EMID-700159

DEPARTMENT OF ENERGY
Environmental Management Los Alamos Field Office (EM-LA)
Los Alamos, New Mexico 87544

DEC 19 2018

Mr. John E. Kieling
Bureau Chief
Hazardous Waste Bureau
New Mexico Environment Department
2905 Rodeo Park Drive East, Building 1
Santa Fe, NM 87505-6303

Dear Mr. Kieling:

Subject: Response to Denial of Request for Certificates of Completion for Two Solid Waste Management Units in the Delta Prime Site Aggregate Area

On June 18, 2015, the U.S. Department of Energy (DOE) and Los Alamos National Security, LLC (LANS) requested certificates of completion for 12 solid waste management units (SWMUs) and 2 areas of concern (AOCs) in the Delta Prime Site Aggregate Area (DPSAA) (Los Alamos National Laboratory [LANL] document LA-UR-15-23983, June 2015). The New Mexico Environment Department (NMED) responded on January 19, 2016, and approved the requests for 10 SWMUs and 2 AOCs but did not approve the requests for SWMUs 21-027(c) and 21-027(d) (HWB-LANL-15-032, January 2016). The purpose of this letter is to provide additional information on SWMUs 21-027(c) and 21-027(d) to address concerns identified in NMED's January 19, 2016, denial.

SWMU 21-027(c), Outfall from Former Building 21-6

SWMU 21-027(c) is a 4-in. vitrified clay pipe that exited a former machine shop and cafeteria (building 21-6) and discharged south on DP Mesa. This site was investigated in 2007 as part of the Phase I investigation of the DPSAA. The results of the investigation indicated that lateral and vertical extent were not defined for lead, several organic chemicals, and several radionuclides, and additional sampling to define extent of contamination was proposed in the Phase II investigation work plan for DPSAA. Phase II sampling was performed in 2009, and the results were presented in the "Phase II Investigation Report for Delta Prime Site Aggregate Area, Revision 1" (LA-UR-10-6478, October 2010). The Phase II investigation report concluded that nature and extent were defined for all chemicals of potential concern and that the site did not pose an unacceptable risk to human health and ecological receptors. The maximum concentration of lead was detected in two samples collected on the canyon-slope portion of SWMU 21-027(c) at the edge of a steep cliff.

Data from samples collected from Reach LA-2W in Los Alamos Canyon downgradient of SWMU 21-027(c) were used to define the lateral extent of lead. NMED indicated that Reach LA-2W does not provide data acceptable for use in determining the extent of lead contamination specifically related to SWMU 21-027(c) and noted they cannot evaluate the site for corrective action complete until the nature and extent of contamination is defined for the site

and it is demonstrated that the site does not pose an unacceptable risk to human health and the environment. Enclosure 1 provides an evaluation of the extent of lead contamination at this site and summarizes the results of the risk screening evaluations performed for this site.

SWMU 21-027(d), Soil Contamination from Former Drainline

SWMU 21-027(d) is an outfall from a fuel storage tank secondary containment system located on the slope below Material Disposal Area (MDA) B and adjacent to MDA V. A voluntary corrective measure was conducted at the site in 1999 and approved by NMED in 2002. Further investigation of SWMU 21-027(d) was to have been included in the investigation of MDA V but was not included in the MDA V investigation report. Data from MDA V investigations relevant to 21-027(d) were, however, provided in the June 18, 2015, request for certificate of completion.

In the January 19, 2016, denial, NMED indicated that the data provided in the request were not complete and did not include results from samples collected from the upper approximately 60 ft of the drainage below the outfall. NMED also noted that the site could not be evaluated for a certificate of completion until DOE demonstrated that the nature and extent of contamination is defined for all of SWMU 21-027(d) and the site does not pose an unacceptable risk to human health and the environment. Enclosure 2 provides an updated evaluation of nature and extent and risk for this site.

Based on the information provided in Enclosures 1 and 2, DOE concludes that nature and extent of contamination are defined or no further sampling is warranted for SWMUs 21-027(c) and 21-027(d) and that the sites do not pose an unacceptable risk to human health under the residential and construction worker scenarios and do not pose an unacceptable risk to ecological receptors. Therefore, in accordance with Section XXI of the Compliance Order on Consent, DOE is requesting certificates of completion without controls for SWMUs 21-027(c) and 21-027(d).

If you have any questions, please contact Kent Rich at (505) 551-2962 (kent.rich@em-la.doe.gov) or Cheryl Rodriguez at (505) 665-5330 (cheryl.rodriguez@em.doe.gov).

Sincerely,

Arturo Q. Duran
Designated Agency Manager
Environmental Management
Los Alamos Field Office

Enclosures:
1. Evaluation of Data for Solid Waste Management Unit 21-027(c) (EM2018-0131)
2. Evaluation of Data for Solid Waste Management Unit 21-027(d) (EM2018-0146)

cc (letter with electronic enclosure[s]):
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EM-LA-40AD-00368

ENCLOSURE 1
Evaluation of Data for Solid Waste Management Unit 21-027(c)

The 2010 “Phase II Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1” (LANL 2010, 110772.33) concluded that the nature and extent of contamination were defined at Solid Waste Management Unit (SWMU) 21-027(c) and that the site did not pose an unacceptable human health risk under the industrial, construction worker, or residential scenarios and did not pose an unacceptable risk to ecological receptors. The conclusion in the Phase II investigation report regarding lateral extent of lead contamination relied on results from samples collected from Reach LA-2W in Los Alamos Canyon downgradient of the site. The Phase II investigation report was not approved by the New Mexico Environment Department (NMED); the only deficiency NMED identified for SWMU 21-027(c) was the use of data from Reach LA-2W to define lateral extent of lead (NMED 2010, 110959).

In January 2012, after completion of the Phase II investigation, NMED and the U.S. Department of Energy (DOE) entered into a framework agreement for realignment of environmental priorities at Los Alamos National Laboratory (LANL the Laboratory). Under the framework agreement, NMED and DOE agreed to review characterization efforts undertaken to date pursuant to the Compliance Order on Consent to identify those sites where the nature and extent of contamination have been adequately characterized. The framework agreement also stipulated the use of U.S. Environmental Protection Agency (EPA) guidance in this process, except in cases where EPA guidance was not supported by sound science. Pursuant to the framework agreement, the Laboratory reviewed its data evaluation process with respect to EPA guidance and the framework agreement principles and concluded that this process could be revised to complete site characterization more efficiently, while providing full protection of human health and the environment. Specifically, the process for evaluating data to define extent of contamination was revised to provide a greater emphasis on risk/dose reduction, consistent with EPA guidance. Data on spatial distribution of lead at SWMU 21-027(c) were re-evaluated using this process to determine whether additional sampling for lead is warranted.

A total of 39 samples (36 soil and 3 tuff) were collected from 18 locations at SWMU 21-027(c) and analyzed for target analyte list metals. Table 1 presents the results of lead detected above background values (BVs) at SWMU 21-027(c). The locations and analytical results of inorganic chemicals detected above BVs are shown in Figure 1 (Figure 6.24-1 of the Phase II investigation report). Lead was detected above the soil and Qbt 2,3,4 BVs (22.3 mg/kg and 11.2 mg/kg, respectively) in 14 soil samples and 3 tuff samples with a maximum concentration of 120 mg/kg. Concentrations did not change substantially with depth at locations 21-27402 and 21-27414 (4.8 mg/kg and 1 mg/kg, respectively) and decreased with depth at all other locations. Concentrations increased laterally to the south (downgradient) at locations 21-27412 and 21-605234, where the maximum concentration was detected.

The residential soil screening level (SSL) is approximately 3.3 times the maximum concentration, the industrial and construction worker SSLs are approximately 6.7 times the maximum concentration, and the recreational SSL is approximately 9.2 times the maximum concentration. Locations 21-27412 and 21-605234 are at the edge of a cliff and collection of samples further to the south (downgradient) was not possible. Lead was not detected above BV in samples collected at locations 21-27408 (36 ft north of location 21-27412), 21-27409 (33 ft north of location 21-605234), 21-27411 (38 ft west of location 21-27412), and 21-27417 (10 ft east of location 21-605234). Thus, the area of elevated lead concentrations is bounded and limited. Although lead contamination to the south of locations 21-27412 and 21-605234 has not been characterized, the potential for exposure to contamination in this area is very low given the steep topography. Therefore, the existing sample locations from the Phase I and Phase II locations are sufficient to characterize the accessible portion of the site. The Phase II investigation report (LANL 2010, 110772.33) demonstrates no unacceptable human-health risk from lead

for the industrial, construction worker, and residential scenarios with hazard quotients of 0.06, 0.05, and 0.1, respectively (Phase II investigation report, Appendix H, Tables H-4.2-196, H-4.2-199, and H-4.2-202), and no unacceptable risk to ecological receptors (Phase II investigation report, Appendix H, Tables H-5.4-60 and H-5.4-88). Because the site risk from lead contamination is low, further sampling is unlikely to change the conclusion that lead does not pose an unacceptable risk. Further sampling for extent of lead, therefore, is not warranted.

The Phase II investigation report concluded that there was no unacceptable human health risk under the industrial, construction worker, and residential scenarios and no unacceptable risk to ecological receptors. As demonstrated above, additional sampling is not warranted. Therefore, the conclusions of the Phase II investigation report regarding human health and ecological risk remain valid.

References

LANL (Los Alamos National Laboratory), September 22, 1998. "Inorganic and Radionuclide Background Data for Soils, Canyon Sediments, and Bandelier Tuff at Los Alamos National Laboratory," Los Alamos National Laboratory document LA-UR-98-4847, Los Alamos, New Mexico. (LANL 1998, 059730)

LANL (Los Alamos National Laboratory), October 2010. "Phase II Investigation Report for Delta Prime Site Aggregate Area at Technical Area 21, Revision 1," Los Alamos National Laboratory document LA-UR-10-6478, Los Alamos, New Mexico. (LANL 2010, 110772.33)

LANL (Los Alamos National Laboratory), September 2017. "Technical Approach for Calculating Recreational Soil Screening Levels for Chemicals, Revision 5," Los Alamos National Laboratory document LA-UR-17-27660, Los Alamos, New Mexico. (LANL 2017, 602581)

NMED (New Mexico Environment Department), October 19, 2010. "Direction to Modify Phase II Investigation Report for Delta Prime Site Aggregate Area, Technical Area 21, Revision 1," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 110959)

NMED (New Mexico Environment Department), March 2017. "Risk Assessment Guidance for Site Investigations and Remediation, Volume 1, Soil Screening Guidance for Human Health Risk Assessments," Hazardous Waste Bureau and Ground Water Quality Bureau, Santa Fe, New Mexico. (NMED 2017, 602273)

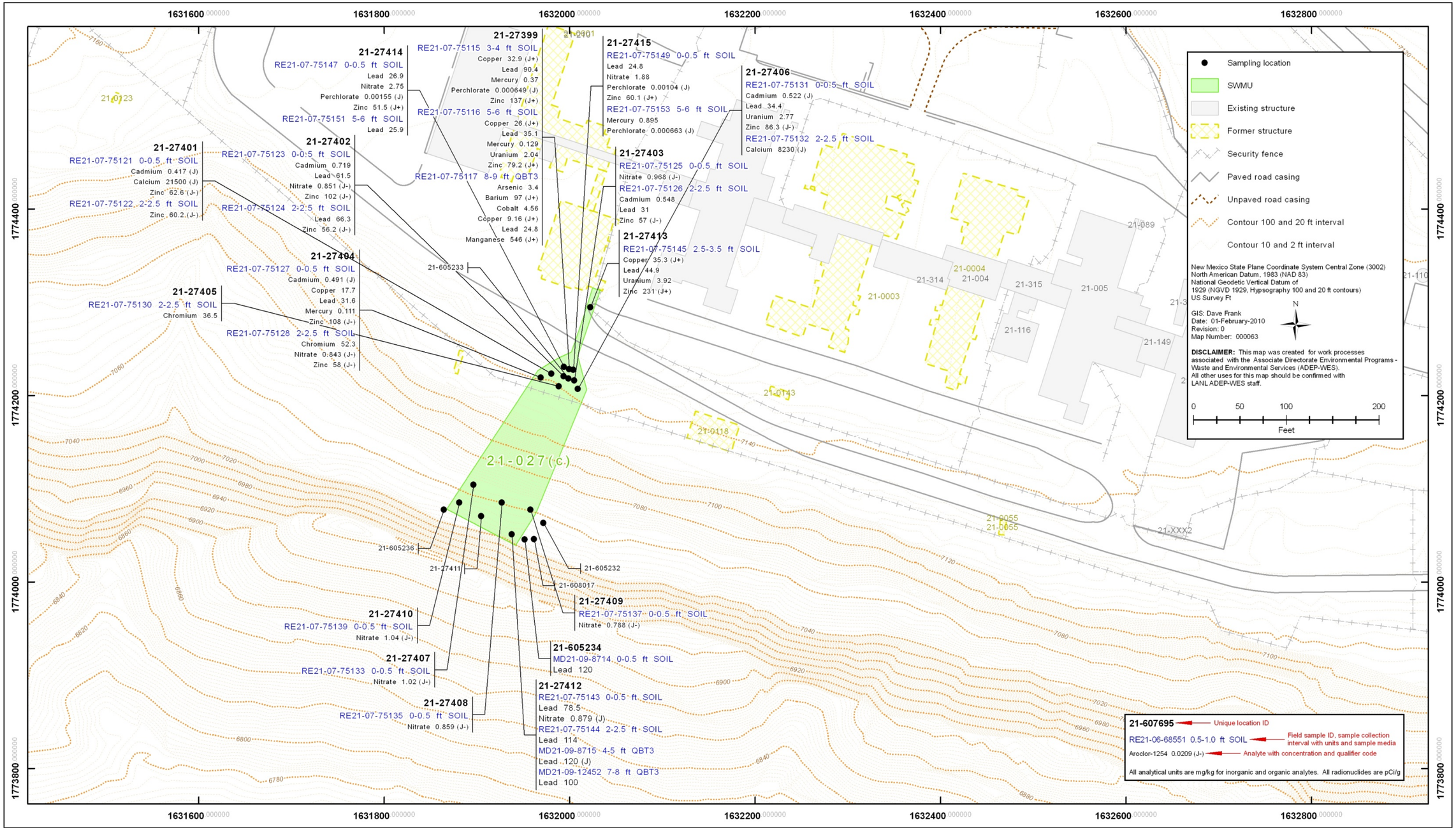

Figure 1 **Inorganic chemicals detected or detected above BVs at SWMU 21-027(c)**

Table 1
Concentrations of Lead above BVs at SWMU 21-027(c)

Sample ID	Location ID	Depth (ft)	Media	Lead
Qbt 2,3,4 BV[a]				**11.2**
Soil BV[a]				**22.3**
Recreational SSL[b]				**1110**
Construction Worker SSL[c]				**800**
Industrial SSL[c]				**800**
Residential SSL[c]				**400**
RE21-07-75115	21-27399	3.0–4.0	SOIL	90.4
RE21-07-75116	21-27399	5.0–6.0	SOIL	35.1
RE21-07-75117	21-27399	8.0–9.0	QBT3	24.8
RE21-07-75123	21-27402	0.0–0.5	SOIL	61.5
RE21-07-75124	21-27402	2.0–2.5	SOIL	66.3
RE21-07-75126	21-27403	2.0–2.5	SOIL	31
RE21-07-75127	21-27404	0.0–0.5	SOIL	31.6
RE21-07-75131	21-27406	0.0–0.5	SOIL	34.4
RE21-07-75143	21-27412	0.0–0.5	SOIL	78.5
RE21-07-75144	21-27412	2.0–2.5	SOIL	114
MD21-09-8715	21-27412	4.0–5.0	QBT3	120 (J)
MD21-09-12452	21-27412	7.0–8.0	QBT3	100
RE21-07-75145	21-27413	2.5–3.5	SOIL	44.9
RE21-07-75147	21-27414	0.0–0.5	SOIL	26.9
RE21-07-75151	21-27414	5.0–6.0	SOIL	25.9
RE21-07-75149	21-27415	0.0–0.5	SOIL	24.8
MD21-09-8714	21-605234	0.0–0.5	SOIL	120

Notes: Results are in mg/kg.

[a] BVs are from LANL (1998, 059730).

[b] SSLs are from LANL (2017, 602581).

[c] SSLs are from NMED (2017, 602273).

ENCLOSURE 2
Evaluation of Data for Solid Waste Management Unit 21-027(d)

The June 18, 2015, request for certificate of completion for Solid Waste Management Unit (SWMU) 21-027(d) (LANL 2015, 600502) evaluated nature and extent of contamination and potential risk using data collected from the investigation of SWMU 21-023(c) that were within the footprint of SWMU 21-027(d). Results for the investigation of SWMU 21-023(c) were presented in the 2007 investigation report for Material Disposal Area (MDA) V (LANL 2007, 098942). The New Mexico Environment Department (NMED) denial of the certificate of completion request (NMED 2016, 601146) noted that the data presented in the request did not include samples from the upper part of the SWMU 21-027(d) drainage and did not demonstrate that the nature and extent of contamination is defined for all of SWMU 21-027(d) and that the site does not pose an unacceptable threat to human health and the environment.

The U.S. Department of Energy (DOE) and Newport News Nuclear BWXT – Los Alamos, LLC (N3B) reviewed historical information related to the site to better define the location of the SWMU 21-027(d) outfall and identified existing sample locations appropriate for characterization of the site. Figure 1 shows the locations of the SWMU 21-023(c) and SWMU 21-027(d) outfalls as well as locations for samples collected during the 1992 Resource Conservation and Recovery Act Facility Investigation (RFI) for SWMU 21-027(d), the 1999 voluntary corrective measure for SWMU 21-027(d), the 1992–1993 RFI for SWMU 21-023(c), and the 2005–2006 investigation for SWMU 21-023(c). Sample locations near and downgradient of the SWMU 21-027(d) outfall were selected to evaluate nature and extent of contamination and risk. These sample locations include locations 21-01329 through 21-01334, 21-11098 through 21-11104, 21-24578, 21-25414 through 21-25423, and 21-25622 through 21-25625. The samples collected at these locations and the analyses requested are presented in Table 1. Data from these samples were evaluated to identify chemicals of potential concern (COPCs), nature and extent of COPCs, and potential human health risk for the residential scenario.

Identification of COPCs

Inorganic Chemicals

A total of 36 samples (30 soil and 6 sediment) were analyzed for target analyte list (TAL) metals, 30 soil samples were analyzed for nitrate and total cyanide, and 22 soil samples were analyzed for perchlorate. Table 2 presents the inorganic chemicals detected or detected above background values (BVs).

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 1.34 mg/kg and was not detected above the sediment BV (0.83 mg/kg) but had detection limits (DLs) (4.8 mg/kg to 5.2 mg/kg) above the BV in six samples. Antimony is retained as a COPC.

Cadmium was detected above the soil and sediment BVs (0.4 mg/kg for both) in 2 soil samples and 6 sediment samples with a maximum concentration of 1.4 mg/kg and was not detected above the soil BV but had DLs (0.504 mg/kg to 0.578 mg/kg) above the BV in 20 samples. Cadmium is retained as a COPC.

Chromium was detected above the soil BV (19.3 mg/kg) in 1 sample at a concentration of 21.7 mg/kg. The concentration was only 2.4 mg/kg above the BV and was equivalent to or below the 3 highest concentrations in the soil background data set (21 mg/kg, 26 mg/kg, and 36.5 mg/kg). Chromium was detected below BV in 35 other samples. Chromium is not a COPC.

Cobalt was detected above the sediment BV (4.73 mg/kg) in two samples with a maximum concentration of 5.7 mg/kg. Cobalt is retained as a COPC.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 22.6 mg/kg. The concentration is greater than the maximum concentration in the soil background data set (16 mg/kg). Copper is retained as a COPC.

Cyanide was detected above the soil BV (0.5 mg/kg) in one sample at a concentration of 5.78 mg/kg. Cyanide is retained as a COPC.

Lead was detected above the soil and sediment BVs (22.3 mg/kg and 19.7 mg/kg) in three soil samples and two sediment samples with a maximum concentration of 39.1 mg/kg. Lead is retained as a COPC.

Mercury was detected above the soil BV (0.1 mg/kg) in eight samples with a maximum concentration of 0.765 mg/kg. Mercury is retained as a COPC.

Nitrate was detected in 24 samples with a maximum concentration of 3.17 mg/kg. Nitrate is naturally occurring, and the concentrations likely reflect naturally occurring levels. In addition, SWMU 21-027(d) was part of a secondary containment system for a fuel storage tank and is not a source of nitrate. Nitrate is not a COPC.

Perchlorate was detected in nine samples with a maximum concentration of 0.00491 mg/kg. Perchlorate is retained as a COPC.

Selenium was not detected above the soil and sediment BVs (1.52 mg/kg and 0.3 mg/kg) but had DLs (0.32 mg/kg to 1.84 mg/kg) above the BVs in 28 soil samples and 6 sediment samples. Selenium is retained as a COPC.

Silver was detected above the soil BV (1 mg/kg) in five samples with a maximum concentration of 24.5 mg/kg. Silver is retained as a COPC.

Thallium was not detected above the soil BV (0.73 mg/kg) but had a DL (1.04 mg/kg) above the BV in 1 sample. The DL was only 0.31 mg/kg above the BV, was similar to the 2 highest concentrations in the thallium background data set (0.9 mg/kg and 1 mg/kg), and was similar to the 15 highest DLs in the background data set (all 1 mg/kg). Thallium was not detected or detected above BV in 35 other samples (detected below BV in 18 samples). Thallium is not a COPC.

Zinc was detected above the soil BV (48.8 mg/kg) in five samples with a maximum concentration of 105 mg/kg. Zinc is retained as a COPC.

Organic Chemicals

A total of 36 samples (30 soil and 6 sediment) were analyzed semivolatile organic compounds (SVOCs), 6 sediment samples were analyzed for volatile organic compounds (VOCs), 8 soil samples were analyzed for polychlorinated biphenyls (PCBs), and 7 sediment samples were analyzed for total petroleum hydrocarbons-diesel range organics (TPH-DRO). Table 3 presents the detected organic chemicals.

Organic chemicals detected at SWMU 21-027(d) include anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, 2-methylnaphthalene, naphthalene, pentachlorophenol, phenanthrene, pyrene, and TPH-DRO. Detected organic chemicals are retained as COPCs.

Radionuclides

A total of 43 samples (30 soil and 13 sediment) were analyzed for americium-241 and isotopic plutonium, 36 samples (30 soil and 6 sediment) were analyzed for strontium-90 and tritium, and 30 soil samples were analyzed for gamma-emitting radionuclides and isotopic uranium. Table 4 presents the radionuclides detected or detected above BVs/fallout values (FVs).

Americium-241 was detected above the soil and sediment FVs (0.013 pCi/g and 0.04 pCi/g) in nine soil and seven sediment samples and was detected below 1 ft below ground surface (bgs) in eight soil samples with a maximum activity of 11.2 pCi/g. Americium-241 is retained as a COPC.

Cesium-137 was detected below 1 ft bgs in seven soil samples with a maximum activity of 0.419 pCi/g. Cesium-137 is retained as a COPC.

Plutonium-238 was detected above the soil and sediment FVs (0.023 pCi/g and 0.006 pCi/g) in two soil and four sediment samples and was detected below 1 ft bgs in one soil sample with a maximum activity of 0.303 pCi/g. Plutonium-238 is retained as a COPC.

Plutonium-239/240 was detected above the soil and sediment FVs (0.054 pCi/g and 0.068 pCi/g) in 14 soil and 13 sediment samples and was detected below 1 ft bgs in 13 soil samples with a maximum activity of 8.59 pCi/g. Plutonium-239/240 is retained as a COPC.

Tritium was detected in 22 samples with a maximum activity of 0.4 pCi/g. Tritium is retained as a COPC.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in three samples with a maximum activity of 6.51 pCi/g. Uranium-234 is retained as a COPC.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in two samples with a maximum activity of 0.32 pCi/g. Uranium-235/236 is retained as a COPC.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in three samples with a maximum activity of 5.67 pCi/g. Uranium-238 is retained as a COPC.

Nature and Extent of Contamination

Inorganic Chemicals

Inorganic COPCs at SWMU 21-027(d) include antimony, cadmium, cobalt, copper, cyanide, lead, mercury, perchlorate, selenium, silver, and zinc.

Antimony was detected above the soil BV in one sample at a concentration of 1.34 mg/kg and was not detected above the sediment BV but had DLs (4.8 mg/kg to 5.2 mg/kg) above the BV in six samples. Concentrations decreased with depth at location 21-25416 and decreased downgradient. The residential SSL was approximately 6 times the maximum DL and the industrial SSL was approximately 100 times the maximum DL. Further sampling for extent of antimony is not warranted.

Cadmium was detected above the soil and sediment BVs in 2 soil samples and 6 sediment samples with a maximum concentration of 1.4 mg/kg, and was not detected above the soil BV but had DLs (0.504 mg/kg to 0.578 mg/kg) above the BV in 20 samples. Only one depth was sampled at locations 21-01329, 21-01330, 21-01331, 21-01332, 21-01333, and 21-01334; concentrations decreased with depth at location 21-25623; and concentrations decreased downgradient. The residential SSL was

approximately 50 times the maximum concentration and 122 times the maximum DL. Further sampling for extent of cadmium is not warranted.

Cobalt was detected above the sediment BV in two samples with a maximum concentration of 5.7 mg/kg. Only one depth was sampled at locations 21-01329 and 21-01331 and concentrations decreased downgradient. The residential SSL was approximately 4 times the maximum concentration and the industrial SSL was approximately 68 times the maximum concentration. Lateral extent of cobalt is defined and further sampling for vertical extent is not warranted.

Copper was detected above the soil BV in one sample at a concentration of 22.6 mg/kg. Concentrations decreased with depth and decreased laterally. The lateral and vertical extent of copper are defined.

Cyanide was detected above the soil BV in one sample at a concentration of 5.78 mg/kg. Concentrations increased with depth at location 21-25624 and decreased laterally. The residential SSL was approximately 2 times the maximum concentration and the industrial SSL was approximately 11 times the maximum concentration. Lateral extent of cyanide is defined and further sampling for vertical extent is not warranted.

Lead was detected above the soil and sediment BVs in three soil samples and two sediment samples with a maximum concentration of 39.1 mg/kg. Concentrations increased with depth at location 21-25622, only one depth was sampled at locations 21-01331 and 21-01333, concentrations decreased with depth at locations 21-25623 and 21-25624, and concentrations decreased downgradient. The residential SSL was approximately 10 times the maximum concentration and the industrial SSL was approximately 20 times the maximum concentration. Lateral extent of lead is defined and further sampling for vertical extent is not warranted.

Mercury was detected above the soil BV in eight samples with a maximum concentration of 0.765 mg/kg. Concentrations increased with depth at locations 21-25418, 21-25624, and 21-25625; decreased with depth at all other locations, and decreased downgradient. The residential SSL was approximately 31 times the maximum concentration. Lateral extent of mercury is defined and further sampling for vertical extent is not warranted.

Perchlorate was detected in nine samples with a maximum concentration of 0.00491 mg/kg. Concentrations increased with depth at locations 21-25419 and 21-25423, decreased with depth at all other locations, and decreased downgradient. The residential SSL was approximately 11,000 times the maximum concentration. Lateral extent of perchlorate is defined and further sampling for vertical extent is not warranted.

Selenium was not detected above the soil and sediment BVs but had DLs (0.32 mg/kg to 1.84 mg/kg) above the BVs in 28 soil samples and 6 sediment samples. The residential SSL was approximately 212 times the maximum DL. Further sampling for extent of selenium is not warranted.

Silver was detected above the soil BV in five samples with a maximum concentration of 24.5 mg/kg. Concentrations increased with depth at locations 21-25624 and 21-25625, decreased with depth at location 21-25623, and decreased downgradient. The residential SSL was approximately 16 times the maximum concentration. Lateral extent of silver is defined and further sampling for vertical extent is not warranted.

Zinc was detected above the soil BV in five samples with a maximum concentration of 105 mg/kg. Concentrations increased with depth at location 21-25625, decreased with depth at locations 21-25623 and 21-25624, and decreased downgradient. The residential SSL was approximately 224 times the maximum concentration. Lateral extent of zinc is defined and further sampling for vertical extent is not warranted.

Organic Chemicals

Organic COPCs at SWMU 21-027(d) include anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, 2-methylnaphthalene, naphthalene, pentachlorophenol, phenanthrene, pyrene, and TPH-DRO.

Anthracene was detected in one sample at a concentration of 0.00918 mg/kg. Concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of anthracene are defined.

Aroclor-1242 was detected in one sample at a concentration of 0.0065 mg/kg. Concentrations increased with depth at location 21-25623 and decreased downgradient. The residential SSL was approximately 374 times the maximum concentration. The lateral extent of Aroclor-1242 is defined and further sampling for vertical extent is not warranted.

Aroclor-1254 was detected in three samples with a maximum concentration of 0.0033 mg/kg. Concentrations increased with depth at location 21-25625, did not change substantially with depth (0.0008 mg/kg) at location 21-25622, decreased with depth at location 21-25623, and increased downgradient. The residential SSL was approximately 345 times the maximum concentration. Further sampling for extent of Aroclor-1254 is not warranted.

Aroclor-1260 was detected in six samples with a maximum concentration of 0.0281 mg/kg. Concentrations increased with depth at location 21-25624, did not change substantially with depth (0.0001 mg/kg) at location 21-25622, decreased with depth at location 21-25623, and decreased downgradient. The residential SSL was approximately 86 times the maximum concentration. Lateral extent of Aroclor-1260 is defined and further sampling for vertical extent is not warranted.

Benzo(a)pyrene was detected in one sample at a concentration of 0.0339 mg/kg. Concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene are defined.

Benzo(b)fluoranthene was detected in four samples with a maximum concentration of 0.0234 mg/kg. Concentrations increased with depth at locations 21-25418 and 21-25419, decreased with depth at location 21-25415, and decreased downgradient. The residential SSL was approximately 65 times the maximum concentration. Lateral extent of benzo(b)fluoranthene is defined and further sampling for vertical extent is not warranted.

Benzoic acid was detected in one sample at a concentration of 0.0659 mg/kg. Concentrations increased with depth at location 21-25625 and increased downgradient. The residential SSL was approximately 3,790,000 times the detected concentration. Further sampling for extent of benzoic acid is not warranted.

Bis(2-ethylhexyl)phthalate was detected in two samples with a maximum concentration of 0.0921 mg/kg. Concentrations increased with depth at location 21-25420, decreased with depth at location 21-25422, and decreased downgradient. The residential SSL was approximately 4120 times the maximum concentration. Lateral extent of bis(2-ethylhexyl)phthalate is defined and further sampling for vertical extent is not warranted.

Chrysene was detected in three samples with a maximum concentration of 0.0189 mg/kg. Concentrations increased with depth at locations 21-25418 and 21-25419, decreased with depth at location 21-25415, and decreased downgradient. The residential SSL was approximately 8100 times the maximum concentration. Lateral extent of chrysene is defined and further sampling for vertical extent is not warranted.

Fluoranthene was detected in 11 samples with a maximum concentration of 0.27 mg/kg. Concentrations increased with depth at location 21-25419; did not change substantially with depth (0.001 mg/kg to 0.035 mg/kg) at locations 21-25622, 21-25624, and 21-25625; decreased with depth at all other locations, and increased downgradient. The residential SSL was approximately 8600 times the maximum concentration. Further sampling for extent of fluoranthene is not warranted.

Methylnaphthalene[2-] was detected in two samples with a maximum concentration of 0.0495 mg/kg. Concentrations increased with depth at location 21-25624, decreased with depth at location 21-25623, and decreased downgradient. The residential SSL was approximately 4690 times the maximum concentration. Lateral extent of 2-methylnaphthalene is defined and further sampling for vertical extent is not warranted.

Naphthalene was detected in two samples with a maximum concentration of 0.0237 mg/kg. Concentrations increased with depth at location 21-25624, decreased with depth at location 21-25623, and decreased downgradient. The residential SSL was approximately 49,000 times the maximum concentration. Lateral extent of naphthalene is defined and further sampling for vertical extent is not warranted.

Pentachlorophenol was detected in one sample at a concentration of 0.212 mg/kg. Concentrations increased with depth at location 21-25416 and decreased downgradient. The residential SSL was approximately 46 times the detected concentration. Lateral extent of pentachlorophenol is defined and further sampling for vertical extent is not warranted.

Phenanthrene was detected in three samples with a maximum concentration of 0.0175 mg/kg. Concentrations increased with depth at location 21-25625, decreased with depth at locations 21-25622 and 21-25623, and decreased downgradient. The residential SSL was approximately 99,000 times the maximum concentration. Lateral extent of phenanthrene is defined and further sampling for vertical extent is not warranted.

Pyrene was detected in nine samples with a maximum concentration of 0.0253 mg/kg. Concentrations increased with depth at locations 21-25418 and 21-25419, did not change substantially with depth (0.0004 mg/kg) at location 21-25625, decreased with depth at all other locations, and decreased downgradient. The residential SSL was approximately 69,000 times the maximum concentration. Lateral extent of pyrene is defined and further sampling for vertical extent is not warranted.

TPH-DRO was detected in one sample at a concentration of 19 mg/kg. Only one depth was sampled at location 21-11100 and concentrations decreased downgradient. The residential SSL was approximately 53 times the detected concentration. Lateral extent of TPH-DRO is defined and further sampling for vertical extent is not warranted.

Radionuclides

Radionuclide COPCs at SWMU 21-027(d) include americium-241, cesium-137, plutonium-238, plutonium-239/240, tritium, uranium-234, uranium-235/236, and uranium-238.

Americium-241 was detected above the soil and sediment FVs in nine soil and seven sediment samples and was detected below 1 ft bgs in eight soil samples with a maximum activity of 11.2 pCi/g. Activities increased with depth at location 21-25418, only one depth was sampled at locations 21-01329 through 21-01334 and 21-11103, activities decreased with depth at all other locations, and activities decreased downgradient. The residential screening action level (SAL) was approximately 7 times the maximum activity and the industrial SAL was approximately 89 times the maximum activity. Lateral extent of americium-241 is defined and further sampling for vertical extent is not warranted.

Cesium-137 was detected below 1 ft bgs in seven soil samples with a maximum activity of 0.419 pCi/g. Activities increased with depth at locations 21-25418, 21-25419, and 21-25625; decreased with depth at locations 21-25415, 21-25622, 21-25623, and 21-25624; and decreased downgradient (the activities in surface samples at locations 21-25415, 21-25622, 21-25623, and 21-25624 were 0.27 pCi/g, 0.301 pCi/g, 0.461 pCi/g, and 0.435 pCi/g, respectively, and below the soil FV). The residential SAL was approximately 29 times the maximum activity. Lateral extent of cesium-137 is defined and further sampling for vertical extent is not warranted.

Plutonium-238 was detected above the soil and sediment FVs in two soil and four sediment samples and was detected below 1 ft bgs in one soil sample with a maximum activity of 0.303 pCi/g. Activities increased with depth at location 21-25418; only one depth was sampled at locations 21-01329, 21-01331, 21-01332, and 21-01333; activities decreased with depth at locations 21-25414 and 21-25622, and activities decreased downgradient. The residential SAL was approximately 277 times the maximum activity. Lateral extent of plutonium-238 is defined and further sampling for vertical extent is not warranted.

Plutonium-239/240 was detected above the soil and sediment FVs in 14 soil and 13 sediment samples and was detected below 1 ft bgs in 13 soil samples with a maximum activity of 8.59 pCi/g. Activities increased with depth at locations 21-25414, 21-25415, and 21-25418; only one depth was sampled at locations 21-01329 through 21-01334 and 21-11098 through 21-11104; activities did not change substantially with depth (0.002 pCi/g) at location 21-25625; activities decreased with depth at all other locations, and activities decreased downgradient. The residential SAL was approximately 9 times the maximum activity and the industrial SAL was approximately 140 times the maximum activity. Lateral extent of plutonium-239/240 is defined and further sampling for vertical extent is not warranted.

Tritium was detected in 22 samples with a maximum activity of 0.4 pCi/g. Activities increased with depth at locations 21-24578, 21-25419, and 21-25622; only one depth was sampled at locations 21-01329 through 21-01334; activities did not change substantially with depth (0.002 pCi/g) at location 21-25423; activities decreased with depth at all other locations, and activities decreased downgradient. The residential SAL was approximately 4250 times the maximum activity. Lateral extent of tritium is defined and further sampling for vertical extent is not warranted.

Uranium-234 was detected above the soil BV in three samples with a maximum activity of 6.51 pCi/g. Activities decreased with depth at locations 21-25623 and 21-25624 and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the soil BV in two samples with a maximum activity of 0.32 pCi/g. Activities decreased with depth at location 21-25623 and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Uranium-238 was detected above the soil BV in three samples with a maximum activity of 5.67 pCi/g. Activities decreased with depth at locations 21-25623 and 21-25624 and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The lateral and vertical extent of inorganic, organic, and radionuclide COPCs is defined or no further sampling for extent is warranted at SWMU 21-027(d).

Risk Screening Evaluation

Human health risk for the residential scenario was screened using the maximum detected concentration of each COPC as the exposure point concentration (EPC). Although the current land use is industrial, the residential scenario was evaluated to determine whether the site could be recommended for corrective action complete without controls. The residential SSLs are less than construction worker SSLs for all COPCs, so the acceptable risk under the residential scenario also demonstrates protection of construction workers. Use of the maximum concentration as the EPC is also more conservative than using the upper confidence limit of the mean concentration as the EPC.

Risk screening results for carcinogenic, noncarcinogenic, and radionuclide COPCs and TPH-DRO are presented in Tables 5 through 8, respectively. The total excess cancer risk for the residential scenario is 8×10^{-7}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2017, 602273). The residential hazard index (HI) is 1, which is equivalent to the NMED target HI of 1 (NMED 2017, 602273). The total dose is 9 mrem/yr, which is less than the target dose of 25 mrem/yr as authorized by DOE Order 458.1. The HI for TPH-DRO for the residential scenario is 0.02, which is less than the NMED target HI of 1 (NMED 2017, 602273).

The MDA V investigation report included a human health screening evaluation of the indoor air pathway for pore gas vapor intrusion and an ecological risk screening assessment (LANL 2007, 098942, Appendix H). Both of these evaluations were conducted for Consolidated Unit 21-018(a)-99 as a whole rather than for the individual SWMUs and AOC composing the consolidated unit. Because SWMU 21-027(d) lies within the consolidated unit investigation footprint associated with the data used in these evaluations, the results of these evaluations should also be applicable to SWMU 21-027(d). The MDA V investigation report concluded Consolidated Unit 21-018(a)-99 poses no unacceptable risk from vapor intrusion (LANL 2007, 098942, p. H-17) and poses no potential risk to ecological receptors (LANL 2007, 098942, p. H-32). These same conclusions are applicable to SWMU 21-027(d).

Summary of Human Health and Ecological Risk Screening Assessments

SWMU 21-027(d) does not present an unacceptable risk to human health under the residential and construction worker scenarios and does not present an unacceptable risk to ecological receptors.

References

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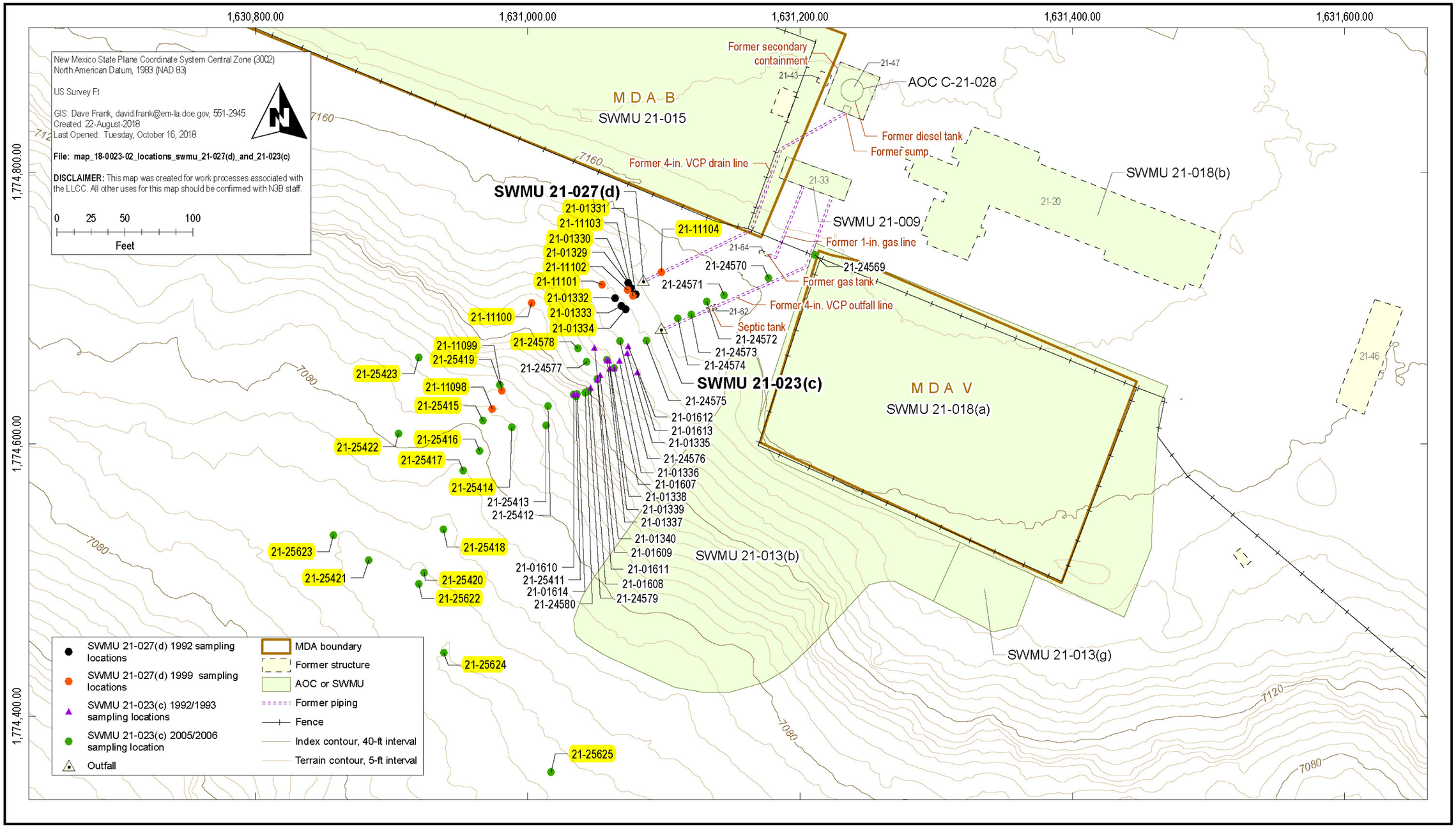

Figure 1 **Sampling locations (yellow) used for SWMU 21-027(d)**

Table 1
Samples Collected and Analyses Requested for SWMU 21-027(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Nitrate	Gamma-Emitting Radionuclides	Tritium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Perchlorate	Strontium-90	VOCs	SVOCs	Cyanide (Total)	TPH-DRO
AAA0615	21-01329	0–0.5	Sediment	13099[a]	—[b]	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
AAA0616	21-01330	0–0.5	Sediment	13099	—	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
AAA0617	21-01331	0–0.5	Sediment	13099	—	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
AAA0619	21-01332	0–0.5	Sediment	13099	—	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
AAA0620	21-01333	0–0.5	Sediment	13099	—	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
AAA0621	21-01334	0–0.5	Sediment	13099	—	—	13099-1	13099	—	13101	—	—	13099	13101	13101	—	—
MD21-99-0210	21-11098	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0211	21-11099	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0212	21-11100	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0213	21-11101	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0214	21-11102	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0215	21-11103	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-99-0216	21-11104	0–0.3	Sediment	6204R	—	—	—	6204R	—	—	—	—	—	—	—	—	6203R
MD21-05-60011	21-24578	0.0–0.5	Soil	4169S	4168S	4169S	4169S	4169S	4169S	4168S	—	4168S	4169S	—	4167S	4168S	—
MD21-05-60012	21-24578	1.5–2.0	Soil	4169S	4168S	4169S	4169S	4169S	4169S	4168S	—	4168S	4169S	—	4167S	4168S	—
MD21-06-66264	21-25414	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66265	21-25414	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66267	21-25415	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66268	21-25415	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66270	21-25416	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66271	21-25416	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66273	21-25417	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66274	21-25417	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66276	21-25418	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66277	21-25418	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66280	21-25419	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66279	21-25419	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66282	21-25420	0–0.5	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66283	21-25420	1.5–2	Soil	4187S	4186S	4187S	4187S	4187S	4187S	4186S	—	4186S	4187S	—	4187S	4186S	—
MD21-06-66285	21-25421	0–0.5	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—
MD21-06-66286	21-25421	1.5–2	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—

Table 1 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Nitrate	Gamma-Emitting Radionuclides	Tritium	Isotopic Plutonium	Isotopic Uranium	TAL Metals	PCBs	Perchlorate	Strontium-90	VOCs	SVOCs	Cyanide (Total)	TPH-DRO
MD21-06-66288	21-25422	0–0.5	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—
MD21-06-66289	21-25422	1.5–2	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—
MD21-06-66291	21-25423	0–0.5	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—
MD21-06-66292	21-25423	1.5–2	Soil	4547S	4547S	4547S	4547S	4547S	4547S	4547S	—	4547S	4547S	—	4547S	4547S	—
MD21-06-68044	21-25622	0–0.5	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68045	21-25622	1.5–2	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68046	21-25623	0–0.5	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68047	21-25623	1.5–2	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68048	21-25624	0–0.5	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68049	21-25624	1.5–2	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68050	21-25625	0–0.5	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—
MD21-06-68051	21-25625	1.5–2	Soil	4942S	4941S	4942S	4942S	4942S	4942S	4941S	4940S	—	4942S	—	4940S	4941S	—

[a] Analytical request number.

[b] — = Analysis not requested.

Table 2
Inorganic Chemicals above BVs at SWMU 21-027(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Cobalt	Copper	Cyanide	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Sediment BV[a]				**0.83**	**0.4**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**0.1**	**na[b]**	**na**	**0.3**	**1**	**0.73**	**60.2**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Construction Worker SSL[c]				**142**	**72.1**	**134[d]**	**36.7**	**14,200**	**12**	**800**	**77.1**	**566,000**	**248**	**1750**	**1770**	**3.54**	**106,000**
Industrial SSL[c]				**519**	**1110**	**505[d]**	**388**	**51,900**	**62.8**	**800**	**389**	**2,080,000**	**908**	**6490**	**6490**	**13**	**389,000**
Residential SSL[c]				**31.3**	**70.5**	**96.6[d]**	**23.4**	**3130**	**11.1**	**400**	**23.5**	**125,000**	**54.8**	**391**	**391**	**0.782**	**23,500**
AAA0615	21-01329	0–0.5	Sediment	4.9 (U)	1.2	—[e]	5.4	—	—	—	—	—	—	0.32 (U)	—	—	—
AAA0616	21-01330	0–0.5	Sediment	4.8 (U)	1.4	—	—	—	—	—	—	—	—	0.32 (U)	—	—	—
AAA0617	21-01331	0–0.5	Sediment	5.2 (U)	1.4	—	5.7	—	—	21.1	—	—	—	0.34 (U)	—	—	—
AAA0619	21-01332	0–0.5	Sediment	5.1 (U)	1	—	—	—	—	—	—	—	—	0.33 (U)	—	—	—
AAA0620	21-01333	0–0.5	Sediment	5.2 (U)	0.89	—	—	—	—	23.7	—	—	—	0.34 (U)	—	—	—
AAA0621	21-01334	0–0.5	Sediment	5.2 (U)	0.69	—	—	—	—	—	—	—	—	0.34 (U)	—	—	—
MD21-05-60011	21-24578	0.0–0.5	Soil	—	—	—	—	—	—	—	—	0.528 (J)	0.00491	1.74 (U)	—	—	—
MD21-05-60012	21-24578	1.5–2.0	Soil	—	0.533 (U)	—	—	—	—	—	—	—	0.00408	1.6 (U)	—	—	—
MD21-06-66264	21-25414	0–0.5	Soil	—	0.514 (U)	—	—	—	—	—	0.103	3.17 (J-)	0.0033	1.54 (U)	—	—	—
MD21-06-66265	21-25414	1.5–2	Soil	—	0.542 (U)	—	—	—	—	—	—	1.39 (J-)	0.00176 (J)	1.63 (U)	—	—	—
MD21-06-66267	21-25415	0–0.5	Soil	—	0.543 (U)	—	—	—	—	—	—	2.19 (J-)	0.00161 (J)	1.63 (U)	—	—	—
MD21-06-66268	21-25415	1.5–2	Soil	—	0.577 (U)	—	—	—	—	—	—	—	—	1.73 (U)	—	—	—
MD21-06-66270	21-25416	0–0.5	Soil	1.34 (J-)	0.527 (U)	—	—	—	—	—	0.127	2.91 (J-)	—	1.58 (U)	—	—	—
MD21-06-66271	21-25416	1.5–2	Soil	—	0.554 (U)	—	—	—	—	—	—	0.972 (J-)	—	1.66 (U)	—	—	—
MD21-06-66273	21-25417	0–0.5	Soil	—	0.578 (U)	—	—	—	—	—	—	—	0.000669 (J)	1.73 (U)	—	—	—
MD21-06-66274	21-25417	1.5–2	Soil	—	0.53 (U)	—	—	—	—	—	—	—	—	1.59 (U)	—	—	—
MD21-06-66276	21-25418	0–0.5	Soil	—	0.505 (U)	—	—	—	—	—	—	2.58 (J-)	—	—	—	—	—
MD21-06-66277	21-25418	1.5–2	Soil	—	0.54 (U)	—	—	—	—	—	0.663	1.27 (J-)	—	1.62 (U)	—	—	—
MD21-06-66280	21-25419	0–0.5	Soil	—	0.555 (U)	—	—	—	—	—	—	0.653 (J-)	0.000593 (J)	1.66 (U)	—	—	—
MD21-06-66279	21-25419	1.5–2	Soil	—	0.532 (U)	—	—	—	—	—	—	1.45 (J-)	0.00159 (J)	1.59 (U)	—	—	—
MD21-06-66282	21-25420	0–0.5	Soil	—	0.504 (U)	—	—	—	—	—	—	1.9 (J-)	—	—	—	—	—
MD21-06-66283	21-25420	1.5–2	Soil	—	0.529 (U)	—	—	—	—	—	—	0.683 (J-)	—	1.59 (U)	—	—	—
MD21-06-66285	21-25421	0–0.5	Soil	—	—	—	—	—	—	—	—	1.44	—	1.67 (U)	—	—	—
MD21-06-66286	21-25421	1.5–2	Soil	—	0.548 (U)	21.7	—	—	—	—	—	1.31	—	1.64 (U)	—	—	—
MD21-06-66288	21-25422	0–0.5	Soil	—	0.516 (U)	—	—	—	—	—	—	1.08	—	1.55 (U)	—	—	—
MD21-06-66289	21-25422	1.5–2	Soil	—	0.524 (U)	—	—	—	—	—	—	—	—	1.57 (U)	—	—	—
MD21-06-66291	21-25423	0–0.5	Soil	—	0.515 (U)	—	—	—	—	—	—	1.26	—	1.54 (U)	—	—	—
MD21-06-66292	21-25423	1.5–2	Soil	—	0.523 (U)	—	—	—	—	—	—	—	0.000841 (J)	1.57 (U)	—	1.04 (U)	—
MD21-06-68044	21-25622	0–0.5	Soil	—	—	—	—	—	—	—	—	1.98	—	1.56 (U)	—	—	—

Table 2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Cobalt	Copper	Cyanide	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Zinc
Sediment BV[a]				**0.83**	**0.4**	**10.5**	**4.73**	**11.2**	**0.82**	**19.7**	**0.1**	**na[b]**	**na**	**0.3**	**1**	**0.73**	**60.2**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1**	**0.73**	**48.8**
Construction Worker SSL[c]				**142**	**72.1**	**134[d]**	**36.7**	**14,200**	**12**	**800**	**77.1**	**566,00**	**248**	**1750**	**1770**	**3.54**	**106,000**
Industrial SSL[c]				**519**	**1110**	**505[d]**	**388**	**51,900**	**62.8**	**800**	**389**	**2,080,000**	**908**	**6490**	**6490**	**13**	**389,000**
Residential SSL[c]				**31.3**	**70.5**	**96.6[d]**	**23.4**	**3130**	**11.1**	**400**	**23.5**	**125,000**	**54.8**	**391**	**391**	**0.782**	**23,500**
MD21-06-68045	21-25622	1.5–2	Soil	—	—	—	—	—	—	24.3	—	1.19	—	1.62 (U)	—	—	—
MD21-06-68046	21-25623	0–0.5	Soil	—	0.846	—	—	22.6	—	39.1	0.765	1.28	—	1.72 (U)	24.5	—	105
MD21-06-68047	21-25623	1.5–2	Soil	—	0.414 (J)	—	—	—	—	—	0.304	0.871 (J)	—	1.62 (U)	10.4	—	54.7
MD21-06-68048	21-25624	0–0.5	Soil	—	—	—	—	—	—	24.3	0.279	1.45	—	1.84 (U)	8.43	—	60.4
MD21-06-68049	21-25624	1.5–2	Soil	—	—	—	—	—	5.78	—	0.429	0.904 (J)	—	1.7 (U)	11.9	—	—
MD21-06-68050	21-25625	0–0.5	Soil	—	—	—	—	—	—	—	—	1.06 (J)	—	1.76 (U)	—	—	52.1
MD21-06-68051	21-25625	1.5–2	Soil	—	—	—	—	—	—	—	0.103	0.98 (J)	—	1.84 (U)	3.08	—	60.9

Notes: Results are in mg/kg.

[a] BVs are from LANL (1998, 059730).

[b] na = Not available.

[c] SSLs are from NMED (2017, 602273). If chemical has both carcinogenic and noncarcinogenic SSLs, the lower of the two is presented.

[d] SSLs are for total chromium.

[e] — = Not detected or not detected above BV.

Table 3
Organic Chemicals Detected at SWMU 21-027(d)

Sample ID	Location ID	Depth (ft)	Media	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzoic acid	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	Methylnaphthalene[2-]	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene	TPH-DRO
Construction Worker SSL[a]				**75,300**	**85.3**	**4.91**	**85.3**	**106**	**240**	**1,310,000[b]**	**5380**	**23,100**	**10,000**	**1000**	**5020**	**34.6**	**7530**	**7530**	**na[c]**
Industrial SSL[a]				**253,000**	**10.9**	**11**	**11.1**	**23.6**	**32.3**	**3,300,000[d]**	**1830**	**3230**	**33,700**	**3370**	**16,800**	**44.5**	**25,300**	**25,300**	**3000[e]**
Residential SSL[a]				**17,400**	**2.43**	**1.14**	**2.43**	**1.12**	**1.53**	**250,000[d]**	**380**	**153**	**2320**	**232**	**1160**	**9.85**	**1740**	**1740**	**1000[e]**
MD21-99-0212	21-11100	0–0.3	Sediment	NA[f]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	19
MD21-06-66267	21-25415	0–0.5	Soil	0.00918 (J)	—[g]	—	—	0.0339 (J)	0.0216 (J)	—	—	0.0138 (J)	0.0189 (J)	—	—	—	—	0.0167 (J)	NA
MD21-06-66271	21-25416	1.5–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.212 (J)	—	—	NA
MD21-06-66273	21-25417	0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.0118 (J)	—	—	—	—	—	NA
MD21-06-66276	21-25418	0–0.5	Soil	—	—	—	—	—	0.0124 (J)	—	—	—	0.0134 (J)	—	—	—	—	0.0116 (J)	NA
MD21-06-66277	21-25418	1.5–2	Soil	—	—	—	—	—	0.0234 (J)	—	—	0.0189 (J)	—	—	—	—	—	0.016 (J)	NA
MD21-06-66279	21-25419	1.5–2	Soil	—	—	—	—	—	0.0222 (J)	—	—	0.0141 (J)	0.0208 (J)	—	—	—	—	0.0228 (J)	NA
MD21-06-66283	21-25420	1.5–2	Soil	—	—	—	—	—	—	—	0.0921 (J)	—	—	—	—	—	—	—	NA
MD21-06-68044	21-25622	0–0.5	Soil	—	—	0.002 (J)	0.0019 (J)	—	—	—	0.0912 (J)	—	0.225 (J)	—	—	—	0.0131 (J)	0.0253 (J)	NA
MD21-06-68045	21-25622	1.5–2	Soil	—	—	0.0028 (J)	0.002 (J)	—	—	—	—	—	0.223 (J)	—	—	—	—	0.0119 (J)	NA
MD21-06-68046	21-25623	0–0.5	Soil	—	—	—	0.0281	—	—	—	—	—	0.236 (J)	0.0495	0.0237 (J)	—	0.0175 (J)	—	NA
MD21-06-68047	21-25623	1.5–2	Soil	—	0.0065	—	0.0073	—	—	—	—	—	—	—	—	—	—	—	NA
MD21-06-68048	21-25624	0–0.5	Soil	—	—	—	0.0044	—	—	—	—	—	0.27 (J)	—	—	—	—	0.0156 (J)	NA
MD21-06-68049	21-25624	1.5–2	Soil	—	—	—	0.0108	—	—	—	—	—	0.235 (J)	0.0309 (J)	0.014 (J)	—	—	—	NA
MD21-06-68050	21-25625	0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.257 (J)	—	—	—	—	0.0173 (J)	NA
MD21-06-68051	21-25625	1.5–2	Soil	—	—	0.0033 (J)	—	—	—	0.0659 (J)	—	—	0.258 (J)	—	—	—	0.0163 (J)	0.0177 (J)	NA

Notes: Results are in mg/kg.

[a] SSLs from NMED (2017, 602273) unless otherwise noted. If chemical has both carcinogenic and noncarcinogenic SSLs, the lower of the two is presented.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (https://www.epa.gov/risk/regional-screening-levels-rsls-generic-tables) and equation and parameters from NMED (2017, 602273).

[c] na = Not available.

[d] SSLs are from EPA regional screening tables (https://www.epa.gov/regional-screening-levels-rsls-generic-tables).

[e] SSL for diesel #2.

[f] NA = Not analyzed.

[g] — = Not detected.

Table 4
Radionuclides Detected or Detected Above BVs/FVs at SWMU 21-027(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-234	Uranium-235/236	Uranium-238
Sediment BV/FV[a]				**0.04**	**0.9**	**0.006**	**0.068**	**na**[b]	**2.59**	**0.2**	**2.29**
Soil BV/FV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**230**	**37**	**230**	**200**	**1,600,000**	**1000**	**130**	**340**
Industrial SAL[c]				**1000**	**41**	**1300**	**1200**	**2,400,000**	**3100**	**160**	**710**
Residential SAL[c]				**83**	**12**	**84**	**79**	**1700**	**290**	**42**	**150**
AAA0615	21-01329	0–0.5	Sediment	0.052	—[d]	0.008	0.753	0.0970	—	—	—
AAA0616	21-01330	0–0.5	Sediment	0.067	—	—	1.35	0.0599	—	—	—
AAA0617	21-01331	0–0.5	Sediment	0.141	—	0.025	4.46	0.0689	—	—	—
AAA0619	21-01332	0–0.5	Sediment	0.076	—	0.016	0.868	0.0792	—	—	—
AAA0620	21-01333	0–0.5	Sediment	0.092	—	0.012	1.54	0.0860	—	—	—
AAA0621	21-01334	0–0.5	Sediment	0.064	—	—	1.11	0.0712	—	—	—
MD21-99-0210	21-11098	0–0.3	Sediment	—	NA[e]	—	0.474	NA	NA	NA	NA
MD21-99-0211	21-11099	0–0.3	Sediment	—	NA	—	0.594	NA	NA	NA	NA
MD21-99-0212	21-11100	0–0.3	Sediment	—	NA	—	0.658	NA	NA	NA	NA
MD21-99-0213	21-11101	0–0.3	Sediment	—	NA	—	0.295	NA	NA	NA	NA
MD21-99-0214	21-11102	0–0.3	Sediment	—	NA	—	3.3	NA	NA	NA	NA
MD21-99-0215	21-11103	0–0.3	Sediment	0.266	NA	—	8.45	NA	NA	NA	NA
MD21-99-0216	21-11104	0–0.3	Sediment	—	NA	—	1.72	NA	NA	NA	NA
MD21-05-60011	21-24578	0.0–0.5	Soil	0.0561	—	—	0.417 (J+)	—	—	—	—
MD21-05-60012	21-24578	1.5–2.0	Soil	—	—	—	0.0439	0.0207	—	—	—
MD21-06-66264	21-25414	0–0.5	Soil	11.2	—	0.0386	5.6	0.0165	—	—	—

Table 4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-234	Uranium-235/236	Uranium-238
Sediment BV/FV[a]				**0.04**	**0.9**	**0.006**	**0.068**	**na[b]**	**2.59**	**0.2**	**2.29**
Soil BV/FV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**230**	**37**	**230**	**200**	**1,600,000**	**1000**	**130**	**340**
Industrial SAL[c]				**1000**	**41**	**1300**	**1200**	**2,400,000**	**3100**	**160**	**710**
Residential SAL[c]				**83**	**12**	**84**	**79**	**1700**	**290**	**42**	**150**
MD21-06-66265	21-25414	1.5–2	Soil	6.47	—	—	7.03	—	—	—	—
MD21-06-66267	21-25415	0–0.5	Soil	—	—	—	0.396	—	—	—	—
MD21-06-66268	21-25415	1.5–2	Soil	—	0.158	—	1.25	—	—	—	—
MD21-06-66270	21-25416	0–0.5	Soil	9.31	—	—	5.36	0.0183	—	—	—
MD21-06-66271	21-25416	1.5–2	Soil	0.555	—	—	0.343	—	—	—	—
MD21-06-66273	21-25417	0–0.5	Soil	1.02	—	—	1.59	—	—	—	—
MD21-06-66274	21-25417	1.5–2	Soil	0.18	—	—	0.375	—	—	—	—
MD21-06-66276	21-25418	0–0.5	Soil	5.56	—	—	4.87	—	—	—	—
MD21-06-66277	21-25418	1.5–2	Soil	9.14	0.225	0.0423	8.59	—	—	—	—
MD21-06-66280	21-25419	0–0.5	Soil	—	—	—	0.967	—	—	—	—
MD21-06-66279	21-25419	1.5–2	Soil	—	0.419	—	0.498	0.0212	—	—	—
MD21-06-66282	21-25420	0–0.5	Soil	4.31	—	—	4.79	0.00641	—	—	—
MD21-06-66283	21-25420	1.5–2	Soil	0.182	—	—	0.288	—	—	—	—
MD21-06-66285	21-25421	0–0.5	Soil	—	—	—	0.408 (J-)	0.15	—	—	—
MD21-06-66286	21-25421	1.5–2	Soil	—	—	—	0.0934	—	—	—	—
MD21-06-66288	21-25422	0–0.5	Soil	—	—	—	0.0815	0.0184	—	—	—
MD21-06-66291	21-25423	0–0.5	Soil	—	—	—	—	0.0182	—	—	—
MD21-06-66292	21-25423	1.5–2	Soil	—	—	—	—	0.0162	—	—	—
MD21-06-68044	21-25622	0–0.5	Soil	3.26	—	0.303	3.87	0.00585	—	—	—

Table 4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-238	Plutonium-239/240	Tritium	Uranium-234	Uranium-235/236	Uranium-238
Sediment BV/FV[a]				**0.04**	**0.9**	**0.006**	**0.068**	**na[b]**	**2.59**	**0.2**	**2.29**
Soil BV/FV[a]				**0.013**	**1.65**	**0.023**	**0.054**	**na**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**230**	**37**	**230**	**200**	**1,600,000**	**1000**	**130**	**340**
Industrial SAL[c]				**1000**	**41**	**1300**	**1200**	**2,400,000**	**3100**	**160**	**710**
Residential SAL[c]				**83**	**12**	**84**	**79**	**1700**	**290**	**42**	**150**
MD21-06-68045	21-25622	1.5–2	Soil	1.04	0.12	—	1.42	0.074	—	—	—
MD21-06-68046	21-25623	0–0.5	Soil	—	—	—	2.4	0.0979	6.51	0.32	5.67
MD21-06-68047	21-25623	1.5–2	Soil	—	0.166	—	0.831	0.00235	3.56	0.222	3.26
3.MD21-06-68048	21-25624	0–0.5	Soil	1.42	—	—	4.11	0.4	2.87	—	2.65
MD21-06-68049	21-25624	1.5–2	Soil	0.613	0.188	—	3.43	0.00314	—	—	—
MD21-06-68050	21-25625	0–0.5	Soil	0.314	—	—	0.834	0.052	—	—	—
MD21-06-68051	21-25625	1.5–2	Soil	0.157	0.332	—	0.832	—	—	—	—

Notes: Results are in mg/kg.

[a] BVs/FVs are from LANL (1998, 059730).

[b] na = Not available.

[c] SALs are from LANL (2015, 600929).

[d] — = Not detected or not detected above BV.

[e] NA = Not analyzed.

Table 5
Residential Carcinogenic Screening Evaluation for SWMU 21-027(d)

COPC	Maximum Detected Concentration (mg/kg)	Residential SSL (mg/kg)*	Excess Cancer Risk
Cadmium	1.4	85,900	1.63E-10
Cobalt	5.7	17,200	3.31E-09
Aroclor-1242	0.0065	2.43	2.67E-08
Aroclor-1254	0.0033	2.43	1.36E-08
Aroclor-1260	0.0281	2.43	1.16E-07
Benzo(a)pyrene	0.0339	1.12	3.03E-07
Benzo(b)fluoranthene	0.0234	1.53	1.53E-07
Bis(2-ethylhexyl)phthalate	0.0921	380	2.42E-09
Chrysene	0.0189	153	1.24E-09
Pentachlorophenol	0.212	9.85	2.15E-07
		Total Excess Cancer Risk	**8E-07**

* SSLs from NMED (2017, 602273).

Table 6
Residential Noncarcinogenic Screening Evaluation for SWMU 21-027(d)

COPC	Maximum Detected Concentration (mg/kg)	Residential SSL (mg/kg)[a]	HQ
Antimony	1.34	31.3	4.28E-02
Cadmium	1.4	70.5	1.99E-02
Cobalt	5.7	23.4	2.44E-01
Copper	22.6	3130	7.22E-03
Cyanide	5.78	11.1	5.21E-01
Lead	39.1	400	9.78E-02
Mercury	0.765	23.5	3.26E-02
Perchlorate	0.00491	54.8	8.96E-05
Silver	24.5	391	6.27E-02
Zinc	105	23,500	4.47E-03
Anthracene	0.00918	17,400	5.28E-07
Aroclor-1254	0.0033	1.14	2.89E-03
Benzoic acid	0.0659	250,000[b]	2.64E-07
Bis(2-ethylhexyl)phthalate	0.0921	1230	7.49E-05
Fluoranthene	0.27	2320	1.16E-04
Methylnaphthalene[2-]	0.0495	232	2.13E-04
Naphthalene	0.0237	1160	2.04E-05
Pentachlorophenol	0.212	234	9.06E-04
Phenanthrene	0.0175	1740	1.01E-05
Pyrene	0.0253	1740	1.45E-05
		HI	**1**

[a] SSLs from NMED (2017, 602273) unless otherwise noted.

[b] SSL from EPA regional screening tables (https://www.epa.gov/regional-screening-levels-rsls-generic-tables).

Table 7
Residential Radionuclide Screening Evaluation for SWMU 21-027(d)

COPC	Maximum Detected Activity (pCi/g)	Residential SAL (pCi/g)*	Dose (mrem/yr)
Americium-241	11.2	83	3.37E+00
Cesium-137	0.419	12	8.73E-01
Plutonium-238	0.303	84	9.02E-02
Plutonium-239/240	8.59	79	2.72E+00
Tritium	0.4	1700	5.88E-03
Uranium-234	6.51	290	5.61E-01
Uranium-235/236	0.32	42	1.90E-01
Uranium-238	5.67	150	9.45E-01
		Total Dose	**9**

* SALs from LANL (2015, 600929).

Table 8
Residential TPH Screening Evaluation for SWMU 21-027(d)

COPC	Maximum Detected Concentration (mg/kg)	Residential SSL (mg/kg)*	HQ
TPH-DRO	19	1000	1.90E-02
		HI	**0.02**

* SSL for diesel #2 from NMED (2017, 602273).