U	1643776.8	1758018.4	BR	1643367.1	1757630.0
V	1644366.5	1757909.2	BS	1643603.0	1757307.2
W	1644348.3	1757810.9	BT	1643562.7	1757277.7
X	1643758.6	1757920.1	BU	1643740.4	1757822.2
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AY	1644076.8	1757193.4	Shaft-135 Center	1644444.7	1757833.7
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BB	1643676.7	1757645.1	Shaft-C3 Center	1643479.0	1757648.5
BC	1644030.5	1757160.8	Shaft-C4 Center	1643488.7	1757644.4
BD	1643969.1	1757116.0	Shaft-C5 Center	1643497.5	1757639.9
BE	1643698.0	1757985.8	Shaft-C6 Center	1643505.8	1757636.1
BF	1643729.7	1757976.5	Shaft-C7 Center	1643515.8	1757632.8
BG	1643687.0	1757829.7	Shaft-C8 Center	1643525.1	1757628.7
BH	1643655.3	1757838.9	Shaft-C9 Center	1643534.5	1757624.5
BI	1643516.2	1757588.8	Shaft-C10 Center	1643551.0	1757617.2
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PLAN VIEW								DRAWN E. FERNANDEZ	
								DESIGN G. FORD	
								CHECKED T. KOSTRUBALA	
								DATE 8.19.14	
								DATE 8.19.14	
BLDG NA SUBMITTED					APPROVED FOR RELEASE				
SHEET C-1000									
3 OF 6									
CLASSIFICATION PROJECT ID 102891					REVIEWER DRAWING NO C-57039				
					DATE REV 0				

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LAND CLASSIFICATION ABOVE PITS WITHIN THE PJ-SMA-19 BOUNDARY

SURFACE TYPE	PIT 1	PIT 4	PIT 5	PIT 6	PIT 7	PIT 8	PIT 10	PIT 12
ASPHALT	80	50	80	50	30	-	70	97
CHAMISA	-	-	-	-	-	-	-	-
CONCRETE	-	-	-	-	-	-	-	-
BASE COURSE	-	-	-	-	-	20	-	3
PINION JUNIPER	-	-	-	-	-	-	-	-
STRUCTURE	20	50	-	50	2	-	-	-
SPARSE GRASS	-	-	20	-	68	70	10	-
TUFF	-	-	-	-	-	10	20	-
BARE GROUND	-	-	-	-	-	-	-	-

SURFACE TYPE	PIT 13	PIT 17	PIT 18	PIT 19	PIT 20	PIT 21	PIT 22	PIT 24
ASPHALT	95	-	-	-	-	-	-	-
CHAMISA	-	-	-	-	-	-	-	-
CONCRETE	-	-	-	-	-	-	-	-
BASE COURSE	5	-	3	50	20	100	-	5
PINION JUNIPER	-	-	-	-	-	-	-	-
STRUCTURE	-	-	-	-	-	-	-	-
SPARSE GRASS	-	99	97	50	80	-	-	90
TUFF	-	1	-	-	-	-	-	5
BARE GROUND	-	-	-	-	-	-	100	-

NO	DATE	CLASS REV	ADC	DESCRIPTION	DWN	DES	CHKD	SUB	APP

ENVIRONMENTAL PROGRAMS

PJ-SMA-19 AS-BUILT DRAWINGS

LAND CLASSIFICATION ABOVE PITS AND SHAFTS WITHIN PJ-SMA-19

BLDG NA SUBMITTED
 TA-54
 APPROVED FOR RELEASE
 DATE 8.19.14
 SHEET C-1001

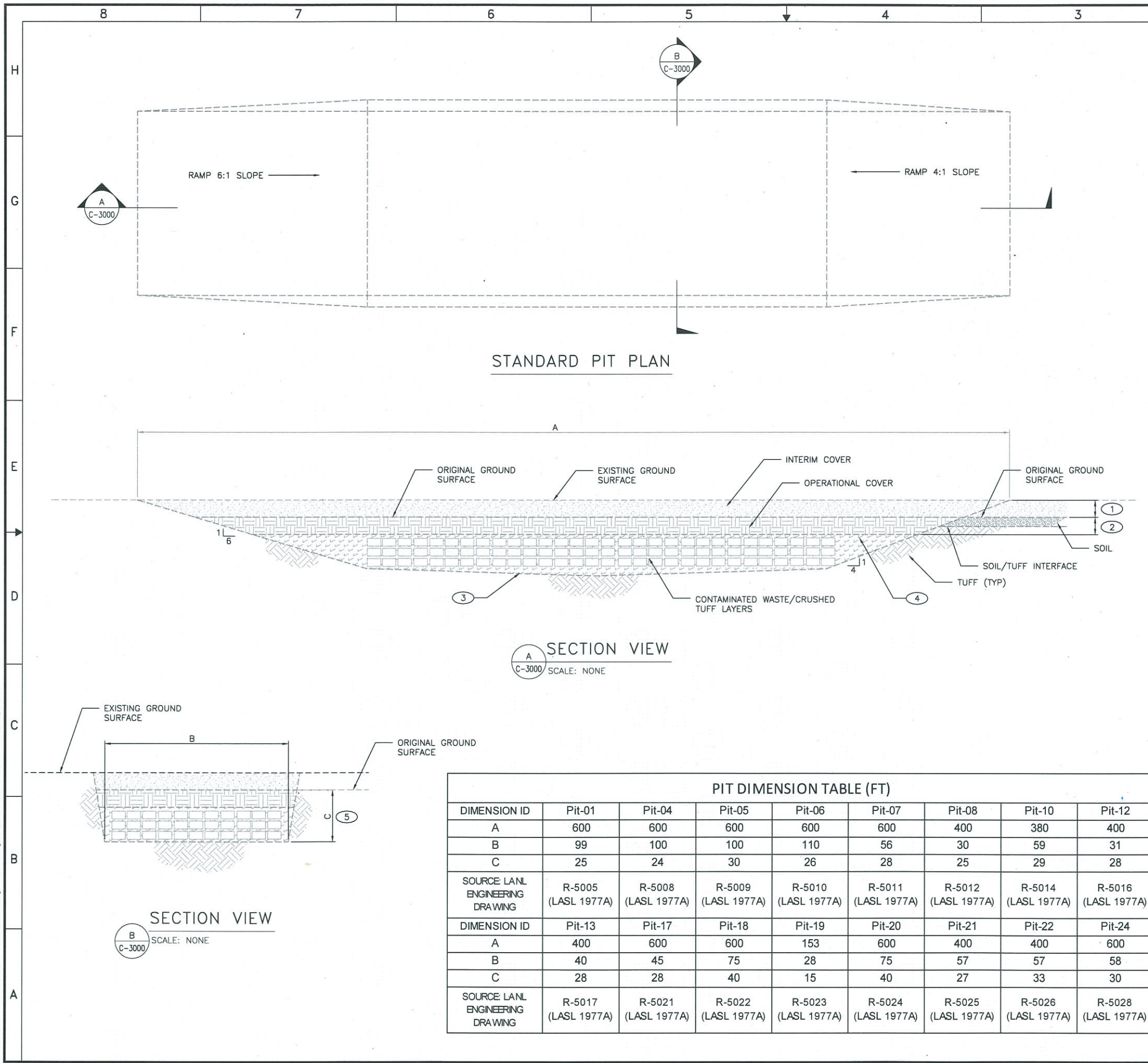
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102891	C-57039		0

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DIMENSION ID	Pit-01	Pit-04	Pit-05	Pit-06	Pit-07	Pit-08	Pit-10	Pit-12
A	600	600	600	600	600	400	380	400
B	99	100	100	110	56	30	59	31
C	25	24	30	26	28	25	29	28
SOURCE LANL ENGINEERING DRAWING	R-5005 (LASL 1977A)	R-5008 (LASL 1977A)	R-5009 (LASL 1977A)	R-5010 (LASL 1977A)	R-5011 (LASL 1977A)	R-5012 (LASL 1977A)	R-5014 (LASL 1977A)	R-5016 (LASL 1977A)
DIMENSION ID	Pit-13	Pit-17	Pit-18	Pit-19	Pit-20	Pit-21	Pit-22	Pit-24
A	400	600	600	153	600	400	400	600
B	40	45	75	28	75	57	57	58
C	28	28	40	15	40	27	33	30
SOURCE LANL ENGINEERING DRAWING	R-5017 (LASL 1977A)	R-5021 (LASL 1977A)	R-5022 (LASL 1977A)	R-5023 (LASL 1977A)	R-5024 (LASL 1977A)	R-5025 (LASL 1977A)	R-5026 (LASL 1977A)	R-5028 (LASL 1977A)

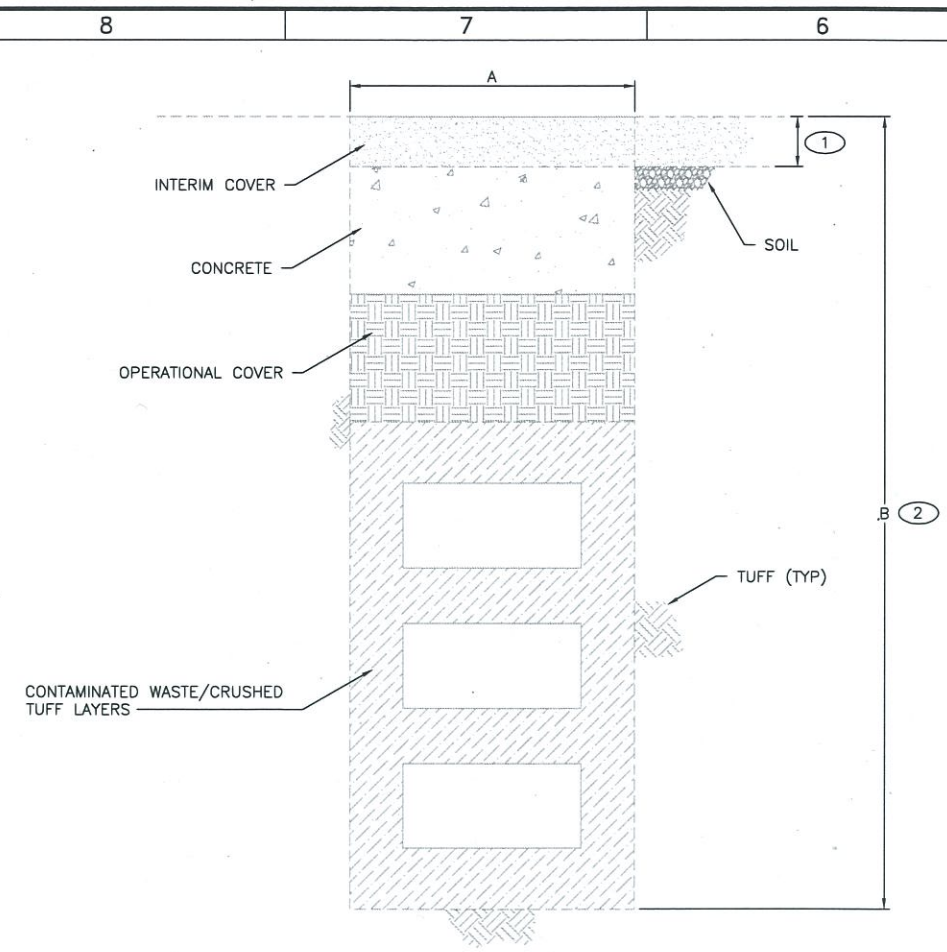
- GENERAL NOTES**
- IF THIS SHEET IS NOT 24" X 36" THEN IT IS A REDUCED SIZE PLOT.
 - STANDARD PIT LAYOUT AND SECTION VIEW DEPICTION FROM LANL ENGINEERING DRAWING, C-25703 (LASL 1965, XXXXXX).
 - SEE SHEET C-1000 FOR PIT CORNER NORTHING/EASTING LOCATIONS.
 - PIT DIMENSIONS ESTABLISHED FROM PIT SURVEYS AND DEPICTED IN LANL ENGINEERING DRAWINGS FOR EACH SPECIFIC PIT. SEE DIMENSION TABLE FOR DRAWING REFERENCE.

- KEYED NOTES**
- INTERIM COVER CONSISTS OF CRUSHED TUFF COVERED BY THE EXISTING ACTIVE WASTE MANAGEMENT OPERATIONS SURFACE (E.G. ASPHALT PADS, STORAGE BUILDINGS/DOMES, AND ROADS). DEPTH FROM EXISTING GROUND SURFACE TO ORIGINAL GROUND SURFACE VARIES FOR EACH PIT LOCATION. EXISTING GROUND SURFACE MAY BE DEFINED BY ASPHALT, CONCRETE, COVER SOIL, OR BUILDINGS.
 - OPERATIONAL COVER CONSISTS OF CRUSHED TUFF. DEPTH FROM ORIGINAL GROUND SURFACE TO CONTAMINATED WASTE / CRUSHED TUFF LAYERS NOT TO BE LESS THAN 2 FEET PER USGS 1965 PIT CONSTRUCTION GUIDELINES LETTER. HISTORICAL RECORDS INDICATE ACTUAL DEPTHS TYPICALLY EXCEED 2 FT MINIMUM (M.A. ROGERS, 1977).
 - PIT BOTTOM SLOPE VARIES. SEE R-SERIES DRAWING FOR SLOPES. TYPICAL SLOPE SHOWN.
 - PER USGS 1965 PIT CONSTRUCTION GUIDELINES, "WASTES ARE TO BE BURIED IN THE CONFINES OF NATURAL TUFF. THE WASTES SHOULD BE BURIED BELOW THE SOIL ZONE WITHIN THE TUFF."
 - DIMENSION "C" IS THE MAXIMUM DIMENSION AS MEASURED FROM THE PIT BOTTOM TO THE ORIGINAL GROUND SURFACE.

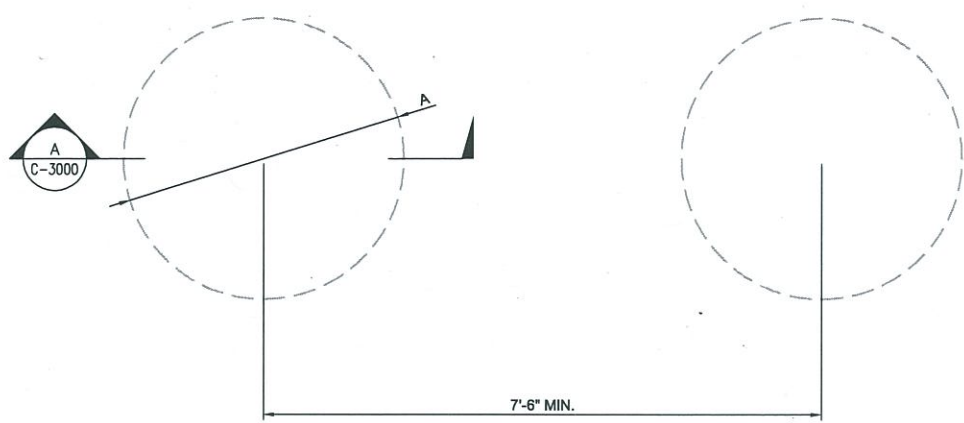
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PJ-SMA-19 AS-BUILT DRAWINGS									
PIT SECTION VIEW									
BLDG NAT SUBMITTED					DATE 8-19-14				
APPROVED FOR RELEASE					DATE 8-19-14				
PO Box 1663 Los Alamos, New Mexico 87545									
SHEET C-3000 5 OF 6									
CLASSIFICATION PROJECT ID			DRAWING NO			DATE			
102891			C-57039						
REV 0									

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SECTION VIEW
SCALE: NONE



STANDARD SHAFT PLAN
SCALE: NONE

GENERAL NOTES

- IF THIS SHEET IS NOT 24" X 36" THEN IT IS A REDUCED SIZE PLOT.
- STANDARD SHAFT LAYOUT AND SECTION VIEW FROM LANL ENGINEERING DRAWING, R-4464 AND ROGERS 1977
- SHAFT DIMENSIONS ESTABLISHED FROM LANL ENGINEERING DRAWING R-4464. SEE DIMENSION TABLE FOR REFERENCE.

KEYED NOTES

- INTERIM COVER CONSISTS OF 1.5 FT. OF CRUSHED TUFF COVERED BY 0.5 TO 3 FT. OF TOPSOIL.
- DIMENSION "B" IS THE MINIMUM DIMENSION AS MEASURED FROM THE SHAFT BOTTOM TO THE ORIGINAL GROUND SURFACE.

SHAFT DIMENSION TABLE (FT)										
DIMENSION ID	SHAFT 22	SHAFT 35	SHAFT 36	SHAFT 37	SHAFT 93	SHAFT 94	SHAFT 95	SHAFT 114	SHAFT 115	SHAFT 119
A (DIA)	1	3	3	3	3	3	3	6	6	8
B (DEPTH)	25	40	40	40	50	50	50	60	60	62
DIMENSION ID	SHAFT 121	SHAFT 122	SHAFT 130	SHAFT 131	SHAFT 132	SHAFT 133	SHAFT 134	SHAFT 135	SHAFT C1	SHAFT C2
A (DIA)	4	4	6	6	6	4	3	3	6	6
B (DEPTH)	60	60	65	65	65	65	65	65	60	60
DIMENSION ID	SHAFT C3	SHAFT C4	SHAFT C5	SHAFT C6	SHAFT C7	SHAFT C8	SHAFT C9	SHAFT C10	SHAFT C12	SHAFT C13
A (DIA)	6	6	6	6	6	6	6	6	6	6
B (DEPTH)	60	60	60	60	60	60	60	60	65	65
SOURCE: LASL ENGINEERING DRAWING R-4464 AND ROGERS 1977										

NO	DATE	CLASS REV	ADC	DESCRIPTION	OWN	DES	CHKD	SUB	APP	
ENVIRONMENTAL PROGRAMS										
PJ-SMA-19 AS-BUILT DRAWINGS					DRAWN	E. FERNANDEZ				
SHAFT SECTION VIEW					DESIGN	G. SOBRIAN				
					CHECKED	T. KOSTRUBALA				
					DATE	8/17/14				
BLDG NA SUBMITTED					APPROVED FOR RELEASE					
					SHEET C-3001					
PO Box 1663 Los Alamos, New Mexico 87545					6 OF 6					
CLASSIFICATION			REVIEWER			DATE				
PROJECT ID			DRAWING NO			REV				
102891			C-57039			0				