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22 September 1997

58979

Attn: Garry Allen
Field Unit 1 Project Leader
CST-18, MS E525
Los Alamos National Laboratory
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Los Alamos, NM 87545

RE: Deliverable: *1994 Site Investigation Activities at Field Unit 1, TA-21, Material Disposal Area (MDA) U, PRS 21-017(a-c)*
Work Release 95-0088
Subcontract F20780002-8M

Dear Garry:

Enclosed is the field summary report work done by Roy F. Weston, Inc., in 1994 at MDA U, PRS 21-017(a-c).

If you have any questions, please feel free to call me at any time.

Sincerely,

ERM Program Management Company

Alan C. Funk
Principal

Attachment: A/S

cc: W.J. Smith (w/o attach)
J. Williams (w/o attach)
L. Wahl (w/o attach)
C. Newton (w/o attach)
J. Santo (w/o attach)
Project File CJ588-7.6.2

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Field Summary Report

1994 Site Investigation Activities at Field Unit 1, TA-21, Material Disposal Area (MDA) U PRS 21-017(a–c)

September 1997

Prepared for

Los Alamos National Laboratory
Environmental Restoration Project
Los Alamos, New Mexico

ERM Program Management Company
Golder Federal Services
2237 Trinity Drive, Building 2
Los Alamos, New Mexico 87544

1.0 INTRODUCTION

An initial investigation was conducted of surface contamination at the Field Unit 1, Technical Area (TA) 21, Material Disposal Area (MDA) U, Potential Release Site (PRS) 21-017(a–c) and the associated drainage area. This investigation was completed in August and September 1994 as part of the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) conducted for the Los Alamos National Laboratory (LANL) Environmental Restoration (ER) Project. This field summary report presents a description and history of the site, the planned and actual field activities, and the results of those activities.

2.0 GENERAL SITE DESCRIPTION AND HISTORY

TA-21 is located on DP Mesa, on the northern boundary of the Laboratory and immediately east-southeast of the Los Alamos town site (Fig. 1). TA-21 was used primarily for plutonium research, metal production, and related activities from 1945 to 1978. Since 1978, administrative and various other activities have been conducted at TA-21. Chemicals used historically at TA-21 include radionuclides, organic compounds, and inorganic compounds. Additional background information is presented in Chapter 3 of the TA-21 work plan (LANL 1991, 0689).

3.0 PRS DESCRIPTION AND HISTORY

A detailed description of MDA U is provided in Chapter 16.6 of the TA-21 work plan (LANL 1991, 0689), which is summarized below. MDA U covers an area of 0.2 acre and contains two absorption beds [PRSs 21-017(a) and (b)] that were used for subsurface disposal of radioactively contaminated liquid wastes from 1948 to 1968 (Hakonson 1987; Hansen 1980). An associated sump, TA-21-164 [PRS 21-017(c)], was located between the two beds (Fig. 2). As constructed, the two absorption beds had a surface area of approximately 1,800 square feet with an estimated volume of about 18,000 cubic feet. The drainage area associated with MDA U is to the north into DP Canyon.

Liquid effluents from Buildings 21-152 and 21-153 and from the Tritium Systems Test Assembly (TSTA) were drained to the MDA U absorption beds. In addition, contaminated oil from precipitrons was disposed of at MDA U. Historical records for MDA U are lacking, however, and the amount of liquid wastes discharged to the beds is unknown.

The primary contaminant released to MDA U was polonium-210, which has a half-life of 138.4 days and would have since decayed to undetectable levels. A 1946 memo (Tribby 1946) indicates that plutonium, as well as polonium, was measured in effluent. These measurements were reported as disintegrations per minute (dpm) of polonium and plutonium per liter of effluent measured at the

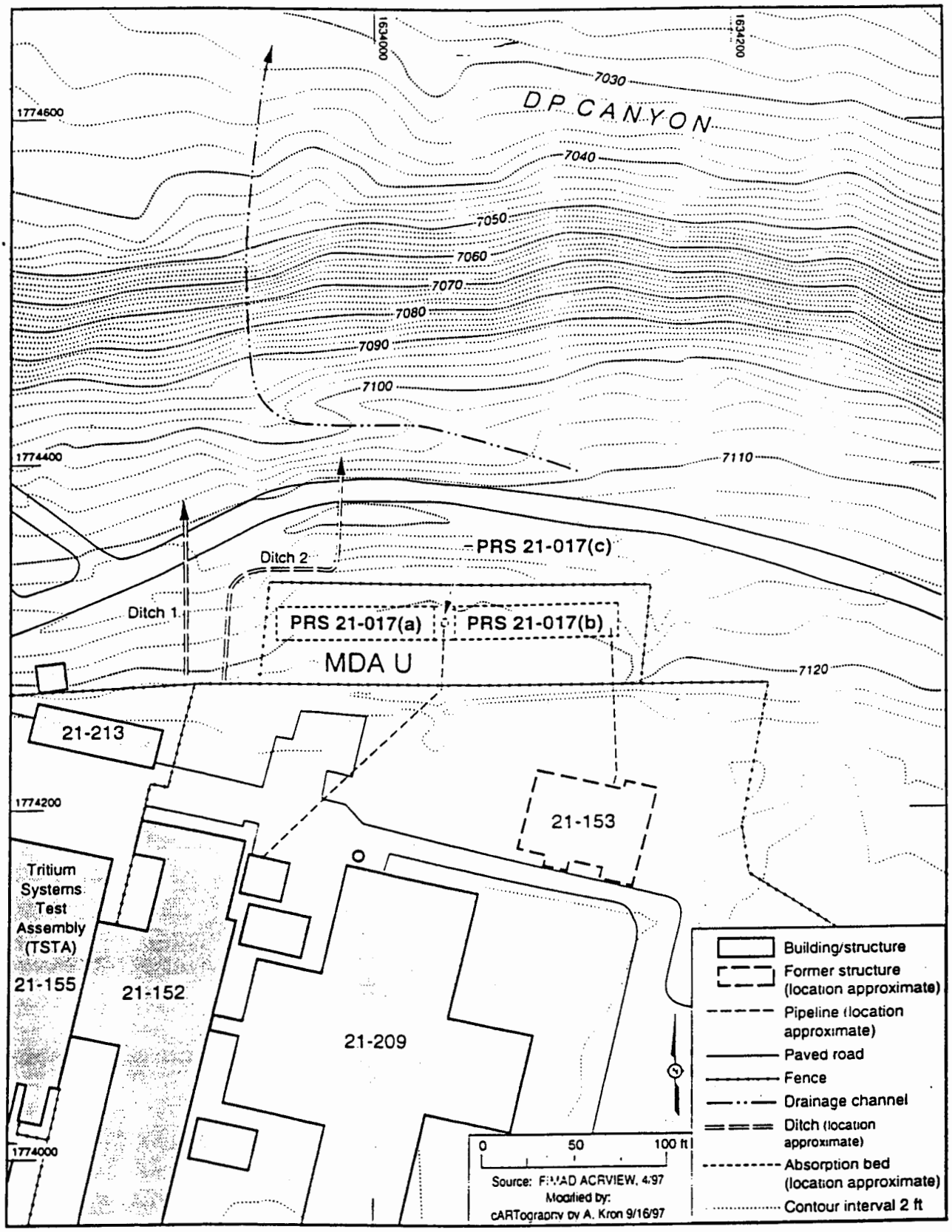

Figure 2. MDA U site map.

Table I. Sample Locations

Location ID	X Coordinate	Y Coordinate	Elevation (ft)
21-1863	1633972.61	1774424.09	7099.38
21-1864	1633964.72	1774427.43	7098.45
21-1865	1633948.66	1774655.99	7029.53
21-2059	1633903.15	1774409.49	7103.99
21-2060	1633903.25	1774442.12	7095.29
21-2061	1633935.99	1774442.21	7095.27
21-2062	1633936.00	1774409.42	7100.76
21-2063	1633903.25	1774376.59	7108.88
21-2064	1633968.78	1774442.15	7099.85
21-2065	1633968.82	1774409.53	7101.67
21-2066	1634001.60	1774442.23	7100.98
21-2067	1634001.64	1774409.49	7106.37
21-2068	1634034.42	1774442.27	7102.22
21-2069	1634100.07	1774442.29	7102.68
21-2070	1634067.25	1774409.38	7103.84
21-2071	1634067.14	1774442.17	7102.48
21-2072	1634034.44	1774409.40	7101.36
21-2073	1634132.78	1774442.23	7104.34
21-2074	1634100.07	1774409.36	7106.99
21-2075	1634132.74	1774409.48	7108.15
21-2076	1634165.55	1774442.22	7105.48
21-2077	1634165.64	1774343.80	7113.52
21-2078	1634165.61	1774376.61	7113.26
21-2079	1634165.65	1774409.36	7108.38
21-2080	1634132.79	1774343.83	7115.29
21-2081	1634132.81	1774376.61	7112.63
21-2082	1634099.97	1774376.64	7111.79
21-2083	1633903.23	1774278.27	7120.41
21-2084	1634034.38	1774376.63	7110.04
21-2085	1633936.01	1774399.54	7103.26
21-2086	1633935.26	1774375.29	7110.80
21-2087	1633903.21	1774343.83	7111.70
21-2088	1633936.02	1774343.82	7114.36
21-2089	1633935.99	1774333.99	7115.74
21-2090	1633968.78	1774376.59	7110.25
21-2091	1633968.86	1774343.85	7116.89
21-2092	1634001.55	1774376.65	7109.71
21-2093	1634034.34	1774343.84	7118.04
21-2094	1633935.96	1774310.97	7117.30
21-2095	1634165.55	1774311.05	7117.36

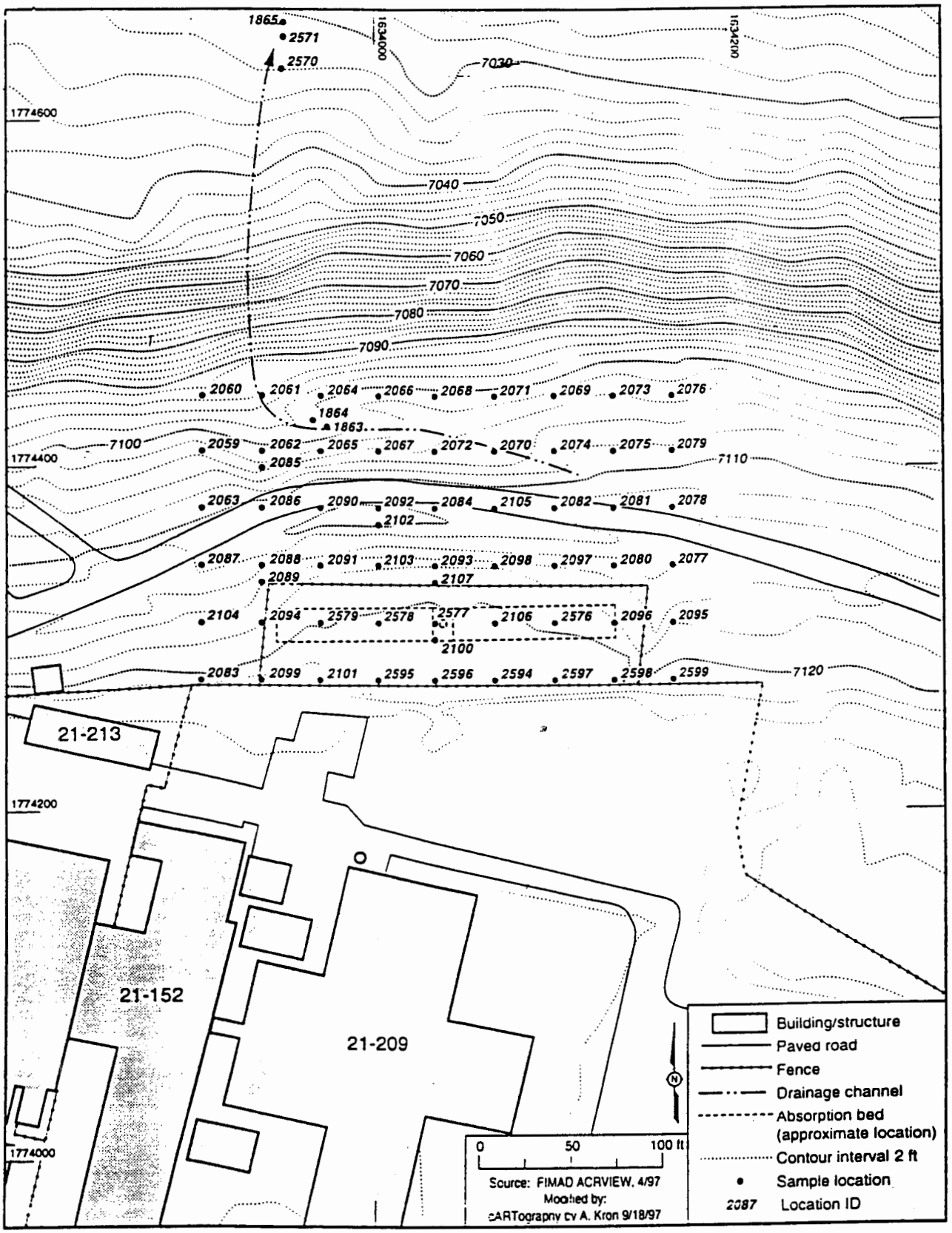

Figure 3. MDA U sample location map.

Location	Alpha Detector Results (cpm)	Gamma Detector Results		
		Ludlum 44-10 (cpm)	Ludlum 19 (μR/hr)	Bicron FIDLER (cpm)
21-2096	12	17,000	17	18,000
21-2097	18	18,000	19	19,000
21-2098	16	18,000	18	20,000
21-2099	2	14,000	15	16,000
21-2100	8	16,000	16	17,000
21-2101	10	14,000	15	17,000
21-2102	6	18,000	18	19,000
21-2103	12	18,000	18	20,000
21-2104	0	14,000	14	14,000
21-2105	4	16,000	16	16,000
21-2106	14	16,000	16	18,000
21-2107	14	16,000	16	17,000
21-2576	10	16,000	17	18,000
21-2577	2	16,000	15	17,000
21-2578	2	14,000	15	17,000
21-2579	4	14,000	15	16,000
21-2594	2	18,000	17	19,000
21-2595	6	15,000	16	17,000
21-2596	14	16,000	15	17,000
21-2597	8	18,000	18	19,000
21-2598	20	18,000	18	20,000
21-2599	0	17,000	17	19,000

[a] Upper limit of background radiation measured on site.
[b] Upper limit of background radiation measured at several Los Alamos locations outside LANL boundaries.

Screening Results. Results of screening for worker health and safety indicate that no soil samples had radiation levels greater than the action levels defined in the site-specific health and safety plan (≥ 500 cpm alpha radiation or ≥ 5000 cpm beta/gamma radiation or ≥ 5000 μR/hr gamma radiation) (LANL 1994a). These results are recorded on sample collection logs (Attachment A).

Results of screening to meet transportation and fixed analytical laboratory acceptance criteria are shown in Table III. These results support the results of the radiation survey and do not suggest significant radiological contamination in samples collected at MDA U.

Location ID	Sample ID	Gross Alpha Radiation (pCi/g)	Gross Beta Radiation (pCi/g)	Gross Gamma Radiation (pCi/g)
21-2091	AAB9782	-13.78	19.38	-2.97
21-2092	AAB9783	-41.33	7.14	-3.84
21-2093	AAB9784	-13.78	-21.42	-5.27
21-2094	AAB9785	-13.78	-37.74	-6.04
21-2095	AAB9786	0	-5.1	-3.98
21-2096	AAB9787	-41.33	-27.54	-4.08
21-2097	AAB9788	-27.55	-15.3	-3.24
21-2098	AAB9789	-27.55	-19.38	-4.01
21-2099	AAB9790	-27.55	-19.38	-5.79
21-2100	AAB9791	-13.78	-3.06	-4.29
21-2101	AAB9792	-27.55	-15.3	-5.02
21-2102	AAB9793	-13.78	-21.42	-4.73
21-2103	AAB9794	-13.78	-29.58	-4.09
21-2103	AAB9802	-27.55	27.54	-4.72
21-2104	AAB9795	-27.55	-21.42	-7.21
21-2105	AAB9796	-41.33	-13.26	-8.33
21-2106	AAB9797	-13.78	13.26	-5.55
21-2107	AAB9798	-13.78	-19.38	-6.57
21-2570	AAB7281	-20.66	19.38	-0.82
21-2570	AAB7282	20.66	5.1	-1.58
21-2570	AAB7283	6.89	-13.26	-1.78
21-2571	AAB7284	-34.44	1.02	-2.1
21-2571	AAB7285	-20.66	-15.3	-3.12
21-2571	AAB7286	-6.89	9.18	-3.19
21-2576	AAB9891	-13.78	-25.5	-4.14
21-2577	AAB9888	-13.78	-25.5	-3.59
21-2578	AAB9889	-41.33	-1.02	-1.72
21-2579	AAB9890	-27.55	-31.62	-3.77
21-2594	AAC0135	-13.78	-30.6	0.55
21-2595	AAC0136	-13.78	-2.04	-0.14
21-2596	AAC0137	0	6.12	-0.58
21-2597	AAC0138	-27.55	-30.6	-1.08
21-2598	AAC0139	-27.55	-14.28	-1.94
21-2599	AAC0140	0	-24.48	-0.62
21-2599	AAC0144	0	2.04	-2.68

5.2.4 Surface Sample Analyses

Activities. Seventy-seven soil and sediment samples were sent to a fixed laboratory for analysis for radionuclides (tritium, total uranium, plutonium isotopes, strontium-90, and gamma-emitting radionuclides by gamma spectroscopy), SVOCs, and inorganic chemicals. Twelve QC samples were sent to a fixed laboratory for the analyses listed above and volatile organic compounds (VOCs). Requested analyses are summarized in Table IV.

Location ID	Sample ID	Depth (in.)	Matrix	Request Number			
				Inorganic Chemicals	Radio-nuclides	SVOCs[a]	VOCs[b]
21-2081	AAB9772	0-6	Soil	19616/19914	19914	19023	NA
21-2082	AAB9773	0-6	Soil	19616/19914	19914	19023	NA
21-2083	AAB9774	0-6	Soil	19616/19914	19914	19023	NA
21-2084	AAB9775	0-6	Soil	19616/19914	19914	19023	NA
21-2085	AAB9776	0-6	Soil	19616/19914	19914	19023	NA
21-2086	AAB9777	0-6	Soil	19616/19914	19914	19023	NA
21-2087	AAB9778	0-6	Soil	19616/19914	19914	19023	NA
21-2088	AAB9779	0-6	Soil	19616/19914	19914	19023	NA
21-2089	AAB9780	0-6	Soil	19616/19914	19914	19023	NA
21-2090	AAB9781	0-6	Soil	19616/19914	19914	19023	NA
21-2091	AAB9782	0-6	Soil	19616/19914	19914	19023	NA
21-2092	AAB9783	0-6	Soil	19616/19914	19914	19023	NA
21-2093	AAB9784	0-6	Soil	19616/19914	19914	19023	NA
21-2094	AAB9785	0-6	Soil	19616/19914	19914	19023	NA
21-2095	AAB9786	0-6	Soil	19616/19914	19914	19023	NA
21-2096	AAB9787	0-6	Soil	19616/19914	19914	19023	NA
21-2097	AAB9788	0-6	Soil	19616/19914	19914	19023	NA
21-2098	AAB9789	0-6	Soil	19616/19914	19914	19023	NA
21-2099	AAB9790	0-6	Soil	19616/19914	19914	19023	NA
21-2100	AAB9791	0-6	Soil	19616/19914	19914	19023	NA
21-2101	AAB9792	0-6	Soil	19616/19914	19914	19023	NA
21-2102	AAB9793	0-6	Soil	19616/19914	19914	19023	NA
21-2103	AAB9794	0-6	Soil	19616/19914	19914	19023	NA
21-2104	AAB9795	0-6	Soil	19616/19914	19914	19023	NA
21-2105	AAB9796	0-6	Soil	19616/19914	19914	19023	NA
21-2106	AAB9797	0-6	Soil	19616/19914	19914	19023	NA
21-2107	AAB9798	0-6	Soil	19616/19914	19914	19023	NA
21-2103	AAB9802	0-6	Soil	19648/19908	19908	19085	NA
21-2078	AAB9803	0-6	Soil	19616/19914	19914	19023	NA
21-2078	AAB9806	NA	Water[d]	19616/19914	19914	19023	NA
21-2103	AAB9807	NA	Water[d]	19616/19914	19914	19023	NA
21-2078	AAB9812	NA	Water[d]	19616	NA	19023	NA
21-2103	AAB9813	NA	Water[d]	19616	NA	19023	NA
NA	AAB9815	NA	Water[d]	NA	NA	NA	18922
NA	AAB9816	NA	Water[d]	NA	NA	NA	18952
21-2577	AAB9888	0-6	Soil	19616/19914	19914	19023	NA
21-2578	AAB9889	0-6	Soil	19616/19914	19914	19023	NA
21-2579	AAB9890	0-6	Soil	19616/19914	19914	19023	NA
21-2576	AAB9891	0-6	Soil	19616/19914	19914	19023	NA
NA	AAC0076	NA	Water[d]	NA	NA	NA	19365
21-2594	AAC0135	0-6	Soil	20240/19912	19912	19365	NA
21-2595	AAC0136	0-6	Soil	20240/19912	19912	19365	NA
21-2596	AAC0137	0-6	Soil	20240/19912	19912	19365	NA

Table V. Organic Compounds Detected

Analyte	Sample ID	Location ID	Result (mg/kg)
Acenaphthene	AAB9772	21-2081	0.45
Anthracene	AAB9772	21-2081	0.88
Benzo(a)anthracene	AAB9772	21-2081	0.66
Benzo(a)anthracene	AAB7285	21-2571	0.44
Benzo(a)anthracene	AAB9889	21-2578	0.42
Benzo(a)pyrene	AAB9772	21-2081	0.81
Benzo(a)pyrene	AAB9889	21-2578	0.47
Benzo(b)fluoranthene	AAB9772	21-2081	0.61
Benzo(b)fluoranthene	AAB9790	21-2099	0.44
Benzo(b)fluoranthene	AAB9889	21-2578	0.43
Benzo(g,h,i)perylene	AAB9772	21-2081	0.62
Benzo(k)fluoranthene	AAB9772	21-2081	0.72
Chrysene	AAB9772	21-2081	0.73
Chrysene	AAB7285	21-2571	0.45
Chrysene	AAB9889	21-2578	0.4
Dichlorobenzidine[3,3'-]	AAA7526	21-1865	0.36
Diethylphthalate	AAB9765	21-2074	8.1
Fluoranthene	AAB9752	21-2061	0.74
Fluoranthene	AAB9772	21-2081	2.9
Fluoranthene	AAB7285	21-2571	1.4
Fluoranthene	AAB9889	21-2578	1.3
Fluorene	AAB9772	21-2081	0.42
Indeno(1,2,3-cd)pyrene	AAB9772	21-2081	0.56
Phenanthrene	AAB9752	21-2061	0.65
Phenanthrene	AAB9772	21-2081	2.9
Phenanthrene	AAB7285	21-2571	1.5 J[a]
Phenanthrene	AAB9889	21-2578	1.3
Pyrene	AAB9752	21-2061	0.54
Pyrene	AAB9772	21-2081	1.8
Pyrene	AAB7285	21-2571	0.99 J
Pyrene	AAB9889	21-2578	0.98

[a] J = estimated quantity

5.4 Site Restoration

Because only surface sampling was performed, with minimum disturbance to the site, no site restoration was required.

5.5 Deviations from the Planned RFI

In general, the planned activities outlined in Section 5.1 of this report were completed. However, the following deviations occurred.

Results of the radiation survey do not suggest radioactive contaminant migration across the surface of MDA U. Preliminary review of the results of laboratory analyses confirm radiation survey results and suggest that there has been no significant migration of radionuclides on the surface of MDA U and the associated drainage area; however, specific information on concentrations of actinium-227 daughters is not available. Although actinium-227 daughters may not be present because most of the contents of MDA U were removed in 1985 (which is supported by results of the radiation survey), this determination requires analytical data. To resolve the issue, it is recommended that additional surface samples be collected during the subsurface investigation and analyzed specifically for actinium-227 daughters.

Preliminary review of the results of laboratory analyses also suggests that there has been no significant migration of inorganic or organic compounds on the surface of MDA U and the associated drainage area.

Based on these results, initial investigations at MDA U surface and drainage area indicate that previous stabilization activities were effective in preventing contaminant migration and that significant concentrations of contaminants have not eroded from the MDA U surface into the associated drainage area. These preliminary conclusions will be confirmed by results of the subsurface RFI.

7.0 REFERENCES

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