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Phase II Investigation Work Plan for Upper Sandia Canyon Aggregate Area

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

The Upper Sandia Canyon Aggregate Area is located in Technical Area 03 (TA-03), TA-60, and TA-61 of Los Alamos National Laboratory and includes a total of 180 solid waste management units and areas of concern. Ninety-one of the sites have been investigated previously and approved for no further action. Eighty-nine were investigated in 2009 and the results reported in the revised investigation report for the Upper Sandia Canyon Aggregate Area. Of these 89 sites, 41 require additional sampling to define the extent of contamination. This Phase II investigation work plan presents the proposed sampling and analyses needed to define the vertical and/or lateral extent of one or more contaminants at each of the 41 sites. The results of the Phase II investigation activities will be reported in a Phase II investigation report.

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1.0 INTRODUCTION

Los Alamos National Laboratory (LANL or the Laboratory) is a multidisciplinary research facility owned by the U.S. Department of Energy (DOE) and managed by Los Alamos National Security, LLC. The Laboratory is located in north-central New Mexico approximately 60 mi northeast of Albuquerque and 20 mi northwest of Santa Fe. The Laboratory site covers 40 mi^2 of the Pajarito Plateau, which consists of a series of fingerlike mesas separated by deep canyons containing perennial and intermittent streams running from west to east. Mesa tops range in elevation from approximately 6200 to 7800 ft above mean sea level. The location of Upper Sandia Canyon Aggregate Area with respect to the Laboratory technical areas (TAs) and surrounding landholdings is shown in Figures 1.0-1 and 1.0-2.

The solid waste management units (SWMUs) and areas of concern (AOCs) addressed in this Phase II investigation work plan are potentially contaminated with both hazardous and radioactive components. The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 5400.5, Radiation Protection of the Public and the Environment; DOE Order 435.1, Radioactive Waste Management; and DOE Order 458.1, Administrative Change 1, Radiation Protection of the Public and the Environment. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). This Phase II work plan describes work activities that will be executed and completed in accordance with the Consent Order.

1.1 Work Plan Overview

The Upper Sandia Canyon Aggregate Area is located in TA-03, TA-60, and TA-61 at the Laboratory and consists of 180 SWMUs and AOCs. Ninety-one of the sites have been previously investigated and approved for no further action. Eighty-nine were investigated in 2009, and the results were reported in the October 2010 Investigation Report for Upper Sandia Canyon Aggregate Area, Revision 1 (LANL 2010, 110862.24), which was approved by NMED (2010, 111398) in November 2010. Of these 89 sites, 41 require additional sampling to define the extent of contamination. This Phase II investigation work plan presents the proposed sampling and analyses needed to define the vertical and/or lateral extent of one or more contaminants at each of the 41 sites. A brief description and additional sampling requirements for the 41 sites are provided in Table 1.1-1.

Section 2 of this Phase II investigation work plan presents the background and conceptual site model of the Upper Sandia Canyon Aggregate Area. Section 3 presents site conditions, and section 4 provides a site description, summarizes previous investigations and data collected, and presents the scope of proposed activities for each site. Section 5 presents investigation methods for proposed field activities. Ongoing monitoring and sampling programs in the Upper Sandia Canyon Aggregate Area are presented in section 6. Section 7 is an overview of the anticipated schedule of the Phase II investigation and reporting activities. The references cited in this report and the map data sources are provided in section 8. Appendix A of this work plan includes a list of acronyms and abbreviations, a glossary, and metric conversion and data qualifier definitions tables. Appendix B describes the management of investigation-derived waste (IDW).

1.2 Work Plan Objectives

The objective of the Phase II work plan is to complete the activities recommended in the investigation report (LANL 2010, 110862.24) for 41 sites requiring additional sampling to define the extent of contamination.

To accomplish this objective, this Phase II work plan

- presents historical and background information on the sites,
- describes the rationale for proposed data collection activities,
- identifies and presents appropriate methods for achieving the investigation objectives and managing IDW, and
- presents a schedule for conducting the investigation activities and reporting the investigation results.

2.0 BACKGROUND

2.1 General Site Information

TA-03 occupies a large area near the western end of South Mesa between Los Alamos Canyon to the north and Mortandad Canyon to the south (Figure 1.0-2). Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two-thirds of the area into fingerlike projections. The middle mesa where most of TA-03 is located is called Sigma Mesa (LANL 1999, 064617, p. 2-11). The core operational facilities for the Laboratory are located at TA-03, including the principal administration buildings, library, Chemistry and Metallurgy Research (CMR) Building, Beryllium Technology Facility, a gas-fired electrical generating plant, and a former sanitary wastewater treatment plant (WWTP) and supporting structures.

TA-60, also known as Sigma Mesa Site, was created from the eastern portion of TA-03 and lies on Sigma Mesa, between Sandia and Mortandad canyons (Figure 1.0-2). All buildings at TA-60 are located on the western end of the mesa and contain Laboratory support and maintenance operations and subcontractor-service facilities.

TA-61 was created from a portion of TA-03 and is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon (LANL 1999, 064617, p. 2-27) (Figure 1.0-2). TA-61 contains physical support and infrastructure facilities, including the Los Alamos County landfill, sewer pump stations, a radio shop, general storage sheds, a blower house, a private concrete batch plant, a Laboratory-operated asphalt batch plant, and general warehouse storage for maintenance activities. A small parcel of private property, the Royal Crest Manufactured Home Community, is surrounded by TA-61. The Los Alamos County landfill occupies most of TA-61.

2.2 Operational History

TA-03 was originally built as a firing site before 1945. It contained several wooden structures that served as an administration building, a shop, hutments (10-ft × 10-ft fiberboard buildings used for storage, minor assembly, and checkout of scientific hardware), and magazines. The area also contained a burn pit for destroying explosives (LASL 1947, 005581). The site was decommissioned and cleared in 1949.

In the early 1950s, operational facilities from TA-01 (located in the Los Alamos townsite) were relocated to TA-03. Early TA-03 facilities included the Van de Graaff accelerator building, a laboratory and support

structures, the communications building, the CMR Building, the general and chemical warehouses, the cryogenics laboratory, the administration building, the Sigma Building, a fire house, and the physics building. Additional new construction continued through the 1960s and 1970s, when storage areas, shops, office buildings, a WWTP, a cement batch plant, and other transportable structures were added.

The administration building was completed in 1956. In addition to offices, it housed laboratory and shop facilities and extensive photographic operations. In 1959, the Sigma Building (03-66) was completed at the eastern end of the site. The building now houses a complex array of equipment and activities concerned with metallurgical and ceramics research and fabrication.

A solar pond was built in the 1970s on the eastern end of Sigma Mesa to test the feasibility of reducing the volume of low-level radioactive wastewater from TA-50. The experiment was unsuccessful, and the pond was abandoned. A mobile equipment repair shop and warehouse were built at TA-03 in 1972. Support structures for these facilities included automotive repair, a gas station, and a steam-cleaning facility surrounding the repair shop and warehouse. Office buildings, shops, storage areas, an addition to the WWTP, a cement batch plant, and numerous transportable buildings were located in the areas between the former buildings.

The Oppenheimer Study Center was constructed in 1977, and an annex was added to the administration building in 1981. In 1979, a geothermal test well was drilled at the eastern end of Sigma Mesa. The site was not suitable for geothermal development, and the experiment was terminated. A small pesticide storage shed was assembled in 1984 just east of the test rack assembly enclosure, and other areas on the mesa were historically designated as storage sites (LANL 1999, 064617, p. 2-25). A test rack facility was built in 1985 to assemble racks for use in underground testing of nuclear devices at Nevada Test Site (NTS). A computer laboratory and several centers for various scientific activities were built during the 1990s (LANL 1999, 064617, p. 2-11).

The TA-03 service garage (former building 03-36) was removed in 1999 to prepare for the construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the demolition of the garage, the structure and all associated infrastructure, including drainlines, hydraulic lift wells, and underground storage tanks, were removed. Soil below the footprint of the garage was excavated and removed to a depth of approximately 15 ft below grade to accommodate the foundation of building 03-2327. The Syllac Building (03-287) underwent decontamination and decommissioning (D&D) from 2003 to 2004, and the Sherwood Complex (building 03-105) underwent D&D in 2001 to make way for the construction of the National Security Science Building (NSSB) (03-1400). D&D activities included the removal of buildings 03-105, 03-287, all existing storm drains, all existing asphalt paving, and fill directly beneath the asphalt. The entire area was graded and leveled, and approximately 10 ft of clean fill was placed over the entire site to accommodate the NSSB and associated infrastructure.

TA-60 was created in 1989 when the Laboratory redefined its TAs and designated a portion of TA-03 to TA-60. The NTS Test Fabrication Facility; the NTS test tower (buildings 60-17 and 60-18); several small abandoned experimental areas, including a solar pond and a test drill hole; and storage sites for pesticides, topsoil, and recyclable asphalt are located at TA-60 (LANL 1999, 064617, p. 2-25).

TA-61 was created in 1989 when the Laboratory redefined its TAs and designated a portion of TA-03 to TA-61. TA-61 contains the Los Alamos County landfill, which accepts nonhazardous waste from Los Alamos County residents and the Laboratory. This landfill is currently being closed under Resource Conservation and Recovery Act (RCRA) Subtitle D.

2.3 Conceptual Site Model

The sampling proposed in this Phase II work plan uses a conceptual site model to predict areas of potential contamination and to allow for adequate characterization of these areas. A conceptual site model describes potential contaminant sources, transport mechanisms, and receptors.

2.3.1 Potential Contaminant Sources

Releases at the sites within the Upper Sandia Canyon Aggregate Area may have occurred as a result of air emissions; potential leaks from septic systems, tanks, waste lines, and drains; discharges from cooling towers and outfalls; and releases from storage areas, transformer pads, and structures associated with a former sanitary WWTP. Previous sampling results indicated contamination from inorganic chemicals, organic chemicals, and radionuclides (LANL 2010, 110862.24). Additional sampling is needed to define the extent of contamination at 41 sites.

2.3.2 Potential Contaminant Transport Mechanisms

Current potential transport mechanisms that may lead to exposure include

- dissolution and/or particulate transport of surface contaminants during precipitation and runoff events,
- airborne transport of contaminated surface soil,
- continued dissolution and advective/dispersive transport of chemical contaminants contained in subsurface soil and tuff as a result of past operations,
- disturbance of contaminants in shallow soil and subsurface tuff by Laboratory operations, and
- disturbance and uptake of contaminants in shallow soil by plants and animals.

2.3.3 Potential Receptors

Potential receptors at one or more of the sites may include

- Laboratory workers,
- plants and animals both on-site and in areas immediately surrounding the sites.

Laboratory workers could potentially be exposed to contaminants in soil, tuff, and sediment by direct contact, ingestion, or inhalation. Ecological receptors may also be exposed to soil and sediment contaminants.

2.3.4 Cleanup Standards

As specified in section VIII.B.1 of the Consent Order, NMED soil screening levels (SSLs) (NMED 2009, 108070) or Laboratory screening action levels (SALs) (LANL 2009, 107655) will be used as soil cleanup levels unless they are determined to be impractical (details of the process are outlined in the Consent Order, section VIII.E [Requests for Variance from Cleanup Goal or Cleanup Level]) or unless SSLs do not exist for the current and reasonably foreseeable future land use (i.e., neither NMED nor the U.S. Environmental Protection Agency [EPA] has determined SSLs for some analytes under some land use scenarios). In cases where NMED SSLs do not exist, EPA regional screening values are used.

2.4 Data Overview

This work plan summarizes the available decision-level data used to evaluate whether the nature and extent of contamination are defined for each site. In addition, this work plan proposes sampling and analyses for those sites at which the extent of contamination has not been defined. The data collected during this investigation, along with existing decision-level data, will be used to define nature and extent and perform risk-screening assessments.

3.0 SITE CONDITIONS

Surface and subsurface features and geologic characteristics of the Upper Sandia Canyon Aggregate Area are described in detail in the investigation report (LANL 2010, 110862.24). Conditions at the sites included in this Phase II investigation work plan are predominantly influenced by

- a semiarid climate with low precipitation and a high evapotranspiration rate that limits the extent of subsurface moisture percolation and, therefore, the amount of moisture available to transport radionuclides or hazardous waste constituents in the subsurface, and
- a thick, relatively dry, unsaturated (vadose) zone that greatly restricts or prevents downward migration of contaminants to the regional aquifer.

These and other elements of the environmental setting in the Upper Sandia Canyon Aggregate Area are considered when the investigation data are evaluated with respect to the fate and transport of contaminants.

4.0 SITE DESCRIPTIONS AND PROPOSED INVESTIGATION ACTIVITIES

4.1 TA-03

TA-03 occupies a large area located near the western end of South Mesa between Los Alamos Canyon to the north and Mortandad Canyon to the south (Figure 1.0-2). Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two-thirds of the area into fingerlike projections.

4.1.1 SWMU 03-002(c), Former Storage Area

4.1.1.1 Site Description and Operational History

SWMU 03-002(c) is the site of a former 19-ft × 15-ft wooden storage shed (former structure 03-1494) that was located 100 ft west of the former Johnson Controls, Inc., administrative office (former building 03-70) (Figure 4.1-1). From the early 1960s to 1984, the shed was used to store containers of liquid and powdered pesticides and herbicides. The shed was removed in 1989 and the floor was disposed of as hazardous waste (LANL 1993, 020947). Between 1994 and 1996, the original concrete pad beneath the shed was surrounded by a new concrete pad that covered the site (LANL 1996, 052930, p. 41). The eastern portion of the concrete pad was paved over with asphalt in 2003 as part of the construction of an access road and parking lot (LANL 2008, 099214).

4.1.1.2 Previous Investigations

In 2009, eight soil samples were collected from four locations at SWMU 03-002(c). Previously sampled locations are shown in Figure 4.1-1. Table 4.1-1 presents the samples collected and analyses requested

for SWMU 03-002(c). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-002(c) consisted of the following activities in 2009:

- Soil samples were collected at four sampling locations from two depth intervals: 0.0–1.0 ft below ground surface (bgs) and at the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for target analyte list (TAL) metals, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), polychlorinated biphenyls (PCBs), pesticides, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 20–21), the lateral and vertical extent of lead and sodium are not defined at SWMU 03-002(c). The vertical extent of lead is not defined at location 03-608148 (Plate 1). Concentrations of lead increased to the north of SWMU 03-002(c). The vertical extent of sodium is not defined at locations 03-608146 and 03-608147 (Plate 1). Concentrations of sodium increased to the south and east of SWMU 03-002(c).

4.1.1.3 Proposed Sampling at SWMU 03-002(c)

Shallow subsurface samples will be collected at three previously sampled locations (03-608146, 03-608147, and 03-608148), extending the depth at these locations to define the vertical extent of lead and sodium. Samples from locations 03-608146 and 03-608147 will be analyzed for sodium only. Samples from location 03-608148 will be analyzed for lead only.

Three new sampling locations, 2c-1, 2c-2, and 2c-3, will be placed to the south, east, and north of existing locations 03-608146, 03-608147, and 03-608148, respectively, to define the lateral extent of lead and sodium. Samples from locations 2c-1 and 2c-2 will be analyzed for sodium only, and samples from location 2c-3 will be analyzed for lead only.

The proposed sampling and analyses at SWMU 03-002(c) are presented in Table 4.1-2, and the proposed sampling locations are shown in Figure 4.1-1.

4.1.2 AOC 03-003(d), Transformer Pad—PCB Only Site

4.1.2.1 Site Description and Operational History

AOC 03-003(d) is a concrete pad located east of building 03-141 where two former PCB-containing transformers, structures 03-146 and 03-176, were located (Figure 4.1-2). These transformers (PCB identification numbers 5008 and 5009) contained dielectric fluid with PCB concentrations greater than 500 ppm and were removed in 1991 and 1992, respectively, in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Because no stains were visible on the concrete pad after the transformers were removed, the area was considered free of contamination, and new non-PCB transformers were relocated on the same concrete pad. Additional concrete was added to extend the existing pad in 1993 (LANL 1995, 057590, p. 6-63).

4.1.2.2 Previous Investigations

In 2009, 11 samples (10 soil and 1 concrete) were collected from six locations at AOC 03-003(d). Previously sampled locations are shown in Figure 4.1-2. Table 4.1-3 presents the samples collected and

analyses requested for AOC 03-003(d). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-003(d) consisted of the following activities in 2009:

- One concrete chip sample (made up of five concrete chips) was collected from the pad and analyzed at an off-site fixed laboratory for PCBs.
- Soil samples were collected from five locations beneath the concrete pad and from around the concrete pad from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for PCBs.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, p. 24), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-003(d), except for the vertical extent of Aroclor-1260 at location 03-608161 (Plate 2).

4.1.2.3 Proposed Sampling at AOC 03-003(d)

Two subsurface samples will be collected at previously sampled location 03-608161 to define the vertical extent of Aroclor-1260. All samples will be analyzed for PCBs only. The proposed sampling and analyses at AOC 03-003(d) are presented in Table 4.1-4, and the proposed sampling locations are shown in Figure 4.1-2.

4.1.3 SWMU 03-009(a), Surface Disposal

4.1.3.1 Site Description and Operational History

SWMU 03-009(a) is a 30-ft × 300-ft fill area located on the rim of a small tributary of Sandia Canyon south of the former TA-03 asphalt batch plant (LANL 1993, 020947, p. 6-16) (Figure 4.1-1). The fill was generated by asphalt plant operations and contained small amounts of concrete, crushed tuff, and asphalt road construction debris. SWMU 03-009(a) is part of Consolidated Unit 03-009(a)-00, which includes several other sites associated with the former asphalt batch plant.

4.1.3.2 Previous Investigations

In 2003 and 2009, a total of 21 samples (7 soil, 1 fill, and 13 tuff) were collected from eight locations at SWMU 03-009(a). Previously sampled locations are shown in Figure 4.1-1. Table 4.1-5 presents the samples collected and analyses requested for SWMU 03-009(a). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

A RCRA facility investigation (RFI) was conducted at this site in 2003. Three boreholes were advanced to a depth of 20 ft bgs and every 5-ft length of core was field screened for total petroleum hydrocarbons–(TPH-) diesel range organics (DRO) to guide sample collection (LANL 2003, 079747). Borehole logs confirm fill material to be present to a depth of approximately 16 ft bgs at the south end of the site and to a depth of approximately 4 ft bgs at the north end of the site. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH–gasoline range organics (GRO). Decision-level data from the 2003 investigation are included in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-009(a) consisted of the following activities in 2009:

- Soil and tuff samples were collected at three boreholes located within the boundary of the surface disposal site from three depth intervals: 9.0–10.0 ft, 14.0–15.0 ft, and 19.0–20.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- Sediment and soil samples were collected at two locations downgradient of the surface disposal site from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 29–33), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-009(a), except for the lateral and vertical extent of anthracene, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chromium, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, lead, phenanthrene, pyrene, selenium, and TPH-DRO and the lateral extent of acenaphthene, Aroclor-1254, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, and 1,2,4-trimethylbenzene.

The lateral extent of chromium and lead is not defined near the western perimeter of SWMU 03-009(a), and the lateral extent of selenium is not defined to the south and downgradient of location 03-22538 (Plate 1). The lateral extent of Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and TPH-DRO is not defined to the south and downgradient of locations 03-608181 and 03-608182 (Plate 3). The lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and 1,2,4-trimethylbenzene is not defined near the western perimeter of the site (Plate 3). The lateral extent of TAL metals, SVOCs, and TPH-DRO is not defined near the eastern perimeter of the site downgradient of location 03-608180 (Plates 1 and 3).

The vertical extent of chromium and lead is not defined at location 03-608178, the vertical extent of chromium is not defined at location 03-608179, and the vertical extent of selenium is not defined at location 03-22538 (Plate 1). The vertical extent of TPH-DRO is not defined at location 03-608181 and the vertical extent of anthracene, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, and TPH-DRO is not defined at location 03-608182 (Plate 3). The vertical extent of benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, and pyrene is not defined at locations 03-608181 and 03-608182 (Plate 3).

4.1.3.3 Proposed Sampling at SWMU 03-009(a)

Subsurface samples will be collected at three previously sampled locations (03-22538, 03-608178, and 03-608179), extending the depths at these locations to define the vertical extent of chromium, lead, and selenium. Samples from location 03-22538 will be analyzed for selenium only. Samples from location 03-608178 will be analyzed for chromium and lead, and samples from location 03-608179 will be analyzed for chromium only.

Shallow subsurface samples will be collected at two previously sampled locations (03-608181 and 03-608182), extending the depths at these locations to define the vertical extent of Aroclor-1260, SVOCs, and TPH-DRO. Samples from location 03-608181 will be analyzed for SVOCs and TPH-DRO, and samples from location 03-608182 will be analyzed for SVOCs, PCBs, and TPH-DRO.

Surface and subsurface samples will be collected at three previously sampled locations (03-608178, 03-608179, and 03-608180) to define the lateral extent to the south and east of SWMU 03-009(a). In 2009, samples were collected at these locations starting at a depth of 9.0–10.0 ft bgs. Samples from two downgradient locations (03-608181 and 03-608182) were collected at 0.0–1.0 and 1.0–2.0 ft bgs. Because samples were collected from different depth intervals, the lateral extent to the south of the site could not be defined. Samples from locations 03-608178, 03-608179, and 03-608180 will be analyzed for TAL metals, VOCs, SVOCs, PCBs, and TPH-DRO.

Samples will also be collected at five new sampling locations to define the lateral extent of chromium, lead, selenium, 4-isopropyltoluene, 1,2,4-trimethylbenzene, SVOCs, PCBs, and TPH-DRO. A new location, 9a-1, will be placed to the west of existing location 03-608178 along the western perimeter of the site. Samples from 9a-1 will be analyzed for chromium, lead, 4-isopropyltoluene, 1,2,4-trimethylbenzene, SVOCs, PCB, and TPH-DRO. New location 9a-2 will be placed downgradient of location 03-22538 to define the lateral extent of selenium. Samples from location 9a-2 will be analyzed for selenium only. New sampling locations 9a-3 and 9a-4 will be placed downgradient and south of existing locations 03-608181 and 03-608182 to define the lateral extent of SVOCs, PCBs, and TPH-DRO. Samples from location 9a-3 and 9a-4 will be analyzed for SVOCs, PCBs, and TPH-DRO. New location 9a-5 will be placed downgradient of location 03-608180 to define lateral extent near the eastern perimeter of the site. Samples from location 9a-5 will be analyzed for TAL metals, SVOCs, and TPH-DRO. The proposed sampling and analyses at SWMU 03-009(a) are presented in Table 4.1-6, and the proposed sampling locations are shown in Figure 4.1-1.

4.1.4 SWMU 03-009(i), Surface Disposal Site

4.1.4.1 Site Description and Operational History

SWMU 03-009(i) is an inactive surface disposal site located east of the liquid and compressed gas facility (building 03-170) (Figure 4.1-3). This site consists of construction debris, including crushed tuff, pieces of concrete, rock, and piles of fill. This surface disposal site ceased to be used in 1980 (LANL 1995, 057590, p. 6-4).

4.1.4.2 Previous Investigations

In 2009, 12 samples (3 soil and 9 tuff) were collected from six locations at SWMU 03-009(i). Previously sampled locations are shown in Figure 4.1-3. Table 4.1-7 presents the samples collected and analyses requested for SWMU 03-009(i). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-009(i) consisted of the following activities in 2009:

- Soil and tuff samples were collected at two locations downgradient of the disposal site from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- Tuff samples were collected from four test pits from two depth intervals: 4.0–5.0 ft and 9.0–10.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 57–59), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-009(i), except for the lateral and vertical extent of barium, chromium, cobalt, copper,

cyanide, nickel, and vanadium; the lateral extent of antimony, calcium, Aroclor-1254, Aroclor-1260, and TPH-DRO; and the vertical extent of lead.

The lateral extent of barium, calcium, chromium, cobalt, copper, cyanide, nickel, and vanadium is not defined downgradient of location 03-608191 (Plate 4). The lateral extent of antimony is not defined to the east of location 03-608190 (Plate 4). The lateral extent of Aroclor-1254, Aroclor-1260, and TPH-DRO is also not defined to the east of location 03-608190, and the lateral extent of TPH-DRO is not defined downgradient of location 03-608191 (Plate 5). The vertical extent of barium, chromium, cobalt, copper, cyanide, nickel, and vanadium is not defined at location 03-608191, and the vertical extent of lead is not defined at location 03-608193 (Plate 4).

4.1.4.3 Proposed Sampling at SWMU 03-009(i)

Shallow subsurface samples will be collected at two previously sampled locations (03-608191 and 03-608193), extending the depths at these locations to define the vertical extent of barium, chromium, cobalt, copper, cyanide, lead, nickel, and vanadium. Samples from location 03-608191 will be analyzed for barium, chromium, cobalt, copper, cyanide, nickel, and vanadium. Samples from location 03-608193 will be analyzed for lead only.

Surface and shallow subsurface samples will be collected at a new sampling location, 9i-1, to define the lateral extent of barium, calcium, chromium, cobalt, copper, cyanide, nickel, vanadium, and TPH-DRO downgradient of location 03-608191. Samples from location 9i-1 will be analyzed for barium, calcium, chromium, cobalt, copper, cyanide, nickel, vanadium, and TPH-DRO. Shallow subsurface samples will be collected at a new sampling location, 9i-2, to define the lateral extent of antimony, Aroclor-1254, Aroclor-1260, and TPH-DRO to the east of location 03-608190. Samples from location 9i-2 will be analyzed for antimony, PCBs, and TPH-DRO. The proposed sampling and analyses at SWMU 03-009(i) are presented in Table 4.1-8, and the proposed sampling locations are shown in Figure 4.1-3.

4.1.5 SWMU 03-012(b), Soil Contamination

4.1.5.1 Site Description and Operational History

SWMU 03-012(b) is soil contamination associated with operational releases from the TA-03 power plant, building 03-22, and associated cooling towers, including cooling tower drift (Figure 4.1-4). In 2007, a gas turbine generator, along with supporting utilities, was installed east of the power plant within the eastern portion of SWMU 03-012(b) (LANL 2008, 099214). SWMU 03-012(b) is part of Consolidated Unit 03-012(b)-00, which includes SWMUs 03-014(q), 03-045(b), and 03-045(c) that are associated with the TA-03 power plant.

4.1.5.2 Previous Investigations

In 2002 and 2004, a total of 50 samples (18 soil and 32 fill) were collected from 27 locations at SWMU 03-012(b). Previously sampled locations are shown in Figure 4.1-4. Table 4.1-9 presents the samples collected and analyses requested for SWMU 03-012(b). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

An RFI was conducted at SWMU 03-012(b) in 1994. The RFI report presented a Phase II sampling plan for SWMU 03-012(b) that included sampling in the vicinity of the cooling towers (LANL 1996, 052930). A modified version of this sampling plan was implemented in 2002 in anticipation of construction activities near the cooling towers that might limit future access for sampling. Twenty-eight fill samples were

collected from 14 locations at depths of 0.0–0.5 ft and 0.5–1 ft bgs; four fill samples were collected from four locations from a depth of 0.5–1 ft bgs. The samples were analyzed for metals and hexavalent chromium (Caporuscio 2003, 088444).

In 2004, 18 soil samples were collected from nine locations at the planned location of a new utility trench for the gas turbine generator. The sampling activities included the collection of surface and subsurface soil samples from the mesa top directly north and east of former cooling tower 03-25. Sixteen samples were collected from eight locations at 0.0–0.5 ft and 3.5–4 ft bgs; two samples were collected from a ninth location at 0.8–1.3 ft and 1.8–2.8 ft bgs. All samples were analyzed for metals and hexavalent chromium. Four surface soil samples and one subsurface sample were also analyzed for PCBs (LANL 2003, 100705, pp. 2-20; LANL 2003, 080102).

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 62–64), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-012(b), except for the lateral and vertical extent of cadmium, chromium, hexavalent chromium, and zinc; and the lateral extent of calcium, copper, mercury, and silver.

The vertical extent of cadmium is not defined at location 03-02-21053; the vertical extent of chromium is not defined at locations 03-02-21045 and 03-02-21048; and the vertical extent of hexavalent chromium is not defined at locations 03-02-21043, 03-02-21048, 03-02-21050, 03-02-21052, 03-02-21053, 03-22579, and 03-22585 (Plate 6). The vertical extent of zinc is not defined at locations 03-02-21048 and 03-02-21053 (Plate 6).

The lateral extent of cadmium, chromium, copper, hexavalent chromium, silver, and zinc is not defined to the north of location 03-02-21036. The lateral extent of cadmium and zinc is not defined to the west of location 03-02-21053.The lateral extent of chromium and hexavalent chromium is not defined to the east of location 03-02-21044, and the lateral extent of hexavalent chromium is not defined to the west of locations 03-02-21050, 03-02-21052, and 03-02-21053. The lateral extent of silver and zinc is not defined to the east of location 03-02-21044.

4.1.5.3 Proposed Sampling at SWMU 03-012(b)

Subsurface samples will be collected at eight previously sampled locations (03-02-21043, 03-02-21045, 03-02-21048, 03-02-21050, 03-02-21052, 03-02-21053, 03-22579, and 03-22585), extending the depths at these locations to define the vertical extent of cadmium, chromium, hexavalent chromium, and zinc. Samples from locations 03-02-21043, 03-02-21050, 03-02-21052, 03-22579, and 03-22585 will be analyzed for hexavalent chromium only, and samples from location 03-02-21045 will be analyzed for chromium only. Samples from location 03-02-21048 will be analyzed for chromium, hexavalent chromium, and zinc, and samples from 03-02-21053 will be analyzed for cadmium, hexavalent chromium, and zinc.

Surface and shallow subsurface samples will be collected at five new sampling locations to define the lateral extent of cadmium, chromium, hexavalent chromium, mercury, silver, and zinc. A new location, 12b-1, will be placed to the north of location 03-02-21036. Samples from location 12b-1 will be analyzed for cadmium, chromium, copper, hexavalent chromium, mercury, silver, and zinc. Three new locations, 12b-2, 12b-3, and 12b-4, will be placed to the west of locations 03-02-21050, 03-02-21052, and 03-02-21053, respectively. Samples from 12b-2 and 12b-3 will be analyzed for hexavalent chromium, and samples from 12b-4 will be analyzed for cadmium, hexavalent chromium, and zinc. A new location, 12b-5, will be placed to the east of location 03-02-21044. Samples from location 12b-5 will be analyzed for chromium, hexavalent chromium, silver, and zinc.

The proposed sampling and analyses at SWMU 03-012(b) are presented in Table 4.1-10, and the proposed sampling locations are shown in Figure 4.1-4.

4.1.6 SWMU 03-013(i), Operational Release

4.1.6.1 Site Description and Operational History

SWMU 03-013(i) is an area of soil and gravel contamination from historical releases of hydraulic oil at former buildings 03-246 and 03-247 (Figure 4.1-5). These buildings housed operations that involved testing the tensile strength of various steel cables used in conjunction with underground nuclear test assemblies. The cable control building (former building 03-246) and the cable stress building (former building 03-247) were collectively referred to as the Pull Test Facility. The facility was constructed before 1967 and operated until the mid-1980s when a replacement facility was constructed on Sigma Mesa. Building 03-246 was constructed on a concrete slab that contained a hydraulic oil compressor and storage tank. Building 03-247 was constructed on a concrete curb surrounding a gravel floor that contained two hydraulic rams used to perform the tensile strength testing. Hydraulic oil was provided to the rams through underground pipes between the buildings (LANL 2005, 091540, pp. 1–2).

Hydraulic oil is likely to have been released to the concrete slab floor inside former building 03-246 and subsequently flowed beneath the building walls and onto the soil surrounding the building. Soil staining was evident along the north side of the building and along the northeast and northwest corners. The gravel floor inside former building 03-247 was visibly stained with oil in several locations beneath the hydraulic ram assembly (LANL 2004, 087406, p. 1). Building 03-247 and its contents were demolished and removed in 2005. The contents and the concrete slab of building 03-246 were also demolished and removed in 2005. Following the demolition and removal of the concrete slab, approximately 144 ft^2 of contaminated soil was excavated from the footprint of former building 03-246. Following the demolition and removal of building 03-247 and its gravel floor, an 8-in. concrete slab connected to the building foundation on the north and west sides was exposed. The slab was removed, and stained soil and debris were also removed from SWMU 03-013(i). Confirmation samples were collected from both locations after demolition and removal, and the excavation was backfilled and graded (LANL 2005, 091540, pp. 1–4).

4.1.6.2 Previous Investigations

In 2005 and 2009, a total of 48 samples (32 soil and 16 fill) were collected from 24 locations at SWMU 03-013(i). Previously sampled locations are shown in Figure 4.1-5. Table 4.1-11 presents the samples collected and analyses requested for SWMU 03-013(i). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

During a 2005 site investigation, eight fill samples were collected from four locations within the footprint of former building 03-246 from depths of 0.0 to 0.5 ft and at 1.5 ft bgs. Four confirmation samples were also collected from two locations downgradient of former building 03-246 at depths of 0.0 to 0.5 ft and at 1.5 ft bgs. Four additional samples were collected from two locations within the footprint of former building 03-247 at depths of 0.0 to 0.5 ft and at 1.5 ft bgs (LANL 2005, 091540, pp. 4–5). A total of 16 samples were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, TPH-DRO, and TPH-GRO. Each of the samples collected from 1.5 ft bgs was also submitted for analysis of VOCs.

Sampling at SWMU 03-013(i) consisted of the following activities in 2009:

- Soil samples were collected at 16 locations from two depth intervals: 0.0–1.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 82–85), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-013(i), except for the lateral extent of antimony to the east of locations 03-608223 and 03-608224 (Plate 7) and the vertical extent of TPH-DRO at locations 03-24445, 03-24448, 03-24450, 03-608230, and 03-608235 (Plate 8).

4.1.6.3 Proposed Sampling at SWMU 03-013(i)

Shallow subsurface samples will be collected at five previously sampled locations (03-24445, 03-24448, 03-24450, 03-608230, and 03-608235), extending the depths at these locations to define the vertical extent of TPH-DRO. Samples from these locations will be analyzed for TPH-DRO only.

Two new sampling locations, 13i-1 and 13i-2, will be placed downgradient of existing sampling locations 03-608223 and 03-608224 to define the lateral extent of antimony. Samples from location 13i-1 and 13i-2 will be analyzed for antimony only. The proposed sampling and analyses at SWMU 03-013(i) are presented in Table 4.1-12, and the proposed sampling locations are shown in Figure 4.1-5.

4.1.7 AOC 03-014(b2), Outfall

4.1.7.1 Site Description and Operational History

AOC 03-014(b2) is a former National Pollutant Discharge Elimination System– (NPDES-) permitted outfall (EPA SSS01S) for the former TA-03 WWTP (Figure 4.1-6), and is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The outfall received treated effluent from a flow-measurement weir north of the WWTP chlorination system and contact chamber via a 1.5-ft-diameter × 300-ft-long corrugated metal pipe. The outfall discharged to a rocky outcrop at the edge of Sandia Canyon (LANL 1993, 020947, p. 5-49). Outfall SSS01S was permitted for the discharge of wastewater and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 2-7).

AOC 03-014(b2) received effluent from the former TA-03 WWTP from 1989 to 1992 when the WWTP was decommissioned. AOC 03-014(b2) received treated effluent from the Sanitary Wastewater Systems Consolidated (SWSC) plant at TA-46 from 1992 to 1998 when the effluent was switched to the outfall at the power plant, building 03-22. AOC 03-014(b2) was monitored three times per month for biochemical oxygen demand, total suspended solids, pH, fecal coliform, total chlorine, and radioactive constituents. From 1989 to 1993, radioactive constituents were reported over the detection limits (LANL 1993, 020947, p. 5-49).

4.1.7.2 Previous Investigations

In 2009, 10 samples (6 soil and 4 tuff) were collected from five locations at AOC 03-014(b2). Previously sampled locations are shown in Figure 4.1-6. Table 4.1-13 presents the samples collected and analyses requested for AOC 03-014(b2).The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-014(b2) consisted of the following activities in 2009:

- Soil and tuff samples were collected at five locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 92–94), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-014(b2), except for the lateral and vertical extent of cyanide, and the vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, perchlorate, and TPH-DRO.

The vertical extent of chromium is not defined at location 03-608242, the vertical extent of cyanide is not defined at location 03-608246, and the vertical extent of perchlorate is not defined at location 03-608244 (Plate 9). The lateral extent of cyanide is not defined downgradient of location 03-608246 (Plate 9). The vertical extent of acetone and TPH-DRO is not defined at location 03-608242, and the vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 03-608244 (Plate 10).

4.1.7.3 Proposed Sampling at AOC 03-014(b2)

Shallow subsurface samples will be collected at three previously sampled locations (03-608242, 03-608244, and 03-608246), extending the depths at these locations to define the vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, cyanide, perchlorate, and TPH-DRO. Samples from location 03-608242 will be analyzed for acetone, chromium, and TPH-DRO. Samples from location 03-608244 will be analyzed for perchlorate and PCBs, and samples from location 03-608246 will be analyzed for cyanide only.

Surface and shallow subsurface samples will be collected at a new sampling location, 14b2-1, to define the lateral extent of cyanide downgradient of location 03-608246. Samples from this new location will be analyzed for cyanide only.

The proposed sampling and analyses at AOC 03-014(b2) are presented in Table 4.1-14, and the proposed sampling location is shown in Figure 4.1-6.

4.1.8 AOC 03-014(c2), Outfall

4.1.8.1 Site Description and Operational History

AOC 03-014(c2) is the inactive overflow outfall that previously received treated effluent from the former TA-03 WWTP from 1975 until the WWTP chlorination system [SWMU 03-014(j)] was constructed in 1985 (LANL 1993, 020947, pp. 5-48–5-49). AOC 03-014(c2) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The outfall was located on the north side of the chlorination system pump pit (structure 03-2209) (Figure 4.1-6). Effluent for this outfall discharged as sheet flow onto a steep slope containing an erosion channel from stormwater runoff. The channel eventually trends northeast into Sandia Canyon. Soil and sediment were occasionally cleaned out of the channel with a backhoe and piled onto the upslope channel bank (LANL 1996, 052930, p. 103). Following the construction of the chlorination system, the outfall was rerouted underground from the pump pit to the chlorination dosing and contact chamber where the final effluent discharged freely into Sandia Canyon from a flow measurement weir north of the contact chamber. This outfall was abandoned in 1988 or 1989, when the WWTP effluent was routed to a new outfall, AOC 03-014(b2) (LANL 1993, 020947, p. 5-49).

An evaluation of the former WWTP blueprints during the 1994 RFI identified the location of the original treated effluent outfall approximately 20 to 30 ft west of the original AOC 03-014(c2) outfall (LANL 1996, 052930, p. 116).

4.1.8.2 Previous Investigations

In 2009, 16 samples (12 soil and 4 tuff) were collected from eight locations at AOC 03-014(c2). Previously sampled locations are shown in Figure 4.1-6. Table 4.1-15 presents the samples collected and analyses requested for AOC 03-014(c2). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-014(c2) consisted of the following activities in 2009:

- Soil and tuff samples were collected at eight locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs or 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 98–101), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-014(c2), except for the vertical extent of acetone, americium-241, Aroclor-1248, Aroclor-1254, Aroclor-1260, chromium, copper, cyanide, 4-isopropyltoluene, mercury, silver, toluene, and TPH-DRO.

The vertical extent of chromium is not defined at locations 03-608248, 03-608252, and 03-608253 (Plate 9). The vertical extent of copper and cyanide is not defined at location 03-608253, and the vertical extent of mercury and silver is not defined at locations 03-608249 and 03-608252 (Plate 9). The vertical extent of acetone, 4-isopropyltoluene, and toluene is not defined at location 03-608253 (Plate 10). The vertical extent of Aroclor-1248 is not defined at location 03-608254; the vertical extent of Aroclor-1254 and Arolor-1260 is not defined at locations 03-608249, 03-608251, and 03-608252; and the vertical extent of TPH-DRO is not defined at locations 03-608249 and 03-608253 (Plate 10). The vertical extent of americium-241 is not defined at locations 03-608254 and 03-608255 (Plate 11).

The investigation report states the vertical extent of chromium is not defined at location 03-608248. However, a review of the data indicated the concentration in the deepest sample (10.8 mg/kg at 1.0–2.0 ft bgs) is below the maximum Qbt 2, 3, and 4 background concentration of 13 mg/kg. Therefore, the vertical extent of chromium is defined at location 03-608248.

4.1.8.3 Proposed Sampling at AOC 03-014(c2)

Shallow subsurface samples will be collected at six previously sampled locations (03-608249, 03-608251, 03-608252, 03-608253, 03-608254, and 03-608255), extending the depths at these locations to define the vertical extent of acetone, americium-241, Aroclor-1248, Aroclor-1254, Aroclor-1260, chromium, copper, cyanide, 4-isopropyltoluene, mercury, silver, toluene, and TPH-DRO. Samples from location 03-608249 will be analyzed for mercury, silver, PCBs, and TPH-DRO. Samples from location 03-608251 will be analyzed for PCBs only. Samples from location 03-608252 will be analyzed for chromium, mercury, silver, and PCBs, and samples from location 03-608253 will be analyzed for acetone, chromium, copper, cyanide, 4-isopropyltoluene, toluene, and TPH-DRO. Samples from location 03-608254 will be analyzed for PCBs and americium-241, and samples from location 03-608255 will be analyzed for americium-241 only.

The proposed sampling and analyses at AOC 03-014(c2) are presented in Table 4.1-16, and the proposed sampling locations are shown in Figure 4.1-6.

4.1.9 SWMU 03-014(k), Structure Associated with Former WWTP

4.1.9.1 Site Description and Operational History

SWMU 03-014(k), structure 03-196, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 4.1-6). SWMU 03-014(k) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The drying beds received sludge siphoned from the Imhoff tanks. Three of the four beds were used for drying sludge, while the fourth bed, SWMU 03-014(n), was used as a skimmer bed (LANL 1993, 020947, pp. 5-46–5-47).

SWMU 03-014(k) consists of an unlined sludge-drying bed excavated into the tuff. The sludge bed measures 35 ft × 10 ft (LANL 1990, 007511, p. 3-14). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

4.1.9.2 Previous Investigations

In 1997 and 2009, a total of 41 samples (17 soil and fill, and 24 tuff) were collected from 12 locations at SWMUs 03-014(k,l,m,n). Previously sampled locations are shown in Figure 4.1-6. Table 4.1-17 presents the samples collected and analyses requested for SWMUs 03-014(k,l,m,n). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

A Phase I RFI was conducted in 1997 at SWMU 03-014(k). One location (03-03264) was sampled near the inlet pipes on the south side of the drying bed. Three samples were collected from three depths: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. All samples were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, pesticides, herbicides, isotopic plutonium and uranium, strontium-90, and tritium. One tuff sample was also submitted for laboratory analysis of VOCs.

Sampling at SWMUs 03-014(k,l,m,n) consisted of the following activities in 2009:

- Soil and tuff samples were collected from historical sampling locations 03-03201, 03-03202, 03-03264, 03-03265, and 03-03266 from two depth intervals: 4.0–5.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, cyanide, perchlorate, nitrate, tritium, americium-241, isotopic plutonium, and isotopic uranium.
- Soil and tuff samples were collected at four locations around and downgradient of SWMUs 03-014(k,l,m,n) from three depth intervals: 0.0–1.0 ft bgs, 0.0–1.0 ft beneath the sand and gravel layer at the base of the bed (the bed-tuff interface), and 5.0 ft below the bed-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, tritium, americium-241, isotopic plutonium, and isotopic uranium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 114–120), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMUs 03-014(k,l,m,n), except for the lateral and vertical extent of Aroclor-1254, cyanide, and tritium, the vertical extent of copper, lead, and TPH-DRO, and the lateral extent of Aroclor-1260, 4-isopropyltoluene, uranium-234, uranium-235/236, and uranium-238.

The vertical extent of copper is not defined at location 03-608271 (Plate 9). The vertical extent of cyanide is not defined at location 03-03265, the vertical extent of lead is not defined at locations 03-608271 and 03-608273, and the lateral extent of cyanide is not defined to the west of location 03-608272 (Plate 9). The vertical extent of Aroclor-1254 is not defined at location 03-03201. The lateral extent of Aroclor-1254 is not defined to the west of location 03-608272, and the lateral extent of Aroclor-1260 is not defined to the south of location 03-608271 and to the west of location 03-608272 (Plate 10). The lateral extent of 4-isopropyltoluene is not defined to the east of location 03-608270, and the vertical extent of TPH-DRO is not defined at location 03-03265 (Plate 10). The vertical extent of tritium is not defined at location 03-608270, and the lateral extent is not defined to the west of location 03-608272 (Plate 11). The lateral extent of uranium-234, uranium-235/236, and uranium-238 is not defined to the north of location 03-608273 (Plate 11).

The investigation report states the vertical extent of lead is not defined at location 03-608273. However, a review of the data indicated the concentration in the deepest sample (12.9 mg/kg at 3.0–4.0 ft bgs) is below the maximum Qbt 2, 3, and 4 background concentration of 15.5 mg/kg. Therefore, the vertical extent of lead is defined at location 03-608273.

4.1.9.3 Proposed Sampling at SWMU 03-014(k)

SWMUs 03-014(k,l,m,n) will be sampled collectively to complete the characterization of the former sludge-drying beds. All data within and around the perimeter of the beds will be evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(k).

Shallow subsurface samples will be collected at four previously sampled locations (03-03201, 03-03265, 03-608270, and 03-608271), extending the depths at these locations to define the vertical extent of copper, cyanide, lead, PCBs, TPH-DRO, and tritium. Samples from location 03-03201 will be analyzed for PCBs only, and samples from location 03-03265 will be analyzed for cyanide and TPH-DRO. Samples from location 03-608270 will be analyzed for tritium only. Samples from location 03-608271 will be analyzed for copper and lead.

Four new sampling locations, 14k-1, 14k-2, 14k-3, and 14k-4, will be placed near existing perimeter locations to define the lateral extent of Aroclor-1254, Aroclor-1260, cyanide, 4-isopropyltoluene, tritium, uranium-234, uranium-235/236, and uranium-238. A new location, 14k-1, will be placed to the west of location 03-608272 to define the lateral extent of Aroclor-1254, Aroclor-1260, cyanide, and tritium. Samples from location 14k-1 will be analyzed for cyanide, PCBs, and tritium. A new location, 14k-2, will be placed to the south of location 03-608271 to define the lateral extent of Aroclor-1260. Samples from location 14k-2 will be analyzed for PCBs only. A new location, 14k-3, will be placed to the east of location 03-608270 to define the lateral extent of 4-isopropyltoluene. Samples from location 14k-3 will be analyzed for 4-isopropyltoluene only. A new location, 14k-4, will be placed to the north of location 03-608273 to define the lateral extent of uranium-234, uranium-235/236, and uranium-238. Samples from location 14k-4 will be analyzed for isotopic uranium only.

The proposed sampling and analyses at SWMUs 03-014(k,l,m,n) are presented in Table 4.1-18, and the proposed sampling locations are shown in Figure 4.1-6.

4.1.10 SWMU 03-014(l), Structure Associated with Former WWTP

4.1.10.1 Site Description and Operational History

SWMU 03-014(l), structure 03-197, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 4.1-6). SWMU 03-014(l) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks (LANL 1993, 020947, pp. 5-46–5-47). SWMU 03-014(l) consists of an unlined sludge drying bed excavated into the tuff. The sludge bed measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-14). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

4.1.10.2 Previous Investigations

A Phase I RFI was conducted in 1997 at SWMU 03-014(l). Three samples were collected from three depth intervals at one sampling location in the center of the bed: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. All samples were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, pesticides, herbicides, isotopic plutonium, isotopic uranium, strontium-90, and tritium. One tuff sample was also submitted for laboratory analysis of VOCs.

Section 4.1.9.2 summarizes previous investigations conducted in 2009 at SWMUs 03-014(k,l,m,n).

4.1.10.3 Proposed Sampling at SWMU 03-014(l)

SWMUs 03-014(k,l,m,n) will be sampled collectively to complete the characterization of the former sludge-drying beds. All data within and around the perimeter of the beds will be evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(l). Section 4.1.9.3 presents the proposed sampling for SWMUs 03-014(k,l,m,n).

4.1.11 SWMU 03-014(m), Structure Associated with Former WWTP

4.1.11.1 Site Description and Operational History

SWMU 03-014(m), structure 03-198, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 4.1-6) (LANL 1993, 020947, pp. 5-46–5-47). SWMU 03-014(m) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks. The sludge bed is excavated into the tuff and measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-14). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

4.1.11.2 Previous Investigations

A Phase I RFI was conducted in 1997 at SWMU 03-014(m). Ten samples were collected from three locations. At one location, one sample was collected from filter (fill) material within the bed, and two samples were collected from successive 1.0-ft intervals (in tuff) beneath the bed. All samples from this location were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, herbicides, pesticides, isotopic plutonium, isotopic uranium, strontium-90, and tritium. One tuff sample was also submitted for

laboratory analysis of VOCs. Filter-material samples were collected from the second location at three successive 0.5-ft intervals and submitted for laboratory analyses of SVOCs and PCBs. Filter-material samples were collected from the third location at four successive 0.5-ft intervals and submitted for laboratory analyses of SVOCs and PCBs.

Section 4.1.9.2 summarizes previous investigations conducted in 2009 at SWMUs 03-014(k,l,m,n).

4.1.11.3 Proposed Sampling at SWMU 03-014(m)

SWMUs 03-014(k,l,m,n) will be sampled collectively to complete the characterization of the former sludge-drying beds. All data within and around the perimeter of the beds will be evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(m). Section 4.1.9.3 presents the proposed sampling for SWMUs 03-014(k,l,m,n).

4.1.12 SWMU 03-014(n), Structure Associated with Former WWTP

4.1.12.1 Site Description and Operational History

SWMU 03-014(n), structure 03-199, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the TA-03 WWTP (Figure 4.1-6) (LANL 1993, 020947, pp. 5-46, 5-47). SWMU 03-014(n) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks. The sludge drying bed is excavated into the tuff and measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

4.1.12.2 Previous Investigations

During RFI sampling activities conducted in 1997 at SWMU 03-014(n), oil was discovered in the sludge bed, which was subsequently remediated in September 1997 (LANL 1997, 056660.4, p. 60). Four samples were collected from two locations. At the first location, one sample collected from the filter (fill) material within the bed and two samples collected from successive 1-ft intervals (in tuff) beneath the bed were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, PCBs, herbicides, pesticides, TPH-DRO, isotopic plutonium, isotopic uranium, strontium-90, and tritium. At the second location, one sample collected from the filter material was submitted for laboratory analyses of TAL metals, VOCs, SVOCs, herbicides, pesticides, and TPH-DRO. Four additional soil, fill, and sludge samples collected from a depth of 0.0–0.5 ft bgs following remediation activities were submitted for analysis of TPH-DRO.

Section 4.1.9.2 summarizes previous investigations conducted in 2009 at SWMUs 03-014(k,l,m,n).

4.1.12.3 Proposed Sampling at SWMU 03-014(n)

SWMUs 03-014(k,l,m,n) will be sampled collectively to complete the characterization of the former sludge-drying beds. All data within and around the perimeter of the beds will be evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(n). Section 4.1.9.3 presents the proposed sampling for SWMUs 03-014(k,l,m,n).

4.1.13 SWMU 03-014(o), Structure Associated with Former WWTP

4.1.13.1 Site Description and Operational History

SWMU 03-014(o) consists of three polypropylene-lined sludge-drying beds (structure 03-1871) excavated into tuff at the former TA-03 WWTP (Figure 4.1-6). SWMU 03-014(o) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. SWMU 03-014(o) is located north and downslope of the four upper sludge-drying beds [SWMUs 03-014(k,l,m,n)]. The drying beds were constructed in 1987, and each bed measures 22 ft × 60 ft and has an approximately 8000-gal. capacity of liquid sludge (LANL 1993, 020947, pp. 5-46–5-47). Berms separating the beds are covered with asphalt, and the asphalt had not deteriorated (LANL 1997, 056660.4, p. 58).

4.1.13.2 Previous Investigations

In 1997 and 2009, a total of 32 samples (6 soil and fill and 26 tuff) were collected from nine locations at SWMU 03-014(o). Previously sampled locations are shown in Figure 4.1-6. Table 4.1-19 presents the samples collected and analyses requested for SWMU 03-014(o). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

A Phase I RFI was conducted in 1997 at SWMU 03-014(o). One sampling location was selected within each of the three beds at SWMU 03-014(o). Two of the locations were near the inlet pipes on the south side of the two outer beds, and the third location was near the center of the middle bed. Samples were collected from three depth intervals at each location: one from filter (fill) material within the bed and two from successive 1-ft intervals (in tuff) beneath the bed. Nine samples were collected from the three locations and submitted for laboratory analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic plutonium, isotopic uranium, strontium-90, and tritium. Three tuff samples collected from the deepest interval at each location were also submitted for laboratory analysis of VOCs (LANL 1997, 056660.4, pp. 59–62).

Sampling at SWMU 03-014(o) consisted of the following activities in 2009:

- Tuff samples were collected from historical sampling location 03-03204 in the center bed, and four samples were collected at two locations from each of the other beds from two depth intervals: 3.0–4.0 and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, and cyanide.
- Soil and tuff samples were collected at four perimeter locations from four depth intervals: 0.0–1.0 ft, 1.0–2.0 ft, 4.0–5.0 ft, and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, strontium-90, and tritium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 128–132), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-014(o), except for vertical extent of chromium, the lateral and vertical extent of acenaphthene and Aroclor-1254, and the lateral extent of Aroclor-1242 and Aroclor-1260.

The vertical extent of chromium is not defined at location 03-608279 (Plate 9). The vertical extent of acenaphthene is not defined at location 03-608277, and the vertical extent of Aroclor-1254 is not defined at location 03-608279 (Plate 10). The lateral extent of acenaphthene is not defined to the east of location 03-608277; the lateral extent of Aroclor-1242, Aroclor-1254, and Aroclor-1260 is not defined to the west

of location 03-608279; and the lateral extent of Aroclor-1254 and Aroclor-1260 is not defined to the south of location 03-608280 (Plate 10).

4.1.13.3 Proposed Sampling at SWMU 03-014(o)

Shallow subsurface samples will be collected at two previously sampled locations (03-608277 and 03-608279), extending the depths at these locations to define the vertical extent of acenaphthene, chromium, and Aroclor-1254. Samples from location 03-608277 will be analyzed for acenaphthene only. Samples from location 03-608279 will be analyzed for chromium and PCBs.

Three new sampling locations, 14o-1, 14o-2, and 14o-3, will be placed near existing perimeter locations to define the lateral extent of acenaphthene, Aroclor-1242, Aroclor-1254, and Aroclor-1260. A new location, 14o-1, will be placed to the east of location 03-608277 to define the lateral extent of acenaphthene. Samples from location 14o-1 will be analyzed for acenaphthene only. A new location, 14o-2, will be placed to the west of location 03-608279 to define the lateral extent of Aroclor-1242, Aroclor-1254, and Aroclor-1260. Samples from location 14o-2 will be analyzed for PCBs only. A new location, 14o-3, will be placed to the south of location 03-608280 to define the lateral extent of Aroclor-1254 and Aroclor-1260. Samples from location 14o-3 will be analyzed for PCBs only.

The proposed sampling and analyses at SWMU 03-014(o) are presented in Table 4.1-20, and the proposed sampling locations are shown in Figure 4.1-6.

4.1.14 SWMU 03-014(u), Structure Associated with Former WWTP

4.1.14.1 Site Description and Operational History

SWMU 03-014(u) is the former location of a 1500-gal. holding tank (structure 03-1901) that collected effluent from the former TA-03 WWTP sludge beds [SWMUs 03-014(k,l,m,n,o)]. SWMU 03-014(u) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. The holding tank was located approximately 50 ft northeast of the chlorination system dosing and contact chamber (Figure 4.1-6). The tank was installed in 1988 (LANL 1990, 007511, p. 3-014). Effluent from the sludge beds flowed through a subsurface drain system to the tank. The contents of the holding tank were recirculated by truck to the head of the plant for additional treatment (LANL 1993, 020947, p. 5-47). The SWMU 03-014(u) holding tank was removed in 1992 following the decommissioning of the TA-03 WWTP (LANL 2008, 099214).

4.1.14.2 Previous Investigations

In 2009, 15 samples (10 soil and 5 tuff) were collected from eight locations at SWMU 03-014(u). Previously sampled locations are shown in Figure 4.1-6. Table 4.1-21 presents the samples collected and analyses requested for SWMU 03-014(u). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-014(u) consisted of the following activities in 2009:

- Soil and tuff samples were collected from three locations within and next to the location of the former tank and drainline from two depth intervals: 0.0–1.0 ft bgs and at the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium. One sample was also analyzed for strontium-90.

- Soil and tuff samples were collected at five locations in the drainage north of the site from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium. Four samples were also analyzed for strontium-90.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 135–139), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-014(u), except for the vertical extent of cyanide, lead, Aroclor-1254, Aroclor-1260, and TPH-DRO. The vertical extent of cyanide and lead is not defined at location 03-608284, and the vertical extent of lead is not defined at location 03-608287 (Plate 9). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 03-608282, and the vertical extent of TPH-DRO is not defined at location 03-609990 (Plate 10).

The investigation report states the vertical extent of lead is not defined at location 03-608287. However, a review of the data indicated the concentrations did not change substantially with depth from the surface (20.6 mg/kg at 0.0–1.0 ft bgs in soil) to the deepest sample (19.2 mg/kg at 1.0–2.0 ft bgs in Qbt 3). Therefore, the vertical extent of lead is defined at location 03-608287.

4.1.14.3 Proposed Sampling at SWMU 03-014(u)

Shallow subsurface samples will be collected at two previously sampled locations (03-608284 and 03-609990), extending the depths at these locations to define the vertical extent of cyanide, lead, and TPH-DRO. Samples from location 03-608284 will be analyzed for cyanide and lead, and samples from location 03-609990 will be analyzed for TPH-DRO only.

Shallow subsurface samples will also be collected at three previously sampled locations (03-608281, 03-608282, and 03-608283) as required in the NMED approval with modifications letter for the investigation work plan, dated August 12, 2008 (NMED 2008, 102721), and the notice of approval letter for the investigation report, dated November 9, 2010 (NMED 2010, 111398). Samples will be collected from two depths (8.0–9.0 ft and 12.0–13.0 ft bgs) at locations 03-608281, 03-608282, and 03-608283 and analyzed for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium. Samples from location 03-608282 will also be used to define the vertical extent for Aroclor 1254 and Aroclor 1260 at this location.

The proposed sampling and analyses at SWMU 03-014(u) are presented in Table 4.1-22, and the proposed sampling locations are shown in Figure 4.1-6.

4.1.15 SWMU 03-015, Outfall

4.1.15.1 Site Description and Operational History

SWMU 03-015 is an outfall located between Eniwetok Drive and the security fence east of building 03-141 (Figure 4.1-2) (LANL 1996, 052930, p. 121). This SWMU is former NPDES-permitted outfall EPA 04A140 that was removed from the permit in 1995 (LANL 1999, 064617, p. 2-7). The outfall historically received effluent from janitorial sinks as well as from floor and roof drains of building 03-141. From 1962 to 1990, building 03-141 housed electrochemical and depleted uranium– (DU-) processing facilities. Powder characterization, plasma flame spray processing, and beryllium processing were also performed. In 1992, the basement floor drains in building 03-141 were rerouted to the TA-50 radioactive liquid waste (RLW) line, and the roof drains were rerouted to an existing storm sewer outfall in Mortandad Canyon. Lines draining to SWMU 03-015 were decommissioned in 1993 (LANL 1995, 057590, p. 5-24-1).

SWMU 03-015 is part of Consolidated Unit 03-015-00, which includes an outfall and floor drains in the basement of building 03-141 (AOC 03-053).

4.1.15.2 Previous Investigations

In 1994 and 2009, a total of 21 samples (20 soil and 1 sediment) were collected from 11 locations at SWMU 03-015. Previously sampled locations are shown in Figure 4.1-2. Table 4.1-23 presents the samples collected and analyses requested for SWMU 03-015. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

A Phase I RFI was conducted in 1994 at SWMU 03-015. One sediment sample was collected from a location downgradient of the outfall in the associated drainage channel. The sample was analyzed for TAL metals and gross-alpha, -beta, and -gamma radiation (LANL 1996, 052930, pp. 121–124).

Sampling at SWMU 03-015 consisted of the following activities in 2009:

- Soil samples were collected from 10 locations (including 1 location beneath the former drainline) to characterize SWMU 03-015 and AOC 03-053. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs, except at location 03-608298 where samples were collected from 2.5–3.5 ft and 5.5–6.5 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 149–153), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-015, except for the vertical extent of Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, cobalt, lead, manganese, and TPH-DRO.

The vertical extent of chromium is not defined at locations 03-608290, 03-608292, and 03-608297; the vertical extent of cobalt is not defined at locations 03-608291 and 03-608295; the vertical extent of lead is not defined at locations 03-608291 and 03-608297; and the vertical extent of manganese is not defined at locations 03-608291 and 03-608298 (Plate 12). The vertical extent of Aroclor-1254 is not defined at locations 03-608290 and 03-608297, and the vertical extent of Aroclor-1260 is not defined at location 03-608290 (Plate 2). The vertical extent of benzo(g,h,i)perylene and benzo(k)fluoranthene is not defined at location 03-608297, and the vertical extent of TPH-DRO is not defined at location 03-608296 (Plate 2).

The investigation report states the vertical extent of chromium is not defined at location 03-608290. However, a review of the data indicated the concentration in the deepest sample (19.4 mg/kg at 1.0–2.0 ft bgs) is below the maximum soil background concentration of 36.5 mg/kg. Therefore, the vertical extent of chromium is defined at location 03-608290.

The NMED approval with modifications letter, dated August 12, 2008 (NMED 2008, 102721), and the notice of approval letter, dated November 9, 2010 (NMED 2010, 111398), required samples to be collected from a new sampling location in the drainage to the northeast of the site. However, one of the original proposed drainage locations was sited in the middle of the road and was moved to the drainage to the northeast of the site; it was included as one of the two new locations proposed in the Laboratory's response to the notice of disapproval and the revised work plan (LANL 2008, 103404.43; LANL 2008, 103404.14). A total of three locations were sampled in the drainage to the northeast of the site during the 2009 investigation (LANL 2010, 110862.24), as required by the approval with modifications letter.

4.1.15.3 Proposed Sampling at SWMU 03-015

Shallow subsurface samples will be collected at seven previously sampled locations (03-608290, 03-608291, 03-608292, 03-608295, 03-608296, 03-608297, and 03-608298), extending the depths at these locations to define the vertical extent of Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, cobalt, lead, manganese, and TPH-DRO. Samples from location 03-608290 will be analyzed for PCBs only. Samples from location 03-608291 will be analyzed for cobalt, lead, and manganese. Samples from location 03-608292 will be analyzed for chromium only, and samples from location 03-608295 will be analyzed for cobalt only. Samples from location 03-608296 will be analyzed for TPH-DRO only, samples from location 03-608297 will be analyzed for benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, lead, and PCBs, and samples from location 03-608298 will be analyzed for manganese only.

The proposed sampling and analyses at SWMU 03-015 and AOC 03-053 are presented in Table 4.1-24, and the proposed sampling locations are shown in Figure 4.1-2.

4.1.16 SWMU 03-021, Outfall

4.1.16.1 Site Description and Operational History

SWMU 03-021 is an outfall and associated daylight channel located approximately 60 ft north of the north exterior wall of the liquid and compressed gas facility (building 03-170) (Figure 4.1-3). The outfall is former NPDES-permitted outfall EPA 04A094 and was removed from the 1997 permit (LANL 1999, 064617, p. 2-7). From 1964 to 1976, the outfall discharged caustic wash and rinse water from compressed-gas-cylinder cleaning operations. The cylinders were washed and stripped of paint using a caustic soda solution before they were repainted. The cylinders were screened for radioactive contamination and cleaned of any exterior oil, dirt, and grease before they were brought to building 03-170. Washing and stripping were done in a below-floor-grade pit in the northern part of building 03-170. A 2-in.-diameter iron outfall pipe in an open exterior ditch carried the caustic wash and rinse water from the pit. The end of the outfall pipe discharged into a northeast-trending surface ditch that continued about 180 ft to the main north-south drainage ditch. This outfall was not used after 1976, when the compressed gas suppliers assumed cylinder washing and painting responsibilities. The outfall was buried when 5 to 10 ft of fill material was placed over the former outfall area and graded during site preparation activities for the construction of building 03-1650, the compressed-gas-cylinder storage shed (LANL 1995, 057590, pp. 5-14-1–5-14-3).

4.1.16.2 Previous Investigations

In 1997 and 2009, a total of 27 samples (20 soil and 7 tuff) were collected from 14 locations at SWMU 03-021. Previously sampled locations are shown in Figure 4.1-3. Table 4.1-25 presents the samples collected and analyses requested for SWMU 03-021. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

RFI activities were conducted in 1997 at SWMU 03-021. One soil sample was collected from one location within the former outfall area at a depth of 0–1 ft bgs. Ten soil samples were collected from five locations along two transects positioned across the former location of the channel (LANL 1997, 056660.4, pp. 79–82). Four samples were collected from two locations at depths of 2.0–3.0 ft and 3.0–4.0 ft bgs; four samples were collected from two locations at depths of 3.0–4.0 ft and 4.0–5.0 ft bgs; and two samples were collected from the fifth location at depths of 2.75 ft–3.75 ft and 3.75 ft–4.25 ft bgs. All samples were analyzed for TAL metals and SVOCs, and one sample was also analyzed for VOCs.

Sampling at SWMU 03-021 consisted of the following activities in 2009:

- Tuff samples were collected at two locations (03-611943 and 03-611944) along the surface ditch from two depth intervals: 4.0–5.0 ft and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, and cyanide.
- Soil and tuff samples were collected at six locations downgradient of the outfall and drainlines from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 162–165), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-021, except for the vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, and lead.

The vertical extent of chromium is not defined at locations 03-03327, 03-03329, 03-03331, and 03-611943, and the vertical extent of lead is not defined at locations 03-03329 and 03-03331 (Plate 4). The vertical extent of acetone is not defined at location 03-608301, and the vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at locations 03-608303 and 03-608304 (Plate 5).

The investigation report indicated the 2009 samples to be collected at location 03-03329 were moved 5 ft south (location 03-611943), and the samples to be collected at location 03-03331 were moved 5 ft south (03-611944) as a result of a buried water line. In reviewing the data, although the concentrations of chromium and lead increased with depth at locations 03-03329 and 03-03331, their concentrations decreased with depth at location 03-611944 (approximately 5 ft away) (Plate 4). Therefore, the vertical extent of chromium and lead is defined at locations 03-03329 and 03-03331. Although chromium concentration increased with depth at location 03-611943, chromium was not detected or detected above the background value (BV) at location 03-611944 at the deepest depth interval sampled (approximately 3 ft away). Therefore, the vertical extent of chromium is defined at location 03-611943.

4.1.16.3 Proposed Sampling at SWMU 03-021

Shallow subsurface samples will be collected at four previously sampled locations (03-03327, 03-608301, 03-608303, and 03-608304), extending the depths at these locations to define the vertical extent of acetone, Aroclor-1254, Aroclor-1260, and chromium. Samples from location 03-03327 will be analyzed for chromium only. Samples from location 03-608301 will be analyzed for acetone only, and samples from locations 03-608303 and 03-608304 will be analyzed for PCBs only.

The proposed sampling and analyses at SWMU 03-021 are presented in Table 4.1-26, and the proposed sampling locations are shown in Figure 4.1-3.

4.1.17 SWMU 03-029, Landfill

4.1.17.1 Site Description and Operational History

SWMU 03-029 is a 30-ft × 250-ft former landfill located approximately 300 ft south of building 03-271 near the rim of Sandia Canyon (Figure 4.1-7). This landfill reportedly received excess asphalt from the batch plant and was subsequently covered with sand. The fill raised and leveled the surface areas at the mesa rim (LANL 1999, 064617, p. 2-17). SWMU 03-029 is part of Consolidated Unit 03-009(a)-00, which includes several other sites associated with the former asphalt batch plant.

NMED issued a notice of violation to the Laboratory in November 1990 concerning pieces of asphalt and an oily sheen found in the Sandia Canyon watercourse below building 03-73 (LANL 1995, 057590, p. 6-23). In early 1993, the Laboratory completed a corrective action at SWMU 03-029 to remove the asphalt within the drainage and on the associated slope, regrade the watercourse and slope to support vegetation, extend the drainage, and construct a concrete berm to prevent additional exposure of asphalt buried in the fill. Dense grass cover was seeded and maintained on all fill slopes and disturbed areas (LANL 1995, 057590, p. 6-24). Water samples collected from the storm drain indicated that oil, grease, or other chemicals typically associated with asphalt-plant operations were not present (LANL 1995, 057590 p. 6-24).

In 2004, an accelerated corrective action (ACA) was proposed to complete the investigation and remediation of SWMU 03-029 to accommodate the Laboratory's security perimeter road project. SWMU 03-029 was situated near the proposed location for the security perimeter road (LANL 2004, 087474, p. 1). In May 2005, ground-penetrating radar and electromagnetic surveys were conducted at SWMU 03-029. The results identified two possible locations for buried asphalt, which were further investigated by trenching. In July 2005, a total of 12 trenches were excavated to the top of bedrock, approximately 2 to 4 ft bgs, and varied in length from 20 ft to greater than 100 ft. Buried asphalt was not encountered in any of the trenches (LANL 2005, 091150, p. 10). Because buried asphalt was not encountered, the remaining proposed ACA activities for SWMU 03-029 were not implemented (LANL 2005, 091150, p. 29).

4.1.17.2 Previous Investigations

In 2009, 10 samples (8 soil and 2 tuff) were collected from four locations at SWMU 03-029. Previously sampled locations are shown in Figure 4.1-7. Table 4.1-27 presents the samples collected and analyses requested for SWMU 03-029. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Investigation sampling at SWMU 03-029 consisted of the following activities in 2009:

- Soil samples were collected at two locations from three depth intervals: the soil-tuff interface, 4.0–5.0 ft and 9.0–10.0 ft bgs. The sampling locations were within the perimeter of SWMU 03-029. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- Soil and tuff samples were collected at two locations between the canyon edge and canyon bottom on the slope below SWMU 03-029 from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 38–40), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-029, except for the lateral and vertical extent of chromium and the vertical extent of copper, Aroclor-1254, and Aroclor-1260. The vertical extent of chromium is not defined at location 03-608186, the vertical extent of copper is not defined at location 03-608185, and the lateral extent of chromium is not defined downgradient of location 03-608186 (Plate 13). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 03-608185 (Plate 14).

4.1.17.3 Proposed Sampling at SWMU 03-029

Shallow subsurface samples will be collected at two previously sampled locations (03-608185 and 03-608186), extending the depths at these locations to define the vertical extent of Aroclor-1254, Aroclor-1260, chromium, and copper. Samples from location 03-608185 will be analyzed for copper and PCBs. Samples from location 03-608186 will be analyzed for chromium only.

A new sampling location, 29-1 will be placed in the drainage downgradient of location 03-608186 to define the lateral extent of chromium. Samples from location 29-1 will be analyzed for chromium only. The proposed sampling and analyses at SWMU 03-029 are presented in Table 4.1-28, and the proposed sampling locations are shown in Figure 4.1-7.

4.1.18 AOC 03-038(d), Former Waste Lines

4.1.18.1 Site Description and Operational History

AOC 03-038(d) consists of the former industrial waste lines from buildings 03-32 (Center for Materials Science) and 03-34 (Cryogenics Building "B") (Figure 4.1-8). Between the 1950s and the 1970s, these waste lines connected the two buildings to the former industrial waste sewer, which was replaced with a RLW line in 1986 that connected building 03-34 to the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF). Drainlines from building 03-32 were connected to the sanitary sewer in 1986. Industrial waste lines throughout TA-03 were removed between 1981 and 1986 as part of the Laboratory's Industrial Waste Line Removal Project; no evidence of a release was observed during removal activities (LANL 1995, 057590, p. 6-45).

4.1.18.2 Previous Investigations

In 2009, 12 soil samples were collected from six locations at AOC 03-038(d). Previously sampled locations are shown in Figure 4.1-8. Table 4.1-29 presents the samples collected and analyses requested for AOC 03-038(d). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-038(d) consisted of the following activities in 2009:

- Soil samples were collected at six locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, isotopic uranium, and tritium.

The depth intervals sampled during the 2009 investigation were not below the location of the former drainline. Therefore, the analytical results were not representative of this site. The six previously sampled locations at AOC 03-038(d) will be resampled at three depth intervals below the drainline.

4.1.18.3 Proposed Sampling at AOC 03-038(d)

Shallow subsurface samples will be collected at six previously sampled locations (03-608310, 03-608311, 03-608312, 03-608313, 03-608314, and 03-608315). All samples will be analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, isotopic uranium, and tritium.

The proposed sampling and analyses at AOC 03-038(d) are presented in Table 4.1-30, and the proposed sampling locations are shown in Figure 4.1-8.

4.1.19 SWMU 03-045(a), Outfall

4.1.19.1 Site Description and Operational History

SWMU 03-045(a) is an inactive outfall from the TA-03 power plant (building 03-22) (Figure 4.1-4). The outfall operated from the 1950s to 1993. The primary outflow from building 03-22 to the SWMU 03-045(a) outfall was noncontact water from steam condensate. In addition, water from floor drains in the building basement, first floor, mezzanine, heater floor, platform, and roof drains previously discharged to this outfall. In 1989, an oil-water separator was installed near the outfall to prevent oil from building operations reaching the outfall. In 1993, the separator was removed and the discharge pipe was capped, causing this outfall to become inactive (LANL 1995, 057590, p. 6-71). In mid-1991, a diesel fuel release of approximately 100 to 200 gal. occurred from the two aboveground diesel fuel tanks at building 03-22. As the system was being pressurized, a faulty fitting on a fuel line to the diesel tanks caused the release (LANL 1995, 057590, p. 6-79). The release occurred directly above SWMU 03-045(a) and flowed down the slope south of the steam plant into the drainage channel (LANL 1996, 055035, Attachment B, p. 1, Attachment D, p. 1). The spill was contained approximately 120 yd east of the leak. The drainage was blocked, and an extensive cleanup was performed to remove all diesel fuel and diesel-contaminated soil (LANL 1995, 057590, p. 6-79). Remediation activities included removing contaminated soil and sediment in and around SWMU 03-045(a) and backfilling the excavation with clean fill (LANL 1995, 057590, p. 6-71).

4.1.19.2 Previous Investigations

In 2009, eight samples (three soil and five tuff) were collected from four locations at SWMU 03-045(a). Previously sampled locations are shown in Figure 4.1-4. Table 4.1-31 presents the samples collected and analyses requested for SWMU 03-045(a). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-045(a) consisted of the following activities in 2009:

- Soil and tuff samples were collected at four locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, PCBs, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 183–185), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(a), except for the lateral and vertical extent of Aroclor-1254 and Aroclor-1260; the lateral extent of copper, mercury, silver, and 4-isopropyltoluene; and the vertical extent of chromium and TPH-DRO.

The vertical extent of chromium is not defined at locations 03-608316, 03-608318, and 03-608319, and the lateral extent of copper, mercury, and silver is not defined downgradient of location 03-608319 (Plate 6). The vertical extent of Aroclor-1254 is not defined at location 03-608317, and the vertical extent of Aroclor-1260 is not defined at locations 03-608316, 03-608317, and 03-608318 (Plate 15). The lateral extent of Aroclor-1254, Aroclor-1260, and 4-isopropyltoluene is not defined downgradient of location 03-608319, and the vertical extent of TPH-DRO is not defined at location 03-608316 (Plate 15).

The investigation report states the vertical extent of chromium is not defined at locations 03-608316 and 03-608319. However, a review of the data indicated the concentration in the deepest samples from location 03-608316 (9.71 mg/kg at 1.0–2.0 ft bgs) and location 03-608319 (7.3 mg/kg at 1.0–2.0 ft bgs) is below the maximum Qbt 2, 3, and 4 background concentration of 13 mg/kg. Therefore, the vertical extent of chromium is defined at locations 03-608316 and 03-608319.

4.1.19.3 Proposed Sampling at SWMU 03-045(a)

Surface and shallow subsurface samples will be collected at three previously sampled locations (03-608316, 03-608317, and 03-608318), extending the depths at these locations to define the vertical extent of Aroclor-1254, Aroclor-1260, chromium, and TPH-DRO. Samples from location 03-608316 will be analyzed for PCBs and TPH-DRO. Samples from location and 03-608317 will be analyzed for PCBs only, and samples from location 03-608318 will be analyzed for chromium and PCBs.

Surface and subsurface samples will be collected at a new sampling location, 45a-1, to define the lateral extent of copper, mercury, silver, Aroclor-1254, Aroclor-1260, and 4-isopropyltoluene downgradient of location 03-608319. Samples from location 45a-1 will be analyzed for copper, mercury, silver, 4-isopropyltoluene, and PCBs. The proposed sampling and analyses at SWMU 03-045(a) are presented in Table 4.1-32, and the proposed sampling locations are shown in Figure 4.1-4.

4.1.20 SWMU 03-045(b), Outfall

4.1.20.1 Site Description and Operational History

SWMU 03-045(b) is NPDES-permitted Outfall 001 that receives treated sanitary effluent from the TA-46 SWSC plant, wastewater from makeup water production and boiler blowdown water from the cogeneration plant, and occasional releases of cooling tower blowdown and other discharges from the TA-03 power plant, building 03-22 (Figure 4.1-4). SWMU 03-045(b) is part of Consolidated Unit 03-012(b)-00, which includes SWMUs 02-012(b), 03-014(q), and 03-045(c) that are associated with the TA-03 power plant. All wastewater discharged from the TA-03 power plant to SWMU 03-045(b) is treated in a neutralization tank (structure 03-1381); the function of the tank is to adjust the pH of wastewater to meet NPDES requirements before it is discharged. Sulfuric acid and soda ash were used to adjust the pH of wastewater before it was discharged to the SWMU 03-045(b) outfall. The NPDES permit number for the outfall was previously identified as EPA 01A001 but is currently permitted as 001 on the 2007 NPDES authorization permit (EPA 2007, 099009). The outfall is currently authorized to discharge power plant wastewater from cooling towers, boiler blowdown drains, demineralizer backwash, floor and sink drains, and treated sanitary reuse to Sandia Canyon (EPA 2007, 099009, p. 1). The outfall discharges onto sand and gravel southeast of building 03-22 and into a small tributary of Sandia Canyon. Discharge from another permitted outfall (13S) at the TA-46 SWSC plant is pumped to the holding tank 03-336 [SWMU 03-014(q)] for potential reuse and eventually discharges to SWMU 03-045(b). The outfall received effluent from two power plant cooling towers (structures 03-25 and 03-58) and the chlorine building (structure 03-24). Cooling tower (structure 03-25) was demolished in 1990, and a new cooling tower (structure 03-592) was constructed at the same location in 1998 (LANL 2008, 099214); the concrete foundation of structure 03-25 collected stormwater that discharged to the outfall (LANL 1996, 052930, p. 56). The two cooling tower structures (03-58 and 03-592) are currently in operation and continue to discharge to SWMU 03-045(b) (LANL 2008, 099214).

A sulfuric acid release to the SWMU 03-045(b) outfall from the power plant neutralization tank, structure 03-1381, occurred in May 1990 (LANL 1995, 057590, p. 5-27-1). Low pH values were reported in a 2.5-mi

section of the watercourse below the outfall. Soda ash was added along the watercourse to raise the pH. A subsequent survey detected no measurements below pH 6.9 (LANL 1996, 052930, p. 56).

4.1.20.2 Previous Investigations

In 2009, two soil samples were collected from one location at SWMU 03-045(b). The previously sampled location is shown in Figure 4.1-4. Table 4.1-33 presents the samples collected and analyses requested for SWMU 03-045(b).The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-045(b) consisted of the following activities in 2009:

- Soil samples were collected at one location at the outfall from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 69–71), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(b), except for the lateral extent of mercury and silver (Plate 6), and the lateral extent of anthracene, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and TPH-DRO (Plate 15).

Because only one location at the outfall was sampled, the lateral extent of anthracene, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, mercury, phenanthrene, pyrene, silver, and TPH-DRO is not defined downgradient of location 03-608197.

4.1.20.3 Proposed Sampling at SWMU 03-045(b)

Two new sampling locations, 45b-1 and 45b-2, will be placed downgradient of existing location 03-608197 to define the lateral extent of anthracene, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, mercury, phenanthrene, pyrene, silver, and TPH-DRO. Samples from locations 45b-1 and 45b-2 will be analyzed for TAL metals, SVOCs, PCBs, and TPH-DRO. These samples will also be analyzed for hexavalent chromium to define the lateral extent of hexavalent chromium at SWMU 03-012(b). The proposed sampling and analyses at SWMU 03-045(b) are presented in Table 4.1-34, and the proposed sampling locations are shown in Figure 4.1-4.

4.1.21 SWMU 03-045(c), Outfall

4.1.21.1 Site Description and Operational History

SWMU 03-045(c) is NPDES-permitted outfall EPA 03A027, located approximately 55 ft east of SWMU 03-045(b) (LANL 1996, 052930, p. 56) (Figure 4.1-4). SWMU 03-045(c) formerly received effluent from a cooling tower (structure 03-285) that served the generators powering a Laboratory computer system. Cooling tower 03-285 was taken out of service several years ago, and SWMU 03-045(c) now receives blowdown from the cooling towers at the Strategic Computing Complex (building 03-2327), which became operational in 2002. SWMU 03-045(c) may have historically received chromate-treated water (LANL 1996, 052930, pp. 56–57). Outfall 03A027 is currently permitted for the discharge of cooling tower blowdown water and other wastewater from structures 03-285 and 03-2327 (EPA 2007, 099009).

SWMU 03-045(c) is part of Consolidated Unit 03-012(b)-00, which includes SWMUs 03-012(b), 03-014(q), and 03-045(b) that are associated with the TA-03 power plant.

4.1.21.2 Previous Investigations

In 2009, two soil samples were collected from one location at SWMU 03-045(c). The previously sampled location is shown in Figure 4.1-4. Table 4.1-35 presents the samples collected and analyses requested for SWMU 03-045(c).The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-045(c) consisted of the following activities in 2009:

- Soil samples were collected at one location at the outfall from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 72–73), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(c), except for the vertical extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene; and the lateral extent of fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and TPH-DRO (Plate 15).

Because only one location at the outfall was sampled, the lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and TPH-DRO is not defined downgradient of location 03-608196. The lateral extent of inorganic chemicals and hexavalent chromium is also not defined downgradient of location 03-608196.

4.1.21.3 Proposed Sampling at SWMU 03-045(c)

Shallow subsurface samples will be collected at previously sampled location 03-608196, extending the depth at this location to define the vertical extent of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene. Samples from location 03-608196 will be analyzed for SVOCs and PCBs.

Two new sampling locations, 45c-1 and 45c-2, will be placed downgradient of existing location 03-608196 to define the vertical and lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and TPH-DRO. Samples from locations 45c-1 and 45c-2 will be analyzed for TAL metals, SVOCs and PCBs. These samples will also be analyzed for hexavalent chromium to define the lateral extent of hexavalent chromium at SWMU 03-012(b). The proposed sampling and analyses at SWMU 03-045(c) are presented in Table 4.1-36, and the proposed sampling locations are shown in Figure 4.1-4.

4.1.22 SWMU 03-045(e), Outfall

4.1.22.1 Site Description and Operational History

SWMU 03-045(e) is an inactive outfall (Figure 4.1-1) from a floor drain in the oil pump house (structure 03-57) located at the TA-03 power plant, building 03-22 (Figure 4.1-4). One line from each of two diesel fuel storage tanks (structures 03-26 and 03-27) passes through the pump house to the power plant. The diesel fuel is backup fuel for the power plant. Valves in the pump house operate each line and allow diesel fuel to flow from one or both storage tanks. The floor drain was in place to prevent the pump house from filling with diesel fuel in the event a valve junction should rupture or leak. The floor drain and associated drainline to the outfall were plugged in 1989. A concrete apron is located at the point where the drainline discharged into Sandia Canyon (LANL 1995, 057590, pp. 6-7–6-8).

4.1.22.2 Previous Investigations

In 2009, two soil samples were collected from one location at SWMU 03-045(e). The previously sampled location is shown in Figure 4.1-1. Table 4.1-37 presents the samples collected and analyses requested for SWMU 03-045(e).The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-045(e) consisted of the following activities in 2009:

- Soil samples were collected at one location at the outfall from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 187–188), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(e), except for the lateral and vertical extent of fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, TPH-DRO, and zinc; and the lateral extent of Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, and toluene.

The vertical extent of lead, thallium, and zinc is not defined at location 03-608320 (Plate 6), and the vertical extent of fluoranthene, 4-isopropyltoluene, phenanthrene, pyrene, and TPH-DRO is not defined at location 03-608320 (Plate 15). Because only one location at the outfall was sampled, the lateral extent of Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, toluene, and TPH-DRO is not defined downgradient of location 03-608320.

The investigation report states the vertical extent of zinc is not defined at location 03-608320. However, a review of the data indicated the concentration in the deepest sample (54.6 mg/kg at 1.0–2.0 ft bgs) is below the maximum soil background concentration of 75.5 mg/kg. Therefore, the vertical extent of zinc is defined at location 03-608320.

4.1.22.3 Proposed Sampling at SWMU 03-045(e)

Shallow subsurface samples will be collected at previously sampled location 03-608320, extending the depth at this location to define the vertical extent of fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, and TPH-DRO. Samples from location 03-608320 will be analyzed for fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, and TPH-DRO.

Four new sampling locations, 45e-1, 45e-2, 45e-3, and 45e-4 will be placed downgradient of existing location 03-608320 to define the lateral extent of Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, toluene, TPH-DRO, and zinc. Samples from locations 45e-1, 45e-2, 45e-3, and 45e-4 will be analyzed for lead, thallium 4-isopropyltoluene, toluene, SVOCs, PCBs, and TPH-DRO.

The proposed sampling and analyses at SWMU 03-045(e) are presented in Table 4.1-38, and the proposed sampling locations are shown in Figure 4.1-1.

4.1.23 SWMU 03-045(f), Outfall

4.1.23.1 Site Description and Operational History

SWMU 03-045(f) is an outfall from a sink drain that served the TA-03 utilities control center (building 03-223) from 1950 to the late 1980s (Figure 4.1-4). The outfall was located on the north side of the building and discharged to Sandia Canyon. The sink was used as a quench tank for welding and cutting. No releases of hazardous wastes or constituents from the sink to the SWMU 03-045(f) outfall have been documented (LANL 1995, 057590, p. 6-8). The sink was removed in the late 1980s.

4.1.23.2 Previous Investigations

In 2009, four soil samples were collected from two locations at SWMU 03-045(f). Previously sampled locations are shown in Figure 4.1-4. Table 4.1-39 presents the samples collected and analyses requested for SWMU 03-045(f). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-045(f) consisted of the following activities in 2009:

- Soil samples were collected at two locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, and nitrate.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 190–191), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(f), except for the vertical extent of antimony at location 03-608322 (Plate 6) and the vertical extent of Aroclor-1260 at location 03-608321 (Plate 15).

4.1.23.3 Proposed Sampling at SWMU 03-045(f)

Shallow subsurface samples will be collected at two previously sampled locations (03-608321 and 03-608322), extending the depths at these locations to define the vertical extent of antimony and Aroclor-1260. Samples from location 03-608321 will be analyzed for PCBs only, and samples from location 03-608322 will be analyzed for antimony only.

The proposed sampling and analyses at SWMU 03-045(f) are presented in Table 4.1-40, and the proposed sampling locations are shown in Figure 4.1-4.

4.1.24 SWMU 03-045(g), Storm Drain

4.1.24.1 Site Description and Operational History

SWMU 03-045(g) consists of a closed and locked storm drain at the former TA-03 asphalt batch plant that is connected to an outfall, formerly permitted under the NPDES as outfall EPA 04A109 (LANL 1993, 020947, p. 6-12) (Figure 4.1-1). The outfall discharged to a tributary of Sandia Canyon directly south of the former asphalt batch plant. The storm drain has been closed and locked since late 1990. Outfall 04A109 had been permitted to discharge noncontact cooling water and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 2-7). Since 1987, the only discharges from the asphalt plant to the outfall were scrubber water used to collect dust from batching operations (SWMU 03-028) diverted to wash vehicles and equipment and from stormwater from the western portion of the batch plant area. Stormwater from parking lots, roads, and roof drains located west of the former asphalt batch plant also discharged to the outfall. SWMU 03-045(g) is part of Consolidated Unit 03-009(a)-00, which includes several other sites associated with the former asphalt batch plant.

4.1.24.2 Previous Investigations

In 2003 and 2009, a total of 12 samples (6 soil, 4 sediment, and 2 tuff) were collected from five locations at SWMU 03-045(g). Previously sampled locations are shown in Figure 4.1-1. Table 4.1-41 presents the samples collected and analyses requested for SWMU 03-045(g). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

In 2003, four sediment samples were collected within the catch basin of the closed storm drain (located approximately 150 ft north of the outfall). The four samples were collected from two locations at depths of 0–0.5 ft bgs and 1.5–2.0 ft bgs and submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc. 2003, 085517, pp. 10, 26).

Sampling at SWMU 03-045(g) consisted of the following activities in 2009:

- Soil samples were collected from previously sampled location 03-22536 and a new location above the inlet from two depth intervals: 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, TPH-GRO, and cyanide.
- Soil and tuff samples were collected at two locations downgradient of the outfall within the drainage from two depth intervals: 0.0–1.0 and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, TPH-GRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 52–55), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(g), except for the vertical extent of cadmium at location 03-22535, and the vertical extent of chromium at location 03-608187 (Plate 1).

The investigation report states the vertical extent of cadmium is not defined at location 03-22535. However, a review of the data indicated the concentration in the deepest sample (0.63 mg/kg at 1.5–2.0 ft bgs) is below the maximum soil background concentration of 2.6 mg/kg and was not detected in a sample collected at a deeper depth at adjacent location 03-22536. Therefore, the vertical extent of cadmium is defined at location 03-22535.

4.1.24.3 Proposed Sampling at SWMU 03-045(g)

Subsurface samples will be collected at previously sampled location 03-608187, extending the depth at this location to define the vertical extent of chromium. Samples from location 03-608187 will be analyzed for chromium only. The proposed sampling and analyses at SWMU 03-045(g) are presented in Table 4.1-42, and the proposed sampling locations are shown in Figure 4.1-1.

4.1.25 SWMU 03-045(h), Outfall

4.1.25.1 Site Description and Operational History

SWMU 03-045(h) is former NPDES-permitted outfall EPA 03A024 located in TA-03 at the north perimeter of the Sigma Complex security fence, approximately 50 ft north of a former cooling tower (structure 03-187) (Figure 4.1-9). The outfall was formerly permitted for the discharge of treated cooling water and stormwater. It served former cooling tower 03-187 from 1953 to the late 1980s when the cooling tower became inactive. The cooling tower remained inactive until early 1995, when it was reactivated. In 1997, the cooling tower was removed and the outfall pipe plugged. The outfall was removed from the NPDES permit in 2007 (EPA 2007, 099009). The area at the outfall pipe is about 3 ft wide × 6 ft long. Effluent drained into a corrugated-metal storm drainpipe that trended northeast and east of structure 03-187 where it combined with more stormwater runoff from surrounding areas. The drainage continued south and joined a channel north of Eniwetok Drive that ultimately drained into Sandia Canyon. Routine water treatment began in 1968. Treatment included biocides and fungicides to reduce algae growth and chelating agents such as ethylenediaminetetraacetic acid to inhibit corrosion.

4.1.25.2 Previous Investigations

In 2009, two samples were collected from one location at SWMU 03-045(h) as part of the Upper Mortandad Canyon Aggregate Area investigation. The previously sampled location (MO-604952) is shown in Figure 4.1-9. Table 4.1-43 presents the samples collected and analyses requested for SWMU 03-045(h). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

SWMU 03-045(h) is included in the Upper Mortandad Canyon Aggregate Area and was sampled in 2009 in accordance with the approved investigation work plan for the Upper Mortandad Canyon Aggregate Area (LANL 2007, 098954). All data collected as part of the investigation of SWMU 03-045(h) are presented in the 2009 investigation report for the Upper Mortandad Canyon Aggregate Area (LANL 2010, 109180.28). Discharges from SWMU 03-045(h) that drained into the corrugated-metal storm drainpipe to the north of structure 03-187 eventually drained into AOC 03-052(b). Analytical data from AOC 03-052(b) were evaluated to determine the nature and extent of contamination to the north of SWMU 03-045(h).

Sampling at SWMU 03-045(h) consisted of the following activities in 2009:

- A soil and fill sample were collected from location MO-604952, north of cooling tower 03-0187, from two depth intervals: 0.0–0.5 ft and 6.0–7.0 ft bgs (the soil-tuff interface). All samples were analyzed at off-site fixed laboratories for TAL metals, hexavalent chromium, VOCs (subsurface sample only), SVOCs, dioxins and furans, PCBs, cyanide, perchlorate, nitrate, and gamma-emitting radionuclides, tritium, and isotopic uranium.
- Soil and tuff samples were collected from 17 locations at AOC 03-052(b) to define the nature and extent of contamination to the north of SWMU 03-045(h).

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 193–195), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-045(h), except for the vertical extent of barium and cobalt at location MO-604952 (Plate 16).

4.1.25.3 Proposed Sampling at SWMU 03-045(h)

Shallow subsurface samples will be collected at previously sampled location MO-604952, in accordance with the Phase II investigation work plan for Upper Mortandad Canyon Aggregate Area (LANL 2010, 111472), extending the depths at this location to define the vertical extent of barium and cobalt. Samples from location MO-604952 will be analyzed for barium and cobalt only. Additional samples will also be collected as part of the investigation for AOC 03-052(b), as discussed in section 4.1.28.3.

4.1.26 AOC 03-047(g), Drum Storage Area

4.1.26.1 Site Description and Operational History

AOC 03-047(g) is a paved area on the north side of building 03-141 at TA-03 where drums of acetone, vacuum pump oil, and ethylene glycol were stored (Figure 4.1-2). During a 1989 site reconnaissance survey, staining was found on the cement. During a site visit in September 1993, the building manager stated the area had been used for approximately 20 yr to store product oil and occasionally solvents. Only one drum was on the pad when the site visit was conducted. The drum contained mineral oil used in vacuum pumps. As oil was dispensed, spills were known to occur. Stains were evident on the concrete around the barrel; however, the staining did not continue beyond the concrete, indicating small oil spills did not migrate off the concrete pad (LANL 1995, 057590, p. 6-46).

4.1.26.2 Previous Investigations

In 2009, eight soil samples were collected from four locations at AOC 03-047(g). Previously sampled locations are shown in Figure 4.1-2. Table 4.1-44 presents the samples collected and analyses requested for AOC 03-047(g). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-047(g) consisted of the following activities in 2009:

- Soil samples were collected at four locations from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, cyanide, nitrate, and perchlorate.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 198–199), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-047(g), except for the lateral and vertical extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260.

The vertical extent of lead is not defined at locations 03-608324, 03-608325, 03-608326, and 03-608327, and the lateral extent is not defined to the north of locations 03-608325 and 03-608326 (Plate 12). The vertical extent of Aroclor-1242, Aroclor-1254, and Aroclor-1260 is not defined at location 03-608325, and the lateral extent is not defined downgradient of locations 03-608325 and 03-608326 (Plate 2).

The investigation report states the vertical extent of lead is not defined at locations 03-608324 and 06-608326. However, a review of the data indicated the concentrations in the deepest samples from

location 03-608324 (24.9 mg/kg at 1.0–2.0 ft bgs) and location 03-608326 (26.2 mg/kg at 1.0–2.0 ft bgs) are below the maximum soil background concentration of 28 mg/kg. Therefore, the vertical extent of lead is defined at locations 03-608324 and 03-608326.

4.1.26.3 Proposed Sampling at AOC 03-047(g)

Shallow subsurface samples will be collected at two previously sampled locations (03-608325 and 03-608327), extending the depths at these locations to define the vertical extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260. Samples from location 03-608325 will be analyzed for lead and PCBs. Samples from locations 03-608327 will be analyzed for lead only.

Surface and shallow subsurface samples will be collected at two new sampling locations, 47g-1 and 47g-2, to define the lateral extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260 to the north and downgradient of the site. Samples from locations 47g-1 and 47g-2 will be analyzed for lead and PCBs. The proposed sampling and analyses at AOC 03-047(g) are presented in Table 4.1-45, and the proposed sampling locations are shown in Figure 4.1-2.

4.1.27 AOC 03-051(c), Soil Contamination—Vacuum Pump Leak

4.1.27.1 Site Description and Operational History

AOC 03-051(c) consists of two former areas of stained asphalt at TA-03 attributed to operational leaks of vacuum pump oil (Figure 4.1-2) (LANL 1995, 057590, p. 6-84). The first area, located on the east side of building 03-141, measured approximately 6 ft × 6 ft. The second area, located at the northeast corner of the building, measured approximately 10 ft × 15 ft (LANL 1996, 053780, p. 15). Both areas were removed during a voluntary corrective action conducted in August 1995 (LANL 1996, 053780).

4.1.27.2 Previous Investigations

In 2009, four soil samples were collected from two locations at AOC 03-051(c). Previously sampled locations are shown in Figure 4.1-2. Table 4.1-46 presents the samples collected and analyses requested for AOC 03-051(c). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 03-051(c) consisted of the following activities in 2009:

- Soil samples were collected at two locations from two depth intervals: 2.5–3.5 ft and 4.5–5.5 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, SVOCs, TPH-DRO, PCBs, cyanide, nitrate, and perchlorate.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 201–203), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-051(c), except for the lateral and vertical extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, cobalt, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO; and the lateral extent of zinc.

The vertical extent of cobalt is not defined at locations 03-608328 and 03-608329 (Plate 12). The lateral extent of cobalt and zinc is not defined to the northeast and downgradient of the site (Plate 12). The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene,

chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene is not defined at location 03-608329 (Plate 2). The vertical extent of Aroclor-1242, Aroclor-1254, and Aroclor-1260, and TPH-DRO is not defined at location 03-608328 (Plate 2). The lateral extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO is not defined to the northeast and downgradient of the site (Plate 2).

4.1.27.3 Proposed Sampling at AOC 03-051(c)

Shallow subsurface samples will be collected at two previously sampled locations (03-608328 and 03-608329), extending the depths at these locations to define the vertical extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, cobalt, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO. Samples from location 03-608328 will be analyzed for cobalt, PCBs, and TPH-DRO. Samples from location 03-608329 will be analyzed for cobalt and SVOCs.

Shallow subsurface samples will be collected at two new sampling locations, 51c-1 and 51c-2, to define the lateral extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, cobalt, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and zinc to the northeast and downgradient of the site. Samples from locations 51c-1 and 51c-2 will be analyzed for cobalt, zinc, SVOCs, PCBs, and TPH-DRO. The proposed sampling and analyses at AOC 03-051(c) are presented in Table 4.1-47, and the proposed sampling locations are shown in Figure 4.1-2.

4.1.28 AOC 03-052(b), Stormwater-Collection Area

4.1.28.1 Site Description and Operational History

AOC 03-052(b) consists of five stormwater-collection areas at TA-03 about 20 ft north and west of the Sigma Building (03-66) (Figure 4.1-9). Surface runoff flows from the area around the north end of the Sigma Building to three stormwater-collection areas within the building fence, which channel stormwater to two collection areas north of the building 03-66 fence: the area to the northeast of building 03-66 discharges to a storm drain outlet just north of Eniwetok Drive, and the area to the northwest of building 03-66 flows to a single storm drain that discharges to a low-lying grassy area northwest of building 03-66 (LANL 1995, 057590, p. 5-15-1).

4.1.28.2 Previous Investigations

In 1997 and 2009, a total of 47 samples (34 soil, 8 fill, and 5 tuff) were collected from 21 locations at AOC 03-052(b). Previously sampled locations are shown in Figure 4.1-9. Table 4.1-48 presents the samples collected and analyses requested for AOC 03-052(b). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

RFI activities were conducted in 1997 at AOC 03-052(b). Two samples were collected from each of five stormwater collection areas, and one additional sample was collected from the stormwater collection area directly north of building 03-66. Samples were collected from 0.0–1.0 ft, 1.0–2.0 ft, 2.0–3.0 ft, or 4.0–

5.0 ft bgs and field screened for radioactivity and organic chemicals. Screening did not detect organic chemicals and radioactivity was detected at or below background levels (LANL 1997, 056660.4, p. iv). All samples were analyzed for TAL metals and isotopic uranium, and one sample was also analyzed for VOCs.

Sampling at AOC 03-052(b) consisted of the following activities in 2009:

- Soil samples were collected at historical locations 03-03286 from two depth intervals: 7.0–8.0 ft and 10.0–11.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.
- Soil and tuff samples were collected at historical locations 03-03291 from four depth intervals: 1.0–2.0 ft, 4.0–5.0 ft, 7.0–8.0 ft, and 10.0–11.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.
- Soil samples were collected at 10 locations (two within each area) from two depth intervals: 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.
- Soil and tuff samples were collected at three locations along the northern part of the drainage between the northwest and northeast polygons associated with this site from two depth intervals: 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.
- Soil and tuff samples were collected at two locations within the stormwater collection area to the northeast across Eniwetok Drive from two depth intervals: 3.0–4.0 ft and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 205–210), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-052(b), except for the vertical extent of acetone, aluminum, Aroclor-1242, Aroclor-1254, Aroclor-1260, barium, benzo(a)pyrene, benzo(k)fluoranthene, beryllium, 2-butanone, calcium, chrysene, cobalt, copper, manganese, phenanthrene and pyrene, and the lateral and vertical extent of benzo(b)fluoranthene, fluoranthene, and indeno(1,2,3-cd)pyrene.

The vertical extent of aluminum is not defined at location 03-608334; the vertical extent of barium is not defined at locations 03-608334, 03-608335, 03-608336, and 03-608338; and the vertical extent of beryllium is not defined at locations 03-608334, 03-608335, and 03-608336 (Plate 16). The vertical extent of calcium and copper is not defined at locations 03-608334 and 03-608336, the vertical extent of cobalt is not defined at locations 03-608334 and 03-608335, and the vertical extent of manganese is not defined at location 03-608335 (Plate 16).

The vertical extent of acetone is not defined at locations 03-608335, 03-608340, 03-608341, 03-608343, and 03-608344 (Plate 17). The vertical extent of Aroclor-1242 is not defined at location 03-608344, and the vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 03-03286 (Plate 17). The vertical extent of 2-butanone is not defined at location 03-608341; the vertical extent of benzo(b)fluoranthene, fluoranthene, and indeno(1,2,3-cd)pyrene is not defined at locations 03-608330 and 03-608331; and the vertical extent of benzo(a)pyrene, benzo(k)fluoranthene, chrysene, phenanthrene, and pyrene is not defined at location 03-608330 (Plate 17).

The investigation report states the lateral extent of benzo(b)fluoranthene, fluoranthene, and indeno(1,2,3-cd)pyrene is not defined. However, a review of the data indicated the concentrations decreased or did not

change from location 03-608330 to location 03-608331 (Plate 17). These two locations are within a large drainage catchment that receives stormwater runoff from parking lots around the Sigma Building (03-66) and other buildings in the area. Because concentrations of benzo(b)fluoranthene, fluoranthene, and indeno(1,2,3-cd)pyrene were not detected at upgradient locations, the detected concentrations are most likely the result of runoff from surrounding parking lots and not from AOC 03-052(b). Therefore, the lateral extent of benzo(b)fluoranthene, fluoranthene, and indeno(1,2,3-cd)pyrene is defined.

4.1.28.3 Proposed Sampling at AOC 03-052(b)

Shallow subsurface samples will be collected at 11 previously sampled locations (03-03286, 03-608330, 03-608331, 03-608334, 03-608335, 03-608336, 03-608338, 03-608340, 03-608341, 03-608343, and 03-608344), extending the depths at these locations to define the vertical extent of acetone, aluminum, Aroclor-1242, Aroclor-1254, Aroclor-1260, barium, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, beryllium, 2-butanone, calcium, chrysene, cobalt, fluoranthene, indeno(1,2,3-cd)pyrene, manganese, phenanthrene, and pyrene.

Samples from location 03-03286 will be analyzed for PCBs only. Samples from locations 03-608330 and 03-608331 will be analyzed for SVOCs only. Samples from location 03-608334 will be analyzed for aluminum, barium, beryllium, calcium, cobalt, and copper, and samples from location 03-608335 will be analyzed for acetone, barium, beryllium, cobalt, and manganese. Samples from location 03-608336 will be analyzed for barium, beryllium, calcium, and copper, and samples from location 03-608338 will be analyzed for barium only. Samples from locations 03-608340 and 03-608343 will be analyzed for acetone only, samples from location 03-608341 will be analyzed for acetone and 2-butanone, and samples from location 03-608344 will be analyzed for acetone and PCBs.

The proposed sampling and analyses at AOC 03-052(b) are presented in Table 4.1-49, and the proposed sampling locations are shown in Figure 4.1-9.

4.1.29 SWMU 03-052(f), Outfall

4.1.29.1 Site Description and Operational History

SWMU 03-052(f) is part of Consolidated Unit 03-013(a)-00, which consists of SWMUs 03-013(a) and 03-052(f). SWMU 03-052(f) is former NPDES-permitted outfall EPA 03A023 (Figure 4.1-10), which received wastewater from floor drains [AOC 03-013(b)], sinks, water fountains, and a storm drain [SWMU 03-013(a)] that served a maintenance shop (building 03-38) until 1987 when the drains were rerouted to the TA-03 sanitary sewer system. Stoddard solvents, dry acid, and caustic materials from the maintenance shop were discarded through sinks and floor drains to this outfall. Spent paint solvents and cutting oils contaminated with machined beryllium particles may also have been released to the floor drains during the 1960s and 1970s. In addition, cooling water for welding torches was discharged directly to the drains. The first spill was approximately 200 gal. of a water-waste oil mixture that was discharged when an automatic compressor blowdown mechanism failed. A second spill from a ruptured air-compressor oil line resulted in the release of approximately 1 qt of compressor oil to the drain. This spill produced an oily sheen on the surface of the water at the SWMU 03-052(f) outfall (LANL 1995, 057590, p. 5-25-1). A third spill occurred when approximately 15 gal. of diesel fuel was released from a ruptured truck fuel line into the utilities construction trench between buildings 03-1793 and 03-1794. On the same day, a clay sewer pipe in the utility trench broke, releasing approximately 2000 gal. of wastewater into the excavation. A sump was used to remove the wastewater from the excavation, and the wastewater was discharged to SWMU 03-052(f). Diesel-contaminated asphalt and soil were removed and disposed of.

Runoff from parking lots and the surrounding areas also discharges to the outfall (LANL 1995, 057590, p. 5-25-2). Outfall 03A023 was removed from the NPDES permit on July 11, 1997.

4.1.29.2 Previous Investigations

In 2009, 14 samples (10 soil and 4 tuff) were collected from seven locations at SWMU 03-052(f). Previously sampled locations are shown in Figure 4.1-10. Table 4.1-50 presents the samples collected and analyses requested for SWMU 03-052(f). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-052(f) consisted of the following activities in 2009:

- Soil and tuff samples were collected at seven locations along the storm drainage from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 76–79), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-052(f), except for the vertical extent of acenaphthene, anthracene, Aroclor-1260, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, chrysene, copper, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO; and the lateral extent of Aroclor-1254 and fluoranthene.

The vertical extent of barium is not defined at locations 03-608215 and 03-608216; the vertical extent of chromium is not defined at locations 03-608215, 03-608216, 03-608217, 03-608219, and 03-608220; and the vertical extent of copper and lead is not defined at location 03-608217 (Figure 4.1-11). The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO is not defined at location 03-608219; the vertical extent of Aroclor-1260 is not defined at location 03-608217; the vertical extent of fluoranthene is not defined at location 03-608214; and the lateral extent of Aroclor-1254 and fluoranthene is not defined downgradient of location 03-608219 (Figure 4.1-12).

The investigation report states the vertical extent of barium is not defined at location 03-608215. However, a review of the data indicated the concentration in the deepest sample (48.8 mg/kg at 1.0–2.0 ft bgs) is below the maximum Qbt 2, 3, and 4 background concentration of 51.6 mg/kg. Therefore, the vertical extent of barium is defined at location 03-608215.

4.1.29.3 Proposed Sampling at SWMU 03-052(f)

Shallow subsurface samples will be collected at six previously sampled locations (03-608214, 03-608215, 03-608216, 03-608217, 03-608219, and 03-608220), extending the depths at these locations to define the vertical extent of acenaphthene, anthracene, Aroclor-1260, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, chrysene, copper, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO. Samples from location 03-608214 will be analyzed for fluoranthene only. Samples from location 03-608215 will be analyzed for chromium only, and samples from location 03-608216 will be analyzed for barium and chromium. Samples from location 03-608217 will be analyzed for chromium, copper, lead, and PCBs. Samples from location 03-608219 will be analyzed

for chromium, SVOCs, and TPH-DRO, and samples from location 03-608220 will be analyzed for chromium only.

One new sampling location, 52f-1, will be placed downgradient of existing location 03-608219 to define the lateral extent of Aroclor-1254 and fluoranthene. Samples from location 52f-1 will be analyzed for fluoranthene and PCBs.

The proposed sampling and analyses at SWMU 03-52(f) are presented in Table 4.1-51, and the proposed sampling locations are shown in Figure 4.1-10.

4.1.30 AOC 03-053, Floor Drains

4.1.30.1 Site Description and Operational History

AOC 03-053 consists of floor drains in the basement of building 03-141 at TA-03 (Figure 4.1-2). The floor drains historically discharged to SWMU 03-015 but were rerouted to the TA-50 RLW line before 1992. From 1962 to 1990, building 03-141 housed electrochemical and DU-processing facilities. Powder characterization, plasma flame spray processing, and beryllium processing were also performed (LANL 1995, 057590, p. 5-24-1). AOC 03-053 is part of Consolidated Unit 03-015-00, which includes an outfall (SWMU 03-015) and the floor drains in the basement of building 03-141.

4.1.30.2 Previous Investigations

In 1994 and 2009, a total of 21 samples (20 soil and 1 sediment) were collected from 11 locations at AOC 03-053. Previously sampled locations are shown in Figure 4.1-2. Table 4.1-23 presents the samples collected and analyses requested for AOC 03-053 and SWMU 03-015. The sampling results are presented in the investigation report (LANL 2010, 110862.24). Section 4.1.15.2 summarizes previous investigations conducted in 2009 at AOC 03-053 and SWMU 03-015.

4.1.30.3 Proposed Sampling at AOC 03-053

AOC 03-053 and SWMU 03-015 will be sampled together to complete the characterization of the outfall. Section 4.1.15.3 presents the proposed sampling for AOC 03-053 and SWMU 03-015. The proposed sampling and analyses at SWMU 03-015 and AOC 03-053 are presented in Table 4.1-24, and the proposed sampling locations are shown in Figure 4.1-2.

4.1.31 SWMU 03-056(a), Accumulation Area

4.1.31.1 Site Description and Operational History

SWMU 03-056(a) is an inactive spent-oil accumulation area built in 1986 at TA-03. The 12-ft × 45-ft structure is located approximately 15 ft north of building 03-271 (Figure 4.1-7). The accumulation area has a concrete floor that slopes toward a small sump and is surrounded by a concrete berm. The area is roofed, but the sides are open. No spills from the bermed area to the environment have been documented (LANL 1993, 020947, p. 6-36).

4.1.31.2 Previous Investigations

In 2001 and 2009, a total of 12 samples (4 fill and 8 soil) were collected from eight locations at SWMU 03-056(a). Previously sampled locations are shown in Figure 4.1-7. Table 4.1-52 presents the

samples collected and analyses requested for SWMU 03-056(a). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

In 2001, samples were collected to determine the nature and extent of any residual TPH or lead contamination at the site. Four asphalt samples were collected next to each side of the concrete storage pad, approximately 1 ft away from the edge of the pad. Soil samples were also collected directly beneath the asphalt (at depths of 0.5–1.0 ft bgs) at each of the four asphalt sampling locations for a total of eight samples (LANL 2001, 070937). All samples were submitted for laboratory analysis of TAL metals; the soil samples were also submitted for analysis of TPH-DRO.

Sampling at SWMU 03-056(a) consisted of the following activities in 2009:

- Soil samples were collected at four locations next to the concrete (one on each side of the concrete floor) from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 213–215), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-056(a), except for the vertical extent of Aroclor-1254 at location 03-608347; the vertical extent of Aroclor-1260 at locations 03-608347, 03-608348, 03-608349, and 03-608350; the vertical extent of TPH-DRO at locations 03-608347, 03-608348, and 03-608350; and the lateral extent of Aroclor-1254, Aroclor-1260, and TPH-DRO (Plate 14).

The investigation report states the lateral extent of Aroclor-1254, Aroclor-1260, and TPH-DRO is not defined. However, a review of the data indicated the concentrations decreased downgradient to the east of the site from locations 03-608348 and 03-608350 to location 03-608349 (Plate 14). Therefore, the lateral extent of Aroclor-1254, Aroclor-1260, and TPH-DRO is defined at SWMU 03-056(a).

4.1.31.3 Proposed Sampling at SWMU 03-056(a)

Shallow subsurface samples will be collected at four previously sampled locations (03-608347, 03-608348, 03-608349, and 03-608350), extending the depths at these locations to define the vertical extent of Aroclor-1254, Aroclor-1260, and TPH-DRO. Samples from locations 03-608347, 03-608348, and 03-608350 will be analyzed for PCBs and TPH-DRO, and samples from location 03-608349 will be analyzed for PCBs only.

The proposed sampling and analyses at SWMU 03-056(a) are presented in Table 4.1-53, and the proposed sampling locations are shown in Figure 4.1-7.

4.1.32 SWMU 03-056(d), Drum Storage Area

4.1.32.1 Site Description and Operational History

SWMU 03-056(d) is a drum storage area located on the northeast side of the inactive Plant 1 trickling filter [SWMU 03-014(c)] associated with the former TA-03 WWTP (Figure 4.1-6). SWMU 03-056(d) is a component of Consolidated Unit 03-014(a)-99, which contains 20 of the 30 SWMUs and AOCs associated with the former WWTP. Use of the storage area began in 1965. The storage area consists of an asphalt base and two bermed areas that measure 25 ft × 5 ft × 10 in. deep. The berms were constructed in 1989. The asphalt floor of the bermed area was covered with oil-absorbing material (LANL 1995, 057590, p. 6-48). Before 1989, only containers of lubricating oil were stored at this site. Inactive containers were placed on pallets over bare soil. Active containers were mounted in racks with drip pans

beneath. Use of the storage area ceased in 1992 when the TA-46 SWSC plant came online and the TA-03 WWTP was decommissioned.

4.1.32.2 Previous Investigations

In 2009, two soil samples were collected from one location at SWMU 03-056(d). The previously sampled location is shown in Figure 4.1-6. Table 4.1-54 presents the samples collected and analyses requested for SWMU 03-056(d). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-056(d) consisted of the following activities in 2009:

- Soil samples were collected at one location from two depth intervals: 0.0–1.0 ft and 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 141–143), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-056(d), except for the lateral and vertical extent of copper, cyanide, mercury, silver, Aroclor-1254, Aroclor-1260, and TPH-DRO.

The vertical extent of copper, cyanide, mercury, and silver is not defined at location 03-608288 (Plate 9). The vertical extent of Aroclor-1254, Aroclor-1260, and TPH-DRO is also not defined at location 03-608288 (Plate 10). The lateral extent of copper, cyanide, mercury, and silver is not defined to the west of location 03-608288, and the lateral extent of cyanide and mercury is not defined to the south of location 03-608288 (Plate 9). The lateral extent of Aroclor-1254 and Aroclor-1260 is not defined to the west and south of location 03-608288, and the lateral extent of TPH-DRO is not defined to the west, south, and north of location 03-608288 (Plate 10).

4.1.32.3 Proposed Sampling at SWMU 03-056(d)

Shallow subsurface samples will be collected at previously sampled location 03-608288, extending the depth at this location to define the vertical extent of copper, cyanide, mercury, silver, Aroclor-1254, Aroclor-1260, and TPH-DRO. Samples from location 03-608288 will be analyzed for copper, cyanide, mercury, silver, PCBs, and TPH-DRO.

Three new sampling locations, 56d-1, 56d-2, and 56d-3, will be placed near existing perimeter locations to define the lateral extent of copper, cyanide, mercury, silver, Aroclor-1254, Aroclor-1260, and TPH-DRO. A new location, 56d-1, will be placed to the west of location 03-608288 to define the lateral extent of copper, cyanide, mercury, silver, Aroclor-1254, Aroclor-1260, and TPH-DRO. Samples from location 56d-1 will be analyzed for copper, cyanide, mercury, silver, PCBs, and TPH-DRO. A new location, 56d-2, will be placed to the south of location 03-608288 to define the lateral extent of cyanide, mercury, Aroclor-1254, Aroclor-1260, and TPH-DRO. Samples from location 56d-2 will be analyzed for cyanide, mercury, PCBs, and TPH-DRO. A new location, 56d-3, will be placed to the north of location 03-608288 to define the lateral extent of TPH-DRO. Samples from location 56d-3 will be analyzed for TPH-DRO only.

The proposed sampling and analyses at SWMU 03-056(d) are presented in Table 4.1-55, and the proposed sampling locations are shown in Figure 4.1-6.

4.1.33 AOC 03-056(k), Container Storage Area

4.1.33.1 Site Description and Operational History

AOC 03-056(k) is a container storage area on the north side of a loading dock at the northwest corner of the Sigma Building, 03-66 (Figure 4.1-9). Waste oil, solvents, and radioactively contaminated graphite were staged in this area (LANL 1990, 007511, p. 3-056). Four documented releases of radiological materials are known to have occurred at this site (LANL 1995, 057590, pp. 5-15-1, 5-15-3–5-15-4).

4.1.33.2 Previous Investigations

In 1997 and 2009, a total of 35 samples (4 asphalt, 14 fill, and 17 soil) were collected from 13 locations at AOC 03-056(k). Previously sampled locations are shown in Figure 4.1-9. Table 4.1-56 presents the samples collected and analyses requested for AOC 03-056(k). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

RFI activities were conducted in 1997 at AOC 03-056(k). Ten soil and fill samples were collected from six locations at depths ranging from 0–4.5 ft bgs. Four asphalt samples were collected from four of the locations. The samples were field screened for organic chemicals and radioactivity. Screening did not detect organic chemicals, and radioactivity was at or below BVs (LANL 1997, 056660.4, pp. 101, 104). All samples were submitted for laboratory analysis of isotopic uranium; all soil and fill samples were submitted for laboratory analysis of metals. One asphalt sample and one fill sample were analyzed for gross-alpha and -beta radiation and by gamma spectroscopy. One fill sample was also analyzed for VOCs.

Sampling at AOC 03-056(k) consisted of the following activities in 2009:

- Fill samples were collected at sampling location 03-03290 from two depth intervals: 3.0–4.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, americium-241, isotopic plutonium, and isotopic uranium.
- Soil and fill samples were collected at sampling location 03-03281 from two depth intervals: 3.0–4.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for VOCs, SVOCs, and PCBs.
- Soil samples were collected at three new locations to the south, west, and northeast of the historical sampling locations from three depth intervals: 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, americium-241, isotopic plutonium, and isotopic uranium.
- Fill and soil samples were collected at four new locations from two depth intervals: 1.0–2.0 ft and 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for VOCs, SVOCs, and PCBs.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 220–224), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 03-056(k), except for the vertical extent of acetone, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 2-butanone, chrysene, fluoranthene, 4-isopropyltoluene, phenanthrene, pyrene, and toluene and the lateral and vertical extent of lead.

The vertical extent of lead is not defined at location 03-608353 (Plate 16). The vertical extent of acetone is not defined at locations 03-608355, 03-608356, and 03-608357, and the vertical extent of Aroclor-1254

and Aroclor-1260 is not defined at locations 03-03290 and 03-608355 (Plate 17). The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene is not defined at location 03-03281, and the vertical extent of benzo(k)fluoranthene is not defined at location 03-608355 (Plate 17). The vertical extent of 2-butanone is not defined at locations 03-608355 and 03-608357, and the vertical extent of fluoranthene is not defined at locations 03-03281 and 03-608356 (Plate 17). The vertical extent of 4-isopropyltoluene is not defined at locations 03-608356 and 03-608357, the vertical extent of phenanthrene and pyrene is not defined at locations 03-03281 and 03-608356, and the vertical extent of toluene is not defined at location 03-608357 (Plate 17).

The investigation report stated that the lateral extent of lead is not defined. However, a review of the data indicated the concentrations decreased downgradient to the north from location 03-608353 to locations 03-608351 and 03-608352 (Plate 16). Therefore, the lateral extent of lead is defined.

4.1.33.3 Proposed Sampling at AOC 03-056(k)

Shallow subsurface samples will be collected at six previously sampled locations (03-03281, 03-03290, 03-608353, 03-608355, 03-608356, and 03-608357), extending the depths at these locations to define the vertical extent of acetone, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 2-butanone, chrysene, fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, and toluene. Samples from location 03-03281 will be analyzed for SVOCs only, and samples from location 03-03290 will be analyzed for PCBs only. Samples from 03-608353 will be analyzed for lead only. Samples from location 03-608355 will be analyzed for acetone, 2-butanone, benzo(k)fluoranthene, and PCBs; samples from location 03-608356 will be analyzed for acetone, 4-isopropyltoluene, fluoranthene, phenanthrene, pyrene; and samples from location 03-608357 will be analyzed for acetone, 2-butanone, 4-isopropyltoluene, and toluene.

The proposed sampling and analyses at AOC 03-056(k) are presented in Table 4.1-57, and the proposed sampling locations are shown in Figure 4.1-9.

4.1.34 SWMU 03-059, Former Storage Area

4.1.34.1 Site Description and Operational History

SWMU 03-059 is a former storage area at TA-03 that is approximately 250 ft × 115 ft and is located next to the south side of building 03-271 (Figure 4.1-7). The perimeter is fenced, except for the part that abuts building 03-271. With the exception of two small portions of the storage area, it is asphalt-paved. SWMU 03-059 is part of Consolidated Unit 03-059-00, which consists of AOC 03-003(n), the location of a one-time PCB spill, and SWMU 03-059.

4.1.34.2 Previous Investigations

In 2009, 34 soil samples were collected from 17 locations at SWMU 03-059. Previously sampled locations are shown in Figure 4.1-7. Table 4.1-58 presents the samples collected and analyses requested for SWMU 03-059. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 03-059 consisted of the following activities in 2009:

- Soil samples were collected at 17 locations from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft beneath the asphalt. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, cyanide, perchlorate, nitrate, and tritium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 232–236), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 03-059, except for the vertical extent of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, TPH-DRO, and tritium.

The vertical extent of Aroclor-1254 is not defined at locations 03-608384 and 03-608386, and the vertical extent of Aroclor-1260 is not defined at locations 03-608386 (Plate 14). The vertical extent of acenaphthene and anthracene is not defined at locations and 03-608377 and 03-608386; and the vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and indeno(1,2,3-cd)pyrene is not defined at location 03-608377 (Plate 14). The vertical extent of fluorene is not defined at location 03-608386; the vertical extent of phenanthrene and pyrene is not defined at locations 03-608377 and 03-608386; and the vertical extent of TPH-DRO is not defined at locations 03-608373, 03-608374, 03-608377, 03-608378, and 03-608386 (Plate 14). The vertical extent of tritium is not defined at location 03-608383, 03-608386, and 03-608387 (Plate 18).

4.1.34.3 Proposed Sampling at SWMU 03-059

Shallow subsurface samples will be collected at eight previously sampled locations (03-608373, 03-608374, 03-608377, 03-608378, 03-608383, 03-608384, 03-608386, and 03-608387), extending the depths at these locations to define the vertical extent of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, TPH-DRO, and tritium. Samples from locations 03-608373 and 03-608374 will be analyzed for TPH-DRO only, and samples from location 03-608377 will be analyzed for SVOCs and TPH-DRO. Samples from 03-608378 will be analyzed for TPH-DRO only, and samples from location 03-608383 will be analyzed for tritium only. Samples from location 03-608384 will be analyzed for PCBs only; samples from location 03-608386 will be analyzed for SVOCs, PCBs, TPH-DRO, and tritium; and samples from location 03-608387 will be analyzed for tritium only.

The proposed sampling and analyses at SWMU 03-059 are presented in Table 4.1-59, and the proposed sampling locations are shown in Figure 4.1-7.

4.1.35 AOC C-03-022, Kerosene Tanker Trailer

4.1.35.1 Site Description and Operational History

AOC C-03-022 is the former location of a tanker trailer used to store and distribute kerosene for former asphalt batch plant operations (Figure 4.1-1). The tanker trailer was located in a bermed materials storage area on a hill directly north of the former TA-03 asphalt batch plant. The tanker was in service for approximately 15 yr and supplied kerosene through a gravity-feed line that had a valve near the oil distributor tank, AOC C-03-016, located approximately 12 ft south (directly below the hill) of the tanker. The tanker and gravity-feed line were removed in 1989, and kerosene was replaced with No. 2 diesel fuel. No record of release is associated with this storage tanker.

4.1.35.2 Previous Investigations

In 2009, eight soil samples were collected from four locations at AOC C-03-022. Previously sampled locations are shown in Figure 4.1-1. Table 4.1-60 presents the samples collected and analyses requested for AOC C-03-022. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC C-03-022 consisted of the following activities in 2009:

- Soil samples were collected at four locations on each side of the former tanker site from two depth intervals: 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals and TPH-DRO.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 237–238), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC C-03-022, except for the lateral and vertical extent of calcium and TPH-DRO.

The lateral extent of calcium is not defined to the south and downgradient from location 03-608392, and the vertical extent of calcium is not defined at location 03-608392 (Plate 1). The lateral extent of TPH-DRO is not defined to the north of location 03-608389, and the vertical extent of TPH-DRO is not defined at location 03-608389 (Plate 3).

4.1.35.3 Proposed Sampling at AOC C-03-022

Shallow subsurface samples will be collected at two previously sampled locations (03-608389 and 03-608392), extending the depths at these locations to define the vertical extent of calcium and TPH-DRO. Samples from location 03-608389 will be analyzed for TPH-DRO only, and samples from location 03-608392 will be analyzed for calcium only.

Shallow subsurface samples will be collected at four new sampling locations to define the lateral extent of calcium and TPH-DRO. A new location, 22-1, will be placed to the south and downgradient of location 03-608392. Samples from location 22-1 will be analyzed for calcium only. Three new locations, 22-2, 22-3, and 22-4, will be placed to the north of location 03-608389. Samples from these locations will be analyzed for TPH-DRO only.

The proposed sampling and analyses at AOC C-03-022 are presented in Table 4.1-61, and the proposed sampling locations are shown in Figure 4.1-1.

4.2 TA-60

TA-60, also known as Sigma Mesa Site, was created from the eastern portion of TA-03 and lies on Sigma Mesa, between Sandia and Mortandad canyons. All buildings at TA-60 are located on the western end of the mesa and contain Laboratory support and maintenance operations and subcontractor-service facilities. The NTS Test Fabrication Facility and the NTS test tower (buildings 60-17 and 60-19, respectively); several small abandoned experimental areas, including a solar pond and a test drill hole; and storage sites for pesticides, topsoil, and recyclable asphalt are also located at TA-60 (LANL 1999, 064617, p. 2-25).

4.2.1 SWMU 60-002, Storage Areas

4.2.1.1 Site Description and Operational History

SWMU 60-002 consists of three former storage areas (designated as west, central, and east) on Sigma Mesa at TA-60 (Figures 4.2-1, 4.2-2, 4.2-3, respectively). The former western storage area (Figure 4.2-1) measures approximately 150 ft × 300 ft and is located approximately 300 ft southeast of building 60-2, on the north side of the unimproved portion of Eniwetok Drive that traverses the mesa. Historically, piles of concrete blocks, wooden poles, tuff, fill, and cables were stored at this location. A large mound of fill, with pieces of cured asphalt and concrete, was situated in the northern portion of the site. The central storage area (Figure 4.2-2) was located approximately 50 ft north of the Roads and Grounds salt and sand storage facility (building 60-178) and consisted of a 50-ft-diameter mound of fill approximately 10 ft high with construction debris, including concrete fence post supports, pipe, metal strips, and wood. The eastern storage area is on the south side of the unimproved portion of Eniwetok Drive about 300 ft west of SWMU 60-007(a) near the east end of Sigma Mesa (Figure 4.2-3). This area was used to stage piles of broken cured asphalt removed from roadways and parking lots for recycling (LANL 2005, 100704). The eastern storage area is currently the site of the Laboratory's asphalt batch plant (Shaw Environmental Inc., 2003, 085517, p. 1).

4.2.1.2 Previous Investigations

No sampling was conducted at SWMU 60-002 (central) and SWMU 60-002 (east) because the nature and extent of contamination had been defined (LANL 2008, 103404.14). In 2009, 12 samples (7 soil and 5 tuff) were collected from six locations at SWMU 60-002 (west). Previously sampled locations are shown in Figure 4.2-1. Table 4.2-1 presents the samples collected and analyses requested for SWMU 60-002 (west). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 60-002 (west) consisted of the following activities in 2009:

- Soil and tuff samples were collected at six locations from two depth intervals: 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, TPH-GRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 242–245), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 60-002 (west), except for the lateral and vertical extent of barium, cobalt, copper, magnesium, nickel, and vanadium and the vertical extent of aluminum, calcium, and lead.

The lateral extent of barium, cobalt, copper, magnesium, nickel, and vanadium is not defined to the north and downgradient of location 03-608393 (Plate 19). The vertical extent of aluminum is not defined at locations 03-608394 and 03-608398; the vertical extent of barium is not defined at locations 03-608393 and 03-608397; the vertical extent of calcium is not defined at location 03-608394; the vertical extent of cobalt, copper, and vanadium is not defined at locations 03-608393 and 03-608398; and the vertical extent of lead, magnesium, and nickel is not defined at locations 03-608393, 03-608394, 03-608397, and 03-608398 (Plate 19).

The investigation report states the vertical extent of lead is not defined at locations 03-608393 and 06-608398. However, a review of the data indicated the concentrations in the deepest sample at location 03-608393 (14.7 mg/kg at 4.0–5.0 ft bgs) and location 03-608398 (12.4 mg/kg at 4.0–5.0 ft bgs) are below the maximum Qbt 2, 3, and 4 background concentration of 15.5 mg/kg (Plate 19). Therefore, the vertical extent of lead is defined at locations 03-608393 and 03-608398.

The investigation report states the vertical extent of aluminum, nickel, and vanadium is not defined at location 06-608398. However, a review of the data indicated concentrations decreased with depth. Aluminum concentrations decreased from 19,800 mg/kg at 1.0–2.0 ft bgs to 10,500 mg/kg at 4.0–5.0 ft bgs; nickel concentrations decreased from 9.96 mg/kg at 1.0–2.0 ft bgs to 7.11 mg/kg at 4.0–5.0 ft bgs; and vanadium concentrations decreased from 26.2 mg/kg at 1.0–2.0 ft bgs to 23.0 mg/kg at 4.0–5.0 ft bgs (Plate 19).Therefore, the vertical extent of aluminum, nickel, and vanadium is defined at location 03-608398.

4.2.1.3 Proposed Sampling at SWMU 60-002

Shallow subsurface samples will be collected at four previously sampled locations (03-608393, 03-608394, 03-608397, and 03-608398), extending the depths at these locations to define the vertical extent of aluminum, barium, calcium, cobalt, copper, lead, magnesium, nickel, and vanadium. Samples from location 03-608393 will be analyzed for barium, cobalt, copper, magnesium, nickel, and vanadium. Samples from location 03-608394 will be analyzed for aluminum, calcium, lead, magnesium, and nickel. Samples from 03-608397 will be analyzed for barium, lead, magnesium, and nickel; and samples from 03-608398 will be analyzed for cobalt, copper, and magnesium.

Shallow subsurface samples will be collected at two new sampling location, 2w-1 and 2w-2, to define the lateral extent of barium, cobalt, copper, magnesium, nickel, and vanadium to the north and downgradient of location 03-608393. Samples from location 2w-1 and 2w-2 will be analyzed for barium, cobalt, copper, magnesium, nickel, and vanadium.

The proposed sampling and analyses at SWMU 60-002 (west) are presented in Table 4.2-2, and the proposed sampling locations are shown in Figure 4.2-1.

4.2.2 AOC 60-004(f), Storage Area

4.2.2.1 Site Description and Operational History

AOC 60-004(f) consists of two formerly used unpaved bermed pads, Pad 2 and Pad 3, located at TA-60 southeast of building 60-2 (Figure 4.2-1). Pad 2 was 12 ft × 65 ft, and Pad 3 was 12 ft × 40 ft. Both pads stored 55-gal. containers that dispensed Stoddard solvent, antifreeze, motor oil, grease, transmission fluid, and window-washing fluid. The pads were constructed in 1978 when the maintenance warehouse (building 60-2) was built. In 1985, 6-in. asphalt berms were built at the open ends of both pads to mitigate rainfall run-on and runoff. In 1990, all containers were removed from the pads. Both pads were stained and had a petroleum odor (LANL 1993, 020947, pp. 5-15–5-16).

4.2.2.2 Previous Investigations

In 2009, 20 samples (14 soil and 6 tuff) were collected from five locations at AOC 60-004(f). Previously sampled locations are shown in Figure 4.2-1. Table 4.2-3 presents the samples collected and analyses requested for AOC 60-004(f). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC 60-004(f) consisted of the following activities in 2009:

- Soil and tuff samples were collected at five locations from four depth intervals: 1.0–2.0 ft, 2.0–3.0 ft, 4.0–5.0 ft, and 9.0–10.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, VOCs, SVOCs, TPH-DRO, cyanide, and tritium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 255–258), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 60-004(f), except for the lateral extent of copper, lead, mercury, silver, and zinc (Plate 19) and the lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and TPH-DRO (Plate 20) to the northeast and downgradient of location 03-608407.

4.2.2.3 Proposed Sampling at AOC 60-004(f)

Shallow subsurface samples will be collected at two new sampling locations, 4f-1 and 4f-2, to define the lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, copper, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, mercury, naphthalene, phenanthrene, pyrene, silver, TPH-DRO, and zinc. Samples from locations 4f-1 and 4f-2 will be analyzed for copper, lead, mercury, silver, zinc, SVOCs, PCBs, and TPH-DRO.

The proposed sampling and analyses at AOC 60-004(f) are presented in Table 4.2-4, and the proposed sampling locations are shown in Figure 4.2-1.

4.2.3 SWMU 60-006(a), Septic System

4.2.3.1 Site Description and Operational History

SWMU 60-006(a) is the former location of a decommissioned septic system located at TA-60 on Sigma Mesa near the northeast corner of the fence surrounding buildings 60-17 and 60-19 (Figure 4.2-2). The septic system consisted of a 1000-gal. septic tank (removed in 2009) and associated 4-ft-wide × 50-ft-deep seepage pit. No outfall is associated with this system. This septic system formerly served buildings 60-17 (NTS Test Fabrication Facility) and 60-19 (NTS test tower). Building 60-17 began operating in 1986 to fabricate equipment for testing activities carried out at NTS. From 1986 to 1989, wastewater generated from facility bathrooms and seven floor drains, including one in a paint booth, discharged to the septic system. In 1989, building 60-17 was connected to the sanitary sewer.

4.2.3.2 Previous Investigations

In 2009, 16 tuff samples were collected from four locations at SWMU 60-006(a). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-5 presents the samples collected and analyses requested for SWMU 60-006(a). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 60-006(a) consisted of the following activities in 2009:

- The septic tank was excavated in accordance with the approved work plan (LANL 2008, 100693; NMED 2008, 102721).
- Tuff samples were collected at three locations at and near the inlet and outlet areas of the tank's former location from three depth intervals ranging from 18.0–30.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, nitrate, perchlorate, americium-241, isotopic plutonium, isotopic uranium, and tritium.

- Tuff samples were collected at one borehole approximately 4 ft downgradient from seven depth intervals: 10.0–11.0 ft, 14.0–15.0 ft, 18.0–19.0 ft, 23.0–24.0 ft, 35.0–36.0 ft, 55.0–56.0 ft, and 60.0–61.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, nitrate, perchlorate, americium-241, isotopic plutonium, isotopic uranium, and tritium.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 260–263), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 60-006(a), except for the lateral and vertical extent of nitrate; the lateral extent of perchlorate; and the vertical extent of Aroclor-1242, Aroclor-1254, Aroclor-1260, and tritium.

The vertical extent of nitrate is not defined at location 03-608412, and the lateral extent of nitrate and perchlorate is not defined to the north and downgradient of location 03-608412 (Figure 4.2-4). The vertical extent of Aroclor-1242, Aroclor-1254 and Aroclor-1260 is not defined at location 03-608410 (Figure 4.2-5). The vertical extent of tritium is not defined at location 03-608411 (Figure 4.2-6).

4.2.3.3 Proposed Sampling at SWMU 60-006(a)

Subsurface samples will be collected at three previously sampled locations (03-608410, 03-608411, and 03-608412), extending the depths at these locations to define the vertical extent of nitrate, Aroclor-1242, Aroclor-1254, Aroclor-1260, and tritium. Samples from location 03-608410 will be analyzed for PCBs only, samples from location 03-608411 will be analyzed for tritium only, and samples from location 03-608412 will be analyzed for nitrate only.

Subsurface samples will be collected at a new sampling location, 6a-1, to define the lateral extent of nitrate and perchlorate to the north and downgradient of location 03-608412. Samples from location 6a-1 will be analyzed for nitrate and perchlorate only.

The proposed sampling and analyses at SWMU 60-006(a) are presented in Table 4.2-6, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.4 SWMU 60-007(a), Former Storage Area

4.2.4.1 Site Description and Operational History

SWMU 60-007(a) is a 100-ft × 100-ft former storage area located at TA-60 near the east end of Sigma Mesa (Figure-4.2-3). This area was used to store equipment for the drilling of a geothermal well. Small spills of oil, hydraulic fluid, and similar substances occurred. In 1992, areas of stained soil were removed, placed in containers, and disposed of by the user group. The remediated areas were covered with gravel. No sampling was conducted by the user group to confirm removal of the contamination (LANL 1996, 052930, pp. 189–190).

4.2.4.2 Previous Investigations

In 1994, 2001, and 2009, a total of 24 samples (7 fill and 17 soil) were collected from 15 locations at SWMU 60-007(a). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-7 presents the samples collected and analyses requested for SWMU 60-007(a). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

RFI activities were conducted in 1994 at SWMU 60-007(a). Eleven soil samples were collected from eight locations and field screened for PCBs and organic vapors. With the exception of one sample, field test

kits did not detect PCBs. Organic vapors were detected at elevated readings, but moisture interference was suspected as the cause (LANL1996, 052930, pp. 192–194). One fill and five soil samples were collected from five locations at depths of 0.0 to 1.0 ft bgs. Two samples were analyzed for TAL metals, five samples were analyzed for VOCs, two samples were analyzed for SVOCs, and three samples were analyzed for PCBs.

Sampling was also performed at SWMU 60-007(a) in 2001 (LANL 2001, 070937, pp. 1, 4). Six fill samples were collected from six locations at depths of 0.0–0.25 ft bgs and 0.0–0.5 ft bgs. All samples were submitted for laboratory analyses of TAL metals, PCBs, and TPH-DRO (LANL 2001–2002, 100703, pp. 2–3).

Sampling at SWMU 60-007(a) consisted of the following activities in 2009:

- Soil samples were collected from four locations from three depth intervals: 0.0–1.0 ft, 2.0–3.0 ft, and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 265–266), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 60-007(a), except for the vertical extent antimony at locations 03-608413 and 03-608415 (Figure 4.2-7), and the vertical extent of TPH-DRO at locations 60-10001, 60-10004, 60-10005, and 60-10006 (Figure 4.2-8).

4.2.4.3 Proposed Sampling at SWMU 60-007(a)

Shallow subsurface samples will be collected at six previously sampled locations (60-10001, 60-10004, 60-10005, 60-10006, 03-608413, and 03-608415), extending the depths at these locations to define the vertical extent of antimony and TPH-DRO. Samples from locations 60-10001, 60-10004, 60-10005, and 60-10006 will be analyzed for TPH-DRO only, and samples from locations 03-608413 and 03-608415 will be analyzed for antimony only.

The proposed sampling and analyses at SWMU 60-007(a) are presented in Table 4.2-8, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.5 SWMU 60-007(b), Storm Drainage

4.2.5.1 Site Description and Operational History

SWMU 60-007(b) is a storm drainage ditch at TA-60 that starts approximately 600 ft from a paved area directly north of the motor pool building (60-1) and extends to the bottom of Sandia Canyon (Figure 4.2-9). Two parking lots located east of building 60-1 drain to a ditch that eventually joins the SWMU 60-007(b) drainage ditch. Other former sources of potential contamination to the ditch are a steam-cleaning pad, a used-oil storage tank, and an oil-water separator. In addition, equipment that used PCB-containing oil was stored on an asphalt area east of building 60-1 (LANL 1993, 020947, pp. 5-14–5-15). In 1986, the user group removed stained soil from the ditch (LANL 1996, 052930, p. 195).

4.2.5.2 Previous Investigations

In 2009, 20 samples (13 soil and 7 tuff) were collected from 12 locations at SWMU 60-007(b). Previously sampled locations are shown in Figure 4.2-9. Table 4.2-9 presents the samples collected and analyses

requested for SWMU 60-007(b). The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at SWMU 60-007(b) consisted of the following activities in 2009:

- Soil and tuff samples were collected at 12 locations within the drainage from two depth intervals: 0.0–0.4 ft, 0.0–0.5 ft bgs, or 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 268–271), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 60-007(b), except for the vertical extent of anthracene, barium, chromium, copper, and zinc.

The vertical extent of barium is not defined at location 03-608424, the vertical extent of chromium is not defined at locations 03-608424 and 03-508425, and the vertical extent of copper and zinc is not defined at location 03-608418 (Plate 19). The vertical extent of anthracene is not defined at location 03-608423 (Plate 20). Because only one sample was collected from one depth interval at locations 03-608417, 03-608418, 03-608419, and 03-608420, the vertical extent of inorganic and organic chemicals is not defined at these locations.

The investigation report states the vertical extent of chromium is not defined at location 03-608424. However, a review of the data indicated the concentration in the deepest sample (9.14 mg/kg at 1.0–2.0 ft bgs) is below the maximum Qbt 2, 3, and 4 background concentration of 13 mg/kg. Therefore, the vertical extent of chromium is defined at location 03-608424.

4.2.5.3 Proposed Sampling at SWMU 60-007(b)

Shallow subsurface samples will be collected at three previously sampled locations (03-608423, 03-608424, and 03-608425), extending the depths at these locations to define the vertical extent of anthracene, barium, and chromium. Samples from location 03-608423 will be analyzed for anthracene only, samples from location 03-608424 will be analyzed for barium only, and samples from location 03-608425 will be sampled for chromium only.

Shallow subsurface samples will also be collected at four previously sampled locations (03-608417, 03-608418, 03-608419, and 03-608420) as required in the NMED approval with modifications letter, dated August 12, 2008 (NMED 2008, 102721), and notice of approval letter, dated November 9, 2010 (NMED 2010, 111398). Samples from locations 03-608417, 03-608418, 03-608419, and 03-608420 will be collected from two depths (2.0–3.0 ft and 5.0–6.0 ft bgs) and analyzed for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

The proposed sampling and analyses at SWMU 60-007(b) are presented in Table 4.2-10, and the proposed sampling locations are shown in Figure 4.2-9.

4.3 TA-61

TA-61 was created from a portion of TA-03 and is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon (LANL 1999, 064617, p. 2-27). TA-61 contains physical support and infrastructure facilities, including the Los Alamos County landfill, sewer pump stations, a radio shop, general storage sheds, a blower house, a private concrete batch plant, a Laboratory-operated asphalt batch plant, and general warehouse storage for maintenance activities. A small parcel of private property,

the Royal Crest Manufactured Home Community, is surrounded by TA-61. The Los Alamos County landfill occupies most of TA-61. The landfill was created in 1974 when large trenches and disposal areas were excavated from the north wall of Sandia Canyon.

4.3.1 AOC C-61-002, Subsurface Contamination

4.3.1.1 Site Description and Operational History

AOC C-61-002 is an area of subsurface contamination located in TA-61, approximately 15 ft north of building 61-16, a former storage building (Figure 4.1-7). The subsurface contamination was found in 1995 during a drill rig test. During the drilling test, a petroleum odor was noted, and diesel contamination was detected at 7.0 to 8.0 ft bgs. A tuff sample was collected and submitted for analysis of TPH-DRO. The results showed the presence of diesel contamination. Interviews conducted with site personnel after the drilling was completed indicated the source of the diesel may have been the previous road maintenance work performed in the area (LANL 1995, 049550, p. 2).

4.3.1.2 Previous Investigations

In 2009, 30 samples (19 soil and 11 tuff) were collected from five locations at AOC C-61-002. Previously sampled locations are shown in Figure 4.1-7. Table 4.3-1 presents the samples collected and analyses requested for AOC C-61-002. The sampling results are presented in the investigation report (LANL 2010, 110862.24).

Sampling at AOC C-61-002 consisted of the following activities in 2009:

- Soil and tuff samples were collected at five boreholes from six depth intervals: 3.0–4.0 ft, 5.0–6.0 ft, 7.0–8.0 ft, 9.0–10.0 ft, 11.0–12.0 ft, and 14.0–15.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.

Based on the sampling results presented in the investigation report (LANL 2010, 110862.24, pp. 275–278), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC C-61-002, except for the lateral extent of aluminum, antimony, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, thallium, vanadium, and TPH-DRO.

The lateral extent of aluminum, chromium, copper, magnesium, mercury, nickel, and vanadium is not defined to the east of the site; the lateral extent of antimony, iron, lead, and thallium is not defined to the east and south of the site; and the lateral extent of cobalt is not defined to the north, west, and east of the site (Plate 13). The lateral extent of TPH-DRO is not defined at the site (Plate 14).

4.3.1.3 Proposed Sampling at AOC C-61-002

Four new sampling locations, C2-1, C2-2, C2-3, and C2-4, will be placed near existing perimeter locations to define the lateral extent of aluminum, antimony, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, thallium, vanadium, and TPH-DRO. A new location, C2-1, will be placed to the north of location 03-608429 to define the lateral extent of cobalt and TPH-DRO. Samples from location C2-1 will be analyzed for cobalt and TPH-DRO. A new location, C2-2, will be placed to the west of location 03-608430 to define the lateral extent of cobalt and TPH-DRO. Samples from location C2-2 will be analyzed for cobalt and TPH-DRO. A new location, C2-3, will be placed to the south of location 03-608432 to define the lateral extent of antimony, iron, lead, thallium, and TPH-DRO. Samples from location C2-3 will be analyzed for antimony, iron, lead, thallium, and TPH-DRO. A new location, C2-4, will be placed to the east of location 03-608433 to define the lateral extent of aluminum, chromium, cobalt,

copper, iron, lead, magnesium, mercury, nickel, thallium, vanadium, and TPH-DRO. Samples from location C2-4 will be analyzed for TAL metals and TPH-DRO.

The proposed sampling and analyses at AOC C-61-002 are presented in Table 4.3-2, and the proposed sampling locations are shown in Figure 4.1-7.

5.0 INVESTIGATION METHODS

A summary of investigation methods to be implemented is presented in Table 5.0-1. The standard operating procedures (SOPs) used to implement these methods are available at http://www.lanl.gov/environment/all/qa/adep.shtml.

Descriptions of the field investigation methods are provided below. Additional procedures may be added as necessary to describe and document quality-affecting activities.

Chemical analyses will be performed in accordance with the current analytical statement of work (LANL 2008, 109962). Accredited non-Laboratory contract analytical laboratories will use the most recent EPA- and industry-accepted extraction and analytical methods for the requested analyses.

5.1 Sampling Locations

Proposed sampling locations are identified for each site based on engineering drawings, surveyed locations of existing structures (from the geographic information system database), previous sampling locations, and topography or other features identified in the field (e.g., drainage channels, sediment accumulation areas). Coordinates of the proposed new sampling locations will be obtained by georeferencing the points from the proposed sampling maps. Coordinates will be located and flagged or otherwise marked in the field using a differential global positioning system (GPS) unit. If any proposed sampling locations are moved because of field conditions, utilities, or other unexpected reasons, the new locations will be surveyed immediately following sample collection as described in section 5.2. Surveying and establishing sampling locations will be conducted in accordance with the latest version of standard operating procedure SOP-5028, Coordinating and Evaluating Geodetic Surveys.

5.2 Geodetic Surveys

Geodetic surveys will be conducted in accordance with the latest version of SOP-5028, Coordinating and Evaluating Geodetic Surveys, to locate historical structures and previous sampling locations and to document field activities such as sample collection. The surveyors will use a Trimble GeoXT hand-held GPS or equivalent for the surveys. The coordinate values will be expressed in the New Mexico State Plane Coordinate System (transverse Mercator), Central Zone, North American Datum 1983. Elevations will be reported per the National Geodetic Vertical Datum of 1929. All GPS equipment used will meet the accuracy requirements specified in the SOP.

5.3 Surface and Shallow Subsurface Sampling

Soil and rock samples will be collected by the most efficient, least invasive method practicable. The methods will be determined by the field team based on site conditions such as topography, the nature of the material to be sampled, the depth intervals sampled, accessibility, and the level of disruption to Laboratory activities. Typically, samples will be collected using spade-and-scoop, hand-auger, or hollow-stem auger drilling methods.

5.3.1 Spade-and-Scoop Method

Surface and shallow subsurface samples will be collected in accordance with SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples. Stainless-steel shovels, spades, scoops, and bowls will be used for ease of decontamination. If the surface location is at bedrock, an axe or hammer and chisel may be used to collect samples. Samples collected for analyses will be placed in the appropriate sample containers, depending upon the analytical method requirement.

5.3.2 Sediment Samples

Sediment samples will be collected from areas of sediment accumulation that include sediment that is representative of the historical period of Laboratory operations (i.e., post-1943). Sediment samples will be collected using either spade-and-scoop and/or hand-auger methods. Proposed sediment sampling locations have been identified and are shown in the figures in the preceding sections. The actual sediment sampling locations will be selected in the field based on geomorphic relationships in areas likely to have been affected by discharges from Laboratory operations. Because sediment is dynamic and subject to redistribution by runoff events, some locations may need to be adjusted when this work plan is implemented. In the course of collecting sediment samples, it may be determined, based on field conditions, that the selected location is not appropriate (e.g., the sediment is much shallower than anticipated, the sediment is predominantly coarse grained, or the sediment shows evidence of being older than the target age). Sediment sampling locations will be adjusted as appropriate, any revised locations will be surveyed, and the updated coordinates will be submitted for inclusion in the appropriate database.

5.4 Subsurface Sampling

Subsurface sampling is proposed to include surface soil and fill, sediment, and tuff. Any adjustments will be noted on sample collection logs (SCLs) and recorded in the Phase II investigation report as deviations from this investigation work plan. Subsurface samples will be collected following the current version of SOP-06.24, Sample Collection from Split-Spoon Samplers and Shelby-Tube Samplers, and SOP-06.26, Core-Barrel Sampling for Subsurface Earth Materials.

5.4.1 Hollow-Stem Auger

A hollow-stem auger may be used to drill holes deeper than approximately 15 ft or to shallower depths where hand-auger refusal is encountered. The hollow-stem auger consists of a hollow steel shaft with a continuous spiraled steel flight welded onto the exterior of the stem. The stem is connected to an auger bit, and when it is rotated, it transports cuttings to the surface. The hollow stem of the auger allows insertion of drill rods, split-spoon core barrels, Shelby tubes, and other samplers through the center of the auger so samples may be retrieved during drilling operations. The hollow stem also acts to case the borehole core temporarily so a well casing (riser) may be inserted down through the center of the auger once the desired depth is reached, thus minimizing the risk of possible collapse of the borehole. A bottom plug or pilot bit can be fastened onto the bottom of the auger to keep out most of the soil and/or water that tends to clog the bottom of augers during drilling. Drilling without a center plug is acceptable if the soil plug, formed in the bottom of the auger, is removed before sampling or installing a well casing. The soil plug can be removed by washing out the plug using a side-discharge rotary bit or auguring out the plug with a solid-stem auger bit sized to fit inside the hollow-stem auger.

During sampling, the auger will be advanced to just above the desired sampling interval. The sample will be collected by driving a split-spoon sampler into undisturbed soil-tuff to the desired depth. Samples will be collected in accordance with SOP-06.26, Core-Barrel Sampling for Subsurface Earth Materials.

5.4.2 Hand Auger

Hand augers may be used to drill shallow holes. The hand auger is advanced by turning the auger into the soil or tuff until the barrel is filled. The auger is removed and the sample is placed in a stainless-steel bowl. Hand-auger samples will be collected in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler.

Because the chromium and nickel concentrations at some previously hand-augered sampling locations are suspected of being influenced by the use of stainless-steel auger buckets, carbon-steel auger buckets will be used to collect the proposed samples at locations not accessible to a drill rig and must be sampled by the hand-auger method.

5.4.3 Borehole Abandonment

All boreholes will be properly abandoned according to the current version of SOP-5.03, Monitoring Well and RFI Borehole Abandonment.

Shallow boreholes (less than approximately 20 ft deep) will be abandoned by filling the borehole with bentonite chips, which are subsequently hydrated, in 1.0- to 2.0-ft lifts. The borehole will be visually inspected while the bentonite chips are added to ensure bridging does not occur.

Deeper boreholes will be pressure-grouted from the bottom of the borehole to the surface using the tremie pipe method. Acceptable grout materials include cement or bentonite grout, neat cement, or concrete.

The use of backfill materials, such as bentonite and grout, will be documented in a field logbook with regard to volume (calculated and actual), intervals of placement, and additives used to enhance backfilling. All borehole abandonment information will be provided in the Phase II investigation report.

5.5 Chain of Custody and Sample Collection Logs

The collection, screening, and transport of samples will be documented on standard forms generated by the Sample Management Office (SMO). These include sample container labels and combined SCL/chain-of-custody (COC) forms. Sample collection portions of the combined forms will be completed at the time of sample collection and signed by the sampler and a reviewer who will verify the logs for completeness and accuracy. The COC portions of the combined forms will be completed and signed to verify the samples are not left unattended. Corresponding labels will be initialed and applied to each sample container, and custody seals will be placed around container lids or openings. Documentation and handling of all samples will be conducted in accordance with WES-EDA-QP-219, Sample Control and Field Documentation, and with SOP-5057, Handling, Packaging, and Transporting Field Samples.

5.6 Field-Screening Methods

The primary field-screening methods to be used on samples include radiological screening and organic vapor screening using a photoionization detector (PID). Field screening will be used primarily for health and safety purposes and for determining transportability of samples from the field sites to the SMO and from the SMO to the analytical laboratories. Field-screening results may be used at the discretion of the field personnel to collect additional samples beyond those planned or to extend the depth of sampling as required. Field changes to sampling plans will be approved by the subcontractor technical representative and will be documented on field paperwork and in the Phase II investigation report.

5.6.1 Radiological Screening

Based on the results of past sampling, field screening for radioactivity will be conducted primarily to ensure worker health and safety rather than to direct sampling. Radiological screening will target gross-alpha, -beta, and -gamma radiation. Field screening for alpha, beta, and gamma radiation will be conducted within 6 in. from soil and core material using appropriate field instruments as determined by the Laboratory's Health Physics Operations Group. Instruments will be calibrated in accordance with the Health Physics Operations Group procedures or equivalent procedures. All instrument calibration activities will be documented daily in the field logbooks in accordance with SOP-5181, Notebook Documentation for Waste and Environmental Services Technical Field Activities.

5.6.2 Organic Vapor Field Screening

Because previous investigations have shown only trace levels of VOCs at the sites being investigated, organic vapor screening will be conducted primarily to ensure worker health and safety rather than to direct sampling. Screening will be conducted using a PID capable of measuring quantities as low as 1 ppm. Vapor screening of soil, sediment, and subsurface core will be conducted using a PID equipped with an 11.7 electron volt lamp. All samples will be screened in headspace gas in accordance with SOP-06.33, Headspace Vapor Screening with a Photo Ionization Detector.

The PID will be calibrated daily to the manufacturer's standard for instrument operation, and the daily calibration results will be documented in the field logbooks. All instrument background checks, background ranges, and calibration procedures will be documented daily in the field logbooks in accordance with SOP-5181, Notebook Documentation for Waste and Environmental Services Technical Field Activities.

5.7 Quality Assurance/Quality Control Samples

Quality assurance/quality control samples will include field duplicate, equipment rinsate, and field trip blank samples. Field duplicate samples and field rinsate blanks will be collected at an overall frequency of at least 1 for every 10 regular samples or as directed by the current version of SOP-5059, Field Quality Control Samples. Field trip blanks will be collected at a rate of at least one per day on days when VOC samples are being collected.

5.8 Laboratory Analytical Methods

The analytical suites for laboratory analyses and the specific analytical methods to be used are summarized in Table 5.8-1. All analytical methods are presented in the statement of work for analytical laboratories (LANL 2008, 109962). Sample collection and analysis will be coordinated with the SMO.

5.9 Health and Safety

The field investigations described in this Phase II investigation work plan will comply with all applicable requirements pertaining to worker health and safety. An integrated work document and a site-specific health and safety plan will be in place before conducting fieldwork.

5.10 Equipment Decontamination

Equipment for drilling and sampling will be decontaminated before and after sampling activities to minimize the potential for cross-contamination. All equipment will be decontaminated using dry

decontamination methods whenever possible to minimize generating liquid waste. All sampling equipment will be decontaminated using dry decontamination methods if possible, as described in SOP-5061, Field Decontamination of Equipment. If dry decontamination methods are not effective as determined by field screening of the equipment after dry decontamination, drilling/exploration equipment that may come in contact with the borehole will be decontaminated by steam-cleaning, hot-water pressure-washing, or another method before each new borehole is drilled. If wet decontamination is necessary, the equipment will be decontaminated on a high-density polyethylene liner on a temporary decontamination pad. Cleaning solutions and wash water will be collected and contained for proper disposal. Decontamination solutions will be sampled and analyzed to determine the final disposition of the wastewater and the effectiveness of the decontamination procedures.

5.11 IDW

The IDW generated during field-investigation activities may include, but is not limited to, drill cuttings; contaminated soil; contaminated personal protective equipment (PPE), sampling supplies, and plastic; fluids from the decontamination of PPE and sampling equipment; and all other waste that has potentially come into contact with contamination.

All IDW generated during field-investigation activities will be managed in accordance with applicable EPA and NMED regulations, DOE orders, and Laboratory requirements. Appendix B presents the IDW management plan.

6.0 MONITORING PROGRAMS

SWMUs 03-009i, 03-012(b), 03-021, 03-029, 03-045(b), 03-045(c), 03-052(f), and 60-007(b) and AOCs 03-014(b2), 03-014(c2), and 03-052(b) are subject to the stormwater monitoring requirements of the Laboratory's NPDES individual permit for stormwater discharges from SWMUs and AOCs.

7.0 SCHEDULE

Preparation for investigation activities is scheduled to start by February 1, 2012. Fieldwork is expected to start on August 14, 2012, and will take approximately 2.5 mo to complete. Fieldwork is scheduled to be completed by October 24, 2012. A submittal date of no later than April 30, 2013, is proposed for the Phase II investigation report.

8.0 REFERENCES AND MAP DATA SOURCES

8.1 References

The following list includes all documents cited in this plan. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information is also included in text citations. ER IDs are assigned by the Environmental Programs Directorate's Records Processing Facility (RPF) and are used to locate the document at the RPF and, where applicable, in the master reference set.

Copies of the master reference set are maintained at the NMED Hazardous Waste Bureau and the Directorate. The set was developed to ensure that the administrative authority has all material needed to review this document, and it is updated with every document submitted to the administrative authority. Documents previously submitted to the administrative authority are not included.

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8.2 Map Data Sources

Data sources used in original figures and/or plates created for this report are described below and identified by legend title.

Legend Item	Data Source
LANL Technical Areas	Technical Area Boundaries; Los Alamos National Laboratory, Site Planning & Project Initiation Group, Infrastructure Planning Office; September 2007; as published 04 December 2008.
Paved roads	Paved Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Paved parking	Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
Dirt roads	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL structures	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL fence lines	Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL communications lines	Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 28 May 2009.
LANL electric lines	Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL gas lines	Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL sewer lines	Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL steam lines	Steam Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 January 2009.
LANL water lines	Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009.
LANL industrial waste lines	Primary Industrial Waste Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 15 October 2008.
LANL historical sampling locations	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 5 June 2010.
LANL PRS boundaries	Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 1:2,500 Scale Data; 25 January 2010.
Contours	Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

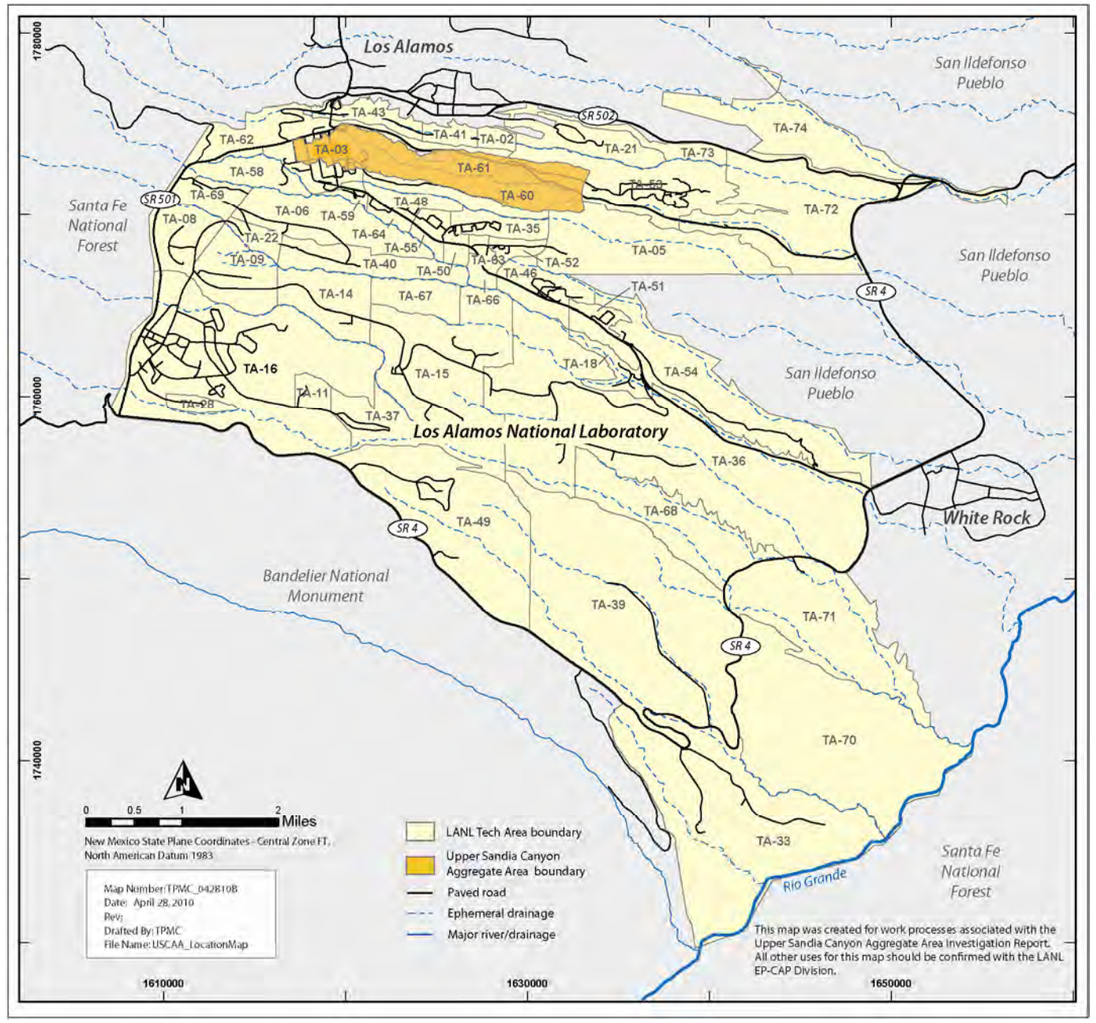

Figure 1.0-1 Location of Upper Sandia Canyon Aggregate Area with respect to Laboratory technical areas

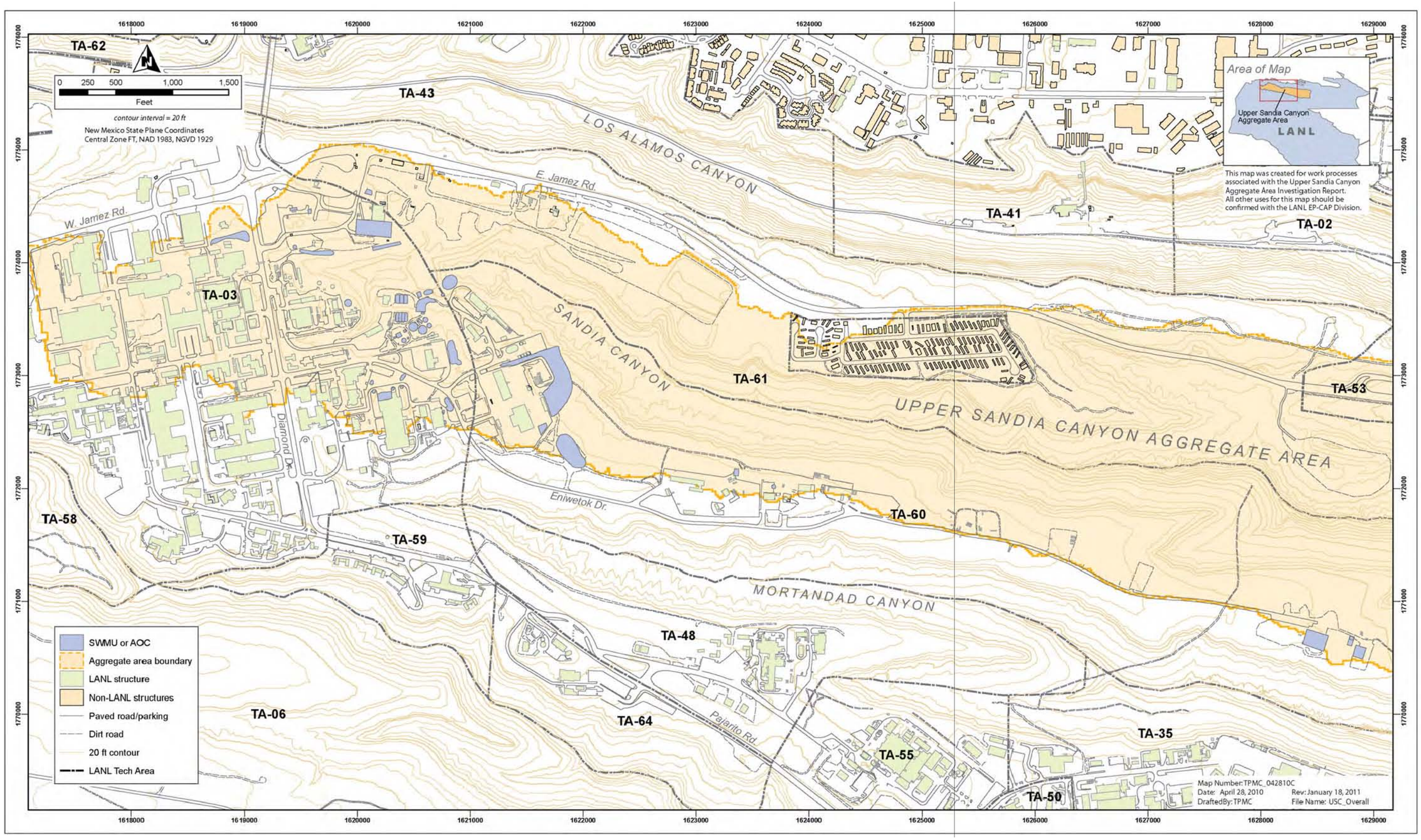

Figure 1.0-2 Location of Upper Sandia Canyon Aggregate Area and its surrounding landholdings

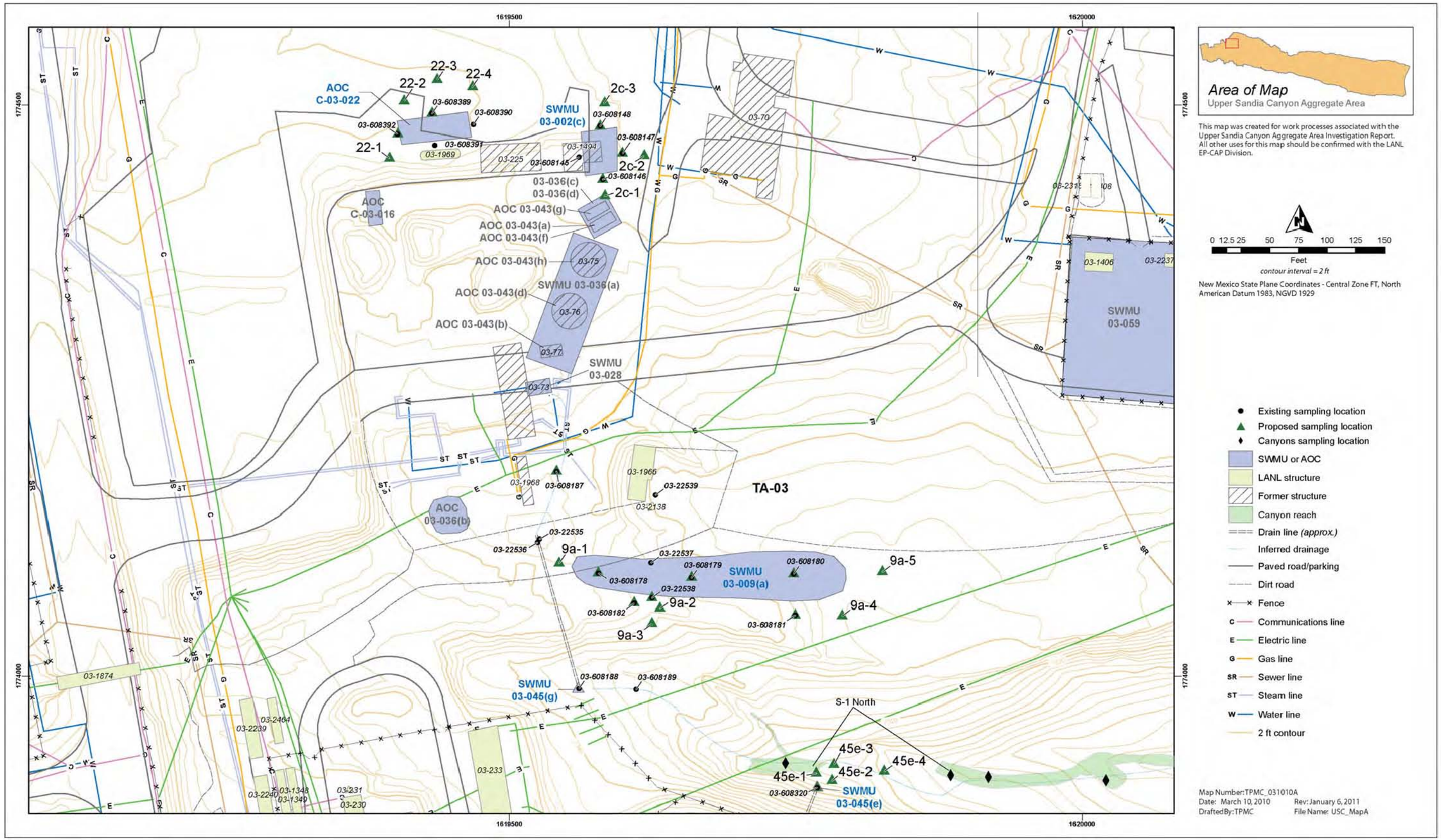

Figure 4.1-1 Site map with existing and proposed sampling locations at SWMUs 03-002(c), 03-009(a), 03-045(e), and 03-045(g) and AOC C-03-022

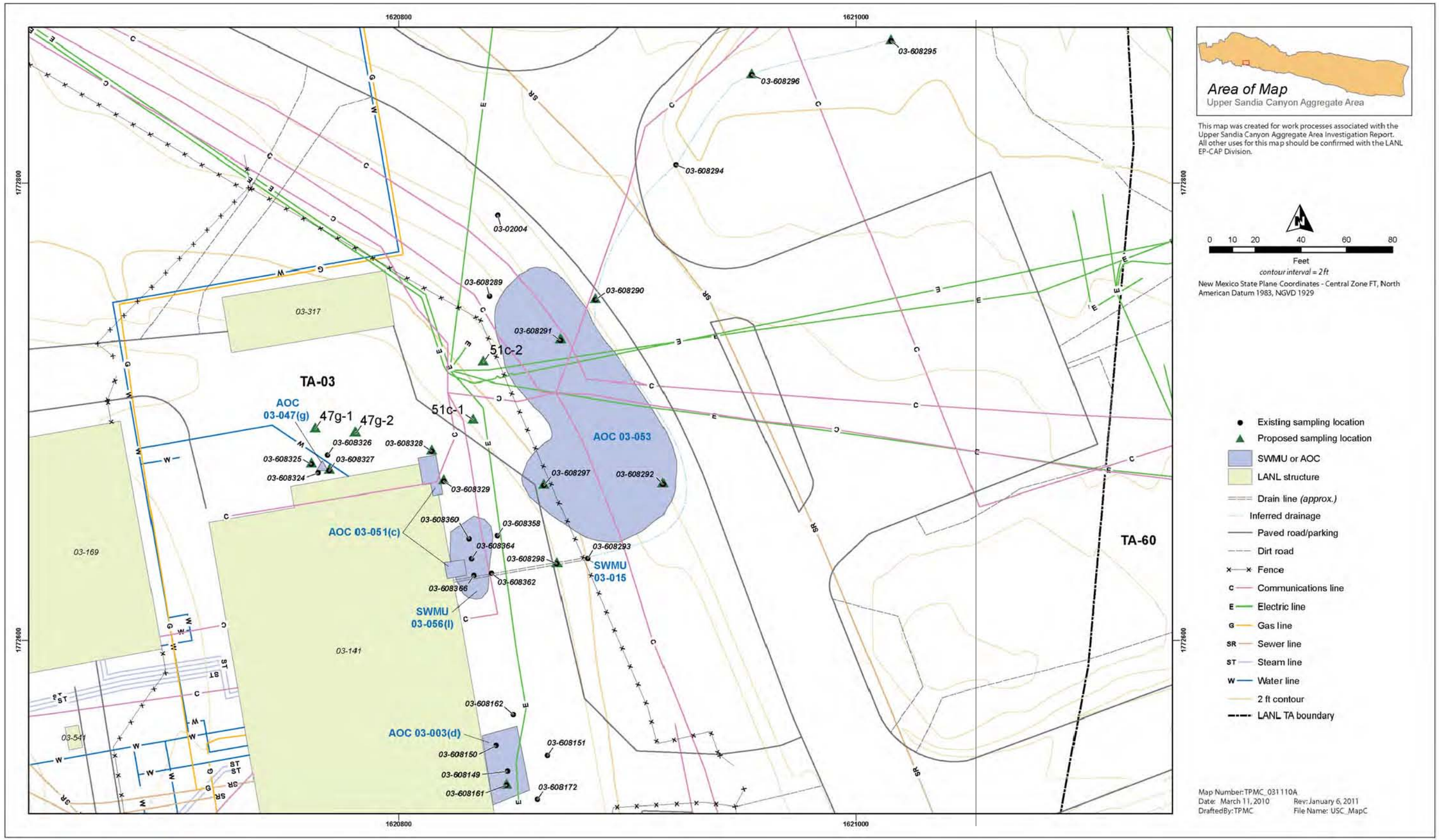

Figure 4.1-2 Site map with existing and proposed sampling locations at SWMUs 03-015 and 03-056(l) and AOCs 03-003(d), 03-047(g), 03-051(c), and 03-053

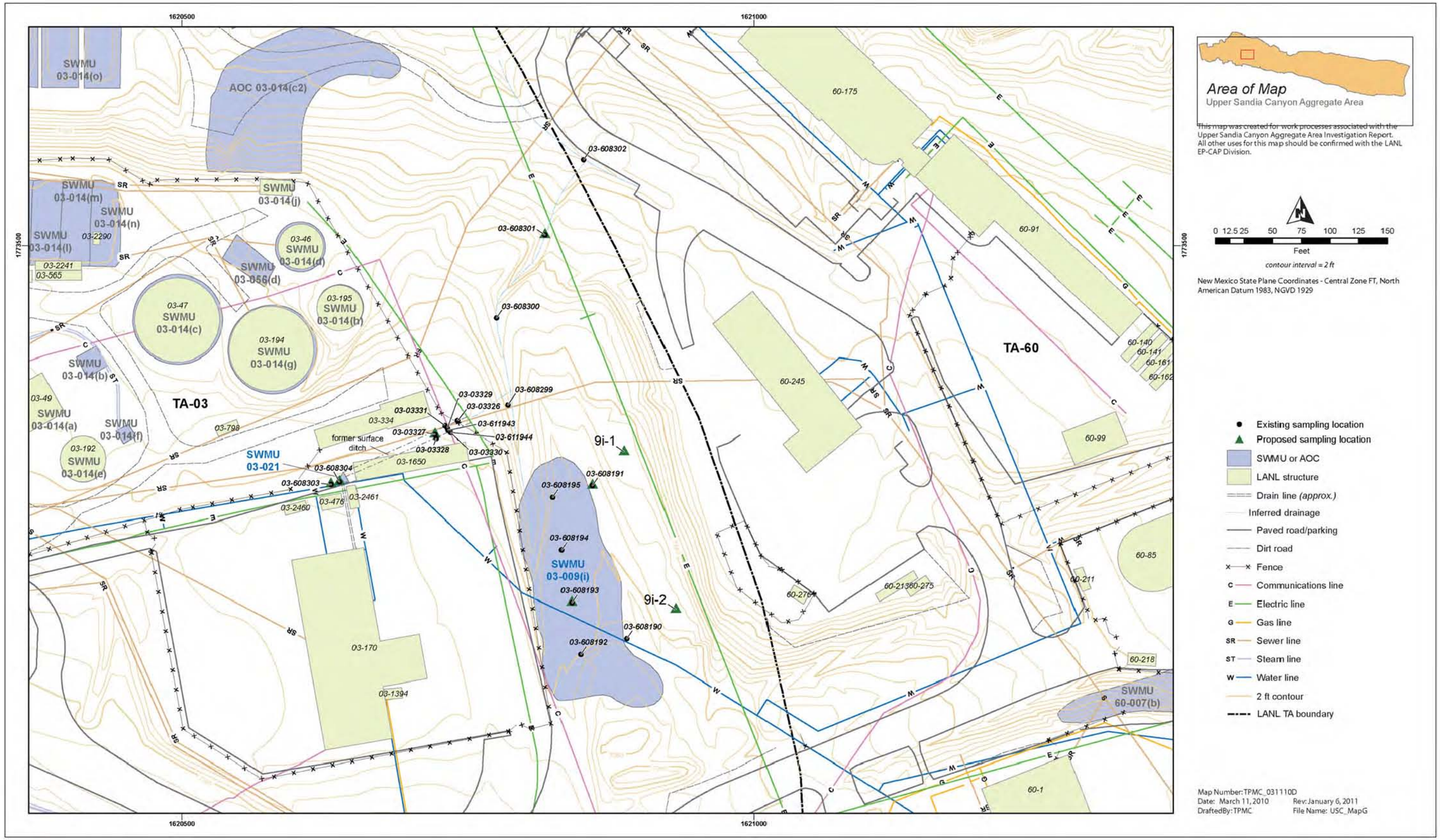

Figure 4.1-3 Site map with existing and proposed sampling locations at SWMUs 03-009(i) and 03-021

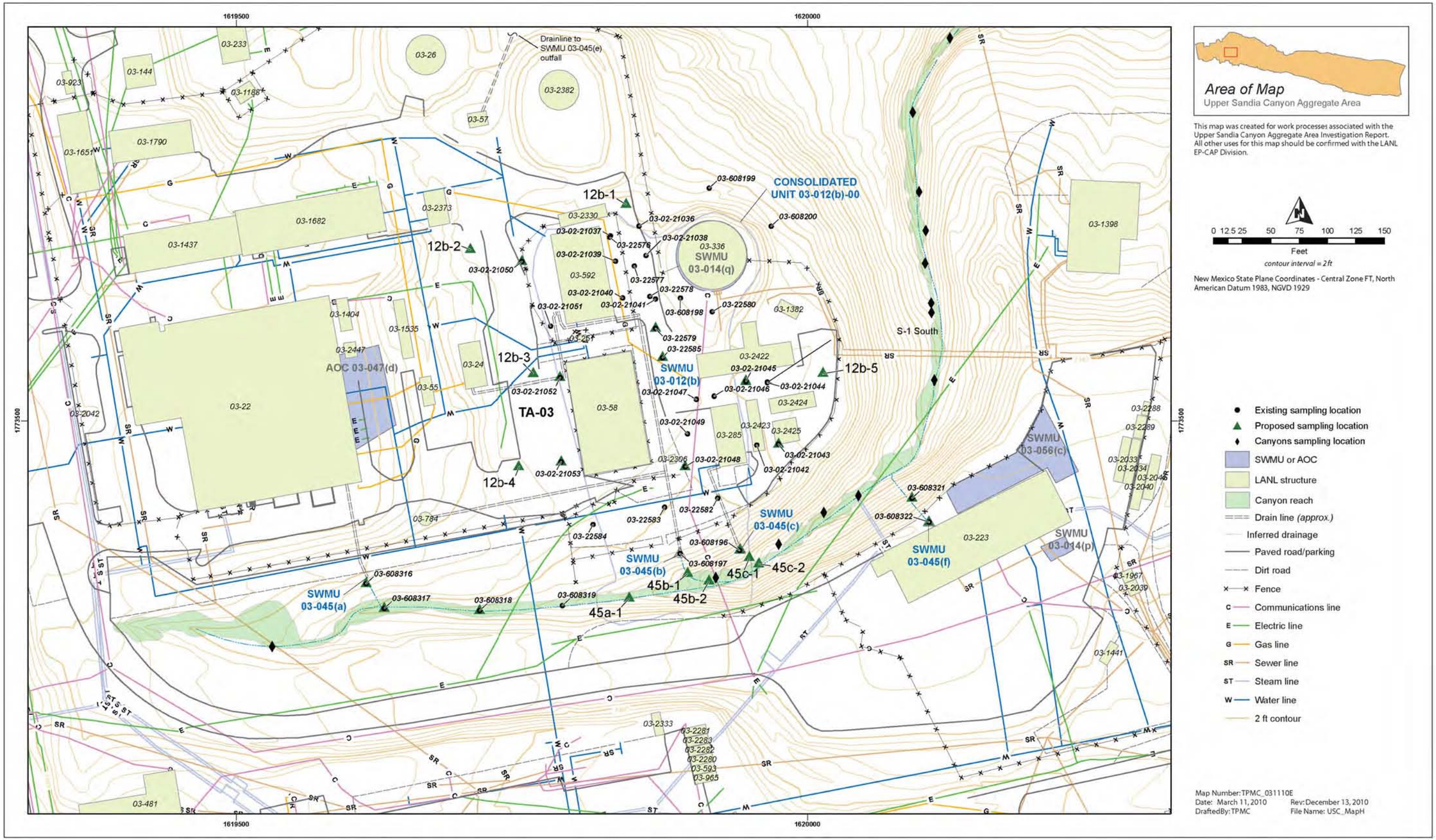

Figure 4.1-4 Site map with existing and proposed sampling locations at SWMUs 03-012(b) and 03-045(a,b,c,e,f)

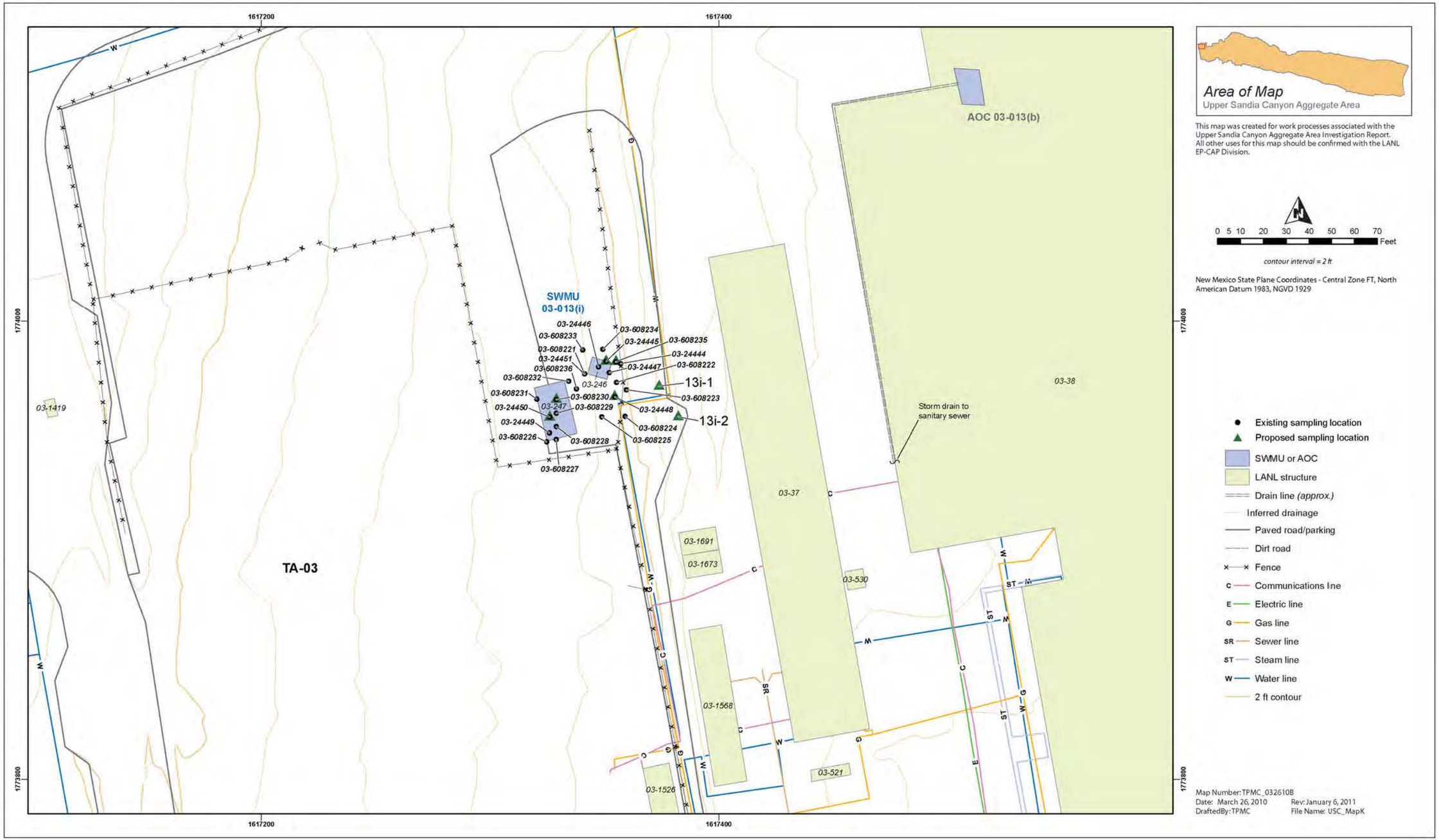

Figure 4.1-5 Site map with existing and proposed sampling locations at SWMU 03-013(i)

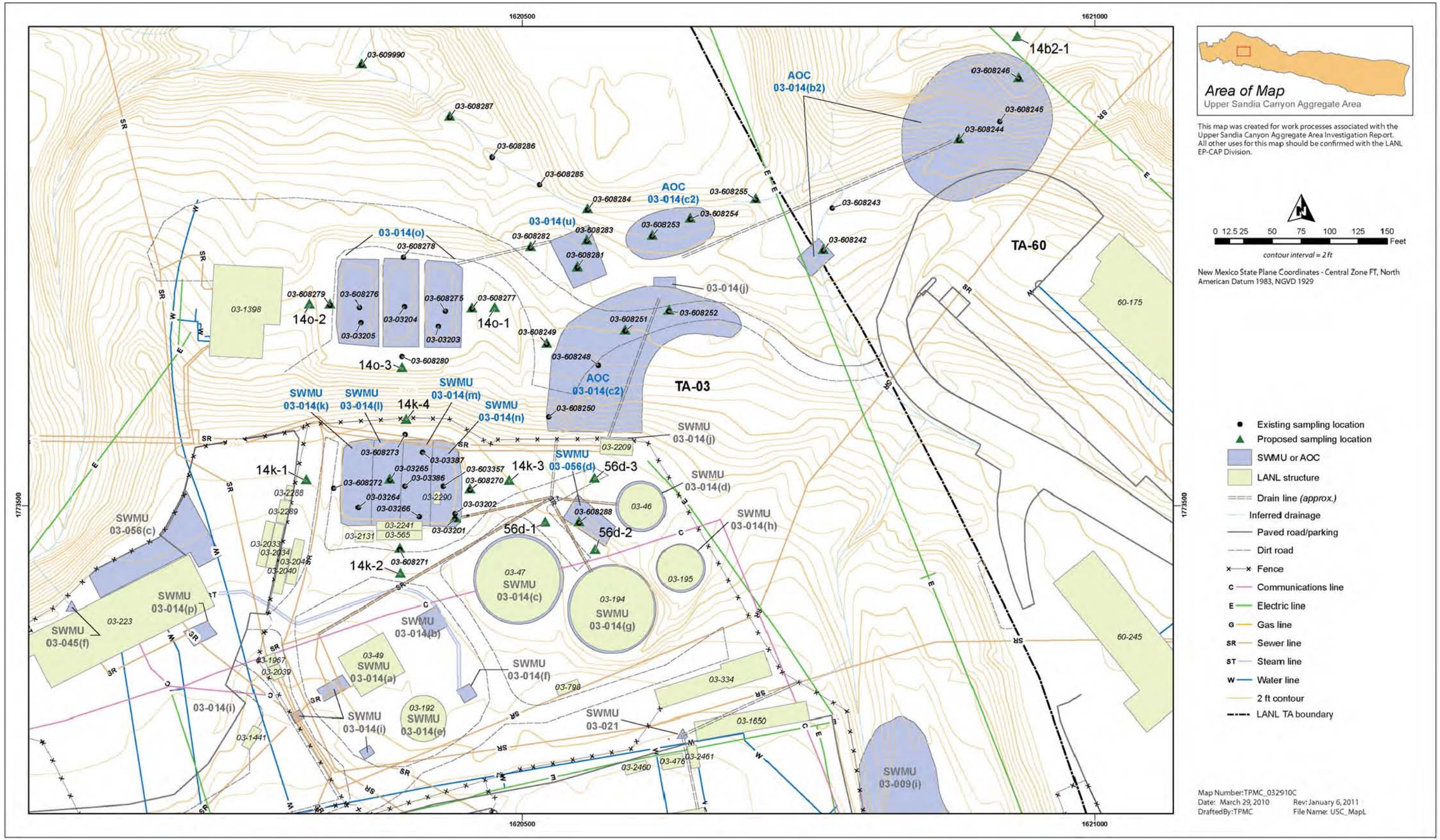

Figure 4.1-6 Site map with existing and proposed sampling locations at SWMUs 03-014(k–o,u), 03-056(d), and AOCs 03-014(b2) and 03-014(c2)

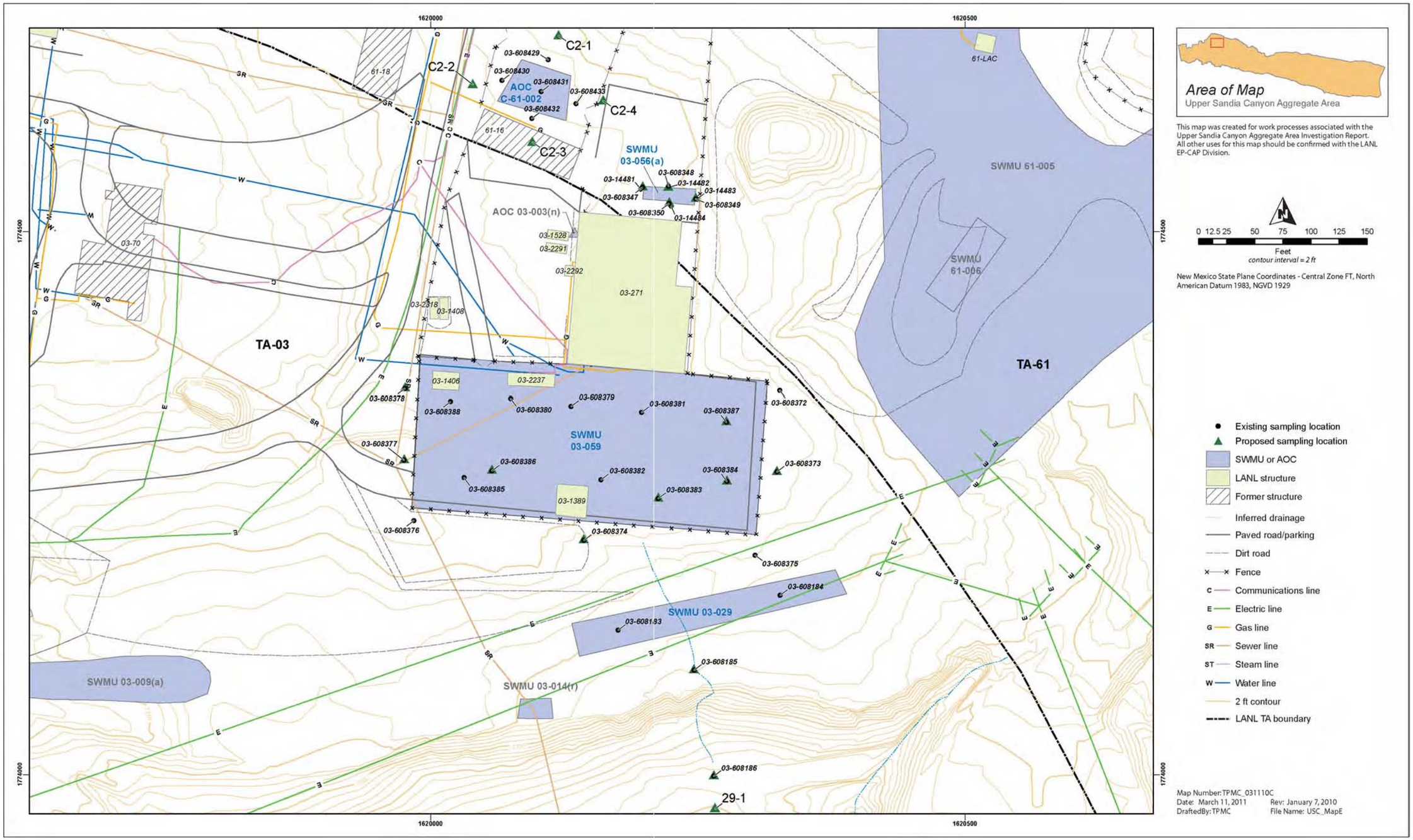

Figure 4.1-7 Site map with existing and proposed sampling locations at SWMUs 03-029, 03-056(a), and 03-059 and AOC C-61-002

Figure 4.1-8 Site map with existing and proposed sampling locations at AOC 03-038(d)

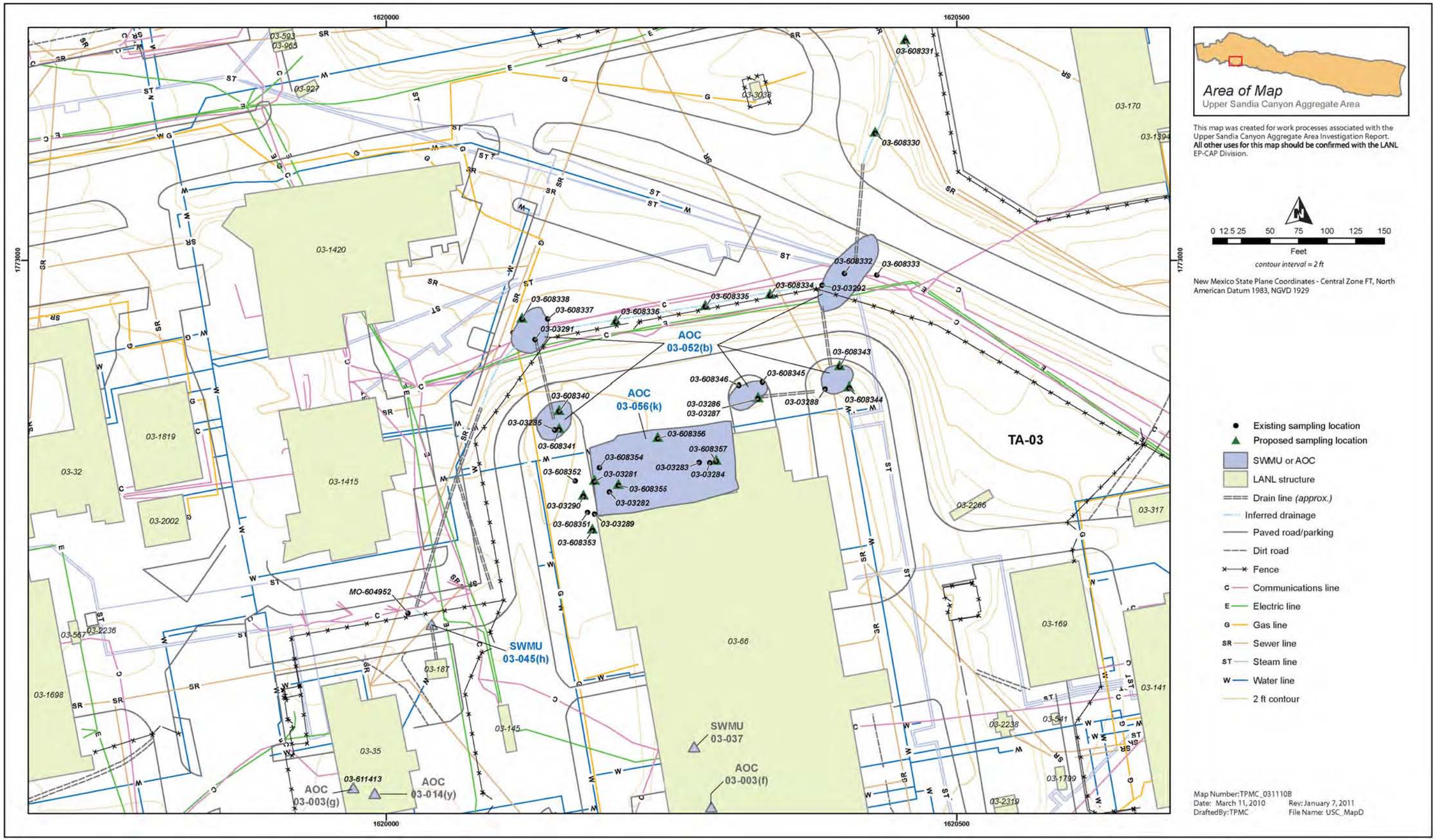

Figure 4.1-9 Site map with existing and proposed sampling locations at SWMU 03-045(h) and AOCs 03-052(b) and 03-056(k)

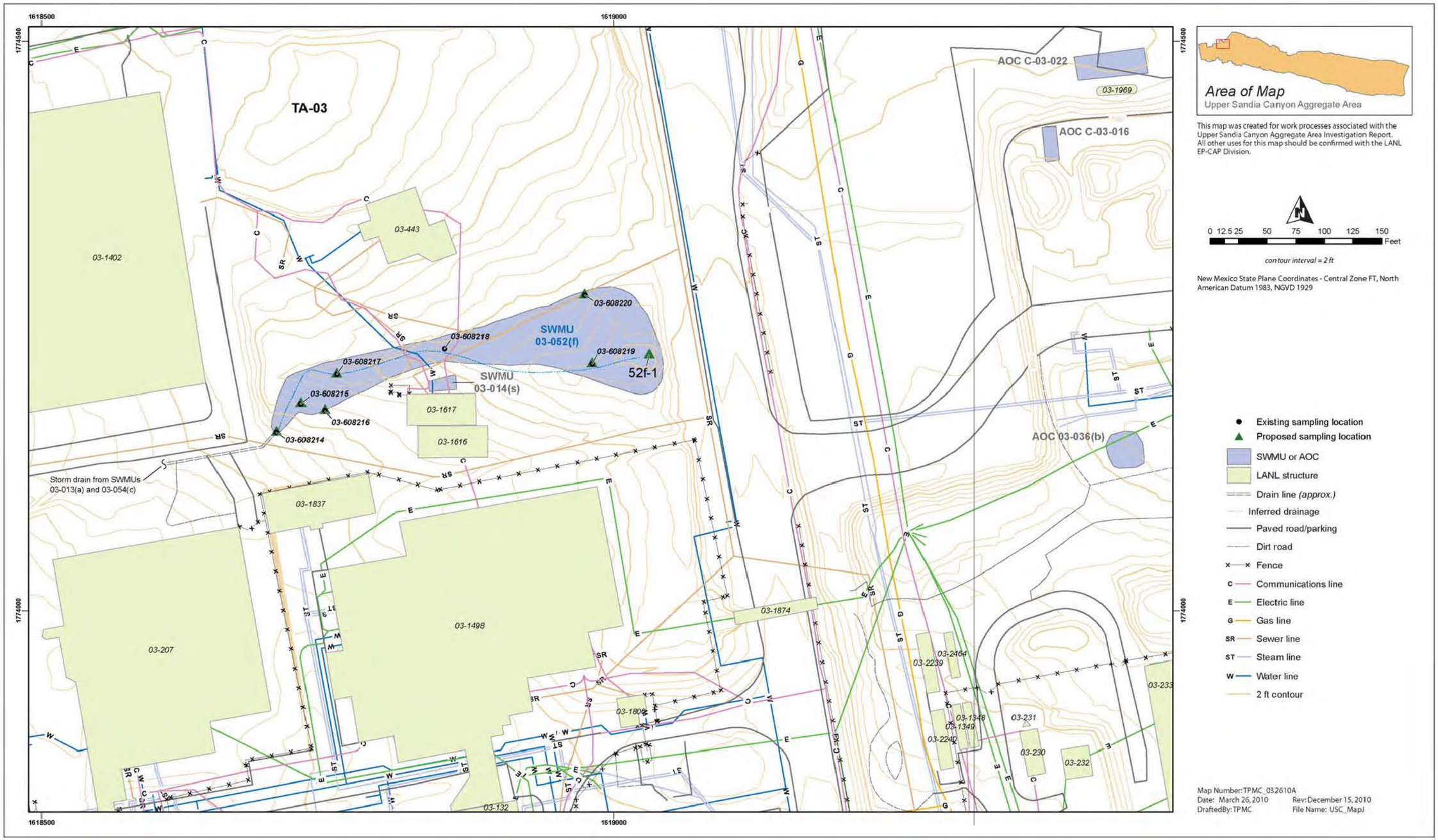

Figure 4.1-10 Site map with existing and proposed sampling locations at SWMU 03-052(f)

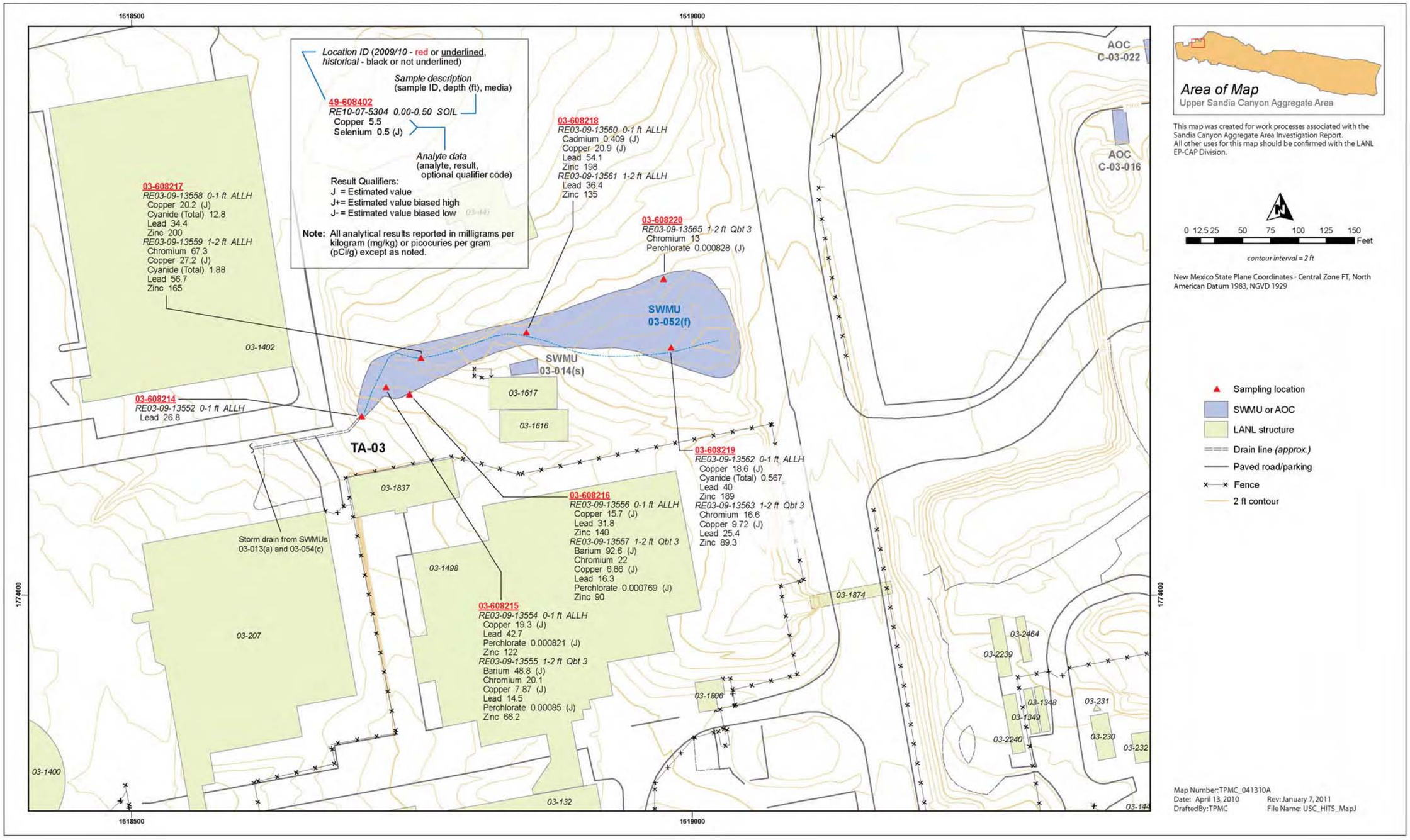

Figure 4.1-11 Inorganic chemical concentrations detected or detected above BVs at SWMU 03-052(f)

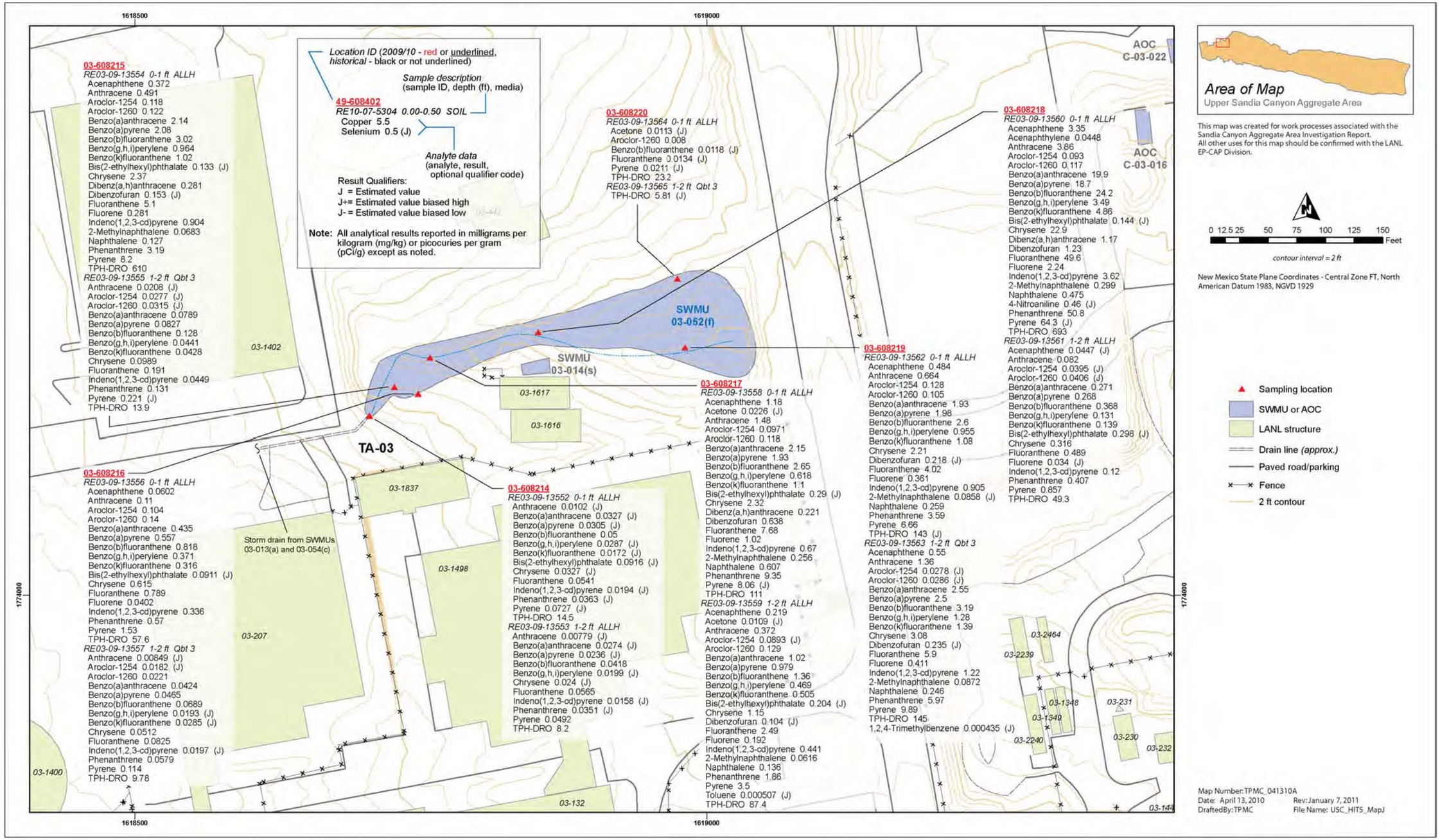

Figure 4.1-12 Organic chemical concentrations detected at SWMU 03-052(f)

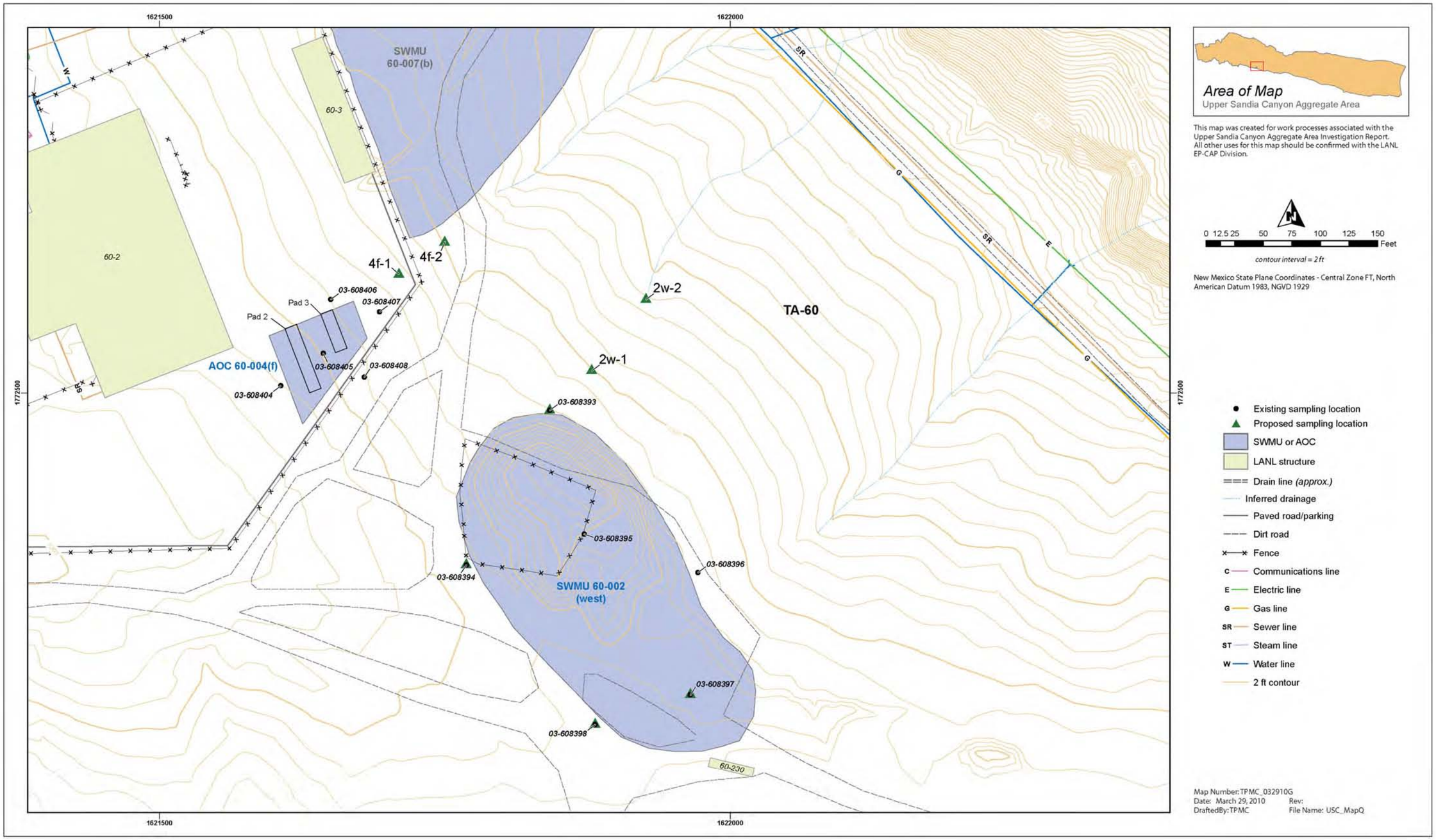

Figure 4.2-1 Site map with existing and proposed sampling locations at SWMU 60-002 (west) and AOC 60-004(f)

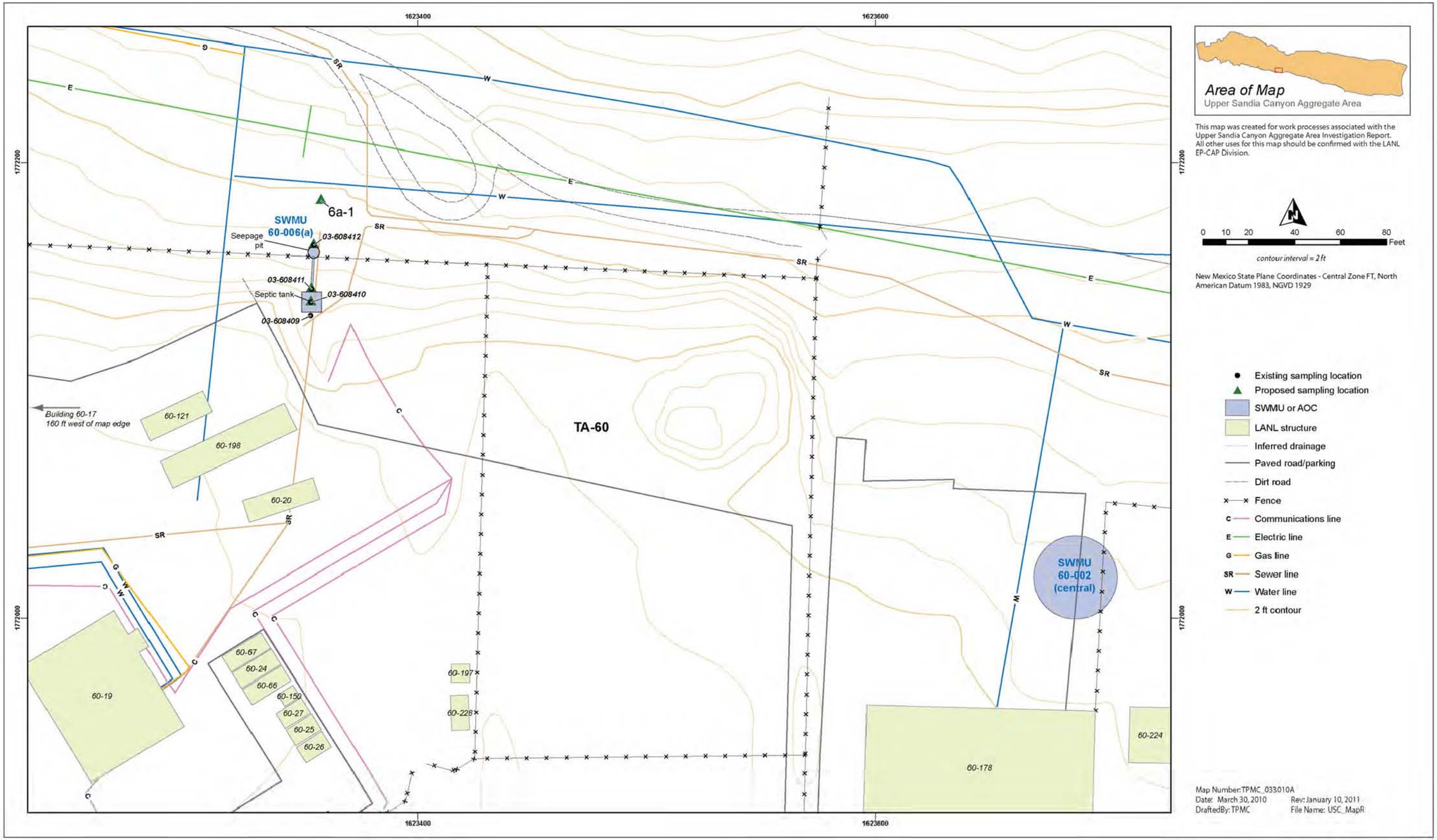

Figure 4.2-2 Site map with existing and proposed sampling locations at SWMUs 60-006(a) and 60-002 (central)

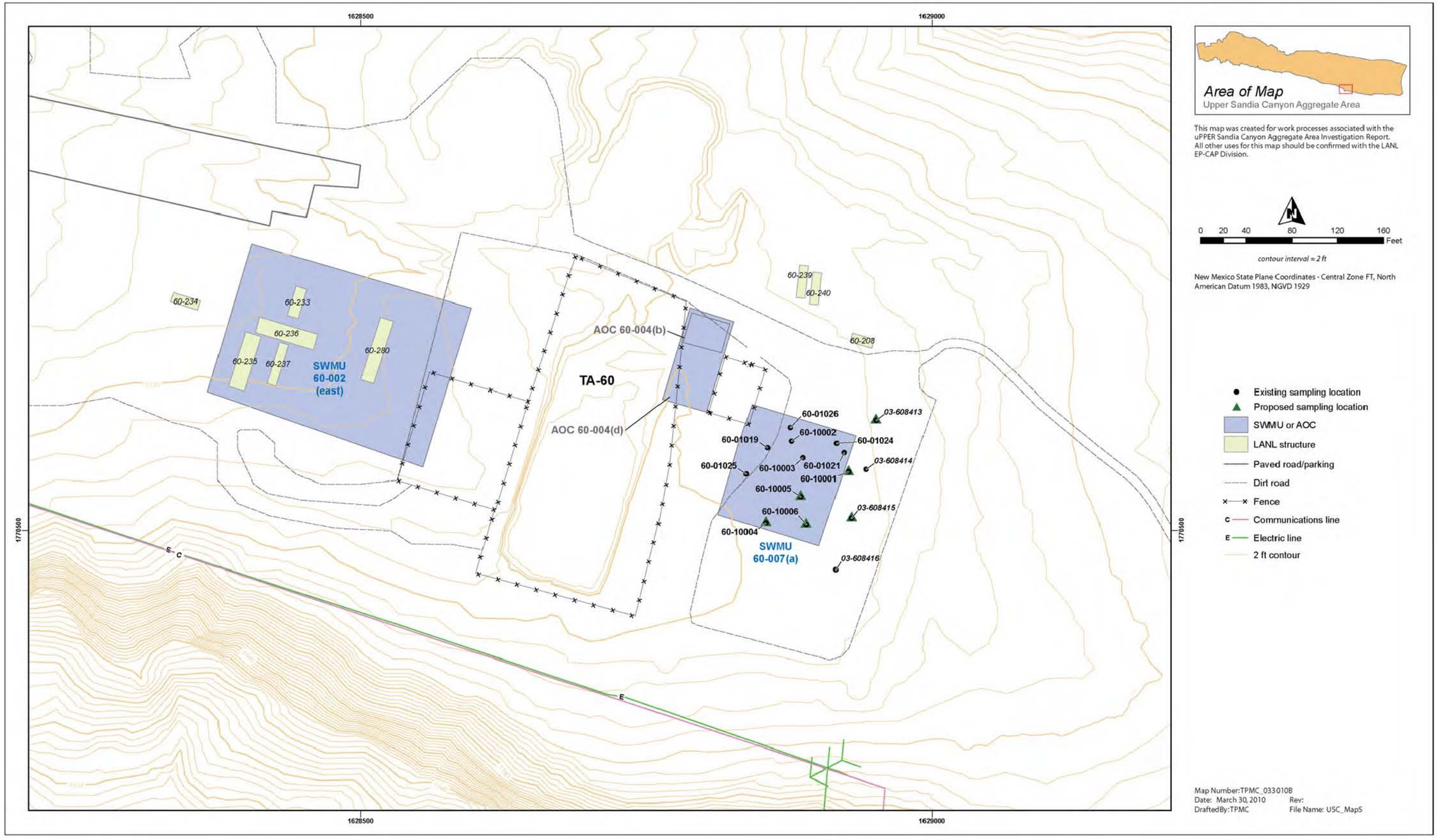

Figure 4.2-3 Site map with existing and proposed sampling locations at SWMUs 60-007(a) and 60-002 (east)

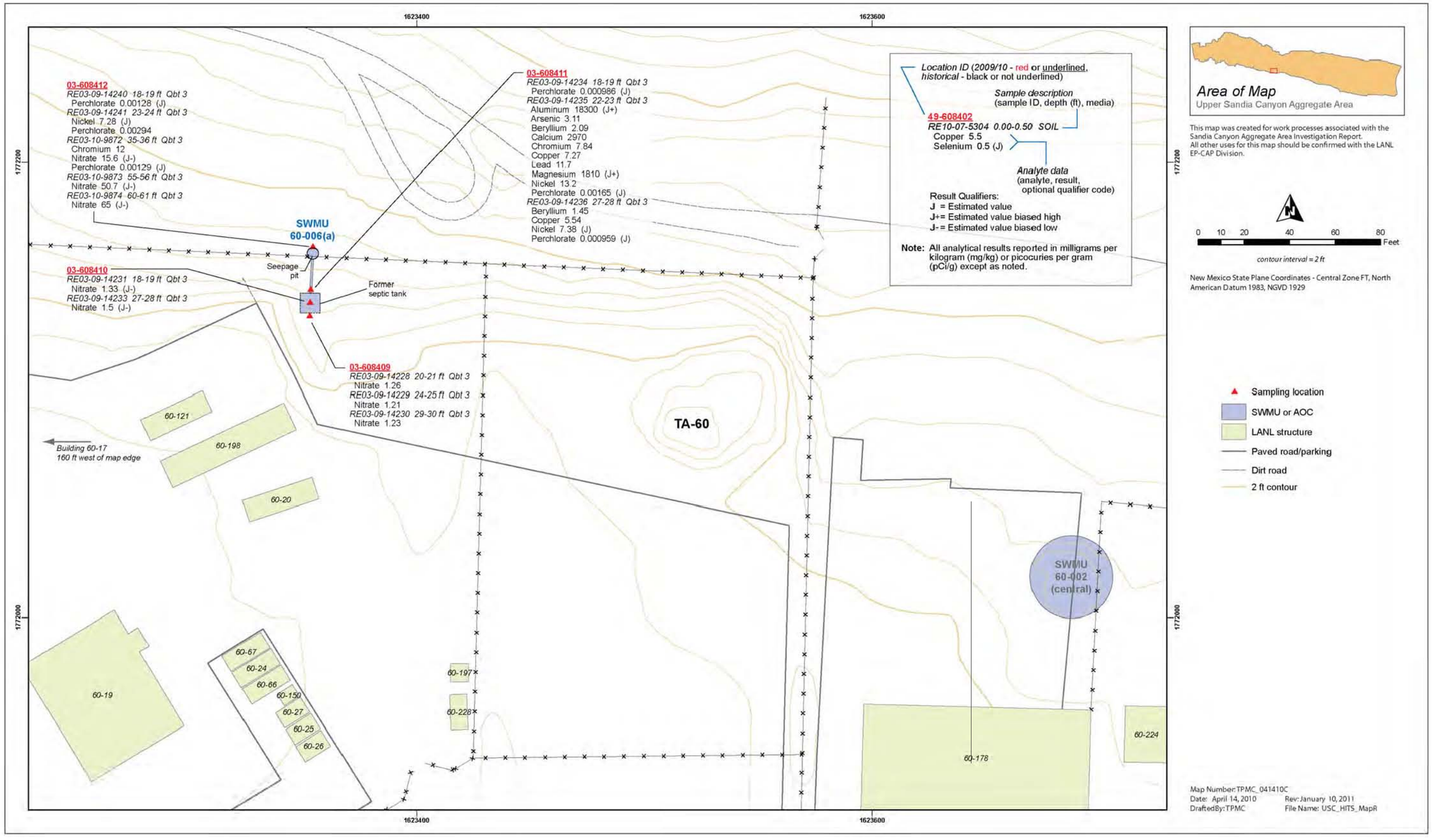

Figure 4.2-4 Inorganic chemical concentrations detected or detected above BVs at SWMU 60-006(a)

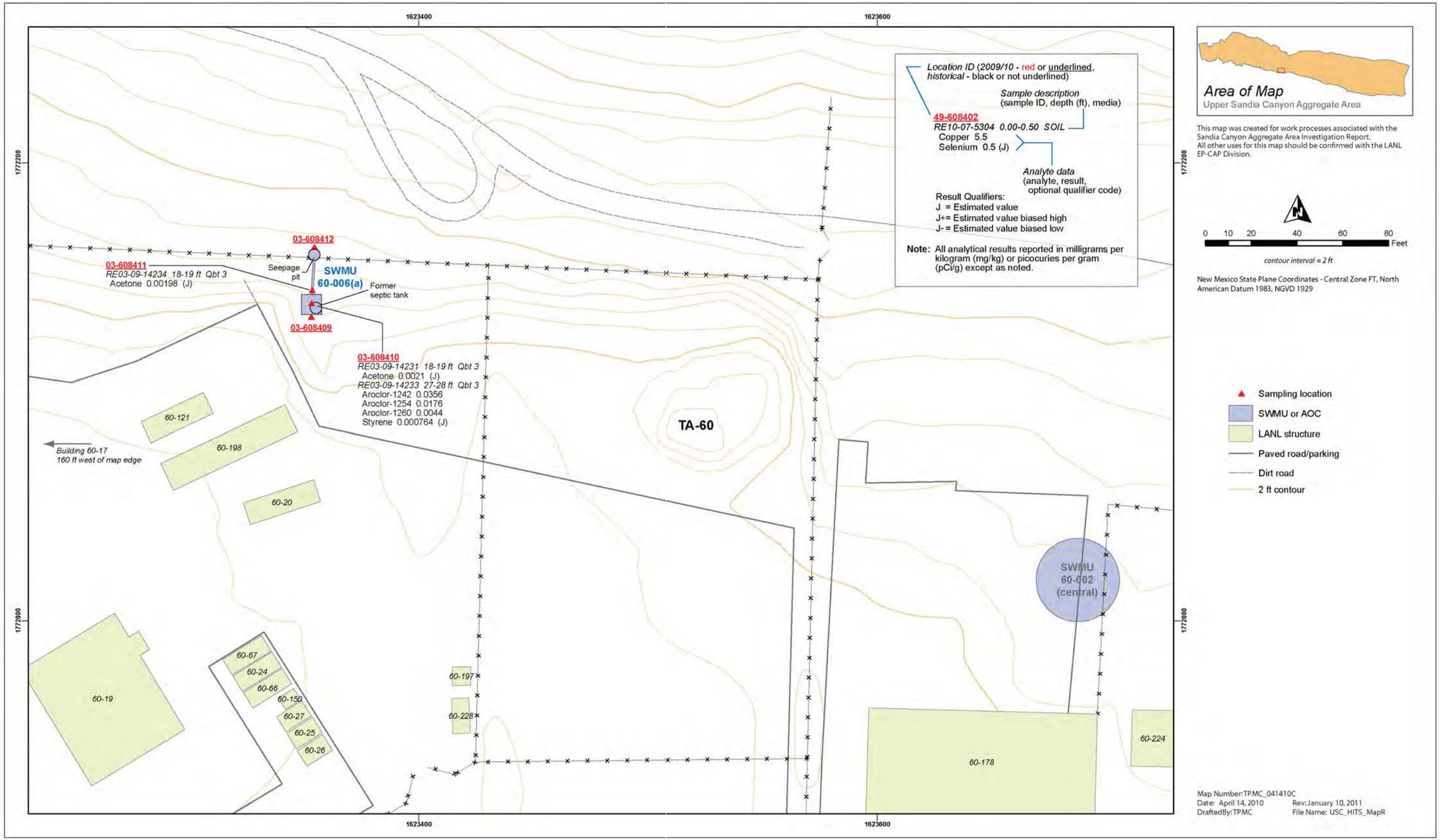

Figure 4.2-5 Organic chemical concentrations detected at SWMU 60-006(a)

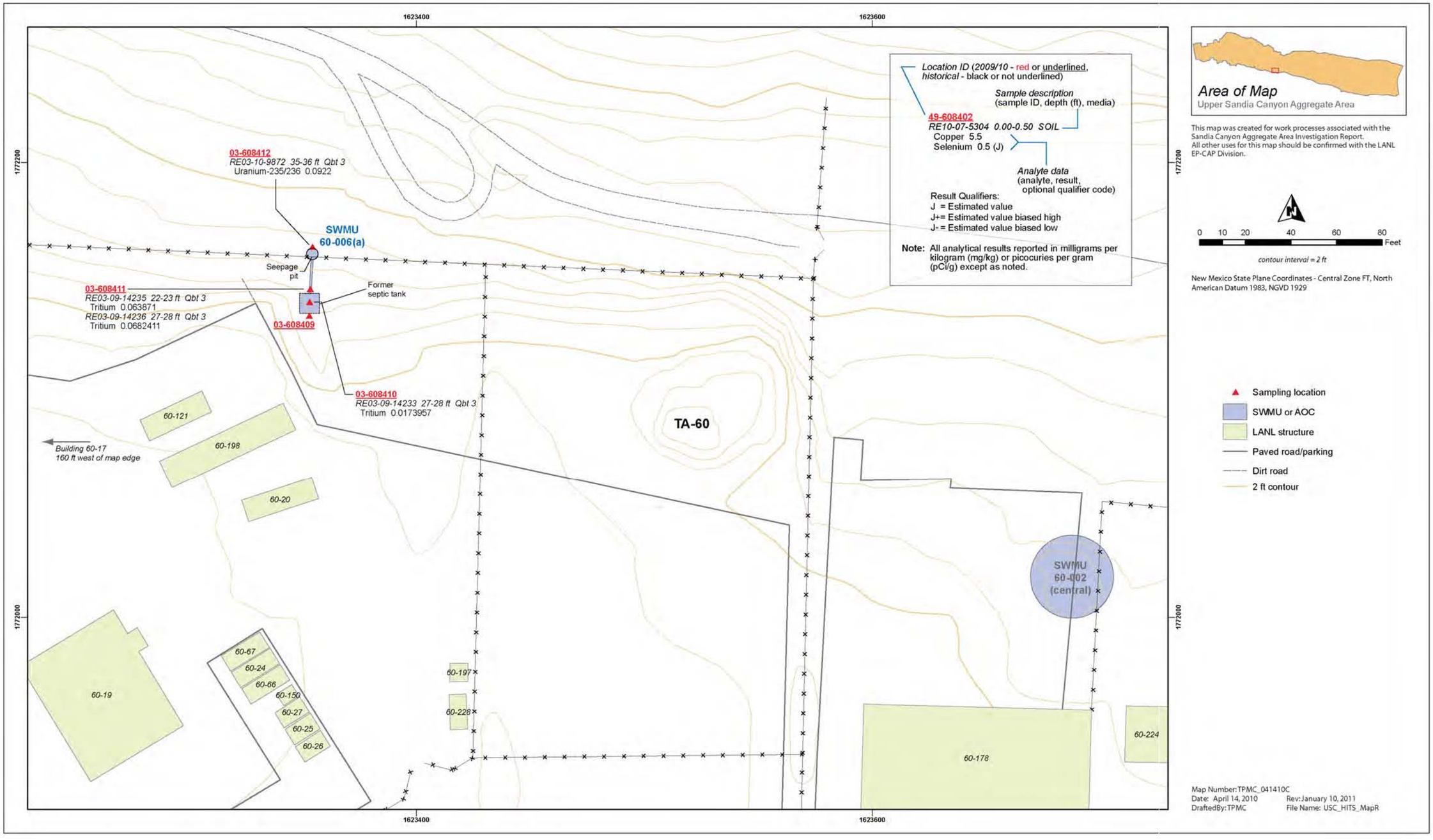

Figure 4.2-6 Radionuclides detected or detected above BVs/FVs SWMU 60-006(a)

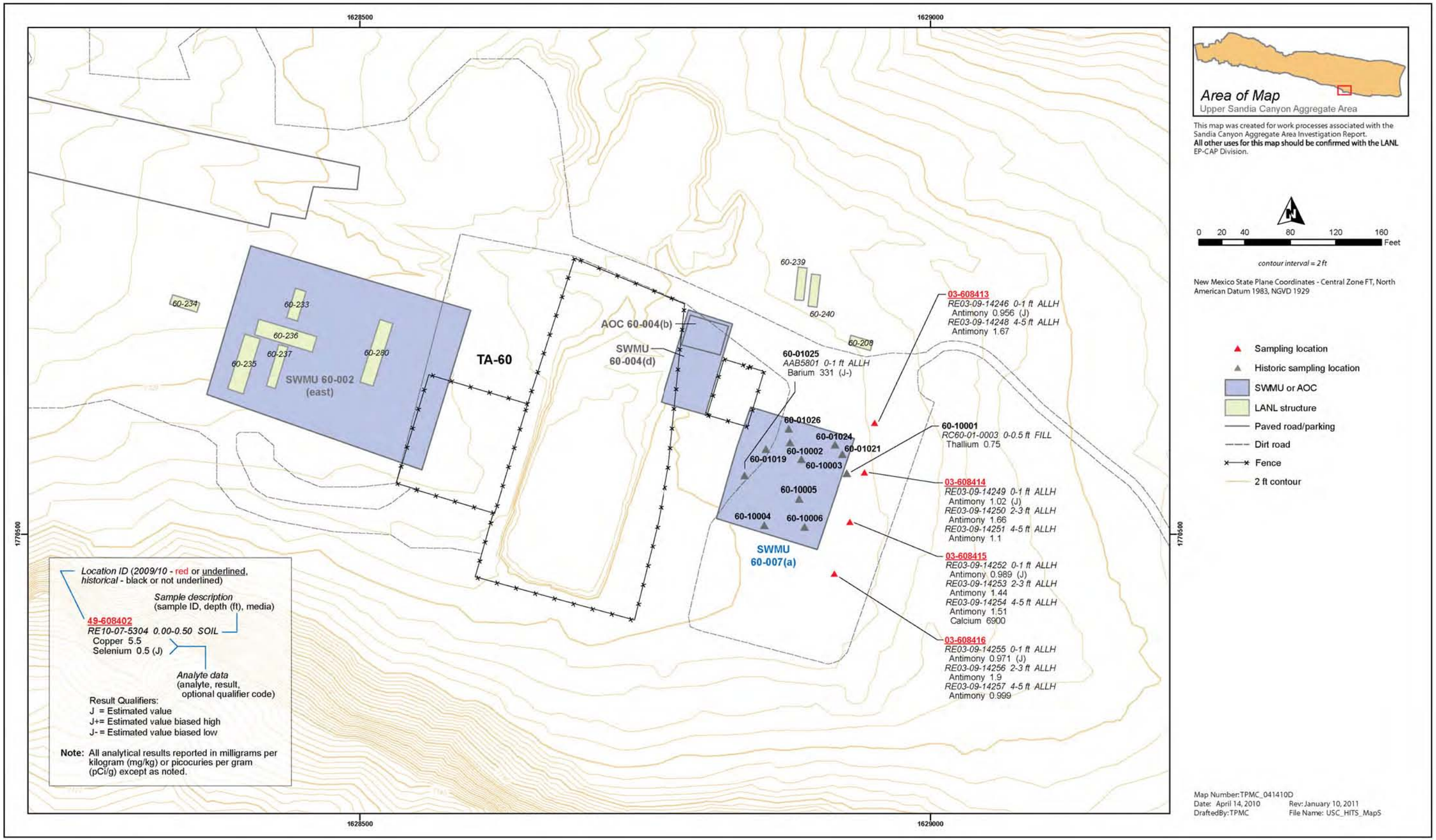

Figure 4.2-7 Inorganic chemical concentrations detected or detected above BVs at SWMU 60-007(a)

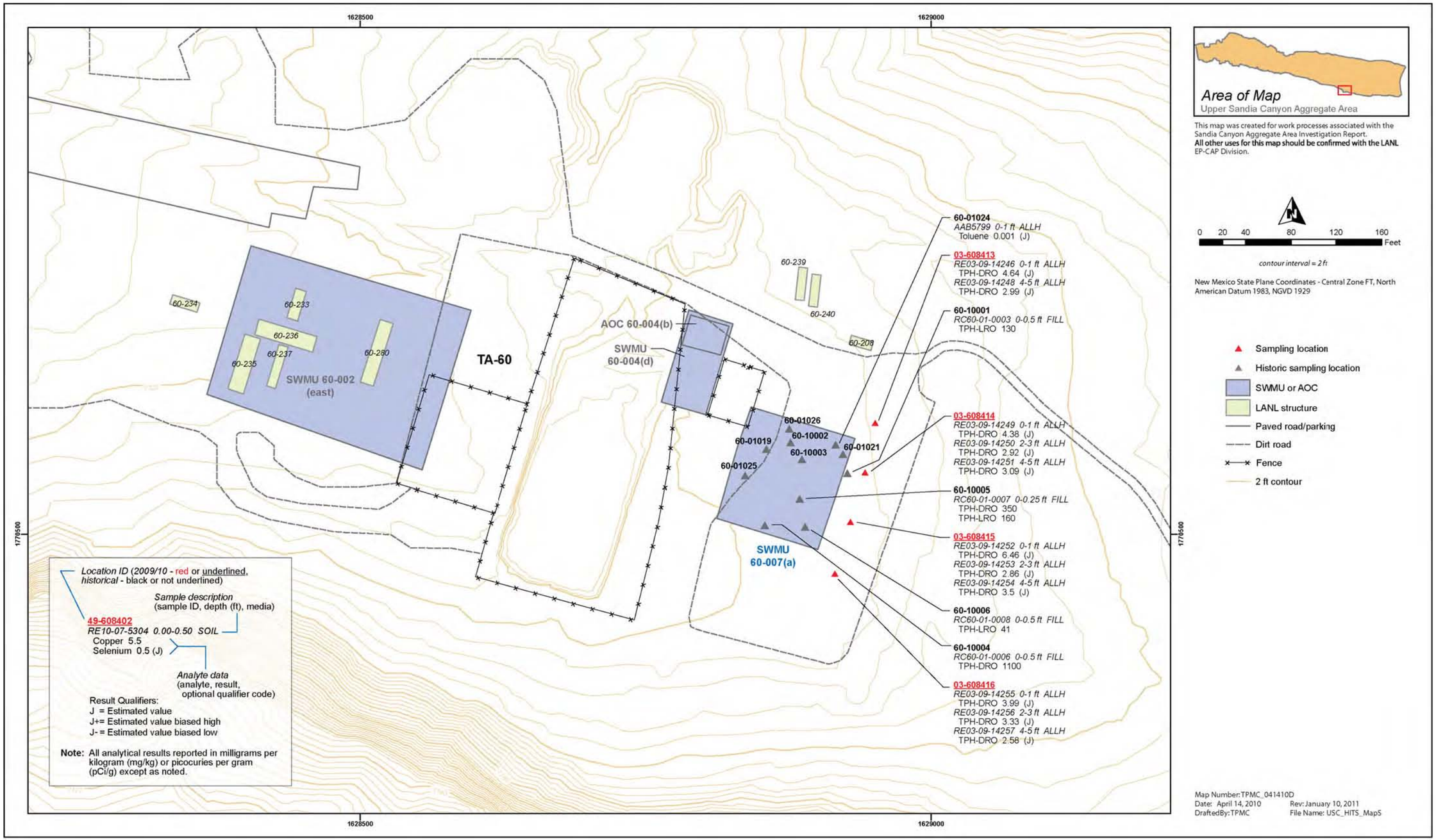

Figure 4.2-8 Organic chemical concentrations detected at SWMU 60-007(a)

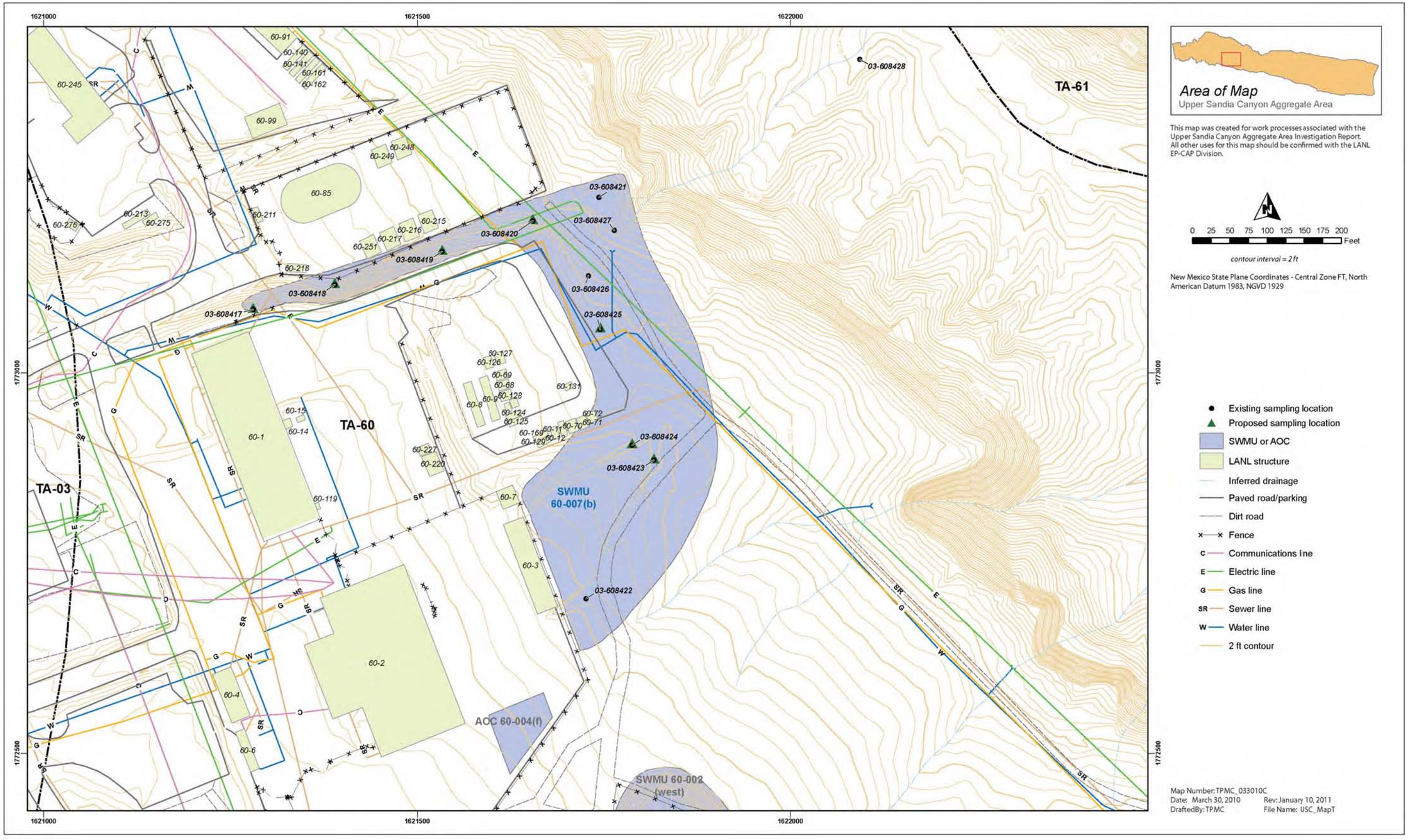

Figure 4.2-9 Site map with existing and proposed sampling locations at SWMU 60-007(b)

Table 1.1-1
Sites under Phase II Investigation in the Upper Sandia Canyon Aggregate Area

SWMU/AOC	Brief Description	2009 Investigation Results	Proposed Activities
SWMU 03-002(c)	Former storage area used to store pesticides and herbicides	Extent not defined: lateral and vertical extent of lead and sodium	Additional sampling to define extent
AOC 03-003(d)	Transformer pad—PCB only site—a concrete pad that formerly housed two transformers	Extent not defined: vertical extent of Aroclor-1260	Additional sampling to define extent
SWMU 03-009(a)	Surface disposal (fill area) located at the canyon rim south of asphalt plant	Extent not defined: lateral and vertical extent of anthracene, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chromium, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, lead, phenanthrene, pyrene, selenium, and TPH-DRO; lateral extent of acenaphthene, Aroclor-1254, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, and 1,2,4-trimethylbenzene	Additional sampling to define extent
SWMU 03-009(i)	Surface disposal site for construction debris	Extent not defined: lateral and vertical extent of barium, chromium , cobalt, copper, cyanide, nickel, and vanadium; lateral extent of antimony, calcium, Aroclor-1254, Aroclor-1260, and TPH-DRO; vertical extent of lead	Additional sampling to define extent
SWMU 03-012(b)	Soil contamination associated with the TA-03 power plant	Extent not defined: lateral and vertical extent of cadmium, chromium, hexavalent chromium, and zinc; lateral extent of calcium, copper, mercury, and silver	Additional sampling to define extent
SWMU 03-013(i)	Operational release, oil-contaminated soil and gravel	Extent not defined: lateral extent of antimony; vertical extent of TPH-DRO	Additional sampling to define extent
AOC 03-014(b2)	Outfall, formerly permitted, that received effluent from flow-measurement weir from former WWTP	Extent not defined: lateral and vertical extent of cyanide; vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, perchlorate, and TPH-DRO	Additional sampling to define extent
AOC 03-014(c2)	Outfall for overflow received effluent from former WWTP	Extent not defined: vertical extent of acetone, americium-241, Aroclor-1248, Aroclor-1254, Aroclor-1260, chromium, copper, cyanide, 4-isopropyltoluene, mercury, silver, toluene, and TPH-DRO	Additional sampling to define extent
SWMU 03-014(k)	Structure associated with former WWTP, one of four unlined sludge-drying beds	Extent not defined: lateral and vertical extent of Aroclor-1254, cyanide, and tritium; vertical extent of copper, lead, and TPH-DRO; lateral extent of Aroclor-1260, 4-isopropyltoluene, uranium-234, uranium-235/236, and uranium-238	Additional sampling to define extent

Table 1.1-1 (continued)

SWMU/AOC	Brief Description	2009 Investigation Results	Proposed Activities
SWMU 03-014(l)	Structure associated with former WWTP, one of four unlined sludge-drying beds	Extent not defined: lateral and vertical extent of Aroclor-1254, cyanide, and tritium; vertical extent of copper, lead, and TPH-DRO; lateral extent of Aroclor-1260, 4-isopropyltoluene, uranium-234, uranium-235/236, and uranium-238	Additional sampling to define extent
SWMU 03-014(m)	Structure associated with former WWTP, one of four unlined sludge-drying beds	Extent not defined: lateral and vertical extent of Aroclor-1254, cyanide, and tritium; vertical extent of copper, lead, and TPH-DRO; lateral extent of Aroclor-1260, 4-isopropyltoluene, uranium-234, uranium-235/236, and uranium-238	Additional sampling to define extent
SWMU 03-014(n)	Structure associated with former WWTP, one of four unlined sludge-drying beds	Extent not defined: lateral and vertical extent of Aroclor-1254, cyanide, and tritium; vertical extent of copper, lead, and TPH-DRO; lateral extent of Aroclor-1260, 4-isopropyltoluene, uranium-234, uranium-235/236, and uranium-238	Additional sampling to define extent
SWMU 03-014(o)	Structure associated with former WWTP, three lined sludge-drying beds	Extent not defined: vertical extent of chromium; lateral and vertical extent of acenaphthene and Aroclor-1254; lateral extent of Aroclor-1242 and Aroclor-1260	Additional sampling to define extent
SWMU 03-014(u)	Structure associated with former WWTP, former holding tank	Extent not defined: vertical extent of cyanide, lead, Aroclor-1254, Aroclor-1260, and TPH-DRO	Additional sampling to define extent
SWMU 03-015	Outfall located between Eniwetok Drive and security fence northeast of building 03-141	Extent not defined: vertical extent of Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, cobalt, lead, manganese, and TPH-DRO	Additional sampling to define extent
SWMU 03-021	Outfall and associated daylight channel 60 ft north of building 03-170	Extent not defined: vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, and lead	Additional sampling to define extent
SWMU 03-029	Former landfill near rim of Sandia Canyon south of building 03-271	Extent not defined: lateral and vertical extent of chromium; vertical extent of copper, Aroclor-1254, and Aroclor-1260	Additional sampling to define extent
AOC 03-038(d)	Former waste lines from buildings 03-32 and 03-34	Extent not defined: lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides	Additional sampling to define extent
SWMU 03-045(a)	Outfall (inactive) from TA-03 power plant, building 03-22	Extent not defined: lateral and vertical extent of Aroclor-1254 and Aroclor-1260; lateral extent of copper, mercury, silver, and 4-isopropyltoluene; vertical extent of chromium and TPH-DRO	Additional sampling to define extent
SWMU 03-045(b)	Outfall, currently NPDES-permitted, receives treated effluent from TA-46 SWSC plant and TA-03 power plant	Extent not defined: lateral extent of anthracene, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, mercury, phenanthrene, pyrene, silver, and TPH-DRO	Additional sampling to define extent

Table 1.1-1 (continued)

SWMU/AOC	Brief Description	2009 Investigation Results	Proposed Activities
SWMU 03-045(c)	Outfall, currently NPDES permitted, receives effluent from cooling tower of the TA-03 power plant	Extent not defined: vertical extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene; lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, hexavalent chromium, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, inorganic chemicals, naphthalene, phenanthrene, pyrene, and TPH-DRO	Additional sampling to define extent
SWMU 03-045(e)	Outfall (inactive) from floor drain in oil pump house (structure 03-57)	Extent not defined: lateral and vertical extent of fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, TPH-DRO, and zinc; lateral extent of Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, and toluene	Additional sampling to define extent
SWMU 03-045(f)	Outfall from sink in utilities control center, building 03-223	Extent not defined: vertical extent of antimony and Aroclor-1260	Additional sampling to define extent
SWMU 03-045(g)	Storm drain, closed and locked, connected to formerly permitted outfall	Extent not defined: vertical extent of chromium	Additional sampling to define extent
SWMU 03-045(h)	Outfall located at north perimeter of Sigma Complex security fence	Extent not defined: vertical extent of barium and cobalt	Additional sampling to define extent
AOC 03-047(g)	Drum storage area on the north side of building 03-141	Extent not defined: lateral and vertical extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260	Additional sampling to define extent
AOC 03-051(c)	Soil contamination from vacuum pump leaks	Extent not defined: lateral and vertical extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, cobalt, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO; lateral extent of zinc	Additional sampling to define extent

Table 1.1-1 (continued)

SWMU/AOC	Brief Description	2009 Investigation Results	Proposed Activities
AOC 03-052(b)	Stormwater collection areas north and west of Sigma Building (03-66)	Extent not defined: vertical extent of acetone, aluminum, Aroclor-1242, Aroclor-1254, Aroclor-1260, barium, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, beryllium, 2-butanone, calcium, chrysene, cobalt, copper, fluoranthene, indeno(1,2,3-cd)pyrene, manganese, phenanthrene, and pyrene	Additional sampling to define extent
SWMU 03-052(f)	Outfall that received wastewater from building 03-38	Extent not defined: vertical extent of acenaphthene, anthracene, Aroclor-1260, barium, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, chrysene, copper, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO; lateral extent of Aroclor-1254 and fluoranthene	Additional sampling to define extent
AOC 03-053	Floor drains in basement of building 03-141	Extent not defined: vertical extent of Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, cobalt, lead, manganese, and TPH-DRO	Additional sampling to define extent
SWMU 03-056(a)	Accumulation area (inactive) for spent oil	Extent not defined: vertical extent of Aroclor-1254, Aroclor-1260, and TPH-DRO	Additional sampling to define extent
SWMU 03-056(d)	Drum storage area (active) on northeast side of Plant 1 trickling filter	Extent not defined: lateral and vertical extent of copper, cyanide, mercury, silver, Aroclor-1254, Aroclor-1260, and TPH-DRO	Additional sampling to define extent
AOC 03-056(k)	Container storage area on north side of loading dock at Sigma Building (03-66)	Extent not defined: vertical extent of acetone, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 2-butanone, chrysene, fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, and toluene	Additional sampling to define extent
SWMU 03-059	Former storage area	Extent not defined: vertical extent of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, TPH-DRO, and tritium	Additional sampling to define extent

Table 1.1-1 (continued)

SWMU/AOC	Brief Description	2009 Investigation Results	Proposed Activities
AOC C-03-022	Kerosene tanker trailer used to store and distribute kerosene for asphalt plant	Extent not defined: lateral and vertical extent of calcium and TPH-DRO	Additional sampling to define extent
SWMU 60-002	Storage areas on Sigma Mesa (designated as west, central, and east)	Extent not defined: lateral and vertical extent of barium, cobalt, copper, magnesium, nickel, and vanadium; vertical extent of aluminum, calcium, and lead	Additional sampling to define extent
AOC 60-004(f)	Storage area consisting of unpaved bermed pads	Extent not defined: lateral extent of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, copper, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, mercury, naphthalene, phenanthrene, pyrene, silver, TPH-DRO, and zinc	Additional sampling to define extent
SWMU 60-006(a)	Septic system on Sigma Mesa	Extent not defined: lateral and vertical extent of nitrate; lateral extent of perchlorate; vertical extent of Aroclor-1242, Aroclor-1254, Aroclor-1260, and tritium	Additional sampling to define extent
SWMU 60-007(a)	Former storage area with small spills of oil and hydraulic fluid	Extent not defined: vertical extent of antimony and TPH-DRO	Additional sampling to define extent
SWMU 60-007(b)	Storm drainage north of motor pool building 60-1	Extent not defined: vertical extent of anthracene, barium, chromium, copper, and zinc	Additional sampling to define extent
AOC C-61-002	Subsurface contamination from diesel	Extent not defined: lateral extent of aluminum, antimony, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, thallium, TPH-DRO, and vanadium	Additional sampling to define extent

Table 4.1-1
Samples Collected and Analyses Requested at SWMU 03-002(c)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Pesticides	Cyanide
RE03-09-13306	03-608145	0.0–1.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13307	03-608145	5.0–5.8	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13308	03-608146	0.0–1.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13309	03-608146	1.5–2.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13310	03-608147	0.0–1.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13311	03-608147	3.5–4.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13312	03-608148	0.0–1.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278
RE03-09-13313	03-608148	4.5–5.0	Soil	10-278	10-278	10-278	10-278	10-278	10-278

Table 4.1-2
Proposed Sampling at SWMU 03-002(c)

Sampling Objective	Location Number	Depth (ft)	TAL Metals
Define vertical extent of lead and sodium	03-608146 03-608147 03-608148	9–10, 14–15 9–10, 14–15 9–10, 14–15	X[a,b] X[b] X[c]
Define lateral extent of lead and sodium south of location 03-608146, east of location 03-608147, and north of location 03-608148	2c-1 2c-2 2c-3	0–1, 4–5, 9–10, 14–15 0–1, 4–5, 9–10, 14–15 0–1, 4–5, 9–10, 14–15	X[b] X[b] X[c]

[a] X = Analysis will be performed.

[b] Sodium only.

[c] Lead only.

Table 4.1-3
Samples Collected and Analyses Requested at AOC 03-003(d)

Sample ID	Location ID	Depth (ft)	Media	PCBs
RE03-09-13314	03-608149	0.0–0.0	Concrete	10-782
RE03-09-13315	03-608150	0.0–1.0	Soil	10-782
RE03-09-13316	03-608150	1.0–2.0	Soil	10-782
RE03-09-13317	03-608151	0.0–1.0	Soil	10-782
RE03-09-13318	03-608151	1.0–2.0	Soil	10-782
RE03-09-13387	03-608161	0.0–1.0	Soil	10-782
RE03-09-13388	03-608161	1.0–2.0	Soil	10-782
RE03-09-13389	03-608162	0.0–1.0	Soil	10-782
RE03-09-13390	03-608162	1.0–2.0	Soil	10-782
RE03-09-13417	03-608172	0.0–1.0	Soil	10-782
RE03-09-13418	03-608172	1.0–2.0	Soil	10-782

Table 4.1-4
Proposed Sampling at AOC 03-003(d)

Sampling Objective	Location Number	Depth (ft)	PCBs
Define vertical extent of Aroclor-1260	03-608161	4–5, 9–10	X*

*X = Analysis will be performed.

Table 4.1-5
Samples Collected and Analyses Requested at SWMU 03-009(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	TPH-GRO	Cyanide
RE03-03-52417	03-22537	4.5–5.0	Qbt4	1885S	1885S	1885S	—*	1885S	1885S	—
RE03-03-52419	03-22537	19.5–20.0	Qbt4	1892S	1892S	1892S	—	1892S	1892S	—
RE03-03-52422	03-22538	14.5–15.0	Fill	1886S	1886S	1886S	—	1886S	1886S	—
RE03-03-52423	03-22538	19.5–20.0	Qbt4	1892S	1892S	1892S	—	1892S	1892S	—
RE03-03-52427	03-22539	4.0–5.0	Qbt4	1886S	1886S	1886S	—	1886S	1886S	—
RE03-03-52429	03-22539	19.5–20.0	Qbt4	1886S	1886S	1886S	—	1886S	1886S	—
RE03-09-13427	03-608178	9.0–10.0	Soil	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13426	03-608178	11.5–12.0	Qbt3	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13428	03-608178	14.0–15.0	Qbt3	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13429	03-608178	19.0–20.0	Qbt3	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13430	03-608179	9.0–10.0	Soil	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13431	03-608179	11.2–12.0	Qbt3	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13432	03-608179	14.0–15.0	Qbt3	10-296	10-295	10-295	10-295	10-295	—	10-296
RE03-09-13433	03-608179	19.0–20.0	Qbt3	10-307	10-307	10-307	10-307	10-307	—	10-307
RE03-09-13434	03-608180	9.0–10.0	Soil	10-323	10-323	10-323	10-323	10-323	—	10-323
RE03-09-13436	03-608180	14.0–15.0	Qbt3	10-323	10-323	10-323	10-323	10-323	—	10-323
RE03-09-13437	03-608180	19.0–20.0	Qbt3	10-323	10-323	10-323	10-323	10-323	—	10-323
RE03-09-13438	03-608181	0.0–1.0	Soil	10-276	10-276	10-276	10-276	10-276	—	10-276
RE03-09-13439	03-608181	1.0–2.0	Soil	10-276	10-276	10-276	10-276	10-276	—	10-276
RE03-09-13440	03-608182	0.0–1.0	Soil	10-276	10-276	10-276	10-276	10-276	—	10-276
RE03-09-13441	03-608182	1.0–2.0	Soil	10-276	10-276	10-276	10-276	10-276	—	10-276

*— = Analyses not requested.

Table 4.1-6
Proposed Sampling at SWMU 03-009(a)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO
Define vertical extent of chromium, lead, and selenium	03-22538 03-608178 03-608179	25–26, 29–30 25–26, 29–30 25–26, 29–30	X[a,b] X[d] X[e]	—[c] — —	— — —	— — —	— — —
Define vertical extent of Aroclor-1260, SVOCs, and TPH-DRO	03-608181 03-608182	9–10, 14–15, 19–20 9–10, 14–15, 19–20	— —	— —	X X	— X	X X
Define lateral extent by collecting shallow samples at locations 03-608178, 03-608179, and 03-608180	03-608178 03-608179 03-608180	0–1, 1–2 0–1, 1–2 0–1, 1–2	X X X	X X X	X X X	X X X	X X X
Define lateral extent of chromium 4-isopropyltoluene, lead, 1,2,4-trimethylbenzene, SVOCs, Aroclor-1254, Aroclor-1260, and TPH-DRO near the western perimeter	9a-1	0–1, 1–2, 9–10, 14–15, 19–20	X[d]	X[f]	X	X	X
Define lateral extent of selenium downgradient of location 03-22538	9a-2	14–15, 19–20, 25–26, 29–30	X[b]	—	—	—	—
Define lateral extent of Aroclor-1260, SVOCs, and TPH-DRO to the south and downgradient of locations 03-608181 and 03-608182	9a-3 9a-4	0–1, 1–2, 9–10, 14–15,19–20	— —	— —	X X	X X	X X
Define lateral extent of TAL metals, SVOCs, and TPH-DRO near the eastern perimeter and downgradient of location 03-608180	9a-5	0–1, 1–2, 9–10, 14–15, 19–20	X	—	X	—	X

[a] X = Analysis will be performed.

[b] Selenium only.

[c] — = Analysis will not be performed.

[d] Chromium and lead only.

[e] Chromium only.

[f] Isopropyltoluene(4-) and 1,2,4-trimethylbenzene only.

Table 4.1-7
Samples Collected and Analyses Requested at SWMU 03-009(i)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13461	03-608190	0.0–1.0	Soil	10-603	10-603	10-603	10-603	10-603	10-603
RE03-09-13462	03-608190	1.0–2.0	Soil	10-603	10-603	10-603	10-603	10-603	10-603
RE03-09-13463	03-608191	0.0–1.0	Soil	10-603	10-603	10-603	10-603	10-603	10-603
RE03-09-13464	03-608191	1.0–2.0	Qbt3	10-603	10-603	10-603	10-603	10-603	10-603
RE03-09-13465	03-608192	4.0–5.0	Qbt3	10-886	10-886	10-886	10-886	10-886	10-886
RE03-09-13466	03-608192	9.0–10.0	Qbt3	10-886	10-886	10-886	10-886	10-886	10-886
RE03-09-13467	03-608193	4.0–5.0	Qbt3	10-886	10-886	10-886	10-886	10-886	10-886
RE03-09-13468	03-608193	9.0–10.0	Qbt3	10-886	10-886	10-886	10-886	10-886	10-886
RE03-09-13469	03-608194	4.0–5.0	Qbt3	10-901	10-901	10-901	10-901	10-901	10-901
RE03-09-13470	03-608194	9.0–10.0	Qbt3	10-901	10-901	10-901	10-901	10-901	10-901
RE03-09-13471	03-608195	4.0–5.0	Qbt3	10-901	10-901	10-901	10-901	10-901	10-901
RE03-09-13472	03-608195	9.0–10.0	Qbt3	10-901	10-901	10-901	10-901	10-901	10-901

Table 4.1-8
Proposed Sampling at SWMU 03-009(i)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Cyanide	PCBs	TPH-DRO
Define vertical extent of barium, chromium, cobalt, copper, cyanide, lead, nickel, and vanadium	03-608191 03-608193	5–6, 9–10 12–13, 16–17	X[a,b] X[d]	X —	—[c] —	— —
Define lateral extent of barium, calcium, chromium, cobalt, copper, cyanide, nickel, vanadium, and TPH-DRO downgradient of location 03-608191	9i-1	0–1, 1–2, 5–6, 9–10	X[e]	X	—	X
Define lateral extent of antimony, Aroclor-1254, Aroclor-1260, and TPH-DRO to the east of location 03-608190	9i-2	0–1, 1–2, 5–6, 9–10	X[f]	—	X	X

[a] X = Analysis will be performed.

[b] Barium, chromium, cobalt, copper, nickel, and vanadium.

[c] — = Analysis will not be performed.

[d] Lead only.

[e] Barium, calcium, chromium, cobalt, copper, nickel, and vanadium.

[f] Antimony only.

Table 4.1-9
Samples Collected and Analyses Requested at SWMU 03-012(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Hexavalent Chromium	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-02-49270	03-02-21036	0–0.5	Fill	1199S	1199S	—*	—	—	—	—
RE03-02-49284	03-02-21036	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49271	03-02-21037	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49285	03-02-21037	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49272	03-02-21038	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49286	03-02-21038	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49273	03-02-21039	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49287	03-02-21039	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49274	03-02-21040	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49288	03-02-21040	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49275	03-02-21041	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49289	03-02-21041	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49276	03-02-21042	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49290	03-02-21042	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49277	03-02-21043	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49291	03-02-21043	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49278	03-02-21044	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49292	03-02-21044	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49279	03-02-21045	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49293	03-02-21045	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49280	03-02-21046	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49294	03-02-21046	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49281	03-02-21047	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49295	03-02-21047	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49282	03-02-21048	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49296	03-02-21048	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49283	03-02-21049	0–0.5	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49297	03-02-21049	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49298	03-02-21050	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49299	03-02-21051	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49300	03-02-21052	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-02-49301	03-02-21053	0.5–1	Fill	1199S	1199S	—	—	—	—	—
RE03-04-52775	03-22576	0–0.5	Soil	1954S	1954S	—	—	1953S	—	—
RE03-04-52785	03-22576	3.5–4	Soil	1954S	1954S	—	—	—	—	—

Table 4.1-9 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Hexavalent Chromium	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-04-52776	03-22577	0–0.5	Soil	1954S	1954S	—	—	—	—	—
RE03-04-52786	03-22577	3–3.5	Soil	1954S	1954S	—	—	—	—	—
RE03-04-52777	03-22578	0–0.5	Soil	1954S	1954S	—	—	1953S	—	—
RE03-04-52787	03-22578	3.5–4	Soil	1954S	1954S	—	—	—	—	—
RE03-04-52778	03-22579	0–0.5	Soil	1954S	1954S	—	—	—	—	—
RE03-04-52788	03-22579	3.5–4	Soil	1954S	1954S	—	—	—	—	—
RE03-04-52779	03-22580	0–0.5	Soil	1961S	1961S	—	—	1960S	—	—
RE03-04-52789	03-22580	3.5–4	Soil	1961S	1961S	—	—	—	—	—
RE03-04-52781	03-22582	0.83–1.33	Soil	1959S	1959S	—	—	1958S	—	—
RE03-04-52791	03-22582	1.83–2.83	Soil	1959S	1959S	—	—	—	—	—
RE03-04-52782	03-22583	0–0.5	Soil	1959S	1959S	—	—	—	—	—
RE03-04-52792	03-22583	3.5–4	Soil	1959S	1959S	—	—	—	—	—
RE03-04-52783	03-22584	0–0.5	Soil	1959S	1959S	—	—	1958S	—	—
RE03-04-52793	03-22584	3.5–4	Soil	1959S	1959S	—	—	—	—	—
RE03-04-52784	03-22585	0–0.5	Soil	1959S	1959S	—	—	—	—	—
RE03-04-52794	03-22585	3.5–4	Soil	1959S	1959S	—	—	—	—	—

*— = Analyses not requested.

Table 4.1-10
Proposed Sampling at SWMU 03-012(b)

Sampling Objective	Location Number	Depth (ft)[a]	TAL Metals	Hexavalent Chromium
Define vertical extent of cadmium, chromium, hexavalent chromium, and zinc	03-02-21043	6–7, 10–11, 14–15	—[b]	X[c]
	03-02-21045	6–7, 10–11, 14–15	X[d]	—
	03-02-21048	6–7, 10–11, 14–15	X[e]	X
	03-02-21050	6–7, 10–11, 14–15	—	X
	03-02-21052	6–7, 10–11, 14–15	—	X
	03-02-21053	6–7, 10–11, 14–15	X[f]	X
	03-22579	6–7, 10–11, 14–15	—	X
	03-22585	6–7, 10–11, 14–15	—	X
Define lateral extent of cadmium, chromium, hexavalent chromium, mercury, silver, and zinc	12b-1	0–1, 6–7, 10–11, 14–15	X[g]	X
	12b-2	0–1, 6–7, 10–11, 14–15	—	X
	12b-3	0–1, 6–7, 10–11, 14–15	—	X
	12b-4	0–1, 6–7, 10–11, 14–15	X[f]	X
	12b-5	0–1, 6–7, 10–11, 14–15	X[h]	X

[a] The deepest depth interval will be adjusted to collect samples in tuff.

[b] — = Analysis will not be performed.

[c] X = Analysis will be performed.

[d] Chromium only.

[e] Chromium and zinc only.

[f] Cadmium and zinc only.

[g] Cadmium, chromium, copper, mercury, silver, and zinc only.

[h] Chromium, silver, and zinc only.

Table 4.1-11
Samples Collected and Analyses Requested at SWMU 03-013(i)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	TPH-GRO	Cyanide
RE03-05-59527	03-24444	0.0–0.5	Fill	3193S	—*	3192S	3192S	3192S	3192S	—
RE03-05-59528	03-24444	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59529	03-24445	0.0–0.5	Fill	3193S	—	3192S	3192S	3192S	3192S	—
RE03-05-59530	03-24445	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59531	03-24446	0.0–0.5	Fill	3195S	—	3194S	3194S	3194S	3194S	—
RE03-05-59532	03-24446	1.5–1.5	Fill	3195S	3194S	3194S	3194S	3194S	3194S	—
RE03-05-59533	03-24447	0.0–0.5	Fill	3193S	—	3192S	3192S	3192S	3192S	—
RE03-05-59534	03-24447	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59535	03-24448	0.0–0.5	Fill	3193S	—	3192S	3192S	3192S	3192S	—
RE03-05-59536	03-24448	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59537	03-24449	0.0–0.5	Fill	3193S	—	3192S	3192S	3192S	3192S	—
RE03-05-59538	03-24449	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59539	03-24450	0.0–0.5	Fill	3193S	—	3192S	3192S	3192S	3192S	—
RE03-05-59540	03-24450	1.5–1.5	Fill	3193S	3192S	3192S	3192S	3192S	3192S	—
RE03-05-59541	03-24451	0.0–0.5	Fill	3195S	—	3194S	3194S	3194S	3194S	—
RE03-05-59542	03-24451	1.5–1.5	Fill	3195S	3194S	3194S	3194S	3194S	3194S	—
RE03-09-13566	03-608221	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13567	03-608221	4.0–5.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13568	03-608222	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13569	03-608222	4.0–5.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13570	03-608223	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13571	03-608223	4.0–5.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13572	03-608224	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13573	03-608224	4.0–5.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13574	03-608225	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13575	03-608225	4.0–5.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13576	03-608226	0.0–1.0	Soil	10-435	10-435	10-435	10-435	10-435	—	10-435
RE03-09-13577	03-608226	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13578	03-608227	0.0–1.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13579	03-608227	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13580	03-608228	0.0–1.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13581	03-608228	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13582	03-608229	0.0–1.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13583	03-608229	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13584	03-608230	0.0–1.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13586	03-608230	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436

Table 4.1-11 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	TPH-GRO	Cyanide
RE03-09-13585	03-608231	0.0–1.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13587	03-608231	4.0–5.0	Soil	10-436	10-436	10-436	10-436	10-436	—	10-436
RE03-09-13588	03-608232	0.0–1.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13589	03-608232	4.0–5.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13590	03-608233	0.0–1.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13592	03-608233	4.0–5.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13593	03-608234	0.0–1.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13595	03-608234	4.0–5.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13594	03-608235	0.0–1.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13597	03-608235	4.0–5.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13591	03-608236	0.0–1.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461
RE03-09-13596	03-608236	4.0–5.0	Soil	10-461	10-460	10-460	10-460	10-460	—	10-461

*— = Analyses not requested.

Table 4.1-12
Proposed Sampling at SWMU 03-013(i)

Sampling Objective	Location Number	Depth (ft)[a]	TAL Metals	TPH-DRO
Define vertical extent of TPH-DRO	03-24445	7–8, 12–13	—[b]	X[c]
	03-24448	7–8, 12–13	—	X
	03-24450	7–8, 12–13	—	X
	03-608230	7–8, 12–13	—	X
	03-608235	7–8, 12–13	—	X
Define the lateral extent of antimony downgradient of locations 03-608223 and 03-608224	13i-1	0–1, 4–5, 7–8	X[d]	—
	13i-2	0–1, 4–5, 7–8	X[d]	—

[a] The deepest depth interval will be adjusted to collect samples in tuff.

[b] — = Analysis will not be performed.

[c] X = Analysis will be performed.

[d] Antimony only.

Table 4.1-13
Samples Collected and Analyses Requested at AOC 03-014(b2)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium
RE03-09-13618	03-608242	0.0–1.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13619	03-608242	1.0–2.0	Qbt3	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13620	03-608243	0.0–1.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13621	03-608243	1.0–2.0	Qbt3	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13622	03-608244	0.0–1.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13623	03-608244	1.0–2.0	Qbt3	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13624	03-608245	0.0–1.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13625	03-608245	1.0–2.0	Qbt3	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13626	03-608246	0.0–1.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545
RE03-09-13627	03-608246	1.0–2.0	Soil	10-544	10-543	10-543	10-543	10-543	10-544	10-544	10-544	10-545	10-545	10-545

Table 4.1-14
Proposed Sampling at AOC 03-014(b2)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Cyanide	Perchlorate	VOCs	PCBs	TPH-DRO
Define vertical extent of acetone, Aroclor-1254, Aroclor-1260, chromium, cyanide, perchlorate, and TPH-DRO	03-608242	4–5, 8–9	X[a,b]	—[c]	—	X[d]	—	X
	03-608244	4–5, 8–9	—	—	X	—	X	—
	03-608246	4–5, 8–9	—	X	—	—	—	—
Define lateral extent of cyanide downgradient of location 03-608246	14b2-1	0–1, 1–2, 4–5	—	X	—	—	—	—

[a] X = Analysis will be performed.

[b] Chromium only.

[c] — = Analysis will not be performed.

[d] Acetone only.

Table 4.1-15
Samples Collected and Analyses Requested at AOC 03-014(c2)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium
RE03-09-13631	03-608248	0.0–1.0	Soil	10-464	10-463	10-463	10-463	10-463	10-464	10-464	10-464	10-465	10-465	10-465
RE03-09-13632	03-608248	1.0–2.0	Qbt3	10-464	10-463	10-463	10-463	10-463	10-464	10-464	10-464	10-465	10-465	10-465
RE03-09-13633	03-608249	0.0–1.0	Soil	10-464	10-463	10-463	10-463	10-463	10-464	10-464	10-464	10-465	10-465	10-465
RE03-09-13634	03-608249	1.0–2.0	Soil	10-464	10-463	10-463	10-463	10-463	10-464	10-464	10-464	10-465	10-465	10-465
RE03-09-13635	03-608250	0.0–1.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13636	03-608250	1.0–2.0	Qbt3	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13637	03-608251	0.0–1.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13638	03-608251	1.0–2.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13639	03-608252	0.0–1.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13640	03-608252	1.0–2.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13641	03-608253	0.0–1.0	Soil	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13642	03-608253	2.0–3.0	Qbt3	10-467	10-466	10-466	10-466	10-466	10-467	10-467	10-467	10-468	10-468	10-468
RE03-09-13643	03-608254	0.0–1.0	Soil	10-485	10-484	10-484	10-484	10-484	10-485	10-485	10-485	10-486	10-486	10-486
RE03-09-13644	03-608254	2.0–3.0	Qbt3	10-485	10-484	10-484	10-484	10-484	10-485	10-485	10-485	10-486	10-486	10-486
RE03-09-13645	03-608255	0.0–1.0	Soil	10-485	10-484	10-484	10-484	10-484	10-485	10-485	10-485	10-486	10-486	10-486
RE03-09-13646	03-608255	2.0–3.0	Soil	10-485	10-484	10-484	10-484	10-484	10-485	10-485	10-485	10-486	10-486	10-486

Table 4.1-16
Proposed Sampling at AOC 03-014(c2)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Cyanide	VOCs	PCBs	TPH-DRO	Americium-241
Define vertical extent of acetone, americium-241, Aroclor-1248, Aroclor-1254, Aroclor-1260, chromium, copper, cyanide, 4-isopropyltoluene, mercury, silver, toluene, and TPH-DRO	03-608249	5–6, 9–10	X[a,b]	—[c]	—	X	X	—
	03-608251	5–6, 9–10	—	—	—	X	—	—
	03-608252	5–6, 9–10	X[d]	—	—	X	—	—
	03-608253	5–6, 9–10	X[e]	X	X[f]	—	X	—
	03-608254	5–6, 9–10	—	—	—	X	—	X
	03-608255	5–6, 9–10	—	—	—	—	—	X

[a] X = Analysis will be performed.

[b] Mercury and silver only.

[c] — = Analysis will not be performed.

[d] Chromium, mercury, and silver only.

[e] Chromium and copper only.

[f] Acetone, 4-isopropyltoluene, and toluene only.

Table 4.1-17
Samples Collected and Analyses Requested at SWMUs 03-014 (k,l,m,n)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Perchlorate	Nitrate	Pesticides	Herbicides	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium
0103-97-0020	03-03201	0.0–1.58	Fill	3434R	3433R	3433R	—*	3433R	—	—	—	3433R	3433R	—	3435R	3435R	3435R	3435R
0103-97-0021	03-03201	1.58–2.58	Qbt4	3434R	3433R	3433R	—	3433R	—	—	—	3433R	3433R	—	3435R	3435R	3435R	3435R
0103-97-0022	03-03201	2.58–3.58	Qbt4	3434R	3433R	3433R	—	3433R	—	—	—	3433R	3433R	—	3435R	3435R	3435R	3435R
RE03-09-13747	03-03201	4.0–5.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13739	03-03201	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
0103-97-0023	03-03202	0.0–0.33	Fill	3434R	3433R	3433R	—	3433R	—	—	—	3433R	3433R	—	—	—	—	—
RE03-09-13746	03-03202	4.0–5.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13743	03-03202	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
0103-97-0011	03-03264	0.0–1.0	Fill	3376R	—	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
0103-97-0012	03-03264	1.33–2.33	Qbt4	3376R	—	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
0103-97-0013	03-03264	2.33–3.33	Qbt4	3376R	3375R	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
RE03-09-13740	03-03264	4.0–5.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13741	03-03264	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13744	03-03265	4.0–5.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13745	03-03265	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
0103-97-0017	03-03266	0.0–0.17	Fill	3376R	—	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
0103-97-0018	03-03266	0.75–1.75	Qbt4	3376R	—	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
0103-97-0019	03-03266	1.75–2.75	Qbt4	3376R	3375R	3375R	3375R	—	—	—	—	3375R	3375R	—	3377R	3377R	3377R	3377R
RE03-09-13748	03-03266	4.0–5.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13749	03-03266	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
0103-97-0363	03-03386	0.0–0.5	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0362	03-03386	0.5–1.0	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0361	03-03386	0.67–1.0	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0367	03-03387	0.0–0.5	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0366	03-03387	0.5–1.0	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0365	03-03387	1.0–1.5	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0364	03-03387	1.5–2.0	Fill	—	—	4002R	4002R	—	—	—	—	—	—	—	—	—	—	—
0103-97-0343	03-603357	0.0–0.5	Soil	—	—	—	—	3721R	—	—	—	—	—	—	—	—	—	—
0103-97-0345	03-603357	0.0–0.5	Fill	—	—	—	—	3721R	—	—	—	—	—	—	—	—	—	—
0103-97-0347	03-603357	0.0–0.5	Fill	—	—	—	—	3721R	—	—	—	—	—	—	—	—	—	—
RE03-09-13726	03-608270	0.0–1.0	Qbt3	10-390	10-390	10-390	10-390	10-390	10-390	10-390	10-390	—	—	—	10-390	10-390	—	10-390
RE03-09-13727	03-608270	3.0–4.0	Qbt3	10-390	10-390	10-390	10-390	10-390	10-390	10-390	10-390	—	—	—	10-390	10-390	—	10-390
RE03-09-13728	03-608270	8.0–9.0	Qbt3	10-390	10-390	10-390	10-390	10-390	10-390	10-390	10-390	—	—	—	10-390	10-390	—	10-390

Table 4.1-17 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Perchlorate	Nitrate	Pesticides	Herbicides	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium
RE03-09-13736	03-608271	0.0–1.0	Soil	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13737	03-608271	6.0–7.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13738	03-608271	11.0–12.0	Qbt3	10-458	10-457	10-457	10-457	10-457	10-458	10-458	10-458	—	—	10-459	10-459	10-459	—	10-459
RE03-09-13732	03-608272	0.0–1.0	Soil	10-408	10-407	10-407	10-407	10-407	10-408	10-408	10-408	—	—	10-408	10-408	10-408	—	10-408
RE03-09-13733	03-608272	3.0–4.0	Qbt3	10-408	10-407	10-407	10-407	10-407	10-408	10-408	10-408	—	—	10-408	10-408	10-408	—	10-408
RE03-09-13734	03-608272	8.0–9.0	Qbt3	10-408	10-407	10-407	10-407	10-407	10-408	10-408	10-408	—	—	10-408	10-408	10-408	—	10-408
RE03-09-13729	03-608273	0.0–1.0	Soil	10-390	10-390	10-390	10-390	10-390	10-390	10-390	10-390	—	—	—	10-390	10-390	—	10-390
RE03-09-13730	03-608273	3.0–4.0	Qbt3	10-390	10-390	10-390	10-390	10-390	10-390	10-390	10-390	—	—	—	10-390	10-390	—	10-390

*— = Analyses not requested.

Table 4.1-18
Proposed Sampling at SWMUs 03-014(k,l,m,n)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Cyanide	VOCs	PCBs	TPH-DRO	Isotopic Uranium	Tritium
Define vertical extent of copper, cyanide, lead, PCBs, TPH-DRO, and tritium	03-03201	10–11, 14–15	—[a]	—	—	X[b]	—	—	—
	03-03265	10–11, 14–15	—	X	—	—	X	—	—
	03-608270	10–11, 14–15	—	—	—	—	—	—	X
	03-608271	14–15, 18–19	X[c]	—	—	—	—	—	—
Define lateral extent of Aroclor-1254, Aroclor-1260, cyanide, and tritium to the west of location 03-608272	14k-1	0–1, 3–4, 8–9	—	X	—	X	—	—	X
Define lateral extent of Aroclor-1260 to the south of location 03-608271	14k-2	0–1, 3–4, 8–9	—	—	—	X	—	—	—
Define lateral extent of 4-isopropyltoluene to the east of location 03-608270	14k-3	0–1, 3–4, 8–9	—	—	X[d]	—	—	—	—
Define lateral extent of uranium-234, uranium-235/236, and uranium-238 to the north of location 03-608273	14k-4	0–1, 3–4, 8–9	—	—	—	—	—	X	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Copper and lead only.

[d] Isopropyltoluene[4-] only.

Table 4.1-19
Samples Collected and Analyses Requested at SWMU 03-014(o)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Nitrate	Cyanide	Perchlorate	Pesticides	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90	Tritium
0103-97-0024	03-03203	0.0–0.5	Fill	3445R	—*	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	—
0103-97-0025	03-03203	1.5–2.5	Qbt4	3445R	—	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0026	03-03203	2.5–3.5	Qbt4	3445R	3444R	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0027	03-03204	0.0–0.83	Fill	3445R	—	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0028	03-03204	1.75–2.75	Qbt4	3445R	—	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0029	03-03204	2.75–3.75	Qbt4	3445R	3444R	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
RE03-09-13754	03-03204	3.0–4.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
RE03-09-13755	03-03204	5.0–6.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
0103-97-0030	03-03205	0.0–0.75	Fill	3445R	—	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0031	03-03205	1.25–2.25	Qbt4	3445R	—	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
0103-97-0032	03-03205	2.25–3.25	Qbt4	3445R	3444R	3444R	3444R	—	—	—	—	3444R	—	3446R	3446R	3446R	3446R
RE03-09-13752	03-608275	3.0–4.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
RE03-09-13753	03-608275	5.0–6.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
RE03-09-13756	03-608276	3.0–4.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
RE03-09-13757	03-608276	5.0–6.0	Qbt3	10-887	—	—	10-887	—	—	10-887	—	—	—	—	—	—	—
RE03-09-13758	03-608277	0.0–1.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13759	03-608277	1.0–2.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13760	03-608277	4.0–5.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13761	03-608277	6.0–7.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13762	03-608278	0.0–1.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13763	03-608278	1.0–2.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13764	03-608278	4.0–5.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13765	03-608278	6.0–7.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13768	03-608279	0.0–1.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13769	03-608279	1.0–2.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13772	03-608279	4.0–5.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-10-5897	03-608279	6.0–7.0	Qbt3	10-546	10-546	10-546	10-546	10-546	10-546	10-546	10-546	—	10-546	10-546	—	10-546	10-546
RE03-09-13766	03-608280	0.0–1.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13767	03-608280	1.0–2.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13771	03-608280	4.0–5.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	—	10-518	10-518	—	10-518	10-518
RE03-09-13770	03-608280	6.0–7.0	Qbt3	10-546	10-546	10-546	10-546	10-546	10-546	10-546	10-546	—	10-546	10-546	—	10-546	10-546

*— = Analyses not requested.

Table 4.1-20
Proposed Sampling at SWMUs 03-014(o)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	SVOCs	PCBs
Define vertical extent of chromium, acenaphthene, and PCBs	03-608277 03-608279	10–11, 14–15 10–11, 14–15	—[a] X[d]	X[b,c] —	— X
Define lateral extent of acenaphthene to the east of location 03-608277	14o-1	0–1, 3–4, 6–7, 10–11, 14–15	—	X[c]	—
Define lateral extent of Aroclor-1242, Aroclor-1254, and Aroclor-1260 to the west of location 03-608279	14o-2	0–1, 3–4, 6–7, 10–11, 14–15	—	—	X
Define lateral extent of Aroclor-1254 and Aroclor-1260 to the south of location 03-608280	14o-3	0–1, 3–4, 6–7, 10–11, 14–15	—	—	X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Acenaphthene only.

[d] Chromium only.

Table 4.1-21
Samples Collected and Analyses Requested at SWMU 03-014(u)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium	Strontium-90
RE03-10-5491	03-608281	0.0–1.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—*
RE03-09-13779	03-608281	1.0–2.0	Qbt3	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13781	03-608282	0.0–1.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-10-5490	03-608282	3.5–4.5	Qbt3	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13783	03-608283	0.0–1.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	10-518	10-518	—	10-518
RE03-09-13799	03-608284	0.0–1.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13800	03-608284	1.0–2.0	Qbt3	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13801	03-608285	0.0–1.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13802	03-608285	1.0–2.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-09-13803	03-608286	0.0–1.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	10-518	10-518	—	10-518
RE03-09-13804	03-608286	1.0–2.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	10-518	10-518	—	10-518
RE03-09-13805	03-608287	0.0–1.0	Soil	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	10-518	10-518	—	10-518
RE03-09-13806	03-608287	1.0–2.0	Qbt3	10-517	10-516	10-516	10-516	10-516	10-517	10-517	10-517	10-518	10-518	—	10-518
RE03-10-5487	03-609990	0.0–1.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—
RE03-10-5488	03-609990	1.0–2.0	Soil	10-488	10-487	10-487	10-487	10-487	10-488	10-488	10-488	10-489	10-489	10-489	—

*— = Analysis not requested.

Table 4.1-22
Proposed Sampling at SWMUs 03-014(u)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium
Define vertical extent of cyanide, lead, PCBs, and TPH-DRO	03-608284 03-609990	4–5, 8–9 4–5, 8–9	X[a,b] —	—[c] —	— —	— —	— X	— —	X —	— —	— —	— —	— —
Additional samples not collected during 2009 investigation	03-608281 03-608282 03-608283	8–9, 12–13 8–9, 12–13 8–9, 12–13	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X	X X X

[a] X = Analysis will be performed.
[b] Lead only.
[c] — = Analysis will not be performed.

Table 4.1-23
Samples Collected and Analyses Requested at SWMU 03-015 and AOC 03-053

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium	Gamma Spectroscopy
AAB5813	03-02004	0.0–1.5	Sed	20215	—*	—	—	—	—	—	—	—	20229
RE03-09-13862	03-608289	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13863	03-608289	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13864	03-608290	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13865	03-608290	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13866	03-608291	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13867	03-608291	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13868	03-608292	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13869	03-608292	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13870	03-608293	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13871	03-608293	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13872	03-608294	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13873	03-608294	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13874	03-608295	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13875	03-608295	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13876	03-608296	0.0–1.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13877	03-608296	1.0–2.0	Soil	10-605	10-604	10-604	10-604	10-604	10-605	10-606	10-606	10-606	—
RE03-09-13878	03-608297	0.0–1.0	Soil	10-756	10-755	10-755	10-755	10-755	10-756	10-756	10-756	10-756	—
RE03-09-13879	03-608297	1.0–2.0	Soil	10-756	10-755	10-755	10-755	10-755	10-756	10-756	10-756	10-756	—
RE03-09-13880	03-608298	2.5–3.5	Soil	10-756	10-755	10-755	10-755	10-755	10-756	10-756	10-756	10-756	—
RE03-09-13881	03-608298	5.5–6.5	Soil	10-756	10-755	10-755	10-755	10-755	10-756	10-756	10-756	10-756	—

*— = Analyses not requested.

Table 4.1-24
Proposed Sampling at SWMU 03-015 and AOC 03-053

Sampling Objective	Location Number	Depth (ft)	TAL Metals	SVOCs	PCBs	TPH-DRO
Define vertical extent of Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, benzo(k)fluoranthene, chromium, cobalt, lead, manganese, and TPH-DRO	03-608290	4–5, 9–10	—[a]	—	X[b]	—
	03-608291	4–5, 9–10	X[c]	—	—	—
	03-608292	4–5, 9–10	X[d]	—	—	—
	03-608295	4–5, 9–10	X[e]	—	—	—
	03-608296	4–5, 9–10	—	—	—	X
	03-608297	4–5, 9–10	X[f]	X[g]	X	—
	03-608298	9–10, 14–15	X[h]	—	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Cobalt, lead, and manganese only.

[d] Chromium only.

[e] Cobalt only.

[f] Chromium and lead only.

[g] Benzo(g,h,i)perylene and benzo(k)fluoranthene only.

[h] Manganese only.

Table 4.1-25
Samples Collected and Analyses Requested at SWMU 03-021

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide
0103-97-0241	03-03326	0.0–1.0	Soil	3429R	—*	3428R	—	—
0103-97-0242	03-03327	2.0–3.0	Soil	3429R	—	3428R	—	—
0103-97-0243	03-03327	3.0–4.0	Soil	3429R	—	3428R	—	—
0103-97-0244	03-03328	3.0–4.0	Soil	3429R	3427R	3428R	—	—
0103-97-0245	03-03328	4.0–5.0	Soil	3429R	—	3428R	—	—
0103-97-0246	03-03329	2.0–3.0	Soil	3429R	—	3428R	—	—
0103-97-0247	03-03329	3.0–4.0	Soil	3429R	—	3428R	—	—
0103-97-0248	03-03330	2.75–3.75	Soil	3429R	—	3428R	—	—
0103-97-0251	03-03330	3.75–4.25	Soil	3429R	—	3428R	—	—
0103-97-0249	03-03331	3.0–4.0	Soil	3429R	—	3428R	—	—
0103-97-0250	03-03331	4.0–5.0	Qbt3	3429R	—	3428R	—	—
RE03-09-13890	03-608299	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13891	03-608299	1.0–2.0	Qbt3	10-357	10-356	10-356	10-356	10-357
RE03-09-13892	03-608300	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13893	03-608300	1.0–2.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13894	03-608301	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13895	03-608301	1.0–2.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13896	03-608302	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13897	03-608302	1.0–2.0	Qbt3	10-357	10-356	10-356	10-356	10-357
RE03-09-13898	03-608303	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13899	03-608303	1.0–2.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13900	03-608304	0.0–1.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13901	03-608304	1.0–2.0	Soil	10-357	10-356	10-356	10-356	10-357
RE03-09-13888	03-611943	4.0–5.0	Qbt3	10-389	—	—	10-389	10-389
RE03-09-13889	03-611943	5.0–6.0	Qbt3	10-389	—	—	10-389	10-389
RE03-09-13886	03-611944	4.0–5.0	Qbt3	10-389	—	—	10-389	10-389
RE03-09-13887	03-611944	5.0–6.0	Qbt3	10-389	—	—	10-389	10-389

*— = Analyses not requested.

Table 4.1-26
Proposed Sampling at SWMU 03-021

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	PCBs
Define vertical extent of acetone, Aroclor-1254, and Aroclor-1260, and chromium	03-03327	5–6, 9–10	X[a,b]	—[c]	—
	03-608301	4–5, 9–10	—	X[d]	—
	03-608303	4–5, 9–10	—	—	X
	03-608304	4–5, 9–10	—	—	X

[a] X = Analysis will be performed.

[b] Chromium only.

[c] — = Analysis will not be performed.

[d] Acetone only.

Table 4.1-27
Samples Collected and Analyses Requested at SWMU 03-029

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13442	03-608183	0.5–1.0	Soil	10-227	10-227	10-227	10-227	10-227	10-227
RE03-09-13443	03-608183	4.0–5.0	Soil	10-227	10-227	10-227	10-227	10-227	—*
RE03-09-13444	03-608183	9.0–10.0	Soil	10-227	10-227	10-227	10-227	10-227	10-227
RE03-09-13445	03-608184	1.5–2.0	Soil	10-236	10-236	10-236	10-236	10-236	10-236
RE03-09-13446	03-608184	4.0–5.0	Soil	10-236	10-236	10-236	10-236	10-236	10-236
RE03-09-13447	03-608184	9.0–10.0	Soil	10-236	10-236	10-236	10-236	10-236	10-236
RE03-09-13448	03-608185	0.0–1.0	Soil	10-248	10-248	10-248	10-248	10-248	10-248
RE03-09-13449	03-608185	1.0–2.0	Soil	10-248	10-248	10-248	10-248	10-248	10-248
RE03-09-13450	03-608186	0.0–1.0	Qbt3	10-248	10-248	10-248	10-248	10-248	10-248
RE03-09-13451	03-608186	1.0–2.0	Qbt3	10-248	10-248	10-248	10-248	10-248	10-248

*— = Analyses not requested.

Table 4.1-28
Proposed Sampling at SWMU 03-029

Sampling Objective	Location Number	Depth (ft)	TAL Metals	PCBs
Define vertical extent of Aroclor-1254, Aroclor-1260, chromium, and copper	03-608185 03-608186	5–6, 9–10 5–6, 9–10	X[a,b] X[c]	X —[d]
Define lateral extent of chromium downgradient of location 03-608186	29-1	0–1, 1–2, 5–6, 9–10	X[c]	—

[a] X = Analysis will be performed.

[b] Copper only.

[c] Chromium only.

[d] — = Analysis will not be performed.

Table 4.1-29
Samples Collected and Analyses Requested at AOC 03-038(d)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium	Tritium
RE03-09-13914	03-608310	0.0–1.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13915	03-608310	1.0–2.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13916	03-608311	0.0–1.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13917	03-608311	1.0–2.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13918	03-608312	0.0–1.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13919	03-608312	1.0–2.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13920	03-608313	0.0–1.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13921	03-608313	1.0–2.0	Soil	10-642	10-640	10-640	10-640	10-642	10-642	10-642	10-641	10-641	10-641	10-641
RE03-09-13922	03-608314	0.0–1.0	Soil	10-689	10-688	10-688	10-688	10-689	10-689	10-689	10-688	10-688	10-688	10-688
RE03-09-13923	03-608314	1.0–2.0	Soil	10-689	10-688	10-688	10-688	10-689	10-689	10-689	10-688	10-688	10-688	10-688
RE03-09-13924	03-608315	0.0–1.0	Soil	10-689	10-688	10-688	10-688	10-689	10-689	10-689	10-688	10-688	10-688	10-688
RE03-09-13925	03-608315	1.0–2.0	Soil	10-689	10-688	10-688	10-688	10-689	10-689	10-689	10-688	10-688	10-688	10-688

Table 4.1-30
Proposed Sampling at AOC 03-038(d)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium	Tritium
Collect samples beneath the former drainline	03-608310	6–7, 9–10, 14–15	X*	X	X	X	X	X	X	X	X	X	X
	03-608311	6–7, 9–10, 14–15	X	X	X	X	X	X	X	X	X	X	X
	03-608312	6–7, 9–10, 14–15	X	X	X	X	X	X	X	X	X	X	X
	03-608313	6–7, 9–10, 14–15	X	X	X	X	X	X	X	X	X	X	X
	03-608314	6–7, 9–10, 14–15	X	X	X	X	X	X	X	X	X	X	X
	03-608315	6–7, 9–10, 14–15	X	X	X	X	X	X	X	X	X	X	X

*X = Analysis will be performed.

Table 4.1-31
Samples Collected and Analyses Requested at SWMU 03-045(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	TPH-DRO	TPH-GRO	PCBs	Cyanide
RE03-09-13932	03-608316	0–1	Qbt3	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13933	03-608316	1–2	Qbt3	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13934	03-608317	0–1	Soil	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13935	03-608317	1–2	Soil	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13936	03-608318	0–1	Qbt3	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13937	03-608318	1–2	Qbt3	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13938	03-608319	0–1	Soil	10-348	10-347	10-347	10-347	10-347	10-347	10-348
RE03-09-13939	03-608319	1–2	Qbt3	10-348	10-347	10-347	10-347	10-347	10-347	10-348

Table 4.1-32
Proposed Sampling at SWMU 03-045(a)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	PCBs	TPH-DRO
Define vertical extent of chromium, Aroclor-1254, Aroclor-1260, and TPH-DRO	03-608316 03-608317 03-608318	4–5, 9–10 4–5, 9–10 4–5, 9–10	—[a] — X[c]	— — —	X[b] X X	X — —
Define lateral extent of copper, mercury, silver, Aroclor-1254, Aroclor-1260, and 4-isopropyltoluene downgradient of location 03-608319	45a-1	0–1, 1–2, 4–5, 9–10	X[d]	X[e]	X	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Chromium only.

[d] Copper, mercury, and silver only.

[e] Isopropyltoluene[4-] only.

Table 4.1-33
Samples Collected and Analyses Requested at SWMU 03-045(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13480	03-608197	0–1	Soil	10-355	10-354	10-354	10-354	10-354	10-355
RE03-09-13481	03-608197	1–2	Soil	10-355	10-354	10-354	10-354	10-354	10-355

Table 4.1-34
Proposed Sampling at SWMU 03-045(b)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Hexavalent Chromium	SVOCs	PCBs	TPH-DRO
Define lateral extent of TAL metals, hexavalent chromium, SVOCs, PCB, and TPH-DRO downgradient of location 03-608197	45b-1 45b-2	0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10	X* X	X X	X X	X X	X X

*X = Analysis will be performed.

Table 4.1-35
Samples Collected and Analyses Requested at SWMU 03-045(c)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13478	03-608196	0–1	Soil	10-355	10-354	10-354	10-354	10-354	10-355
RE03-09-13479	03-608196	1–2	Soil	10-355	10-354	10-354	10-354	10-354	10-355

Table 4.1-36
Proposed Sampling at SWMU 03-045(c)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Hexavalent Chromium	SVOCs	PCBs	TPH-DRO
Define vertical extent of SVOCs and PCBs	03-608196	4–5, 9–10	—[a]	—	X[b]	X	—
Define lateral extent of TAL metals, hexavalent chromium, SVOCs, PCB, and TPH-DRO downgradient of location 03-608196	45c-1 45c-2	0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10	X X	X X	X X	X X	X X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

Table 4.1-37
Samples Collected and Analyses Requested at SWMU 03-045(e)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13940	03-608320	0.0–1.0	Soil	10-312	10-312	10-312	10-312	10-312	10-312
RE03-09-13941	03-608320	1.0–2.0	Soil	10-313	10-313	10-313	10-313	10-313	10-313

Table 4.1-38
Proposed Sampling at SWMU 03-045(e)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO
Define vertical extent of fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, thallium, and TPH-DRO	03-608320	4–5, 9–10	X[a,b]	X[c]	X[d]	—[e]	X
Define lateral extent of TAL metals, VOCs, SVOCs, PCBs, and TPH-DRO downgradient of location 03-608320	45e-1 45e-2 45e-3 45e-4	0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10	X[b] X[b] X[b] X[b]	X[f] X[f] X[f] X[f]	X X X X	X X X X	X X X X

[a] X = Analysis will be performed.

[b] Lead and thallium only.

[c] Isopropyltoluene[4-] only.

[d] Fluoranthene, phenanthrene, and pyrene only.

[e] — = Analysis will not be performed.

[f] Isopropyltoluene[4-] and toluene only

Table 4.1-39
Samples Collected and Analyses Requested at SWMU 03-045(f)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Nitrate
RE03-09-13942	03-608321	0.0–1.0	Soil	10-388	10-388	10-388	10-388	10-388	10-388
RE03-09-13943	03-608321	1.0–2.0	Soil	10-388	10-388	10-388	10-388	10-388	10-388
RE03-09-13944	03-608322	0.0–1.0	Soil	10-388	10-388	10-388	10-388	10-388	10-388
RE03-09-13945	03-608322	1.0–2.0	Soil	10-388	10-388	10-388	10-388	10-388	10-388

Table 4.1-40
Proposed Sampling at SWMU 03-045(f)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	PCBs
Define vertical extent of antimony and Aroclor-1260	03-608321 03-608322	4–5, 9–10 4–5, 9–10	—[a] X[c]	X[b] —

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Antimony only.

Table 4.1-41
Samples Collected and Analyses Requested at SWMU 03-045(g)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	TPH-GRO	Cyanide
RE03-03-52407	03-22535	0.0–0.5	Sed	1886S	1886S	1886S	—*	1886S	1886S	—
RE03-03-52408	03-22535	1.5–2.0	Sed	1886S	1886S	1886S	—	1886S	1886S	—
RE03-03-52412	03-22536	0.0–0.5	Sed	1886S	1886S	1886S	—	1886S	1886S	—
RE03-09-13455	03-22536	1.0–2.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-03-52413	03-22536	1.5–2.0	Sed	1886S	1886S	1886S	—	1886S	1886S	—
RE03-09-13456	03-22536	4.0–5.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13453	03-608187	1.0–2.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13454	03-608187	4.0–5.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13457	03-608188	0.0–1.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13458	03-608188	1.0–2.0	Qbt3	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13459	03-608189	0.0–1.0	Soil	10-307	10-307	10-307	10-307	10-307	10-307	10-307
RE03-09-13460	03-608189	1.0–2.0	Qbt3	10-307	10-307	10-307	10-307	10-307	10-307	10-307

*— = Analyses not requested.

Table 4.1-42
Proposed Sampling at SWMU 03-045(g)

Sampling Objective	Location Number	Depth (ft)	TAL Metals
Define vertical extent of chromium	03-608187	8–9, 14–15	X[a,b]

[a] X = Analysis will be performed.

[b] Chromium only.

Table 4.1-43
Samples Collected and Analyses Requested at SWMU 03-045(h)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Hexavalent Chromium	VOCs	SVOCs	Dioxin/Furan	PCBs	Cyanide	Perchlorate	Nitrate	Gamma Spectroscopy	Tritium	Isotopic Uranium
CAMO-09-6010	MO-604952	0.0–0.5	Fill	09-2307	09-2307	—*	09-2307	09-2306	09-2307	09-2307	09-2307	09-2307	09-2307	09-2307	09-2307
CAMO-09-6011	MO-604952	6.0–7.0	Qbt4	09-2307	09-2307	09-2307	09-2307	09-2306	09-2307	09-2307	09-2307	09-2307	09-2307	09-2307	09-2307

*— = Analyses not requested.

Table 4.1-44
Samples Collected and Analyses Requested at AOC 03-047(g)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Nitrate	Perchlorate
RE03-09-13946	03-608324	0.0–1.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13947	03-608324	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13948	03-608325	0.0–1.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13949	03-608325	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13950	03-608326	0.0–1.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13951	03-608326	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13952	03-608327	0.0–1.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13953	03-608327	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-757	10-758	10-758	10-758

Table 4.1-45
Proposed Sampling at AOC 03-047(g)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	PCBs
Define vertical extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260	03-608325 03-608327	4–5, 9–10 4–5, 9–10	X[a,b] X[b]	X —[c]
Define lateral extent of lead, Aroclor-1242, Aroclor-1254, and Aroclor-1260 to the north and downgradient of the site	47g-1 47g-2	0–1, 1–2, 4–5, 9–10 0–1, 1–2, 4–5, 9–10	X[b] X[b]	X X

[a] X = Analysis will be performed.

[b] Lead only.

[c] — = Analysis will not be performed.

Table 4.1-46
Samples Collected and Analyses Requested at AOC 03-051(c)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	SVOCs	TPH-DRO	PCBs	Cyanide	Nitrate	Perchlorate
RE03-09-13954	03-608328	2.5–3.5	Soil	10-758	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13955	03-608328	4.5–5.5	Soil	10-758	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13956	03-608329	2.5–3.5	Soil	10-758	10-757	10-757	10-757	10-758	10-758	10-758
RE03-09-13957	03-608329	4.5–5.5	Soil	10-758	10-757	10-757	10-757	10-758	10-758	10-758

Table 4.1-47
Proposed Sampling at AOC 03-051(c)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	SVOCs	PCBs	TPH-DRO
Define vertical extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, cobalt, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO	03-608328 03-608329	8–9, 12–13 8–9, 12–13	X[a,b] X[b]	—[c] X	X —	X —
Define lateral extent of acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, cobalt, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and zinc to the northeast and downgradient of the site	51c-1 51c-2	2–3, 4–5, 8–9, 12–13 2–3, 4–5, 8–9, 12–13	X[d] X[d]	X X	X X	X X

[a] X = Analysis will be performed.

[b] Cobalt only.

[c] — = Analysis will not be performed.

[d] Cobalt and zinc only.

Table 4.1-48
Samples Collected and Analyses Requested at AOC 03-052(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Isotopic Uranium
0103-97-0163	03-03285	0.0–1.0	Soil	3410R	—*	—	—	—	3411R
0103-97-0164	03-03285	2.0–3.0	Fill	3410R	3408R	—	—	—	3411R
0103-97-0165	03-03286	0.0–1.0	Fill	3410R	—	—	—	—	3411R
0103-97-0166	03-03286	1.0–2.0	Fill	3410R	—	—	—	—	3411R
RE03-09-13982	03-03286	7.0–8.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13983	03-03286	10.0–11.0	Soil	10-758	10-757	10-757	10-757	10-758	—
0103-97-0167	03-03287	0.0–1.0	Fill	3410R	—	—	—	—	3411R
0103-97-0168	03-03287	1.0–2.0	Fill	3410R	—	—	—	—	3411R
0103-97-0169	03-03288	0.0–1.0	Fill	3410R	—	—	—	—	3411R
0103-97-0170	03-03288	1.0–2.0	Fill	3410R	—	—	—	—	3411R
0103-97-0175	03-03291	0.0–1.0	Soil	3410R	—	—	—	—	3411R
RE03-09-13976	03-03291	1.0–2.0	Soil	10-602	10-601	10-601	10-601	10-602	—
0103-97-0176	03-03291	4.0–5.0	Soil	3410R	—	—	—	—	3411R
RE03-09-13977	03-03291	4.0–5.0	Soil	10-602	10-601	10-601	10-601	10-602	—
RE03-10-12247	03-03291	7.0–8.0	Soil	10-1604	10-1604	10-1604	10-1604	10-1604	—
RE03-10-12248	03-03291	10.0–11.0	Qbt3	10-1604	10-1604	10-1604	10-1604	10-1604	—
0103-97-0177	03-03292	0.0–0.67	Fill	3410R	—	—	—	—	3411R
RE03-09-13958	03-608330	3.0–4.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13959	03-608330	5.0–6.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13960	03-608331	3.0–4.0	Qbt3	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13961	03-608331	5.0–6.0	Qbt3	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13962	03-608332	1.0–2.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13963	03-608332	4.0–5.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13964	03-608333	1.0–2.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13965	03-608333	4.0–5.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13966	03-608334	1.0–2.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13967	03-608334	4.0–5.0	Qbt3	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13968	03-608335	1.0–2.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13969	03-608335	4.0–5.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13970	03-608336	1.0–2.0	Soil	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13971	03-608336	4.0–5.0	Qbt3	10-577	10-576	10-576	10-576	10-577	—
RE03-09-13972	03-608337	1.0–2.0	Soil	10-602	10-601	10-601	10-601	10-602	—
RE03-09-13973	03-608337	4.0–5.0	Soil	10-602	10-601	10-601	10-601	10-602	—
RE03-09-13974	03-608338	1.0–2.0	Soil	10-602	10-601	10-601	10-601	10-602	—
RE03-09-13975	03-608338	4.0–5.0	Soil	10-602	10-601	10-601	10-601	10-602	—
RE03-09-13978	03-608340	1.0–2.0	Soil	10-728	10-727	10-727	10-727	10-728	—

Table 4.1-48 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Isotopic Uranium
RE03-09-13979	03-608340	4.0–5.0	Soil	10-728	10-727	10-727	10-727	10-728	—
RE03-09-13981	03-608341	1.0–2.0	Soil	10-728	10-727	10-727	10-727	10-728	—
RE03-09-13980	03-608341	4.0–5.0	Soil	10-728	10-727	10-727	10-727	10-728	—
RE03-09-13984	03-608343	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13985	03-608343	4.0–5.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13986	03-608344	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13987	03-608344	4.0–5.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13988	03-608345	1.0–2.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13989	03-608345	4.0–5.0	Soil	10-758	10-757	10-757	10-757	10-758	—
RE03-09-13990	03-608346	1.0–2.0	Soil	10-759	10-759	10-759	10-759	10-759	—
RE03-09-13991	03-608346	4.0–5.0	Soil	10-759	10-759	10-759	10-759	10-759	—

*— = Analyses not requested.

Table 4.1-49
Proposed Sampling at AOC 03-052(b)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs
Define vertical extent of acetone, aluminum, Aroclor-1242, Aroclor-1254, Aroclor-1260, barium, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, beryllium, 2-butanone, calcium, chrysene, cobalt, copper, fluoranthene, indeno(1,2,3-cd)pyrene, manganese, phenanthrene, and pyrene	03-03286	12–13, 15–16	—[a]	—	—	X[b]
	03-608330	9–10, 14–15	—	—	X	—
	03-608331	9–10, 14–15	—	—	X	—
	03-608334	9–10, 14–15	X[c]	—	—	—
	03-608335	9–10, 14–15	X[d]	X[e]	—	—
	03-608336	9–10, 14–15	X[f]	—	—	—
	03-608338	9–10, 14–15	X[g]	—	—	—
	03-608340	9–10, 14–15	—	X[e]	—	—
	03-608341	9–10, 14–15	—	X[h]	—	—
	03-608343	9–10, 14–15	—	X[e]	—	—
	03-608344	9–10, 14–15	—	X[e]	—	X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Aluminum, barium, beryllium, calcium, cobalt, and copper only.

[d] Barium, beryllium, cobalt, and manganese only.

[e] Acetone only.

[f] Barium, beryllium, calcium, and copper only.

[g] Barium only.

[h] Acetone and 2-butanone only.

Table 4.1-50
Samples Collected and Analyses Requested at SWMU 03-052(f)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium
RE03-09-13552	03-608214	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13553	03-608214	1.0–2.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13554	03-608215	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13555	03-608215	1.0–2.0	Qbt3	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13556	03-608216	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13557	03-608216	1.0–2.0	Qbt3	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13558	03-608217	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13559	03-608217	1.0–2.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13560	03-608218	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13561	03-608218	1.0–2.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13562	03-608219	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13563	03-608219	1.0–2.0	Qbt3	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13564	03-608220	0.0–1.0	Soil	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311
RE03-09-13565	03-608220	1.0–2.0	Qbt3	10-310	10-309	10-309	10-309	10-309	10-310	10-310	10-311	10-311	10-311

Table 4.1-51
Proposed Sampling at SWMU 03-052(f)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	SVOCs	PCBs	TPH-DRO
Define vertical extent of barium, chromium, copper, lead, SVOCs, VOCs, and TPH-DRO	03-608214	4–5, 9–10	—[a]	X[b,c]	—	—
	03-608215	4–5, 9–10	X[d]	—	—	—
	03-608216	4–5, 9–10	X[e]	—	—	—
	03-608217	4–5, 9–10	X[f]	—	X	—
	03-608219	4–5, 9–10	X[d]	X	—	X
	03-608220	4–5, 9–10	X[d]	—	—	—
Define the lateral extent of fluoranthene and PCBs downgradient of location 03-608219	52f-1	0–1, 1–2, 4–5, 9–10	—	X[c]	X	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Fluoranthene only.

[d] Chromium only.

[e] Barium and chromium only.

[f] Chromium, copper, and lead only.

Table 4.1-52
Samples Collected and Analyses Requested at SWMU 03-056(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RC03-01-0041	03-14481	0.5–1	Fill	9433R	—*	—	—	9432R	—
RC03-01-0042	03-14482	0.5–1	Fill	9433R	—	—	—	9432R	—
RC03-01-0043	03-14483	0.5–1	Fill	9433R	—	—	—	9432R	—
RC03-01-0044	03-14484	0.5–1	Fill	9433R	—	—	—	9432R	—
RE03-09-13992	03-608347	0–1	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13993	03-608347	1–2	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13994	03-608348	0–1	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13995	03-608348	1–2	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13996	03-608349	0–1	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13997	03-608349	1–2	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13998	03-608350	0–1	Soil	10-245	10-244	10-244	10-244	10-244	10-245
RE03-09-13999	03-608350	1–2	Soil	10-245	10-244	10-244	10-244	10-244	10-245

*— = Analyses not requested.

Table 4.1-53
Proposed Sampling at SWMU 03-056(a)

Sampling Objective	Location Number	Depth (ft)	PCBs	TPH-DRO
Define vertical extent of Aroclor-1254, Aroclor-1260, and TPH-DRO	03-608347	5–6, 9–10	X[a]	X
	03-608348	5–6, 9–10	X	X
	03-608349	5–6, 9–10	X	—[b]
	03-608350	5–6, 9–10	X	X

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

Table 4.1-54
Samples Collected and Analyses Requested at SWMU 03-056(d)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-13811	03-608288	0.0–1.0	Soil	10-575	10-575	10-575	10-575	10-575	10-575
RE03-09-13812	03-608288	3.0–4.0	Soil	10-575	10-575	10-575	10-575	10-575	10-575

Table 4.1-55
Proposed Sampling at SWMU 03-056(d)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	Cyanide	PCBs	TPH-DRO
Define vertical extent of copper, cyanide, mercury, silver, PCBs, and TPH-DRO	03-608288	9–10, 14–15	X[a,b]	X	X	X
Define lateral extent of copper, cyanide, mercury, silver, PCBs, and TPH-DRO to the west of location 03-608288	56d-1	0–1, 3–4, 9–10, 14–15	X[b]	X	X	X
Define lateral extent of cyanide, mercury, PCBs, and TPH-DRO to the south of location 03-608288	56d-2	0–1, 3–4, 9–10, 14–15	X[c]	X	X	X
Define lateral extent of TPH-DRO to the north of location 03-608288	56d-3	0–1, 3–4, 9–10, 14–15	—[d]	—	—	X

[a] X = Analysis will be performed.

[b] Copper, mercury, and silver only.

[c] Mercury only.

[d] — = Analysis will not be performed.

Table 4.1-56
Samples Collected and Analyses Requested at AOC 03-056(k)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Americium-241	Isotopic Plutonium	Isotopic Uranium	Gamma Spectroscopy	Gross Alpha Beta
0103-97-0151	03-03281	0.0–0.17	n/a[a]	—[b]	—	—	—	—	—	—	3411R	—	—
0103-97-0152	03-03281	0.5–1.0	Fill	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0153	03-03281	1.83–2.83	Fill	3410R	3408R	—	—	—	—	—	3411R	—	—
RE03-09-14011	03-03281	3.0–4.0	Soil	—	10-727	10-727	10-727	—	—	—	—	—	—
RE03-09-14012	03-03281	6.0–7.0	Fill	—	10-727	10-727	10-727	—	—	—	—	—	—
0103-97-0154	03-03282	0.0–0.5	n/a	—	—	—	—	—	—	—	3411R	3411R	3411R
0103-97-0155	03-03282	0.5–1.5	Fill	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0156	03-03282	1.5–2.17	Soil	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0157	03-03283	0.0–0.25	n/a	—	—	—	—	—	—	—	3411R	—	—
0103-97-0158	03-03283	0.33–1.25	Fill	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0160	03-03284	0.0–0.17	n/a	—	—	—	—	—	—	—	3411R	—	—
0103-97-0161	03-03284	0.5–1.25	Fill	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0171	03-03289	0.0–1.0	Fill	3410R	—	—	—	—	—	—	3411R	3411R	3411R
0103-97-0172	03-03289	3.5–4.5	Soil	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0173	03-03290	0.0–1.0	Fill	3410R	—	—	—	—	—	—	3411R	—	—
0103-97-0174	03-03290	1.0–1.5	Fill	3410R	—	—	—	—	—	—	3411R	—	—
RE03-09-14009	03-03290	3.0–4.0	Fill	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14010	03-03290	6.0–7.0	Fill	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14000	03-608351	0.0–1.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14001	03-608351	3.0–4.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14002	03-608351	6.0–7.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—

Table 4.1-56 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Americium-241	Isotopic Plutonium	Isotopic Uranium	Gamma Spectroscopy	Gross Alpha Beta
RE03-09-14003	03-608352	0.0–1.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14004	03-608352	3.0–4.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14005	03-608352	6.0–7.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14006	03-608353	0.0–1.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14007	03-608353	3.0–4.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14008	03-608353	6.0–7.0	Soil	10-728	10-727	10-727	10-727	10-728	10-728	10-728	10-728	—	—
RE03-09-14013	03-608354	1.0–2.0	Fill	—	10-727	10-727	10-727	—	—	—	—	—	—
RE03-09-14014	03-608354	3.0–4.0	Fill	—	10-727	10-727	10-727	—	—	—	—	—	—
RE03-09-14015	03-608355	1.0–2.0	Fill	—	10-727	10-727	10-727	—	—	—	—	—	—
RE03-09-14016	03-608355	3.0–4.0	Soil	—	10-729	10-729	10-729	—	—	—	—	—	—
RE03-09-14017	03-608356	1.0–2.0	Soil	—	10-729	10-729	10-729	—	—	—	—	—	—
RE03-09-14018	03-608356	3.0–4.0	Soil	—	10-729	10-729	10-729	—	—	—	—	—	—
RE03-09-14019	03-608357	1.0–2.0	Soil	—	10-729	10-729	10-729	—	—	—	—	—	—
RE03-09-14020	03-608357	3.0–4.0	Soil	—	10-729	10-729	10-729	—	—	—	—	—	—

[a] n/a = Not applicable.

[b] — = Analyses not requested.

Table 4.1-57
Proposed Sampling at AOC 03-056(k)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs
Define vertical extent of acetone, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, 2-butanone, chrysene, fluoranthene, 4-isopropyltoluene, lead, phenanthrene, pyrene, and toluene	03-03281	9–10, 14–15	—[a]	—	X[b]	—
	03-03290	9–10, 14–15	—	—	—	X
	03-608353	9–10, 14–15	X[c]	—	—	—
	03-608355	9–10, 14–15	—	X[d]	X[e]	X
	03-608356	9–10, 14–15	—	X[f]	X[g]	—
	03-608357	9–10, 14–15	—	X[h]	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Lead only.

[d] Acetone and 2-butanone only.

[e] Benzo(k)fluoranthene only.

[f] Acetone and 4-isopropyltoluene only.

[g] Fluoranthene, phenanthrene, and pyrene only.

[h] Acetone, 2-butanone, 4-isopropyltoluene, and toluene only.

Table 4.1-58
Samples Collected and Analyses Requested at SWMU 03-059

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Perchlorate	Nitrate	Tritium
RE03-09-14048	03-608372	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2707	03-608372	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14050	03-608373	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2708	03-608373	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14053	03-608374	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2710	03-608374	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14055	03-608375	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2709	03-608375	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14056	03-608376	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-09-14057	03-608376	2.0–3.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-09-14058	03-608377	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2711	03-608377	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14060	03-608378	0.0–1.0	Soil	10-172	10-171	10-171	10-171	10-171	10-172	10-172	10-172	10-173
RE03-10-2712	03-608378	2.0–3.0	Soil	10-229	10-228	10-228	10-228	10-228	10-229	10-229	10-229	10-230
RE03-09-14063	03-608379	0.0–1.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14062	03-608379	2.0–3.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14065	03-608380	0.0–1.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14064	03-608380	2.0–3.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14066	03-608381	0.0–1.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14067	03-608381	2.0–3.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14068	03-608382	0.0–1.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189
RE03-09-14069	03-608382	2.0–3.0	Soil	10-189	10-188	10-188	10-188	10-188	10-189	10-189	10-189	10-189

Table 4.1-58 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide	Perchlorate	Nitrate	Tritium
RE03-09-14070	03-608383	0.0–1.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14071	03-608383	2.0–3.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14073	03-608384	0.0–1.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14072	03-608384	2.0–3.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14074	03-608385	0.0–1.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14075	03-608385	2.0–3.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14076	03-608386	0.0–1.0	Soil	10-247	10-246	10-246	10-246	10-246	10-247	10-247	10-247	10-247
RE03-09-14077	03-608386	2.0–3.0	Soil	10-247	10-246	10-246	10-246	10-246	10-247	10-247	10-247	10-247
RE03-09-14079	03-608387	0.0–1.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14078	03-608387	2.0–3.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14080	03-608388	0.0–1.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208
RE03-09-14081	03-608388	2.0–3.0	Soil	10-207	10-206	10-206	10-206	10-206	10-207	10-207	10-207	10-208

Table 4.1-59
Proposed Sampling at SWMU 03-059

Sampling Objective	Location Number	Depth (ft)	SVOCs	PCBs	TPH-DRO	Tritium
Define vertical extent of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, TPH-DRO, and tritium	03-608373	5–6, 9–10	—[a]	—	X[b]	—
	03-608374	5–6, 9–10	—	—	X	—
	03-608377	5–6, 9–10	X	—	X	—
	03-608378	5–6, 9–10	—	—	X	—
	03-608383	5–6, 9–10	—	—	—	X
	03-608384	5–6, 9–10	—	X	—	—
	03-608386	5–6, 9–10	X	X	X	X
	03-608387	5–6, 9–10	—	—	—	X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

Table 4.1-60
Samples Collected and Analyses Requested at AOC C-03-022

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	TPH-DRO
RE03-09-14082	03-608389	1.0–2.0	Soil	10-275	10-275
RE03-09-14083	03-608389	4.0–5.0	Soil	10-275	10-275
RE03-09-14084	03-608390	1.0–2.0	Soil	10-275	10-275
RE03-09-14085	03-608390	4.0–5.0	Soil	10-275	10-275
RE03-09-14086	03-608391	1.0–2.0	Soil	10-275	10-275
RE03-09-14087	03-608391	4.0–5.0	Soil	10-275	10-275
RE03-09-14088	03-608392	1.0–2.0	Soil	10-275	10-275
RE03-09-14089	03-608392	4.0–5.0	Soil	10-275	10-275

Table 4.1-61
Proposed Sampling at AOC C-03-022

Sampling Objective	Location Number	Depth (ft)	TAL Metals	TPH-DRO
Define vertical extent of calcium and TPH-DRO	03-608389 03-608392	9–10, 14–15 9–10, 14–15	—[a] X[c]	X[b] —
Define lateral extent of calcium to the south and downgradient of location 03-608392	22-1	1–2, 4–5, 9–10, 14–15	X[c]	—
Define lateral extent of TPH-DRO to the north of location 03-608389	22-2 22-3 22-4	1–2, 4–5, 9–10, 14–15 1–2, 4–5, 9–10, 14–15 1–2, 4–5, 9–10, 14–15	— — —	X X X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Calcium only.

Table 4.2-1
Samples Collected and Analyses Requested at SWMU 60-002 (West)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	TPH-GRO	Cyanide
RE03-09-14094	03-608393	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14095	03-608393	4–5	Qbt3	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14096	03-608394	1–2	Qbt3	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14097	03-608394	4–5	Qbt3	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14098	03-608395	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14099	03-608395	4–5	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14100	03-608396	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14101	03-608396	4–5	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14102	03-608397	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14103	03-608397	4–5	Qbt3	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14104	03-608398	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-830	10-831
RE03-09-14105	03-608398	4–5	Qbt3	10-831	10-830	10-830	10-830	10-830	10-830	10-831

Table 4.2-2
Proposed Sampling at SWMU 60-002 (West)

Sampling Objective	Location Number	Depth (ft)	TAL Metals
Define vertical extent of aluminum, barium, calcium, cobalt, copper, lead, magnesium, nickel, and vanadium	03-608393 03-608394 03-608397 03-608398	9–10, 14–15 9–10, 14–15 9–10, 14–15 9–10, 14–15	X[a,b] X[c] X[d] X[e]
Define lateral extent of copper and vanadium to the north and downgradient of location 03-608393	2w-1 2w-2	1–2, 4–5, 9–10, 14–15 1–2, 4–5, 9–10, 14–15	X[b] X[b]

[a] X = Analysis will be performed.

[b] Barium, cobalt, copper, magnesium, nickel, and vanadium only.

[c] Aluminum, calcium, lead, magnesium, and nickel only.

[d] Barium, lead, magnesium, and nickel only.

[e] Cobalt, copper, and magnesium only.

Table 4.2-3
Samples Collected and Analyses Requested at AOC 60-004(f)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	Cyanide	PCBs	TPH-DRO	Tritium
RE03-09-14208	03-608404	1.0–2.0	Soil	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14209	03-608404	2.0–3.0	Qbt3	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14210	03-608404	4.0–5.0	Qbt3	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14211	03-608404	9.0–10.0	Qbt3	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14212	03-608405	1.0–2.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14213	03-608405	2.0–3.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14214	03-608405	4.0–5.0	Qbt3	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14215	03-608405	9.0–10.0	Qbt3	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14216	03-608406	1.0–2.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14217	03-608406	2.0–3.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14218	03-608406	4.0–5.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14219	03-608406	9.0–10.0	Soil	10-918	10-917	10-917	10-918	10-917	10-917	10-918
RE03-09-14220	03-608407	1.0–2.0	Soil	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14221	03-608407	2.0–3.0	Soil	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14222	03-608407	4.0–5.0	Soil	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14223	03-608407	9.0–10.0	Qbt3	10-941	10-940	10-940	10-941	10-940	10-940	10-941
RE03-09-14224	03-608408	1.0–2.0	Soil	10-853	10-852	10-852	10-853	10-852	10-852	10-853
RE03-09-14225	03-608408	2.0–3.0	Soil	10-853	10-852	10-852	10-853	10-852	10-852	10-853
RE03-09-14226	03-608408	4.0–5.0	Soil	10-853	10-852	10-852	10-853	10-852	10-852	10-853
RE03-09-14227	03-608408	9.0–10.0	Soil	10-853	10-852	10-852	10-853	10-852	10-852	10-853

Table 4.2-4
Proposed Sampling at AOC 60-004(f)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	SVOCs	PCBs	TPH-DRO
Define lateral exteny of acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, copper, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, lead, mercury, naphthalene, phenanthrene, pyrene, silver, TPH-DRO, and zinc to the northeast and downgradient of location 03-608407	4f-1 4f-2	1–2, 2–3, 4–5, 9–10 1–2, 2–3, 4–5, 9–10	X[a,b] X[b]	X X	X X	X X

[a] X = Analysis will be performed.

[b] Copper, lead, mercury, sliver, and zinc only.

Table 4.2-5
Samples Collected and Analyses Requested at SWMU 60-006(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Nitrate	Perchlorate	Americium-241	Isotopic Plutonium	Isotopic Uranium	Tritium
RE03-09-14228	03-608409	20.0–21.0	Qbt3	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057
RE03-09-14229	03-608409	24.0–25.0	Qbt3	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057
RE03-09-14230	03-608409	29.0–30.0	Qbt3	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057	10-1057
RE03-09-14231	03-608410	18.0–19.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14232	03-608410	22.0–23.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14233	03-608410	27.0–28.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14234	03-608411	18.0–19.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14235	03-608411	22.0–23.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14236	03-608411	27.0–28.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14238	03-608412	10.0–11.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14239	03-608412	14.0–15.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14240	03-608412	18.0–19.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-09-14241	03-608412	23.0–24.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-10-9872	03-608412	35.0–36.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-10-9873	03-608412	55.0–56.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088
RE03-10-9874	03-608412	60.0–61.0	Qbt3	10-1087	10-1086	10-1086	10-1086	10-1087	10-1087	10-1087	10-1088	10-1088	10-1088	10-1088

Table 4.2-6
Proposed Sampling at SWMU 60-006(a)

Sampling Objective	Location Number	Depth (ft)	Nitrate	Perchlorate	PCBs	Tritium
Define vertical extent of nitrate, Aroclor-1242, Aroclor-1254, Aroclor-1260, and tritium	03-608410	32–33, 40–41	—[a]	—	X[b]	—
	03-608411	32–33, 40–41	—	—	—	X
	03-608412	70–71, 80–81	X	—	—	—
Define lateral extent of nitrate and perchlorate to the north and downgradient of location 03-608412	6a-1	18–19, 23–24, 35–36, 60–61, 70–71, 80–81	X	X	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

Table 4.2-7
Samples Collected and Analyses Requested at SWMU 60-007(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-14246	03-608413	0.0–1.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14247	03-608413	2.0–3.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14248	03-608413	4.0–5.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14249	03-608414	0.0–1.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14250	03-608414	2.0–3.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14251	03-608414	4.0–5.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14252	03-608415	0.0–1.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14253	03-608415	2.0–3.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14254	03-608415	4.0–5.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14255	03-608416	0.0–1.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14256	03-608416	2.0–3.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
RE03-09-14257	03-608416	4.0–5.0	Soil	10-643	10-644	10-644	10-644	10-644	10-643
AAB5794	60-01019	0.0–1.0	Fill	—*	18086	—	—	—	—
AAB5804	60-01019	0.0–1.0	Soil	20203	—	18086	18086	—	—
AAB5796	60-01021	0.0–1.0	Soil	—	18086	—	—	—	—
AAB5799	60-01024	0.0–1.0	Soil	—	18086	—	—	—	—
AAB5801	60-01025	0.0–1.0	Soil	20203	18086	18086	18086	—	—
AAB5806	60-01026	0.0–1.0	Soil	—	18086	—	18086	—	—
RC60-01-0003	60-10001	0.0–0.5	Fill	9408R	—	—	9407R	9407R	—
RC60-01-0004	60-10002	0.0–0.5	Fill	9408R	—	—	9407R	9407R	—
RC60-01-0005	60-10003	0.0–0.5	Fill	9408R	—	—	9407R	9407R	—
RC60-01-0006	60-10004	0.0–0.5	Fill	9408R	—	—	9407R	9407R	—
RC60-01-0007	60-10005	0.0–0.25	Fill	9408R	—	—	9407R	9407R	—
RC60-01-0008	60-10006	0.0–0.5	Fill	9408R	—	—	9407R	9407R	—

*— = Analyses not requested.

Table 4.2-8
Proposed Sampling at SWMU 60-007(a)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	TPH-DRO
Define vertical extent of antimony and TPH-DRO	60-10001	4–5, 9–10	—[a]	X[b]
	60-10004	4–5, 9–10	—	X
	60-10005	4–5, 9–10	—	X
	60-10006	4–5, 9–10	—	X
	03-608413	9–10, 12–13	X[c]	—
	03-608415	9–10, 12–13	X[c]	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Antimony only.

Table 4.2-9
Samples Collected and Analyses Requested at SWMU 60-007(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	TPH-DRO	PCBs	Cyanide
RE03-09-14265	03-608417	0–1	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14267	03-608418	0–0.5	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14269	03-608419	0–0.4	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14271	03-608420	0–0.5	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14273	03-608421	0–1	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14274	03-608421	1–2	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14275	03-608422	0–1	Soil	10-831	10-830	10-830	10-830	10-830	10-831
RE03-09-14276	03-608422	1–2	Soil	10-831	10-830	10-830	10-830	10-830	10-831
RE03-09-14277	03-608423	0–1	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14278	03-608423	1–2	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14279	03-608424	0–1	Soil	10-831	10-830	10-830	10-830	10-830	10-831
RE03-09-14280	03-608424	1–2	Qbt3	10-831	10-830	10-830	10-830	10-830	10-831
RE03-09-14281	03-608425	0–1	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14282	03-608425	1–2	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14283	03-608426	0–1	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14284	03-608426	1–2	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14285	03-608427	0–1	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14286	03-608427	1–2	Qbt3	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14287	03-608428	0–1	Soil	10-853	10-852	10-852	10-852	10-852	10-853
RE03-09-14288	03-608428	1–2	Soil	10-853	10-852	10-852	10-852	10-852	10-853

Table 4.2-10
Proposed Sampling at SWMU 60-007(b)

Sampling Objective	Location Number	Depth (ft)	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
Define vertical extent of anthracene, barium, and chromium	03-608423	4–5, 8–9	—[a]	—	X[b,c]	—	—	—
	03-608424	4–5, 8–9	X[d]	—	—	—	—	—
	03-608425	4–5, 8–9	X[e]	—	—	—	—	—
Define vertical extent of TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide at previous locations where only one depth interval was sampled	03-608417	2–3, 5–6	X	X	X	X	X	X
	03-608418	2–3, 5–6	X	X	X	X	X	X
	03-608419	2–3, 5–6	X	X	X	X	X	X
	03-608420	2–3, 5–6	X	X	X	X	X	X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Anthracene only.

[d] Barium only.

[e] Chromium only.

Table 4.3-1
Samples Collected and Analyses Requested at AOC C-61-002

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	TPH-DRO	Cyanide
RE03-09-14300	03-608429	3.0–4.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14301	03-608429	5.0–6.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14302	03-608429	7.0–8.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14303	03-608429	9.0–10.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14304	03-608429	11.0–12.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14305	03-608429	14.0–15.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14306	03-608430	3.0–4.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14307	03-608430	5.0–6.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14308	03-608430	7.0–8.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14309	03-608430	9.0–10.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14310	03-608430	11.0–12.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14311	03-608430	14.0–15.0	Soil	10-345	10-344	10-344	10-344	10-344	10-345
RE03-09-14312	03-608431	3.0–4.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14313	03-608431	5.0–6.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14314	03-608431	7.0–8.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14315	03-608431	9.0–10.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14316	03-608431	11.0–12.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14317	03-608431	14.0–15.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14318	03-608432	3.0–4.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14319	03-608432	5.0–6.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14320	03-608432	7.0–8.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14321	03-608432	9.0–10.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14322	03-608432	11.0–12.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14323	03-608432	14.0–15.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14324	03-608433	3.0–4.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14325	03-608433	5.0–6.0	Soil	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14326	03-608433	7.0–8.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14327	03-608433	9.0–10.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14328	03-608433	11.0–12.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360
RE03-09-14329	03-608433	14.0–15.0	Qbt3	10-360	10-359	10-359	10-359	10-359	10-360

Table 4.3-2
Proposed Sampling at AOC C-61-002

Sampling Objective	Location Number	Depth (ft)	TAL Metals	TPH-DRO
Define lateral extent of aluminum, antimony, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, thallium, vanadium, and TPH-DRO around the perimeter of the site	C2-1	3–4, 5–6, 7–8, 9–10, 11–12, 14–15	X[a,b]	X
	C2-2	3–4, 5–6, 7–8, 9–10, 11–12, 14–15	X[b]	X
	C2-3	3–4, 5–6, 7–8, 9–10, 11–12, 14–15	X[c]	X
	C2-4	3–4, 5–6, 7–8, 9–10, 11–12, 14–15	X	X

[a] X = Analysis will be performed.

[b] Cobalt only.

[c] Antimony, iron, lead, and thallium only.

Table 5.0-1
Summary of Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used to collect shallow (i.e., approximately 0-12 in.) soil or sediment samples. The spade-and-scoop method involves digging a hole to the desired depth, as prescribed in the work plan, and collecting a discrete grab sample. The sample is typically placed in a clean stainless-steel bowl for transfer into various sample containers.
Hand Auger Collection of Soil Samples	This method is typically used for sampling soil or sediment at depths of less than 10–15 ft but in some cases may be used to collect samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in. inside diameter [I.D.]), creating a vertical hole that can be advanced to the desired sampling depth. When the desired depth is reached during the investigation, the auger will be decontaminated before the hole is advanced through the sampling depth. The sample material will be transferred from the auger bucket to a stainless-steel sampling bowl before the various required sample containers are filled.
Hollow-Stem Auger Drilling	In this method, hollow-stem augers (sections of seamless pipe with auger flights welded to the pipe) act as a screw conveyor to bring cuttings of sediment, soil, and/or rock to the surface. Auger sections are typically 5 ft in length and have outside diameters of 4.25 in. to 14 in. Drill rods, split-spoon core barrels, Shelby tubes, and other samplers can pass through the center of the hollow-stem auger sections for collection of discrete samples from desired depths. Hollow-stem augers are used as temporary casings when setting wells to prevent cave-ins of the borehole walls.
Split-Spoon Core-Barrel Sampling	In this method, a stainless-steel core barrel (typically 4 in. I.D., 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock that can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so the two halves can be separated to expose the core sample. Once extracted, the section of core is screened for radioactivity and organic vapors and described in a geologic log. A portion of the core is then collected as a discrete sample from the desired depth.
Handling, Packaging, and Shipping of Samples	Field team members seal and label samples before packing them to ensure the sample containers and the containers used for transport are free of external contamination. Field team members package all samples to minimize the possibility of breakage during transport. After all environmental samples are collected, packaged, and preserved, a field team member will transport them to the SMO. The SMO will arrange for shipping the samples to analytical laboratories.
Sample Control and Field Documentation	The collection, screening, and transport of samples will be documented on standard forms generated by the SMO. These include SCLs, COC forms, and sample container labels. SCLs are completed at the time of sample collection, and the logs are signed by the sampler and a reviewer who verifies the logs for completeness and accuracy. Corresponding labels are initialed and applied to each sample container, and custody seals are placed around each sample container. COC forms are completed and signed to verify the samples were not left unattended.

Table 5.0-1 (continued)

Method	Summary
Field Quality Control Samples	Field quality control samples will be collected as follows: *Field Duplicates*: At a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: At a frequency of 10%; collected by rinsing sampling equipment with deionized water that will be collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: Required for all field events that include the collection of samples for VOC analysis. Trip blanks containers of certified clean sand will be opened and kept with the other sample containers during the sampling process.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is used to minimize the generation of liquid waste. Dry decontamination includes the use of a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on EPA guidance for environmental sampling, preservation, and quality assurance. Specific requirements for each sample are printed on the SCL provided by the SMO (size and type of container [e.g., glass, amber glass, and polyethylene]). All samples will be preserved by placing them with ice in insulated containers to maintain a temperature of 4°C.
Management, Characterization, and Storage of IDW	IDW is managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and characterization approach for each waste stream managed. Waste characterization will comply with on- or off-site waste acceptance criteria. All stored IDW will be marked with appropriate signage and labels. Drummed IDW will be stored on pallets to prevent deterioration of containers. A waste storage area will be established before waste is generated. Waste storage areas will be located in controlled areas of the Laboratory to prevent unauthorized personnel from inadvertently adding or managing wastes. Each container of waste generated will be individually labeled with waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste will be segregated by classification and compatibility to prevent cross-contamination. Management of IDW is described in Appendix B.
Coordinating and Evaluating Geodetic Surveys	Geodetic surveys focus on obtaining survey data of acceptable quality to use during project investigations. Geodetic surveys will be conducted with a Trimble 5700 differential GPS. The survey data will conform to Laboratory Information Architecture project standards IA-CB02, GIS Horizontal Spatial Reference System, and IA-D802, Geospatial Positioning Accuracy Standard for A/E/C/ and Facility Management. All coordinates will be expressed as State Plane Coordinate System 83, NM Central, U.S. feet. All elevation data will be reported relative to the National Geodetic Vertical Datum of 1983.

Table 5.8-1
Analytical Methods for Phase II Surface and Subsurface Characterization

Analytical Method	Analytical Description	Analytical Suite
Inorganic Methods		
EPA Method 300.0	Ion chromatography	Anions (nitrate)
EPA SW-846: 9012A	Colorimetric	Cyanide
EPA SW-846: 6010B/6020	Inductively coupled plasma emission spectrometry—atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, silver, thallium, vanadium, and zinc (TAL metals)
EPA SW-846: 7196A	Colorimetric	Hexavalent chromium
EPA SW-846: 6850	Liquid chromatography/mass spectrometry	Perchlorate
EPA SW-846:7471A	Cold vapor atomic absorption	Mercury
Organic Methods		
EPA SW-846:8270C	Gas chromatograph/mass spectrometry	SVOCs
EPA SW-846:8260B	Gas chromatograph/mass spectrometry	VOCs
EPA SW-846:8082	Gas chromatograph	PCBs
EPA SW-846:8015B	Gas chromatograph	TPH-DRO
Radionuclide Methods		
HASL-300	Chemical separation/alpha spectroscopy	Isotopic plutonium, isotopic uranium, americium-241
EPA 906	Liquid scintillation	Tritium

Appendix A

Acronyms and Abbreviations,
Metric Conversion Table, and Data Qualifier Definitions

A-1.0 ACRONYMS AND ABBREVIATIONS

ACA	accelerated corrective action
AOC	area of concern
bgs	below ground surface
BV	background value
CMR	Chemistry and Metallurgy Research
COC	chain of custody
Consent Order	Compliance Order on Consent
D&D	decontamination and decommissioning
DOE	Department of Energy (U.S.)
DRO	diesel range organics
DU	depleted uranium
EPA	Environmental Protection Agency (U.S.)
FV	fallout value
GPS	global positioning system
GRO	gasoline range organics
I.D.	inside diameter
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
NSSB	National Security Science Building
NST	Nevada Test Site
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
RCRA	Resource Conservation and Recovery Act
RFI	RCRA facility investigation
RLW	radioactive liquid waste
RLWTF	Radioactive Liquid Waste Treatment Facility
RPF	Records Processing Facility
SAL	screening action level
SCL	sample collection log

SMO	Sample Management Office
SOP	standard operating procedure
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
SWSC	Sanitary Wastewater Systems Consolidated
TA	technical area
TAL	target analyte list (EPA)
TPH	total petroleum hydrocarbons
VOC	volatile organic compound
WAC	waste acceptance criteria
WCSF	waste characterization strategy form
WWTP	wastewater treatment plant

A-2.0 METRIC CONVERSION TABLE

Multiply SI (Metric) Unit	by	To Obtain U.S. Customary Unit
kilometers (km)	0.622	miles (mi)
kilometers (km)	3281	feet (ft)
meters (m)	3.281	feet (ft)
meters (m)	39.37	inches (in.)
centimeters (cm)	0.03281	feet (ft)
centimeters (cm)	0.394	inches (in.)
millimeters (mm)	0.0394	inches (in.)
micrometers or microns (µm)	0.0000394	inches (in.)
square kilometers (km^2)	0.3861	square miles (mi^2)
hectares (ha)	2.5	acres
square meters (m^2)	10.764	square feet (ft^2)
cubic meters (m^3)	35.31	cubic feet (ft^3)
kilograms (kg)	2.2046	pounds (lb)
grams (g)	0.0353	ounces (oz)
grams per cubic centimeter (g/cm^3)	62.422	pounds per cubic foot (lb/ft^3)
milligrams per kilogram (mg/kg)	1	parts per million (ppm)
micrograms per gram (µg/g)	1	parts per million (ppm)
liters (L)	0.26	gallons (gal.)
milligrams per liter (mg/L)	1	parts per million (ppm)
degrees Celsius (°C)	9/5 + 32	degrees Fahrenheit (°F)

A-3.0 DATA QUALIFIER DEFINITIONS

Data Qualifier	Definition
U	The analyte was analyzed for but not detected.
J	The analyte was positively identified, and the associated numerical value is estimated to be more uncertain than would normally be expected for that analysis.
J+	The analyte was positively identified, and the result is likely to be biased high.
J-	The analyte was positively identified, and the result is likely to be biased low.
UJ	The analyte was not positively identified in the sample, and the associated value is an estimate of the sample-specific detection or quantitation limit.
R	The data are rejected as a result of major problems with quality assurance/quality control parameters.

Appendix B

Investigation-Derived Waste Management Plan

B-1.0 INTRODUCTION

This appendix describes how investigation-derived waste (IDW) generated during the Upper Sandia Canyon Aggregate Area Phase II investigation will be managed at Los Alamos National Laboratory (LANL or the Laboratory). IDW may include, but is not limited to, drill cuttings, contact waste, decontamination fluids, and all other waste that has potentially come into contact with contaminants.

B-2.0 IDW

All IDW generated during investigation activities will be managed in accordance with applicable standard operating procedures (SOPs). These SOPs incorporate the requirements of all applicable U.S. Environmental Protection Agency and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy orders, and Laboratory requirements. The SOP applicable to the characterization and management of IDW is SOP-5238, Characterization and Management of Environmental Program Waste (available at http://www.lanl.gov/environment/all/qa.shtml).

The most recent version of the Laboratory's Hazardous Waste Minimization Report will be implemented during the investigation to minimize waste generation. The report is updated annually as a requirement of the Laboratory's Hazardous Waste Facility Permit.

A waste characterization strategy form (WCSF) will be prepared and approved before field work begins and IDW is generated. The WCSF will provide detailed information on IDW characterization methods, management, containerization, and potential volumes. IDW characterization is completed through review of investigation data and/or documentation or by direct sampling of the IDW or the media being investigated (e.g., surface soil, subsurface soil). Waste characterization may include a review of historical information and process knowledge to identify whether listed hazardous waste may be present (i.e., due diligence reviews). If low levels of listed hazardous waste are identified, a "contained in" determination may be submitted for approval to NMED.

Wastes will be containerized and placed in clearly marked, appropriately constructed waste accumulation areas. If IDW is generated within the boundary of an area of contamination, it will be managed as nonhazardous within those boundaries in designated, properly constructed waste management areas. If hazardous, the IDW will be managed in accordance with hazardous waste requirements once it is removed from the area of contamination. If IDW is generated outside of area of contamination boundaries, the initial management of the waste will rely on the data from previous investigations and/or process knowledge. If the analytical data changes the expected waste category, the waste will be managed in accumulation areas appropriate to the final waste determination. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type of IDW and its classification. Container and storage requirements, as well as transportation and disposal requirements, will be detailed in the WCSF and approved before waste is generated. Table B-2.0-1 summarizes the estimated IDW waste streams, waste types, waste volumes, and other data.

The waste streams that are anticipated to be generated during work plan implementation are described below.

B-2.1 Drill Cuttings

This waste stream consists of soil and rock chips generated by the drilling of boreholes to collect samples. Drill cuttings include excess core sample not submitted for analysis and any returned samples sent for analysis. Drill cuttings will be stored in accordance with the approved WCSF.

This waste stream will be characterized based either on direct sampling of the waste in each container or on the results from core samples collected during drilling. The WCSF will specify the sampling suites for direct sampling of the waste stream. Constituents may be analyzed as necessary to meet the waste acceptance criteria (WAC) for a receiving facility or if visual observations indicate that additional contaminants may be present.

Cuttings will be land applied if they are nonhazardous and meet residential soil screening levels and the criteria in the NMED-approved Notice of Intent Decision Tree for Land Application of Investigation Derived Waste Solids from Construction of Wells and Boreholes. The Laboratory expects that cuttings will be land-applied or treated/disposed of at an authorized on- or off-site facility appropriate for the waste classification. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.2 Contact Waste

The contact waste stream consists of potentially contaminated materials that came into contact with waste during sampling and excavation. This waste stream consists primarily of, but is not limited to, personal protective equipment such as gloves, decontamination wastes such as paper wipes, and disposable sampling supplies. Contact waste will be stored in containers and characterized in accordance with the WCSF.

Characterization of this waste stream will use acceptable knowledge based on data from the media with which it came into contact (e.g., drill cuttings, soil, sumps). The Laboratory expects most of the contact waste to be designated as nonhazardous, nonradioactive waste that will be disposed of in accordance with the WCSF. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.3 Decontamination Fluids

Decontamination fluids consist of liquid wastes generated from decontamination of excavation, sampling, and drilling equipment. For waste minimization, dry decontamination methods will be used to avoid the generating liquid waste and to minimize the IDW. Dry decontamination uses disposable paper towels and over-the-counter cleaner, such as Fantastik or equivalent. All sampling and measuring equipment, including but not limited to, stainless-steel sampling tools and split-barrel or core samplers will be decontaminated in accordance with SOP-01.08, Field Decontamination of Drilling and Sampling Equipment.

Dry decontamination may be followed by wet decontamination, if necessary. Wet decontamination may include washing with a nonphosphate detergent and water, followed by a water rinse and a second rinse with deionized water. Alternatively, steam cleaning may be used. All wet decontamination fluids will be containerized and characterized by direct sampling for the suites specified in the WCSF. The Laboratory expects any wastes generated during wet decontamination to be nonhazardous liquid waste that will be sent to one of the Laboratory's wastewater treatment facilities in accordance with the WCSF.
Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

Table B-2.0-1
Summary of Estimated IDW Generation and Management

Waste Stream	Expected Waste Type	Estimated Volume	Characterization Method	On-Site Management	Expected Disposition
Drill Cuttings	Industrial waste, nonhazardous, nonradioactive	4 yd^3	Analytical results from direct sampling of waste or core samples	Accumulation in 55-gal. drums, covered rolloff containers or other appropriate containers	Land application, or permitted off-site facility for which waste meets acceptance criteria; or Technical Area 54 (TA-54), Area G
Contact Waste	Industrial waste, nonhazardous, nonradioactive	0.5 yd^3	Acceptable knowledge	Accumulation in 55-gal. drums	Permitted off-site facility for which waste meets acceptance criteria; or TA-54, Area G
Decontamination Fluids	Industrial waste, nonhazardous, nonradioactive	5 gal.	Acceptable knowledge; analytical results from direct sampling of waste	Accumulation in 30-gal. plastic drums	Treatment at an on-site facility for which waste meets acceptance criteria