ERID-208315

LA-UR-11-6363
November 2011
EP2011-0372

Phase II Investigation Work Plan for Upper Cañada del Buey Aggregate Area

Prepared by the Environmental Programs Directorate

EP2011-0372

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November 2011

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EXECUTIVE SUMMARY

The Upper Cañada del Buey Aggregate Area is located in Technical Area 46 (TA-46), TA-52, and former TA-04 at Los Alamos National Laboratory and includes a total of 83 solid waste management units (SWMUs) and areas of concern. Twenty-seven sites had been previously investigated and/or remediated and approved for no further action or recommended for no further action pending review by the New Mexico Environment Department. Fifty-six were investigated in 2010 and the results reported in the revised investigation report for the Upper Cañada del Buey Aggregate Area. Of these 56 sites, 47 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 47 sites. The results of the Phase II investigation activities will be reported in a Phase II investigation report. The Phase II investigation report will also present the results of risk assessments performed at two sites, SWMUs 46-004(r) and 46-004(w), investigated in 2010.

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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 Cañada del Buey 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, Change 1, Radioactive Waste Management; and DOE Order 458.1, Administrative Change 2, 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 the 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 Cañada del Buey Aggregate Area is located in TA-46, TA-52, and former TA-04 of the Laboratory and consists of 83 SWMUs and AOCs. Twenty-six of the sites have been previously investigated and/or remediated and approved for no further action, and one site was recommended for no further action pending NMED review. Fifty-six were investigated in 2010 and the results reported in the Investigation Report for Upper Cañada del Buey Aggregate Area, Revision 1 (LANL 2011, 203410), which was approved by NMED (2011, 203617) in May 2011. Of these 56 sites, 47 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 remaining 47 sites. The results of the Phase II investigation activities will be reported in a Phase II investigation report. The Phase II investigation report will also present the results of risk assessments performed at two sites, SWMUs 46-004(r) and 46-004(w), investigated in 2010. A brief description and additional sampling requirements for the 47 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 Cañada del Buey Aggregate Area. Section 3 presents site conditions, and section 4 provides site descriptions, 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 in the Upper Cañada del Buey Aggregate Area are discussed 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).

The approved investigation report for the Upper Cañada del Buey Aggregate Area did not compare data with industrial soil screening levels (SSLs) to determine if soil removal was required during the Phase II investigation (LANL 2011, 203410; NMED 2011, 203617). The results of this comparison, conducted after the investigation report was submitted, show the industrial SSLs were exceeded at four sites: SWMUs 46-004(b2), 46-008(b), and 46-008(g) and AOC 04-004. Proposed soil removal activities and confirmation sampling for these sites are discussed in sections 4 and 5.

1.2 Work Plan Objectives

The objective of the Phase II work plan is to complete the activities recommended in the investigation report (LANL 2011, 203410) for 47 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

Former TA-04 is located on a small fingerlike mesa that extends eastward from the main Pajarito Mesa. The mesa is bounded on the north by Ten Site Canyon, which branches west from Mortandad Canyon, and on the south by Cañada del Buey (LANL 1992, 007666, p. 3-2) (Figure 1.0-2). Former TA-04, called Alpha Site, was used as a firing site until the late 1940s. The former TA underwent decontamination and decommissioning (D&D) in 1985 and now lies within the current boundaries of TA-52 and TA-63. The SWMU and AOC within former TA-04 addressed in this Phase II investigation work plan are located within the boundaries of TA-52.

TA-46, one of the Laboratory's basic research areas, is bounded to the north by Cañada del Buey (Figure 1.0-2). A small tributary to Cañada del Buey, informally known as Sanitary Wastewater Systems Consolidation (SWSC) Canyon, originates near the southern end of TA-46 and drains northeast to Cañada del Buey. The Laboratory's main sanitary waste treatment plant, the SWSC plant, was constructed in 1992 and is located in this small tributary canyon. A detached cluster of buildings and two sewage ponds are located south of SWSC Canyon. Pajarito Road extends along the southern boundary of TA-46 (LANL 1993, 020952, p. 2-1).

TA-52 is located on a small fingerlike mesa that extends eastward from the main Pajarito Mesa. The mesa is bounded on the north by Ten Site Canyon, which branches west from Mortandad Canyon and on the south by Cañada del Buey (Figure 1.0-2). TA-52 was established to house the historical Ultra-High-Temperature Reactor Experiment, which involved the use of high-temperature, gas-cooled reactor

technology and the research and development of new fuels. No SWMUs or AOCs at TA-52 require additional investigation and TA-52 is not discussed further in this work plan.

2.2 Operational History

Former TA-04 was established in 1944 as a test firing site for small charges and for implosion studies using the electric method of detonation wave determination. Maximum charges fired were 200 lb. Other activities at former TA-04 included smaller tests of the pin shot and magnetic methods of studying implosions and equation of state experiments. Former TA-04 operated from 1944 until 1949 and underwent D&D in 1985 (LANL 1992, 007666, p. 3-5).

TA-46 was established in 1954 as a weapons assembly site; however, weapons assembly never took place at this TA. Instead, TA-46 was used for the Laboratory's Nuclear Rocket Division's Rover Program. The Rover Program worked on developing nuclear reactors for propulsion of space rockets and continued through approximately 1973. TA-46 was taken over by the Laboratory's Applied Photochemistry Division. By 1976, the Photochemistry Division had established the Jumper Program that developed uranium isotope separation methods using lasers. The Jumper Program was terminated in the early 1980s, but laser research remains a principal activity at TA-46. In addition, the Laboratory's Energy Division conducted solar energy research from the 1970s to the late 1980s. Other activities conducted at TA-46 included free-electron laser research, heat pipe research, accelerator technology, electronics development, and the production of nonradioactive isotopes of oxygen, carbon, and nitrogen. TA-46 remains one of the Laboratory's basic research areas (LANL 1993, 020952, pp. 2-1, 2-3). There is no documented evidence that high explosives (HE) have been used at TA-46 from its establishment in 1954 to the present.

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 Cañada del Buey Aggregate Area may have occurred as a result of air emissions; potential leaks from septic systems, tanks, dry wells, waste lines, and drains; discharges from outfalls; and releases from storage areas, surface disposal areas, and former buildings. Previous sampling results indicated contamination from inorganic chemicals, organic chemicals, and radionuclides (LANL 2011, 203410). Additional sampling is needed to define the extent of contamination at 47 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,
- construction workers, and
- 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 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/SALs do not exist for the current and reasonably foreseeable future land use (i.e., NMED, the Laboratory, or the U.S. Environmental Protection Agency [EPA] has not determined SSLs/SALs 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 Cañada del Buey Aggregate Area are described in detail in the investigation report (LANL 2011, 203410). 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 Cañada del Buey 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 Former TA-04

Former TA-04 is located on a small fingerlike mesa that extends eastward from the main Pajarito Mesa. The mesa is bounded on the north by Ten Site Canyon, which branches west from Mortandad Canyon, and on the south by Cañada del Buey (LANL 1992, 007666, p. 3-2) (Figure 1.0-2).

4.1.1 Consolidated Unit 04-003(a)-00

Consolidated Unit 04-003(a)-00 consists of SWMU 04-003(a), an inactive outfall and associated drainline from former building 04-7, and AOC 04-004, an area of potential soil contamination associated with former building 04-7.

4.1.1.1 SWMU 04-003(a), Inactive Outfall and Associated Drainline from Former Building 04-7

4.1.1.1.1 Site Description and Operational History

SWMU 04-003(a) is an outfall located approximately 15 ft southeast of former building 04-7 at former TA-04 (now TA-52) (Figure 4.1-1). Former building 04-7 operated from 1948 to 1955 and housed a darkroom and photoprocessing laboratory that discharged to the outfall. Discharges to the outfall flowed to a trench southeast of former building 04-7 that eventually discharged into Cañada del Buey. Portions of the trench have since been covered by buildings 52-114 and 52-115 and an asphalt parking lot. Beta activity was detected in the darkroom in 1955, and portions of the floor were removed in an attempt to remediate the contamination (Lopez Escobedo 1998, 058840, p. 1-2). It is not known whether the drainlines were removed when former building 04-7 was dismantled in 1956 (LANL 1992, 007666, p. 3-7).

4.1.1.1.2 Previous Investigations

In 1994, 1995, 1998, and 2010, a total of 38 samples were collected from 12 locations at SWMU 04-003(a). Previously sampled locations are shown in Figure 4.1-1. Table 4.1-1 presents the samples collected and analyses requested for SWMU 04-003(a). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Resource Conservation and Recovery Act facility investigation (RFI) activities were conducted at SWMU 04-003(a) in 1994, 1995, and 1998 (Lopez Escobedo 1998, 058840). Results of radiation surveys performed in 1994 and 1995 were within instrument background levels. During the 1995 Phase I RFI, 18 samples were collected from six locations. All samples were submitted for analysis of isotopic plutonium and isotopic uranium. One sample was also submitted for analysis of target analyte list (TAL) metals, one sample for volatile organic compounds (VOCs), and one sample for semivolatile organic compounds (SVOCs), gross-alpha/-beta radioactivity, and by gamma spectroscopy (Lopez Escobedo 1998, 058840, pp. 2–8). During the 1998 RFI, 10 samples were collected from three locations sampled during the 1995 Phase I RFI and from two new sampling locations. Samples were submitted for analysis of TAL metals, SVOCs, and HE (Lopez Escobedo 1998, 058840, pp. 3–4). Decision-level data from the

1995 and 1998 investigations are included in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

In 2010, 10 soil samples were collected from four locations at SWMU 04-003(a). Previously sampled locations are shown in Figure 4.1-1. Table 4.1-1 presents the samples collected and analyses requested for SWMU 04-003(a). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 04-003(a) consisted of the following activities in 2010:

- Soil and tuff samples were collected at four sampling locations from two to three depth intervals: two locations within the mesa top portion of the drainage channel from three depth intervals of 1.0–2.0 ft, 2.0–3.0 ft, and 3.0–4.0 ft below ground surface (bgs); and two locations at the top of the hillside portion of the drainage channel from two depth intervals ranging from 0.0–0.5 ft and/or 0.0–1.0 ft, and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, total cyanide, SVOCs, isotopic uranium, isotopic plutonium, and americium-241. Four of the 10 samples were also analyzed for polychlorinated biphenyls (PCBs).

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 18–20), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 04-003(a), except for the vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

The vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene is not defined at location 04-02009 (Figure 4.1-2). The vertical extent of indeno(1,2,3-cd)pyrene is not defined at locations 04-02009 and 52-610952 (Figure 4.1-2).

4.1.1.1.3 Proposed Sampling at SWMU 04-003(a)

Shallow subsurface samples will be collected at two previously sampled locations (04-02009 and 52-610952), extending the depth at these locations to define the vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene only. Samples from location 04-02009 will be analyzed for polycyclic aromatic hydrocarbons (PAHs). Samples from location 52-610952 will be analyzed for indeno(1,2,3-cd)pyrene only.

The proposed sampling and analyses at SWMU 04-003(a) are presented in Table 4.1-2, and the proposed sampling locations are shown in Figure 4.1-1.

4.1.2.1 AOC 04-004, Area of Potential Soil Contamination

4.1.2.1.1 Site Description and Operational History

AOC 04-004 is an area of potential soil contamination associated with the footprint of former building 04-7 at former TA-04 (now TA-52) (Figure 4.1-1). The former building, which measured approximately 16 ft × 43 ft, housed a darkroom and photoprocessing laboratory. The building was used to develop film from 1948 to 1955 and was dismantled in 1956 (Lopez Escobedo 1998, 058840, pp. 1–3).

4.1.2.1.2 Previous Investigations

In 1994, 1995, 1998, and 2010, a total of 47 samples were collected from 11 locations at AOC 04-004. Previously sampled locations are shown in Figure 4.1-1. Table 4.1-3 presents the samples collected and analyses requested for AOC 04-004. The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

RFI activities were conducted at AOC 04-004 in 1994, 1995, and 1998 (Lopez Escobedo 1998, 058840). Results of radiation surveys performed in 1994 and 1995 were within instrument background levels. During 1995 Phase I RFI activities conducted at AOC 04-004, 12 samples were collected from four locations. All samples were submitted for analysis of isotopic plutonium and isotopic uranium. One soil sample was also submitted for analysis of TAL metals, one sample was submitted for analysis of SVOCs, and one sample was submitted for analysis of gamma-emitting radionuclides and gross-alpha/-beta radioactivity (Lopez Escobedo 1998, 058840, pp. 2–8). During the 1998 RFI, 17 samples were collected from four locations sampled during the 1995 Phase I RFI and from one new sampling location. Samples were submitted for analysis of TAL metals, SVOCs, and HE (Lopez Escobedo 1998, 058840, pp. 3–4). Three samples from one location were also submitted for analysis of VOCs. Decision-level data from the 1995 and 1998 investigations are included in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at AOC 04-004 consisted of the following activities in 2010:

- Eighteen soil and tuff samples were collected from six locations within and bounding the footprint of the former building from three depth intervals: 1.0–2.0 ft, 2.0–3.0 ft, and 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, SVOCs, PCBs, total cyanide, isotopic uranium, isotopic plutonium, and americium-241.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 22–25), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 04-004, except for the vertical extent of barium, copper, plutonium-239/240, and uranium-235/236.

The vertical extent of barium is not defined at locations 52-610954 and 52-610956 (Figure 4.1-3). The vertical extent of copper is not defined at location 52-610956 (Figure 4.1-3). The vertical extent of plutonium-239/240 is not defined at location 52-610959, and the vertical extent of uranium-235/236 is not defined at location 52-610954 (Figure 4.1-4).

4.1.2.1.3 Proposed Sampling at AOC 04-004

Shallow subsurface samples will be collected at three previously sampled locations (52-610954, 52-610956, and 52-610959), extending the depth at these locations to define the vertical extent of barium, copper, plutonium-239/240, and uranium-235/236. Samples from location 52-610954 will be analyzed for barium and isotopic uranium. Samples from location 52-610956 will be analyzed for barium and copper. Samples from location 52-610959 will be analyzed for isotopic plutonium.

The results of the previous sampling at location 04-02002 showed arsenic to be present at 210 mg/kg in the sample from 0.0–1.0 ft bgs and below the soil background value (BV) in the samples from 1.5–2.5 ft and 2.5–3.75 ft bgs. Based on the decrease in concentrations with depth, vertical extent is defined at this location. However, arsenic was detected above the industrial SSL (17.7 mg/kg) in the surface soil, and the top 1.5 ft of soil will be removed from a 2.5-ft radius around location 04-02002. Confirmation samples will be collected north, south, east, and west of the location 04-02002 excavation at depths of 0.0–1.0 ft and 1.0–2.0 ft bgs at new locations 4-1, 4-2, 4-3, and 4-4 and analyzed for arsenic. Data from new

locations 4-1, 4-2, 4-3, and 4-4 will confirm cleanup to the north, south, east, and west of the location 04-02002 excavation. The previously collected sample from and 1.5–2.5 ft bgs at location 04-02002 will serve as the confirmation sample at the bottom of the excavation. The proposed sampling and analyses at AOC 04-004 are presented in Table 4.1-4, and the proposed sampling locations are shown in Figure 4.1-1.

4.2 TA-46

TA-46, one of the Laboratory's basic research areas, is bounded to the north by Cañada del Buey (Figure 1.0-2). A small tributary to Cañada del Buey, informally known as SWSC Canyon, originates near the southern end of TA-46 and drains northeast to Cañada del Buey.

4.2.1 SWMU 46-003(b), Septic System

4.2.1.1 Site Description and Operational History

SWMU 46-003(b) is an inactive septic system approximately 60 ft southwest of building 46-77 at TA-46 (Figure 4.2-1). The septic system consisted of a septic tank (structure 46-22), a distribution box (structure 46-29), associated drainlines, and a drain field located approximately 50 ft south of building 46-77 at TA-46. This septic system was installed in 1956 and served the restroom facilities in building 46-17, which housed a generator that charged batteries for the Rover Program. The septic system was removed from service in 1973, and drainlines that discharged to SWMU 46-003(b) were rerouted to the SWMU 46-002 surface impoundment system. Septic tank 46-22 was reportedly emptied, backfilled, and left in place (LASL 1975, 101827). The drainlines that previously served this septic system were rerouted to the SWSC plant in the early 1990s and are currently active (LANL 1996, 101813). No evidence of the septic tank was found during the geophysical survey conducted in 2010 investigation, indicating the tank has been removed.

4.2.1.2 Previous Investigations

In 2010, 10 samples (5 soil and 5 tuff) were collected from five locations at SWMU 46-003(b). Previously sampled locations are shown in Figure 4.2-1. Table 4.2-1 presents the samples collected and analyses requested for SWMU 46-003(b). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(b) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two locations associated with the former septic tank at the assumed location of the inlet pipe (location 46-611590) and at the assumed location of the tank (location 46-611592) from two depth intervals: the soil-tuff interface (depth range of 3.5–6.0 ft bgs) and 5 ft below the soil-tuff interface (depth range of 8.5–11.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from three locations associated with the distribution box and drain field (locations 46-611594, 46-611595, and 46-611596) from two depth intervals: the soil-tuff interface (depth range of 0.0–6.0 ft bgs) and 5 ft below the soil-tuff interface (depth range of 5.0–11.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 37–38), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(b), except for the vertical extent of calcium and 2-hexanone. The vertical extent of calcium is not defined at location 46-611590 (Plate 1). The vertical extent of 2-hexanone is not defined at location 46-611594 (Plate 2).

4.2.1.3 Proposed Sampling at SWMU 46-003(b)

Shallow subsurface samples will be collected at two previously sampled locations (46-611590 and 46-611594), extending the depth at these locations to define the vertical extent of calcium and 2-hexanone. Samples from location 46-611590 will be analyzed for calcium. Samples from location 46-611594 will be analyzed for 2-hexanone. The presence of a permanent guardrail adjacent to location 46-611590 prevents access by a drill rig; therefore, a sample will be collected as deep as possible, with a target depth of 15–16 ft bgs.

The proposed sampling and analyses at SWMU 46-003(b) are presented in Table 4.2-2, and the proposed sampling locations are shown in Figure 4.2-1.

4.2.2 SWMU 46-003(c), Septic System

4.2.2.1 Site Description and Operational History

SWMU 46-003(c) is an inactive septic system approximately 80 ft southeast of building 46-76 at TA-46 (Figure 4.2-2). The septic system consisted of a septic tank (structure 46-49), a distribution box (structure 46-50), associated drainline, a drain field, and an outfall located southeast of building 46-76 beneath an asphalt road outside the security fence at TA-46. This septic system was installed in 1956 and served the restroom facilities, floor drains, roof drains, sinks, and acid sinks in building 46-24, which housed offices, a machine shop, electrical laboratories, and chemical laboratories where fuel rods were handled (LANL 1993, 020952, p. 5-10). In 1958, an acid dry well located in room B22 of building 46-24 was connected into the SWMU 46-003(c) septic system but drained to the septic tank for less than 1 yr. The drain field associated with this septic system was removed from service sometime before 1968, and septic tank 46-49 was rerouted to the drain field associated with SWMU 46-003(f) (LANL 1993, 020952, p. 5-10). In the 1970s, sanitary waste drainlines that previously discharged to septic tank 46-49 were rerouted to the SWMU 46-002 surface impoundment system, and septic tank 46-49 was reportedly removed from service, emptied, filled, and left in place (LASL 1975, 101827). No evidence of the septic tank was found during the geophysical survey conducted during the 2010 investigation, indicating the tank has been removed.

4.2.2.2 Previous Investigations

In 2010, 16 samples (8 soil and 8 tuff) were collected from eight locations at SWMU 46-003(c). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-3 presents the samples collected and analyses requested for SWMU 46-003(c). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(c) consisted of the following activities in 2010:

- Soil and tuff samples were collected from three locations associated with the former septic tank (location 46-611257), inlet line (location 46-611255), and distribution box (location 46-611259) from two depth intervals: the soil-tuff interface (depth range of 5.0–10.0 ft bgs) and 5.0 ft below

the soil-tuff interface (depth range of 10.0–12.5 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

- Soil and tuff samples were collected from five locations associated with the drain field (locations 46-611260 through 46-611264) from two depth intervals: the soil-tuff interface (depth range of 0.3–5.5 ft bgs) and 5 ft below the soil-tuff interface (depth range of 5.3–10.5 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 40–41), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(c), except for the lateral and vertical extent of antimony, cadmium, chromium, cobalt, and copper and the vertical extent of uranium-235/236.

The lateral extent of antimony, cadmium, chromium, cobalt, and copper is not defined south of the drain field. The vertical extent of antimony, cadmium, cobalt, and copper is not defined at location 46-611262 (Plate 3). The vertical extent of chromium is not defined at locations 46-611255 and 46-611262 (Plate 3). The vertical extent of uranium-235/236 is not defined at location 46-611257 (Plate 4).

4.2.2.3 Proposed Sampling at SWMU 46-003(c)

Shallow subsurface samples will be collected at three previously sampled locations (46-611255, 46-611257, and 46-611262), extending the depth at these locations to define the vertical extent of antimony, cadmium, chromium, cobalt, copper, and uranium-235/236. Samples from location 46-611255 will be analyzed for chromium. Samples from location 46-611257 will be analyzed for isotopic uranium. Samples from location 46-611262 will be analyzed for antimony, cadmium, chromium, cobalt, and copper.

Shallow subsurface samples will be collected at two new sampling locations 3c-1 and 3c-2 to define the lateral extent of antimony, cadmium, chromium, cobalt, and copper to the south (downgradient) of the drain field. Samples from locations 3c-1 and 3c-2 will be analyzed for antimony, cadmium, chromium, cobalt, and copper.

The proposed sampling and analyses at SWMU 46-003(c) are presented in Table 4.2-4, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.3 SWMU 46-003(d), Septic System

4.2.3.1 Site Description and Operational History

SWMU 46-003(d) is an inactive septic system approximately 30 ft northwest of building 46-31 at TA-46 (Figure 4.2-3). The septic system consisted of a septic tank (structure 46-53), a distribution box (structure 46-54), associated drainline, a drain field, and associated outfall. The septic system was installed in 1956 and served the restrooms in building 46-31, which housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). The septic system was removed from service in approximately 1972 to 1973, and its drainline was rerouted to the SWMU 46-002 surface impoundment system. Septic tank 46-53 was emptied, filled, and left in place (LASL 1975, 101827). The septic tank was removed during the 2010 investigation.

4.2.3.2 Previous Investigations

In 2010, 14 samples (3 soil and 11 tuff) were collected from seven locations at SWMU 46-003(d). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-5 presents the samples collected and analyses requested for SWMU 46-003(d). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(d) consisted of the following activities in 2010:

- Soil and tuff samples were collected at two locations beneath the tank inlet and outlet (locations 46-611597 and 46-611599) from two depth intervals: at the soil-tuff interface (4.0–5.0 ft bgs) and 5.0 ft below the soil-tuff interface (9.0–10.0 ft bgs). Tuff samples were collected from below the tank excavation (location 46-611598) at two depth intervals: 7.0–8.0 ft and 12.0–13.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from four locations next to the distribution box and in the drain field (locations 46-611600 through 46-611603) from two depth intervals at the soil-tuff interface (4.0–5.0 ft bgs) and 5.0 ft below the soil-tuff interface (9.0–10.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 44–47), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(d), except for the vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, uranium-234, and uranium-235/236.

The vertical extent of barium and calcium is not defined at location 46-611597 (Plate 5). The vertical extent of chromium is not defined at location 46-611601 (Plate 5). The vertical extent of copper is not defined at locations 46-611597 and 46-611599 (Plate 5). The vertical extent of mercury is not defined at location 46-611599, and the vertical extent of zinc is not defined at locations 46-611597 and 46-611598 (Plate 5).

The vertical extent of acetone is not defined at location 46-611599 (Plate 6). The vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, chrysene is not defined at location 46-611597 (Plate 6). The vertical extent of 1,4-dichlorobenzene, fluoranthene, and pyrene is not defined at locations 46-611597 and 46-611598 (Plate 6). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at locations 46-611597 and 46-611599.

The vertical extent of americium-241 is not defined at locations 46-611598 and 46-611599 (Plate 7). The vertical extent of uranium-234 is not defined at location 46-611598 (Plate 7). The vertical extent of uranium-235/236 is not defined at locations 46-611597, 46-611599, and 46-611600 (Plate 7).

4.2.3.3 Proposed Sampling at SWMU 46-003(d)

Shallow subsurface samples will be collected at five previously sampled locations (46-611597 through 46-611601), extending the depth at these locations to define the vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241,

uranium-234, and uranium-235/236. Samples from location 46-611597 will be analyzed for barium, calcium, copper, zinc, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4 dichlorobenzene, fluoranthene, pyrene, PCBs, and isotopic uranium. Samples from location 46-611598 will be analyzed for zinc, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, and isotopic uranium. Samples from location 46-611599 will be analyzed for copper, mercury, acetone, PCBs, americium-241, and isotopic uranium. Samples from location 46-611600 will be analyzed for isotopic uranium. Samples from location 46-611601 will be analyzed for chromium.

The proposed sampling and analyses at SWMU 46-003(d) are presented in Table 4.2-6, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.4 SWMU 46-003(e), Septic System

4.2.4.1 Site Description and Operational History

SWMU 46-003(e) is an inactive septic system consisting of a septic tank (structure 46-66), a siphon tank (structure 46-67), a distribution box (structure 46-68), and a drain field located approximately 20 ft east of building 46-58 outside the TA-46 perimeter fence (Figure 4.2-4) Septic tank 46-66 was installed in 1960 and served the restroom facility, shower, water cooler, janitorial sink, and mechanical room floor drain in building 46-58, which contained office space, a laboratory, a machine shop, and an equipment room. The septic system was removed from service from approximately 1972 to 1973, and its drainline was rerouted to the SWMU 46-002 surface impoundment system. Septic tank 46-66 was reportedly emptied, filled, and left in place (LASL 1975, 101827). During the 2010 investigation, the SWMU 46-003(e) septic tank was discovered to contain sludge and a water layer. This waste was likely placed in the septic tank after the system was removed from service because the inlet and outlet lines were plugged. The water layer, sludge, and septic tank were removed and managed as low-level waste at Area G at TA-54 in 2010 (LANL 2011, 203410).

4.2.4.2 Previous Investigations

During the preparation of the 1993 RFI work plan, a concrete distribution box was found on the ground surface in Cañada del Buey near the location of SWMU 46-003(e). The box was determined to be the SWMU 46-003(e) septic system distribution box, presumably moved to that location during the early 1970s construction of the SWMU 46-002 surface impoundment system. Swipe samples collected and analyzed for radioactivity at the time of discovery detected no radioactivity above instrument background. No indications of staining or sediment deposits were observed on the box; the distribution box was subsequently removed (LANL 1993, 020952, p. 6-8).

In 2010, 16 samples (5 soil and 11 tuff) were collected from eight locations at SWMU 46-003(e). Previously sampled locations are shown in Figure 4.2-4. Table 4.2-7 presents the samples collected and analyses requested for SWMU 46-003(e). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(e) consisted of the following activities in 2010:

- Soil and tuff samples were collected at three locations associated with the former septic tank from two depth intervals: beneath the inlet (location 46-611604) at the base of the inlet line (3.0–4.0 ft bgs) and 5 ft below the inlet line (8.0–9.0 ft bgs), beneath the outlet (location 46-611606) at the base of the outlet line (3.0–4.0 ft bgs) and 5 ft below the base of the siphon tank (15.0–16.0 ft bgs), and below the tank (location 46-611605) at the base of the tank (8.0–9.0 ft bgs) and 5 ft below the base of the tank (13.0–14.0 ft bgs). All samples were analyzed at off-site fixed

laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

- Soil and tuff samples were collected from five locations next to the location where the drainline exits building 46-58 (location 46-611607), beneath and next to the distribution box (location 46-611608), and in the drain field (locations 46-611609 through 46-611611) at the soil-tuff interface from two depth intervals: (depth range of 0.0–7.0 ft bgs) and 5 ft below the soil-tuff interface (depth range of 5.0–12.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 49–51), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(e), except for the vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236.

The vertical extent of lead is not defined at location 46-611611 (Plate 8). The vertical extent of perchlorate is not defined at locations 46-611604 and 46-611608 (Plate 8). The vertical extent of acetone is not defined at location 46-611605 (Plate 9). The vertical extent of pyrene, Aroclor-1254, and Aroclor-1260 is not defined at location 46-611608 (Plate 9). The vertical extent of uranium-235/236 is not defined at location 46-611605 (Plate 10).

4.2.4.3 Proposed Sampling at SWMU 46-003(e)

Shallow subsurface samples will be collected at four previously sampled locations (46-611604, 46-611605, 46-611608, and 46-611611), extending the depth at these locations to define the vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236. Samples from location 46-611604 will be analyzed for perchlorate. Samples from location 46-611605 will be analyzed for acetone and isotopic uranium. Samples from location 46-611608 will be analyzed for perchlorate, pyrene, and PCBs. Samples from location 46-611611 will be analyzed for lead.

The proposed sampling and analyses at SWMU 46-003(e) are presented in Table 4.2-8, and the proposed sampling locations are shown in Figure 4.2-4.

4.2.5 SWMU 46-003(f), Septic System

4.2.5.1 Site Description and Operational History

SWMU 46-003(f) is an inactive septic system consisting of a septic tank (structure 46-94), a manhole (structure 46-95), a distribution box (structure 46-97), and a drain field located approximately 300 ft east of building 46-88 at TA-46 (Figure 4.2-2) (LANL 1993, 020952, pp. 5-12, 5-130). Engineering drawings show a drainpipe outfall, located approximately 30 ft northeast of the drain field, that is also associated with this system (LANL 1993, 020952, p. 5-130). This septic system was installed in 1960 and served the restroom facilities, floor drains, and restroom sinks in building 46-88. This building was the core support test facility for the Rover Program and provided a clean-room, temperature- and humidity-controlled environment for the testing and certification of hydrogen vessels. Previously, a guard station (building 46-2) had been connected to another septic system [SWMU 46-003(a)], but it was disconnected from that unit and connected to this septic system when it was relocated in the mid-1960s to its present location west of building 46-24. Beginning in 1968, the drain field received effluent not only from septic tank 46-94 but also from septic tank 46-8 [SWMU 46-003(a)] and septic tank 46-49 [SWMU 46-003(c)]. This septic system was removed from service in approximately 1972 to 1973, when the buildings it served

were connected to a sanitary lagoon (SWMU 46-002) (LANL 1993, 020952, p. 5–12). Septic tank 46-94 was emptied, filled, and left in place (LASL 1975, 101827). Visual observations indicated the distribution box drain field and drainpipe outfall had been removed (LANL 1993, 020952, p. 5-130). Septic tank 46-94 was removed during the 2010 investigation (LANL 2011, 203410).

4.2.5.2 Previous Investigations

In 2010, 18 samples (8 soil and 10 tuff) were collected from nine locations at SWMU 46-003(f). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-9 presents the samples collected and analyses requested for SWMU 46-003(f). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(f) consisted of the following activities in 2010:

- Soil and tuff samples were collected from three locations associated with the septic tank from two depth intervals: beneath the inlet (location 46-611360) (8.0–9.0 ft and 13.0–14.0 ft bgs), beneath the outlet (location 46-611362) (11.0–12.0 ft and 16.0–17.0 ft bgs), and below the tank (location 46-611361) (12.0–13.0 ft and 17.0–18.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from one location beneath the inlet drainline (location 46-611359) 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, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from four locations associated with the distribution box, drain field, and drain field outfall pipe (locations 46-611363 through 46-611366) from two depth intervals: the soil-tuff interface (depth range of 3.0–6.0 ft bgs and 5 ft below the soil-tuff interface (depth range of 5.0–11.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil samples were collected from one location downgradient of the drain field outfall (location 46-611367) 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, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 53–55), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(f), except for the vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236.

The vertical extent of lead is not defined at location 46-611364 (Plate 3). The vertical extent of acetone is not defined at locations 46-611364 and 46-611367 (Plate 11). The vertical extent of Aroclor-1254 is not defined at locations 46-611360 and 46-611361 (Plate 11). The vertical extent of Aroclor-1260 is not defined at location 46-611361 (Plate 11). The vertical extent of 4-isopropyltoluene and toluene is not defined at location 46-611367 (Plate 11). The vertical extent of uranium-235/236 is not defined at locations 46-611362, 46-611365, and 46-611366 (Plate 4).

4.2.5.3 Proposed Sampling at SWMU 46-003(f)

Shallow subsurface samples will be collected at seven previously sampled locations (46-611360 through 46-611362, 46-611364 through 46-611367), extending the depth at these locations to define the vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236. Samples from locations 46-611360 and 46-611361 will be analyzed for PCBs. Samples from location 46 611362 will be analyzed for isotopic uranium. Samples from location 46-611364 will be analyzed for lead and acetone. Samples from locations 46-611365 and 46-611366 will be analyzed for isotopic uranium. Samples from location 46-611367 will be analyzed for acetone, 4-isopropyltoluene, and toluene.

The proposed sampling and analyses at SWMU 46-003(f) are presented in Table 4.2-10, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.6 SWMU 46-003(g), Septic System

4.2.6.1 Site Description and Operational History

SWMU 46-003(g) is an inactive septic system approximately 50 ft northeast of the northeast corner of building 46-158 at TA-46 (Figure 4.2-5). The septic system consisted of a septic tank (structure 46-230) and a seepage pit. Septic tank 46-230 was installed after 1960 and served the restroom facilities, water cooler, floor drains, service sinks, laboratory sinks, an eyewash sink, and a kitchen sink in building 46-158, which housed laboratories that conducted laser-induced chemistry experiments. The septic tank also received effluent from former office transportables (structures 46-175, 46-226, and 46-251). The septic tank stopped receiving effluent in 1988 when the drain lines from these buildings were rerouted to two surface impoundments, (SWMU 46-005) (LANL 1993, 020952, p. 5-13). However, the septic tank continued to receive effluent from at least one office transportable (former structure 46-175) until 1996 when the transportable was removed from TA-46. Septic tank 46-230 was removed during the 2010 investigation and was not connected to any building or transportable structure when it was removed.

4.2.6.2 Previous Investigations

In 2010, 12 samples (4 soil and 8 tuff) were collected from six locations at SWMU 46-003(g). Previously sampled locations are shown in Figure 4.2-5. Table 4.2-11 presents the samples collected and analyses requested for SWMU 46-003(g). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-003(g) consisted of the following activities in 2010:

- Soil and tuff samples were collected from three locations associated with the former septic tank from two depth intervals: at the tank inlet and outlet (locations 46-611613 and 46-611615) at the base of the inlet/outlet (4.0–5.0 ft bgs) and 5 ft below the below the bottom of the inlet/outlet (9.0–10.0 ft bgs) and within the tank excavation (location 46-611614) at the bottom of the tank (10.0–11.0 ft bgs) and 5 ft below the bottom of the tank (15.0–16.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from one location next to the seepage pit (location 46-611612) from 4.0–5.0 ft bgs and below the bottom of the pit at 17.0–18.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total

cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

- Soil and tuff samples were collected from two locations beneath the primary and secondary inlet lines (locations 46-611616 and 46-611617) from two depth intervals: directly beneath the line (6.0–7.0 ft bgs) and 5 ft below the bottom of the line (11.0–12.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 57–59), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-003(g), except for the vertical extent of cobalt and copper at location 46-611612 (Plate 12).

4.2.6.3 Proposed Sampling at SWMU 46-003(g)

Shallow subsurface samples will be collected at one previously sampled location (46-611612), extending the depth at this location to define the vertical extent of cobalt and copper. Samples from location 46-611612 will be analyzed for cobalt and copper.

The proposed sampling and analyses at SWMU 46-003(g) are presented in Table 4.2-12, and the proposed sampling locations are shown in Figure 4.2-5.

4.2.7 SWMU 46-004(a), Drainlines

4.2.7.1 Site Description and Operational History

SWMU 46-004(a) consists of two drainlines from former sinks in building 46-31 at TA-46 (Figure 4.2-3) that discharged to a dry well, SWMU 46-004(c), located approximately 10 ft north of building 46-31. Engineering drawings show one drainline discharged acid waste from three sinks on the north side of room 151 (LASL 1960, 101819), and a second drainline was connected to a sink on the west side of room 151 (LANL 1993, 101825). Both drainlines extended north approximately 35 ft beneath building 46-31 to the dry well. Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). During the Rover Program, the sinks on the north side of room 151 were removed, but the drainline was left in place (LANL 1993, 020952, pp. 5-13–5-14). Engineering drawings show the western sink was removed in the early 1990s (LANL 1993, 101823).

4.2.7.2 Previous Investigations

In 2010, four samples (two soil and two tuff) were collected from two locations at SWMU 46-004(a). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-13 presents the samples collected and analyses requested for SWMU 46-004(a). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(a) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two location along the drainlines (locations 46-611588 and 46-611589) from two depth intervals: directly below the bottom of the drainlines (3.0–4.0 ft bgs) and 5 ft below the bottom of the drainlines (8.0–9.0 ft bgs). All samples were

analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 61–62), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(a), except for the lateral extent of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene and the vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)phthalate, and n-butylbenzene.

The lateral extent of cesium, chromium, copper, lead, and mercury is not defined downgradient of locations 46-611588 and 46-611589 (Plate 5). The vertical extent of cesium and copper is not defined at locations 46-611588 and 46-611589 (Plate 5). The vertical extent of chromium is not defined at location 46-611588, and the vertical extent of lead and selenium is not defined at location 46-611589 (Plate 5).

The lateral extent of bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene is not defined downgradient of locations 46-611588 and 46-611589 (Plate 6). The vertical extent of bis(2-ethylhexyl)phthalate and n-butylbenzene is not defined at location 46-611589 (Plate 6).

4.2.7.3 Proposed Sampling at SWMU 46-004(a)

Shallow subsurface samples will be collected at two previously sampled locations (46-611588 and 46-611589), extending the depth at these locations to define the vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)pthhalate, and n-butylbenzene. Samples from location 46-611588 will be analyzed for chromium, copper, and cesium. Samples from location 46-611589 will be analyzed for copper, lead, selenium, cesium, bis(2-ethylhexyl)phthalate, and n-butylbenzene. The proximity of sampling locations 46-611588 and 46-611589 to building 46-31 may prevent a drill rig from collecting samples at these existing locations. If so, samples will be collected as close as possible to the existing sampling locations.

The investigation report states the lateral extent of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene is not defined at SWMU 46-004(a) because concentrations increased downgradient at SWMU 46-004(c) (LANL 2011, 203410, pp. 61–62). Although concentrations of these constituents increased downgradient in samples from location 46-611622 at SWMU 46-004(c), concentrations decreased farther downgradient in samples from location 46-611623; thus, the investigation report later concluded the lateral extent of these constituents is defined at SWMU 46-004(c) (LANL 2011, 203410, pp. 76–78). Therefore, additional sampling of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene is not required downgradient of SWMU 46-004(a).

The proposed sampling and analyses at SWMU 46-004(a) are presented in Table 4.2-14, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.8 SWMU 46-004(a2), Outfall

4.2.8.1 Site Description and Operational History

SWMU 46-004(a2) is an inactive outfall located on the east side of building 46-31 at TA-46 (Figure 4.2-6). The outfall discharged to a shallow ditch on the east side of building 46-31, which traversed approximately 50 ft north to a storm drain culvert discharging into Cañada del Buey. The outfall received effluent from a 6-in.-diameter industrial drainline that was historically plumbed to the sinks and drains in

rooms 101, 103, and 105 of building 46-31 (LANL 1993, 020952, p. 5-128). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1996, 054929, pp. 5-11–5-14). By 1994, the outfall pipe was plugged (LANL 1996, 054929, p. 99), and all drains leading to the outfall either were removed from service or were rerouted to the SWSC plant (Santa Fe Engineering Ltd. 1994, 101839, Figure 2).

4.2.8.2 Previous Investigations

In 2010, eight samples (three soil and five tuff) were collected from four locations at SWMU 46-004(a2). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-15 presents the samples collected and analyses requested for SWMU 46-004(a2). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(a2) consisted of the following activities in 2010:

- Soil and tuff samples were collected from four locations at the outfall, the culvert, and the culvert outfall (locations 46-611618 through 46-611621) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 65–66), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(a2), except for the vertical extent of copper, perchlorate, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260.

The vertical extent of copper, perchlorate, and zinc is not defined at location 46-611621 (Plate 13). The vertical extent of Aroclor-1242 is not defined at location 46-611620, and the vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at locations 46-611620 and 46-611621 (Plate 14).

The investigation report states the vertical extent of perchlorate is defined at SWMU 46-004(a2) (LANL 2011, 203410, p. 65). However, perchlorate concentrations increased from 0.00208 mg/kg at 0.0–1.0 ft bgs to 0.00445 mg/kg at 2.0–3.0 ft bgs at location 46-611621 (LANL 2011, 203410, p. 351). Therefore, the vertical extent of perchlorate is not defined at location 46-611621.

4.2.8.3 Proposed Sampling at SWMU 46-004(a2)

Shallow subsurface samples will be collected at two previously sampled locations (46-611620 and 46-611621), extending the depth at these locations to define the vertical extent of copper, perchlorate, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260. Samples from location 46-611620 will be analyzed for PCBs only. Samples from location 46-611621 will be analyzed for copper, zinc, perchlorate, and PCBs.

The proposed sampling and analyses at SWMU 46-004(a2) are presented in Table 4.2-16, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.9 SWMU 46-004(b), Former Tank

4.2.9.1 Site Description and Operational History

SWMU 46-004(b) is a former alkali-metal cleaning tank (structure 46-81) at TA-46 (Figure 4.2-3). The tank measured approximately 4 ft × 8 ft × 6 ft tall and was located on asphalt pavement within 20 ft of the northwest corner of building 46-31, within the boundary of the SWMU 46-006(d) (section 4.2.29). The tank was of steel construction with an outlet plumbed to the SWMU 46-004(c) dry well (LASL 1963, 101821). The tank was used in the late 1950s and early 1960s to douse laboratory equipment from cesium-plasma diode experiments before the equipment was reused or disposed of. Butanol or kerosene was used on the equipment to dissolve naturally occurring alkali isotopes of cesium and lithium (LANL 1996, 054929, pp. 24, 27). The tank was removed in 1973 (LANL 1993, 020952, p. 6-7). The 1990 SWMU report incorrectly described the tank as being constructed of concrete (LANL 1990, 007513).

4.2.9.2 Previous Investigations

In 2010, four soil samples were collected from two locations at SWMU 46-004(b). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-17 presents the samples collected and analyses requested for SWMU 46-004(b). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(b) consisted of the following activities in 2010:

- Soil samples were collected from two locations: one at the northwest corner of the tank pad (location 46-611545) and one in the drainage approximately 15 ft northwest of the pad (location 46-611546) from 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, total cyanide, total petroleum hydrocarbon (TPH) diesel range organics (DRO), isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 68–70), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(b), except for the lateral extent of TPH-DRO and the vertical extent of cesium, 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, phenanthrene, and pyrene.

The vertical extent of cesium is not defined at location 46-611546 (Plate 5). The vertical 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, phenanthrene, and pyrene is not defined at location 46-611546 (Plate 6). The lateral extent of TPH-DRO is not defined downgradient of location 46-611546 (Plate 6).

4.2.9.3 Proposed Sampling at SWMU 46-004(b)

Shallow subsurface samples will be collected at one previously sampled location (46-611546), extending the depth at this location to define the vertical extent of cesium, 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, phenanthrene, and pyrene. Samples from location 46-611546 will be analyzed for cesium, PAHs, and PCBs.

Surface and shallow subsurface samples will be collected at three new sampling locations 4b-1, 4b-2, and 4b-3 to define the lateral extent of TPH-DRO downgradient of location 46-611546. Samples from locations 4b-1, 4b-2, and 4b-3 will be analyzed for TPH-DRO.

The proposed sampling and analyses at SWMU 46-004(b) are presented in Table 4.2-18, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.10 SWMU 46-004(b2), Outfall

4.2.10.1 Site Description and Operational History

SWMU 46-004(b2) is an inactive outfall located approximately 20 ft east of building 46-1 at TA-46 (Figure 4.2-7). The outfall pipe consists of a 4-in.-diameter vitrified clay pipe (VCP) that discharged to the east side of building 46-1, down a steep embankment and into a storm drainage ditch, which flowed to a storm drain culvert that discharged into Cañada del Buey (LANL 1993, 020952, p. 5-129). The storm drainage ditch also receives runoff from SWMUs 46-004(s), 46-007, and 46-008(b) (sections 4.2-19, 4.2-31, and 4.2-33, respectively). Engineering drawings show the floor drains along the east wall of the north high bay in building 46-1 were plumbed to this outfall pipe (LANL 1993, 020952, p. 5-129). Building 46-1 housed offices, two assembly bays, a machine shop, and several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area in support of the Rover Program (LANL 1993, 020952, p. 5-7). In 1995, the outfall was plugged and the associated floor drains were either taken out of service or were rerouted to the SWSC plant (LANL 1998, 101808, p. 75).

4.2.10.2 Previous Investigations

In 2010, four soil samples were collected from two locations at SWMU 46-004(b2). Previously sampled locations are shown in Figure 4.2-7. Table 4.2-19 presents the samples collected and analyses requested for SWMU 46-004(b2). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 230617).

Sampling at SWMU 46-004(b2) consisted of the following activities in 2010:

- Soil samples were collected from two locations in the drainage ditch beneath the outfall (locations 46-611123 and 46-611124) from 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 72–73), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(b2), except for the vertical extent of Aroclor-1254 and Aroclor-1260 at location 46-611123 (Plate 15).

4.2.10.3 Proposed Sampling at SWMU 46-004(b2)

Shallow subsurface samples will be collected at one previously sampled location (46-611123), extending the depth at this location to define the vertical extent of PCBs. Samples from location 46-611123 will be analyzed for PCBs.

The results of the previous sampling at location 46-611123 showed benzo(a)pyrene detected above the industrial SSL (2.34 mg/kg) at 7.01 mg/kg in the sample from 0.0–1.0 ft bgs and at 3.74 mg/kg in the sample from 1.0–2.0 ft bgs. Therefore, the top 3.0 ft of soil will be removed from a 2.5-ft radius around location 46-611123. Confirmation samples will be collected north, south, east, and west of the location 46-611123 excavation at new locations 4b2-1, 4b2-2, 4b2-3, and 4b2-4 and analyzed for benzo(a)pyrene. The results of sampling at locations 4b2-1, 4b2-2, 4b2-3, and 4b2-4 will confirm cleanup to the north, south, east, and west of the location 46-611123 excavation. Samples collected from deeper depths at location 46-611123 will also be analyzed for benzo(a)pyrene to confirm cleanup.

The proposed sampling and analyses at SWMU 46-004(b2) are presented in Table 4.2-20, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.11 SWMU 46-004(c), Dry Well

4.2.11.1 Site Description and Operational History

SWMU 46-004(c) is an inactive dry well (structure 46-61) located approximately 10 ft north of the high bay in building 46-31 at TA-46 (Figure 4.2-3). The 1990 SWMU report incorrectly identified SWMU 46-004(c) as a sump (LANL 1990, 007513). The dry well is constructed of two sections of 2.5-ft-diameter × 4-ft-long concrete pipe installed vertically to a depth of approximately 8 ft bgs. Engineering drawings show the bottom of the dry well is open (LASL 1960, 101820). Industrial sink drains in room 151 discharged to the dry well through drainlines [SWMU 46-004(a)] that run beneath building 46-31. Engineering drawings show one drainline discharged acid waste from three sinks on the north side of room 151 (LASL 1960, 101819), and a second drainline was connected to a sink on the west side of room 151 (LANL 1993, 101825). During the Rover Program, the sinks on the north side of room 151 were removed, and the drainline was left in place (LANL 1993, 020952, pp. 5-13–5-14). Engineering drawings show the western sink and associated drainline were removed in the early 1990s (LANL 1993, 101823). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). Engineering drawings also show the alkali-metal cleaning tank [SWMU 46-004(b)] was connected to the dry well from the late 1950s to the early 1960s (LASL 1963, 101821).

4.2.11.2 Previous Investigations

In 2010, eight tuff samples were collected from two locations at SWMU 46-004(c). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-21 presents the samples collected and analyses requested for SWMU 46-004(c). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(c) consisted of the following activities in 2010:

- Tuff samples were collected from two locations: one in the center of the well (location 46-611622) and one downgradient of the well (location 46-611623) from four depth intervals of 8.0–9.0 ft, 13.0–14.0 ft, 18.0–19.0 ft, and 23.0–24.0 ft bgs, corresponding to the bottom of the well and 5 ft, 10 ft, and 15 ft below the bottom of the well. All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, asbestos, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 76–78), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(c), except for the vertical extent of cesium, copper, mercury, and Aroclor-1242.

The vertical extent of cesium, copper, and mercury is not defined at location 46-611622 (Plate 5). The vertical extent of Aroclor-1242 is not defined at location 46-611623 (Plate 6).

4.2.11.3 Proposed Sampling at SWMU 46-004(c)

Shallow subsurface samples will be collected at two previously sampled locations (46-611622 and 46-611623), extending the depth at these locations to define the vertical extent of cesium, copper, mercury, and Aroclor-1242. Samples from location 46-611622 will be analyzed for copper, mercury, and cesium. Samples from location 46-611623 will be analyzed for PCBs.

The proposed sampling and analyses at SWMU 46-004(c) are presented in Table 4.2-22, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.12 SWMU 46-004(c2), Outfall

4.2.12.1 Site Description and Operational History

SWMU 46-004(c2) is a former National Pollutant Discharge Elimination System– (NPDES-) permitted outfall from an industrial drainline in building 46-1 at TA-46 (Figure 4.2-6). The outfall consists of a 4-in.-diameter cast-iron pipe that discharged effluent from floor drains in the north equipment room of building 46-1 to a ditch approximately 50 ft northwest of building 46-1. From the ditch, the effluent flowed to a storm drain culvert that discharged into Cañada del Buey. In 1997, the floor drains that discharged to the SWMU 46-004(c2) outfall either were removed from service or were rerouted to the SWSC plant (LANL 1998, 101808, pp. 77–78). The outfall was removed from the NPDES permit effective March 10, 1998. Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area in support of the Rover Program (LANL 1993, 020952, p. 5-7).

4.2.12.2 Previous Investigations

In 2010, 22 samples (18 soil and 4 tuff) were collected from 11 locations at SWMU 46-004(c2). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-23 presents the samples collected and analyses requested for SWMU 46-004(c2). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(c2) consisted of the following activities in 2010:

- Soil and tuff samples were collected from 11 locations in the drainage below the outfall (locations 46-611111 through 46-611121) from two depth intervals: 0.0–0.25 ft 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, cesium, lithium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 81–83), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(c2), except for the vertical extent of cesium, lead, lithium, perchlorate, zinc,

benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

The vertical extent of cesium is not defined at locations 46-611111, 46-611112, 46-611115, and 46-611118 (Plate 13). The vertical extent of lithium is not defined at locations 46-611111, 46-611112, and 46-611115, and the vertical extent of lead is not defined at location 46-611113 (Plate 13). The vertical extent of perchlorate is not defined at locations 46-611111, 46-611112, 46-611113, 46-611115, and 46-611117 (Plate 13). The vertical extent of zinc is not defined at location 46-611115 (Plate 13).

The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at location 46-611114 (Plate 14). The vertical extent of benzo(g,h,i)perylene is not defined at locations 46-611112 and 46-611114 (Plate 14).

4.2.12.3 Proposed Sampling at SWMU 46-004(c2)

Shallow subsurface samples will be collected at seven previously sampled locations (46-611111 through 46-611115, 46-611117, and 46-611118), extending the depth at these locations to define the vertical extent of cesium, lead, lithium, perchlorate, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Samples from location 46-611111 will be analyzed for cesium, lithium, and perchlorate. Samples from location 46-611112 will be analyzed for cesium, lithium, perchlorate, and benzo(g,h,i)perylene. Samples from location 46-611113 will be analyzed for lead and perchlorate. Samples from location 46-611114 will be analyzed for PAHs. Samples from location 46-611115 will be analyzed for zinc, cesium, lithium, and perchlorate. Samples from location 46-611117 will be analyzed for perchlorate. Samples from location 46-611118 will be analyzed for cesium.

The proposed sampling and analyses at SWMU 46-004(c2) are presented in Table 4.2-24, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.13 Consolidated Unit 46-004(d)-99

Consolidated Unit 46-004(d)-99 consists of SWMUs 46-004(d) and 46-004(e). Both SWMUs are inactive dry wells that were plumbed in series and received effluent from sink drains in building 46-58 at TA-46 (Figure 4.2-4). Both dry wells are located approximately 20 ft north of building 46-58. The dry wells are constructed of 3-ft-diameter × 4-ft-long concrete cylinders stacked vertically, with a nesting joint and a gravel bottom. Visual inspection of both wells indicates they are approximately 10 ft deep. The dry wells are belowgrade, except for the top 4- to 6-in. concrete lip, and are covered with metal lids. Both dry wells received effluent from an acid drain in building 46-58 (LANL 1993, 020952, p. 5-14) and effluent from a fume hood sink and a hand-washing sink in building 46-58 (Santa Fe Engineering Ltd. 1994, 101838, p. 16). Building 46-58 contains office space, a laboratory, and an equipment room, and historically housed a machine shop (LANL 1993, 020952, p. 5-14). The fume hood sink was removed and the drainline plugged in 1994; the drainline from the hand-washing sink was repiped to the sanitary sewer system in 1995 (LANL 1998, 101808, p. 82).

4.2.13.1 SWMU 46-004(d), Outfall

4.2.13.1.1 Site Description and Operational History

SWMU 46-004(d) (structure 46-69) is an inactive dry well located within 3 ft west of the SWMU 46-004(e) dry well (structure 46-70) at TA-46 (Figure 4.2-4). Engineering drawings show SWMU 46-004(d) has an inlet pipe to receive overflow from the SWMU 46-004(e) dry well but has no outlet pipe and was not connected to building 46-58 (LANL 1993, 020952, p. 5-14).

4.2.13.1.2 Previous Investigations

In 2010, 10 samples (7 soil and 3 tuff) were collected from four locations at SWMU 46-004(d). Previously sampled locations are shown in Figure 4.2-4. Table 4.2-25 presents samples collected and analyses requested for SWMU 46-004(d). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(d) consisted of the following activities in 2010:

- Soil and tuff samples were collected from one location in the center of the dry well (location 46-611557) from four depth intervals: 8.0–9.0 ft, 13.0–14.0 ft, 18.0–19.0 ft, and 23.0–24.0 ft bgs, corresponding to the bottom of the well and 5 ft, 10 ft, and 15 ft below the bottom of the well. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from three locations on the slope downgradient of the dry well (locations 46-611558 through 46-611560) 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, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 86–88), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(d), except for the vertical extent of acenaphthene at location 46-611559 (Plate 9).

4.2.13.1.3 Proposed Sampling at SWMU 46-004(d)

Shallow subsurface samples will be collected at one previously sampled location (46-611559), extending the depth at this location to define the vertical extent of acenaphthene. Samples from location 46-611559 will be analyzed for acenaphthene.

The proposed sampling and analyses at SWMU 46-004(d) are presented in Table 4.2-26, and the proposed sampling locations are shown in Figure 4.2-4.

4.2.13.2 SWMU 46-004(e), Dry Well

4.2.13.2.1 Site Description and Operational History

SWMU 46-004(e) (structure 46-70) is a dry well located next to SWMU 46-004(d) and connected to building 46-58 by an inlet drainline (Figure 4.2-4). This dry well is of the same construction and has the same operational history as SWMU 46-004(d).

4.2.13.3.2 Previous Investigations

In 2010, 12 samples (8 soil and 4 tuff) were collected from five locations at SWMU 46-004(e). Previously sampled locations are shown in Figure 4.2-4. Table 4.2-27 presents the samples collected and analyses requested for SWMU 46-004(e). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(e) consisted of the following activities in 2010:

- Subsurface soil and tuff samples were collected from one location in the center of the dry well (location 46-611561) from four depth intervals: 7.5–8.5 ft, 12.5–13.5 ft, 17.5–18.5 ft, and 22.5–23.5 ft bgs, corresponding to the bottom of the well, and 5 ft, 10 ft, and 15 ft below the bottom of the well. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from the location closest to where the inlet drainline exits building 46-58 (location 46-611562) 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, nitrate, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.
- Soil samples were collected from three locations on the slope downgradient of the dry well [same locations sampled at SWMU 46-004(d)] 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, total cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 90–92), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(e), except for the vertical extent of acenaphthene at location 46-611559 (Plate 9).

4.2.13.2.3 Proposed Sampling at SWMU 46-004(e)

The proposed sampling and analyses at SWMU 46-004(e) are presented in section 4.2.13.1.3 as part of the Phase II investigation of SWMU 46-004(d).

4.2.14 Consolidated Unit 46-004(d2)-99

Consolidated Unit 46-004(d2)-99 consists of SWMUs 46-004(d2), 46-004(g), and 46-004(h) and AOCs C-46-002 and C-46-003 at TA-46 (Figure 4.2-8). SWMU 46-004(d2) and AOCs C-46-002 and C-46-003 are areas of potential soil contamination from exhaust emissions from stacks on buildings 46-24, 46-31, and 46-30, respectively. SWMUs 46-004(g) and 46-004(h) include an exhaust-emissions component and an outfall component and are associated with buildings 46-1 and 46-16, respectively.

4.2.14.1 Stack Emissions at Consolidated Unit 46-004(d2)-99

4.2.14.1.1 Previous Investigations

In 2010, 40 samples (33 soil and 7 tuff) were collected from 20 locations at Consolidated Unit 46-004(d2)-99. Previously sampled locations are shown in Figure 4.2-8. Table 4.2-28 presents the

samples collected and analyses requested for Consolidated Unit 46-004(d2)-99. The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at Consolidated Unit 46-004(d2)-99 consisted of the following activities:

- Soil and tuff samples were collected from 20 locations on the mesa top (locations 46-611481 through 46-611500), proximal to stack locations, from unpaved areas and undisturbed areas 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, SVOCs, PCBs, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 94–97), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at Consolidated Unit 46-004(d2)-99, except for the vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234.

The vertical extent of chromium is not defined at locations 46-611484 and 46-611488 (Plate 16). The vertical extent of perchlorate is not defined at location 46-611499, and the vertical extent of selenium is not defined at location 46-611489 (Plate 16). The vertical extent of fluoranthene, phenanthrene, and pyrene is not defined at location 46-611491 (Plate 17). The vertical extent of uranium-234 is not defined at location 46-611486 (Plate 18).

4.2.14.1.2 Proposed Sampling at Consolidated Unit 46-004(d2)-99

Shallow subsurface samples will be collected at six previously sampled locations (46-611484, 46-611486, 46-611488, 46-611489, 46-611491, and 46-611499), extending the depth at these locations to define the vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234. Samples from location 46-611484 will be analyzed for chromium. Samples from location 46-611486 will be analyzed for isotopic uranium. Samples from location 46-611488 will be analyzed for chromium. Samples from location 46-611489 will be analyzed for selenium. Samples from location 46-611491 will be analyzed for fluoranthene, phenanthrene, and pyrene. Samples from location 46-611499 will be analyzed for perchlorate.

The proposed sampling and analyses at Consolidated Unit 46-004(d2)-99 are presented in Table 4.2-29, and the proposed mesa top sampling locations are shown in Figure 4.2-8.

4.2.14.2 SWMU 46-004(g), Outfall

4.2.14.2.1 Site Description

The outfall component of SWMU 46-004(g) consists of an inactive 12-in.-diameter VCP industrial drain that received effluent from floor drains and roof drains within the central portion of building 46-1 and discharged into Cañada del Buey north of building 46-154 (LANL 1993, 020952, pp. 5-123, 5-184) (Figure 4.2-6). Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, p. 5-7). In 1996 and 1997, the floor drains that discharged to this outfall either were removed from service or were rerouted to the SWSC plant. Roof drains from building 46-1 that discharged to this outfall were rerouted to the stormwater drain system in 1996 (LANL 1998, 101808, pp. 74–75).

4.2.14.2.2 Previous Investigations

In 2010, 16 samples (14 soil and 2 tuff) were collected from eight locations at SWMU 46-004(g). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-30 presents the samples collected and analyses requested for SWMU 46-004(g). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(g) consisted of the following activities in 2010:

- Soil and tuff samples were collected from eight locations in the drainage downgradient of the outfall (locations 46-611444 through 46-611451) from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bags. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 101–104), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(g), except for the vertical extent of copper, mercury, silver, acenaphthene, anthracene, Aroclor-1254, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236.

The vertical extent of copper, mercury, and silver is not defined at location 46-611447 (Plate 13). The vertical extent of 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene is not defined at location 46-611446 (Plate 14). The vertical extent of Aroclor-1254 and benzo(b)fluoranthene is not defined at locations 46-611446 and 46-611447 (Plate 14). The vertical extent of dibenz(a,h)anthracene is not defined at location 46-611445 (Plate 14). The vertical extent of uranium-234 and uranium-235/236 is not defined at location 46-611447 (Plate 19).

4.2.14.2.3 Proposed Sampling at SWMU 46-004(g)

Shallow subsurface samples will be collected at three previously sampled locations (46-611445 through 46-611447), extending the depth at these locations to define the vertical extent of copper, mercury, silver, acenaphthene, anthracene, Aroclor-1254, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236. Samples from location 46-611445 will be analyzed for dibenz(a,h)anthracene. Samples from location 46-611446 will be analyzed for 2-methylnaphthalene and PAHs. Samples from location 46-611447 will be analyzed for copper, mercury, silver, benzo(b)fluoranthene, PCBs, and isotopic uranium.

The proposed sampling and analyses at SWMU 46-004(g) are presented in Table 4.2-31, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.14.3 SWMU 46-004(h), Outfall

4.2.14.3.1 Site Description and Operational History

The outfall component of SWMU 46-004(h) consists of an inactive 6-in.-diameter cast-iron pipe that received effluent from building floor drains and discharged to an outfall north of building 46-16 into Cañada del Buey (LANL 1993, 020952, p. 5-124; Santa Fe Engineering Ltd. 1994, 101839, Figure 2) (Figure 4.2-4). In 1995, floor drains that discharged to this outfall either were removed from service or were rerouted to the SWSC plant (LANL 1998, 101808, pp. 78–79).

4.2.14.3.2 Previous Investigations

In 2010, four soil samples were collected from two locations at SWMU 46-004(h). Previously sampled locations are shown in Figure 4.2-4. Table 4.2-32 presents the samples collected and analyses requested for SWMU 46-004(h). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(h) consisted of the following activities in 2010:

- Soil samples were collected from two locations below the outfall (locations 46-611765 and 46-611766) 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, SVOCs, PCBs, total cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, p. 107), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(h), except for the vertical extent of mercury (Plate 8) and Aroclor-1254 (Plate 9) at location 46-611766.

4.2.14.3.3 Proposed Sampling at SWMU 46-004(h)

Shallow subsurface samples will be collected previously sampled location 46-611766, extending the depth at this location to define the vertical extent of mercury and Aroclor-1254. Samples collected from location 46-611766 will be analyzed for mercury and PCBs.

Analyses for VOCs and pesticides were inadvertently excluded from the sampling paperwork for SWMU 46-004(h). Samples will be collected at previously sampled locations 46-611765 and 46-611766 and analyzed for VOCs and pesticides.

The proposed sampling and analyses at SWMU 46-004(h) are presented in Table 4.2-33, and the proposed sampling locations are shown in Figure 4.2-4.

4.2.15 AOC 46-004(e2), Outfall

4.2.15.1 Site Description and Operational History

AOC 46-004(e2) is the outfall from roof, floor, and sink drains in building 46-42 at TA-46 (Figure 4.2-7). The outfall consists of a 4-in.-diameter pipe located approximately 50 ft northeast of building 46-42 at the head of a drainage ditch associated with SWMU 46-006(a). The outfall is located approximately 3 ft below the level of the asphalt pavement. Building 46-42 was constructed as an equipment checkout facility and contains electronics and robotics laboratories (LANL 1996, 054929, pp. 128–129). In the mid-1990s, the

floor and sink drains that discharged to this outfall either were removed from service or were rerouted to the sanitary sewer system. The outfall currently receives stormwater from building 46-42 roof drains only (LANL 1998, 101808, pp. 81–82).

4.2.15.2 Previous Investigations

In 2010, six samples (three soil and three tuff) were collected from three locations at AOC 46-004(e2). Previously sampled locations are shown in Figure 4.2-7. Table 4.2-34 presents the samples collected and analyses requested for AOC 46-004(e2). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at AOC 46-004(e2) consisted of the following activities in 2010:

- Soil and tuff samples were collected from three locations in the drainage downgradient of the outfall (locations 46-611022 through 46-611024) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 111–113), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 46-004(e2), except for the vertical extent of copper, fluoranthene, phenanthrene, and pyrene.

The vertical extent of copper is not defined at location 46-611022 (Plate 20). The vertical extent of fluoranthene, phenanthrene and pyrene is not defined at location 46-611024 (Plate 15).

4.2.15.3 Proposed Sampling at SWMU 46-004(e2)

Shallow subsurface samples will be collected at two previously sampled locations (46-611022 and 46-611024), extending the depth at the locations to define the vertical extent of copper, fluoranthene, phenanthrene, and pyrene. Samples from location 46-611022 will be analyzed for copper. Samples from location 46-611024 will be analyzed for fluoranthene, phenanthrene, and pyrene.

The proposed sampling and analyses at AOC 46-004(e2) are presented in Table 4.2-35, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.16 SWMU 46-004(f), Outfall

4.2.16.1 Site Description and Operational History

SWMU 46-004(f) is an inactive outfall from an industrial drainline that served rooms 101 through 134 of building 46-24 at TA-46 (Figure 4.2-2). The outfall consists of a 6-in.-diameter VCP that received discharges from a sump, acid sink, several floor and sink drains, and cooling water system (LANL 1993, 020952, p. 5-123). The outfall pipe discharged to a drain approximately 50 ft east of building 46-24. This drain is part of a network of drains that discharge to SWSC Canyon at former NPDES-permitted outfall 04A018 (LANL 1993, 020952, pp. 5-122–5-123). Building 46-24 housed offices, a machine shop, electrical laboratories, and chemical laboratories where fuel rods were handled (LANL 1993, 020952, p. 5-10). Before the outfall was removed from the NPDES permit, all discharges to the outfall from building 46-24 ceased (LANL 1999, 064617, p. 2-8).

4.2.16.2 Previous Investigations

In 2010, eight samples (six soil and two tuff) were collected from four locations at SWMU 46-004(f). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-36 presents the samples collected and analyses requested for SWMU 46-004(f). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(f) consisted of the following activities in 2010:

- Soil and tuff samples were collected from four locations: two locations at the outfall (locations 46-611272 and 46-611274) and two locations below the drain network discharge point (locations 46-611273 and 46-611275) in the drainage to SWSC Canyon from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp.115–117), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(f), except for the vertical extent of lead, Aroclor-1254, and Aroclor-1260.

The vertical extent of lead is not defined at location 46-611273 (Plate 3). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 46-611272 (Plate 11).

4.2.16.3 Proposed Sampling at SWMU 46-004(f)

Shallow subsurface samples will be collected at two previously sampled locations (46-611272 and 46-611273), extending the depth at these locations to define the vertical extent of lead, Aroclor-1254, and Aroclor-1260. Samples from location 46-611272 will be analyzed for PCBs. Samples from location 46-611273 will be analyzed for lead.

The proposed sampling and analyses at SWMU 46-004(f) are presented in Table 4.2-37, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.17 AOC 46-004(f2), Outfall

4.2.17.1 Site Description and Operational History

AOC 46-004(f2) is an inactive outfall located approximately 10 ft below the TA-46 perimeter fence and 50 ft north of the northwest corner of building 46-31 (Figure 4.2-6). The outfall consists of a 4-in.-diameter cast-iron pipe that discharged onto the steep slope north of building 46-31. This outfall received effluent from a single floor drain in room 151B of building 46-31 and discharged into Cañada del Buey. Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). The floor drain leading to this outfall was plugged before 1993.

4.2.17.2 Previous Investigations

In 2010, 12 samples (9 soil and 3 tuff) were collected from six locations at AOC 46-004(f2). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-38 presents the samples collected and analyses

requested for AOC 46-004(f2). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at AOC 46-004(f2) consisted of the following activities in 2010:

- Twelve samples were collected from six locations in the drainage downgradient of the outfall (locations 46-611475 through 46-611480) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 119–121), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at AOC 46-004(f2), except for the vertical extent of cesium-137 and plutonium-239/240 at location 46-611478 (Plate 19).

4.2.17.3 Proposed Sampling at AOC 46-004(f2)

Shallow subsurface samples will be collected at one previously sampled location (46-611478), extending the depth at this location to define the vertical extent of cesium-137 and plutonium-239/240. Samples from location 46-611478 will be analyzed for cesium-137 and isotopic plutonium.

The proposed sampling and analyses at AOC 46-004(f2) are presented in Table 4.2-39, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.18 SWMU 46-004(q), Outfall

4.2.18.1 Site Description and Operational History

SWMU 46-004(q) is an inactive outfall located approximately 40 ft north of building 46-58 at TA-46 (Figure 4.2-4). The outfall consists of a 6-in.-diameter cast-iron pipe that discharged into Cañada del Buey. The source of the discharge to the outfall is not known (LANL 1993, 020952, pp. 5-124–5-125).

4.2.18.2 Previous Investigations

In 2010, 26 samples (15 soil and 11 tuff) were collected from 13 locations at SWMU 46-004(q). Previously sampled locations are shown in Figure 4.2-4. Table 4.2-40 presents the samples collected and analyses requested for SWMU 46-004(q). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(q) consisted of the following activities in 2010:

- Soil and tuff samples were collected from 13 locations in the drainage below the outfall (locations 46-611501 through 46-611513) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 132–134), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined

at SWMU 46-004(q), except for the vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60.

The vertical extent of barium is not defined at location 46-611505 (Plate 8). The vertical extent of lead and mercury is not defined at location 46-611501 (Plate 8). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 46-611501 (Plate 9). The vertical extent of cobalt-60 is not defined at location 46-611502 (Plate 10).

4.2.18.3 Proposed Sampling at SWMU 46-004(q)

Shallow subsurface samples will be collected at three previously sampled locations (46-611501, 46-611502, and 46-611505), extending the depth at these locations to define the vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60. Samples from location 46-611501 will be analyzed for lead, mercury, and PCBs. Samples from location 46-611502 will be analyzed for cobalt-60. Samples from location 46-611505 will be analyzed for barium.

The proposed sampling and analyses at SWMU 46-004(q) are presented in Table 4.2-41, and the proposed sampling locations are shown in Figure 4.2-4.

4.2.19 SWMU 46-004(s), Outfall

4.2.19.1 Site Description and Operational History

SWMU 46-004(s) is an outfall located approximately 20 ft south of building 46-1 at TA-46 (Figure 4.2-7). The outfall consists of a 4-in.-diameter cast-iron pipe that discharged to a drainage ditch (SWMU 46-007) on the south side of building 46-1 (LANL 1993, 020952, p. 5-125). The drainage ditch leads to a storm drain culvert that discharges into Cañada del Buey. The outfall received effluent from floor and roof drains of the south high bay in building 46-1. Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, p. 5-7). In 1995, all floor drains in the south high bay of building 46-1 either were plugged or were rerouted to the SWSC plant. Currently, roof drains from the south high bay discharge to the storm drainage system and/or daylight near building 46-1 (LANL 1998, 101808, pp. 76–77).

4.2.19.2 Previous Investigations

In 2010, four samples (two soil and two tuff) were collected from two locations at SWMU 46-004(s). Previously sampled locations are shown in Figure 4.2-7. Table 4.2-42 presents the samples collected and analyses requested for SWMU 46-004(s). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(s) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two locations below the outfall (locations 46-611198 and 46-611199) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 140–141), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined

at SWMU 46-004(s), except for the vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene.

The vertical extent of chromium is not defined at location 46-611199 (Plate 15). The vertical extent of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at location 46-611199 (Plate 20).

4.2.19.3 Proposed Sampling at SWMU 46-004(s)

Shallow subsurface samples will be collected at one previously sampled location (46-611199), extending the depth at this location to define the vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene. Samples from location 46-611199 will be analyzed for chromium and PAHs.

The proposed sampling and analyses at SWMU 46-004(s) are presented in Table 4.2-43, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.20 SWMU 46-004(t), Outfall

4.2.20.1 Site Description and Operational History

SWMU 46-004(t) is a former NPDES-permitted outfall (04A014) located approximately 60 ft southeast of building 46-76 at TA-46 (Figure 4.2-2). The outfall is a 4-in.-diameter VCP drainline that received effluent from sink drains in rooms 101 and 102, from all floor drains in room 104, and from the high bay in building 46-88 (Santa Fe Engineering Ltd. 1994, 101840, Figures 11 and 12). The drainline discharged at a point approximately 250 ft northeast of building 46-88 on the west side of SWSC Road. Effluent from the outfall flowed to a storm drain culvert under the road and discharged to SWSC Canyon (LANL 1993, 020952, pp. 5-125–5-126). Building 46-88 housed a structural laboratory for testing pressure vessels associated with the Rover Program. Later, the building was used for process chemistry work to isolate nonradioactive isotopes of carbon, oxygen, and nitrogen (LANL 1993, 020952, p. 5-126). Outfall 04A014 was removed from the NPDES permit in July 1995. All discharges from building 46-88 ceased before the outfall was removed from the NPDES permit.

4.2.20.2 Previous Investigations

In 2010, 20 samples (14 soil and 6 tuff) were collected from 10 locations at SWMU 46-004(t). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-44 presents the samples collected and analyses requested for SWMU 46-004(t). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(t) consisted of the following activities in 2010:

- Soil and tuff samples were collected from seven locations in the drainage below the outfall (locations 46-611279 through 46-611285) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

- Soil and tuff samples were collected from three locations along the drainline where it was assumed to exit the building (location 46-611276) and at the assumed location of the elbows (location 46-611277 and 46-611278) at two depth intervals: from a depth range of 2.5–5.5 ft bgs directly below the bottom of the drainline and 5.0 ft below the bottom of the line from a depth range of 4.5–10.5 ft bgs. Potholing at locations 46-611277 and 46-611278 could not verify the location and depth of the drainline at these two locations. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 143–147), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(t), except for the vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236.

The vertical extent of aluminum, calcium, cobalt, nickel, and vanadium is not defined at location 46-611285 (Plate 3). The vertical extent of barium is not defined at locations 46-611284 and 46-611285 (Plate 3). The vertical extent of selenium is not defined at location 46-611276 (Plate 3).

The vertical extent of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at location 46-611280 (Plate 11). The vertical extent of bis(2-ethylhexyl)phthalate and 4-isopropyltoluene is not defined at location 46-611282 (Plate 11). The vertical extent of 4-isopropyltoluene is not defined at location 46-611284 (Plate 11).

The vertical extent of cesium-137 is not defined at location 46-611280, and the vertical extent of uranium-235/236 is not defined at locations 46-611277 and 46-611285 (Plate 4).

4.2.20.3 Proposed Sampling at SWMU 46-004(t)

Shallow subsurface samples will be collected at six previously sampled locations (46-611276, 46-611277, 46-611280, 46-611282, 46-611284, and 46-611285), extending the depth at these locations to define the vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236. Samples from location 46-611276 will be analyzed for selenium. Samples from location 46-611277 will be analyzed for isotopic uranium. Samples from location 46-611280 will be analyzed for PAHs and cesium-137. Samples from location 46-611282 will be analyzed for 4-isopropyltoluene and bis(2-ethylhexyl)phthalate. Samples from location 46-611284 will be analyzed for barium and 4-isopropyltoluene. Samples from location 46-611285 will be analyzed for aluminum, barium, calcium, cobalt, nickel, vanadium, and isotopic uranium.

Exploratory trenches will be excavated at and around locations 46-611277 and 46-611278 to determine the location of the drainline, which could not be verified during the 2010 investigation. If the drainline is located, the locations and depth intervals of the samples collected at locations 46-611277 and 46-611278 during the 2010 investigation will be verified. If locations 46-611277 and 46-611278 are within 2 ft of the drainline, additional samples are not necessary. Otherwise, samples will be collected at two new sampling locations along the drainline at drainline joints or elbows if possible (locations 4t-1 and 4t-2) at depths of 0.0–1.0 ft and 5.0–6.0 ft below the bottom of the drainline. Samples from locations 4t-1 and 4t-2

will be analyzed for TAL metals, total cyanide, perchlorate, VOCs, SVOCs, PCBs, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The proposed sampling and analyses at SWMU 46-004(t) are presented in Table 4.2-45, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.21 SWMU 46-004(u), Outfall

4.2.21.1 Site Description and Operational History

SWMU 46-004(u) is an inactive outfall located approximately 10 ft north of former building 46-87 at TA-46 (Figure 4.2-6). The outfall consisted of an 8-in.-diameter cast-iron pipe that discharged into Cañada del Buey. This pipe was the overflow pipe for a concrete wet well located in former building 46-87. The wet well was designed as a holding pit for deionized water and historically received effluent from a closed-loop cooling water system serving buildings 46-16, 46-25, and 46-31. The wet well also received effluent from sink drains in building 46-25, which was a battery storage facility also used for small-scale painting activities in support of the Rover Program (LANL 1993, 020952, p. 5-126). Building 46-87 was the pump house for an adjacent cooling tower (former building 46-86) that housed two wet well systems and mechanical equipment associated with the cooling tower (LANL 1993, 020952, p. 5-127). Building 46-87 also stored water-treatment chemicals (Santa Fe Engineering Ltd. 1994, 101838, pp. 16–17). Building 46-87 underwent D&D in December 2001 (LANL 2008, 101882). By the early 1990s, the outfall had been plugged, and effluent discharged to the wet well was periodically pumped out and disposed of at the SWSC plant (Santa Fe Engineering Ltd. 1994, 101838, p. 16). By 1998, the building 46-25 drains that discharged to the wet well were removed from service (LANL 1998, 101808, p. 80).

4.2.21.2 Previous Investigations

In 2010, 20 samples (15 soil and 5 tuff) were collected from 10 locations at SWMU 46-004(u). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-46 presents the samples collected and analyses requested for SWMU 46-004(u). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(u) consisted of the following activities in 2010:

- Soil and tuff samples were collected from 10 locations in the drainage below the outfall (locations 46-611527 through 46-611536) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 149–152), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(u), except for the vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254.

The vertical extent of barium and cobalt is not defined at location 46-611536 (Plate 13). The vertical extent of chromium is not defined at location 46-611535 (Plate 13). The vertical extent of copper is not defined at locations 46-611527, 46-611528, and 46-611536. The vertical extent of lead, thallium, and zinc is not defined at location 46-611527 (Plate 13). The vertical extent of selenium is not defined at locations

46-611527 and 46-611528 (Plate 13). The vertical extent of Aroclor-1254 is not defined at locations 46-611527 and 46-611535 (Plate 14).

4.2.21.3 Proposed Sampling at SWMU 46-004(u)

Shallow subsurface samples will be collected at four previously sampled locations (46-611527, 46-611528, 46-611535, and 46-611536), extending the depth at these locations to define the vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254. Samples from location 46-611527 will be analyzed for copper, lead, selenium, thallium, zinc, and PCBs. Samples from location 46-611528 will be analyzed for copper and selenium. Samples from location 46-611535 will be analyzed for chromium and PCBs. Samples from location 46-611536 will be analyzed for barium, cobalt, and copper.

The proposed sampling and analyses at SWMU 46-004(u) are presented in Table 4.2-47, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.22 SWMU 46-004(v), Outfall

4.2.22.1 Site Description and Operational History

SWMU 46-004(v) is an inactive outfall located approximately 20 ft north of former building 46-87 at TA-46 (Figure 4.2-6). The outfall consists of a 6-in.-diameter cast-iron pipe that discharged effluent from the roof and floor drains of former building 46-87 into Cañada del Buey. Building 46-87 was the pump house for an adjacent cooling tower (former building 46-86) that housed two wet well systems and mechanical equipment associated with the cooling tower (LANL 1993, 020952, p. 5-127). This building was also used to store water-treatment chemicals (Santa Fe Engineering Ltd. 1994, 101838, pp. 16–17). By the early 1990s, the floor drains in former building 46-87 had been plugged, and the outfall was receiving only discharges from the roof drains (Santa Fe Engineering Ltd. 1994, 101838, Figure 9). Building 46-87 underwent D&D in December 2001 (LANL 2008, 101882).

4.2.22.2 Previous Investigations

In 2010, four samples (two soil and two tuff) were collected from two locations at SWMU 46-004(v). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-48 presents the samples collected and analyses requested for SWMU 46-004(v). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(v) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two locations in the drainage below the outfall (locations 46-611821 and 46-611822) from two depth intervals: 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed by off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 154–155), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(v), except for the vertical extent of selenium and zinc.

The vertical extent of zinc is not defined at location 46-611821 (Plate 13). The vertical extent of selenium is not defined at location 46-611822 (Plate 13).

4.2.22.3 Proposed Sampling at SWMU 46-004(v)

Shallow subsurface samples will be collected at two previously sampled locations (46-611821 and 46-611822), extending the depth at these locations to define the vertical extent of selenium and zinc. Samples from location 46-611821 will be analyzed for zinc. Samples from location 46-611822 will be analyzed for selenium.

The proposed sampling and analyses at SWMU 46-004(v) are presented in Table 4.2-49, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.23 SWMU 46-004(x), Outfall

4.2.23.1 Site Description and Operational History

SWMU 46-004(x) is an outfall located approximately 30 ft north of building 46-31 at TA-46 (Figure 4.2-6). The outfall consists of a 6-in.-diameter pipe that receives effluent from roof drains in building 46-31 (LANL 1993, 020952, p. 5-127). The outfall pipe extends approximately 1 ft beyond the steep canyon slope and discharges to a 1- to 2-ft-wide drainage that stretches to the toe of the slope of Cañada del Buey (LANL 1996, 054929, p. 81). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14).

4.2.23.2 Previous Investigations

In 2010, 10 soil samples were collected from five locations at SWMU 46-004(x). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-50 presents the samples collected and analyses requested for SWMU 46-004(x). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(x) consisted of the following activities in 2010:

- Soil samples were collected from five locations in the drainage below the outfall (locations 46-611514 through 46-611517 and 46-611526) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 159–160), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(x), except for the vertical extent of copper and plutonium-239/240.

The vertical extent of copper is not defined at location 46-611526 (Plate 13). The vertical extent of plutonium-239/240 is not defined at location 46-611514 (Plate 19).

4.2.23.3 Proposed Sampling at SWMU 46-004(x)

Shallow subsurface samples will be collected at two previously sampled locations (46-611514 and 46-611526), extending the depth at these locations to define the vertical extent of copper and plutonium-239/240. Samples from location 46-611514 will be analyzed for isotopic plutonium. Samples from location 46-611526 will be analyzed for copper.

The proposed sampling and analyses at SWMU 46-004(x) are presented in Table 4.2-51, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.24 SWMU 46-004(y), Outfall

4.2.24.1 Site Description and Operational History

SWMU 46-004(y) is a former NPDES-permitted outfall (03A043) located approximately 40 ft north of building 46-31 at TA-46 (Figure 4.2-6). This outfall consisted of a 6-in.-diameter cast-iron pipe that received blowdown from a cooling tower in building 46-31 and effluent from the building's floor drains, roof drains, and laboratory sinks. The outfall pipe discharged into Cañada del Buey (LANL 1993, 020952, p. 5-127). The outfall pipe to the canyon was removed before 1996, the roof drains were rerouted to new storm drains that discharge to the north side of building 46-31, and all floor and sink drains discharging to this outfall were rerouted to the SWSC plant (Santa Fe Engineering Ltd. 1994, 101839, Figure 2). In July 1996, the outfall was removed from the NPDES permit (LANL 1999, 064617, p. 2-8).

4.2.24.2 Previous Investigations

In 2010, 16 samples (14 soil and 2 tuff) were collected from eight locations at SWMU 46-004(y). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-52 presents the samples collected and analyses requested for SWMU 46-004(y). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(y) consisted of the following activities in 2010:

- Soil and tuff samples were collected from eight locations in the drainage below the outfall (locations 46-611518 through 46-611525) 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, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 163–166), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(y), except for the vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240.

The vertical extent of perchlorate is not defined at location 46-611518 (Plate 13). The vertical extent of acetone is not defined at location 46-611522 (Plate 14). The vertical extent of acenaphthene and trichloroethene is not defined at location 46-611518 (Plate 14). The vertical extent of benzo(a)anthracene and pyrene is not defined at location 46-611519 (Plate 14). The vertical extent of plutonium-239-240 is not defined at locations 46-611518 and 46-611519 (Plate 19).

4.2.24.3 Proposed Sampling at SWMU 46-004(y)

Shallow subsurface samples will be collected at three previously sampled locations (46-611518, 46-611519, and 46-611522), extending the depth at these locations to define the vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240. Samples from location 46-611518 will be analyzed for perchlorate, trichloroethene, acenaphthene, and isotopic plutonium. Samples from location 46-611519 will be analyzed for benzo(a)anthracene, pyrene, and isotopic plutonium. Samples from location 46-611522 will be analyzed for acetone.

The proposed sampling and analyses at SWMU 46-004(y) are presented in Table 4.2-53, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.25 SWMU 46-004(z), Outfall

4.2.25.1 Site Description and Operational History

SWMU 46-004(z) is an inactive outfall located approximately 60 ft northwest of building 46-31 at TA-46 (Figure 4.2-6). This outfall consists of a 6-in.-diameter cast-iron pipe that receives stormwater discharge from two roof drains at building 46-31 and discharges into Cañada del Buey (LANL 1993, 020952, p. 5-128). Previously, the outfall also served the floor drains for rooms 160 through 172 of building 46-31. The floor drains leading to this outfall were rerouted to the SWSC plant sometime before 1993 (LANL 1996, 054929, p. 94).

4.2.25.2 Previous Investigations

In 2010, 12 samples (10 soil and 2 tuff) were collected from six locations at SWMU 46-004(z). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-54 presents the samples collected and analyses requested for SWMU 46-004(z). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-004(z) consisted of the following activities in 2010:

- Soil and tuff samples were collected from six locations in the drainage below the outfall (locations 46-611468 through 46-611473) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 168–170), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-004(z), except for the vertical extent of perchlorate, plutonium-239/240, uranium-234, and uranium-235/236.

The vertical extent of perchlorate is not defined at location 46-611471 (Plate 13). The vertical extent of uranium-234 and uranium-235/236 is not defined at location 46-611468 (Plate 19). The vertical extent of plutonium-239/240 is not defined at location 46-611469 (Plate 19).

4.2.25.3 Proposed Sampling at SWMU 46-004(z)

Shallow subsurface samples will be collected at three previously sampled locations (46-611468, 46-611469, and 46-611471), extending the depth at these locations to define the vertical extent of perchlorate, uranium-234, uranium-235/236, and plutonium-239/240. Samples from location 46-611468 will be analyzed for isotopic uranium. Samples from location 46-611469 will be analyzed for isotopic plutonium. Samples from location 46-611471 will be analyzed for perchlorate.

The proposed sampling and analyses at SWMU 46-004(z) are presented in Table 4.2-55, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.26 SWMU 46-005, Surface Impoundments

4.2.26.1 Site Description and Operational History

SWMU 46-005 consists of two surface impoundments (structures 46-170 and 46-171) at TA-46: the associated drainlines that connected the impoundments to buildings 46-158, 46-226, and 46-251 and a former NPDES-permitted outfall (SSS12S) (Figure 4.2-5). The upper impoundment (structure 46-170) has an overflow drain to the lower impoundment (structure 46-171), which in turn has an overflow line to former NPDES-permitted outfall SSS12S that discharged to SWSC Canyon (LANL 1993, 020952, p. 5-56). The impoundment system, lined with a reinforced Hypalon liner (LANL 1987, 110570), was constructed in approximately 1979 and was first used in 1980. From 1980 to 1987, salt brine associated with solar-energy experiments was discharged from buildings 46-158, 46-226, and 46-251 to the impoundments. There is no evidence that anything other than salt brine was discharged into the impoundments at this time. In 1982, one of the impoundments leaked for approximately 30 d, losing approximately 10,000 to 20,000 kg of sodium chloride. In 1987, the solar experiments were discontinued, and the brine was drained and disposed of by a salt disposal company (LANL 1990, 007513, p. 212), and the impoundments were converted to accommodate sanitary waste. The sanitary waste line from buildings 46-158, 46-226, and 46-251 was disconnected from the SWMU 46-003(g) septic system and connected to the uppermost surface impoundment (structure 46-170). In the early 1990s, the SWMU 46-005 impoundments were taken out of service altogether, and the sanitary waste line to the impoundments was rerouted to the SWSC plant (LANL 1996, 101818). The outfall was removed from the NPDES permit before 1994 (LANL 1999, 064617, p. 2-8).

4.2.26.2 Previous Investigations

In 2010, 28 samples (20 soil and 8 tuff) were collected from 14 locations at SWMU 46-005. Previously sampled locations are shown in Figure 4.2-5. Table 4.2-56 presents the samples collected and analyses requested for SWMU 46-005. The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-005 consisted of the following activities in 2010:

- Soil and tuff samples were collected from four locations beneath the drainlines (locations 46-611628 through 46-611631) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from five locations within the surface impoundments (locations 46-611632 through 46-611636) from two depth intervals: the base of the impoundments (0.0–1.0 ft bgs), and 5 ft below the impoundments (5.0–6.0 ft bgs). All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from two locations next to the surface impoundments (locations 46-611637 and 46-611638) 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, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

- Soil samples were collected from one location at the impoundment outfall (location 46-611639) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil samples were collected from two locations in the drainage below the surface impoundment outfall (locations 46-611640 and 46-611641) 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, cesium, VOCs, SVOCs, PCBs, nitrate, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 172–174), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-005, except for the vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137.

The vertical extent of cesium is not defined at locations 46-611628, 46-644629, 46-611631, 46-611636, 46-611637, 46-611640, and 46-611641 (Plate 12). The vertical extent of mercury is not defined at location 46-611640 (Plate 12). The vertical extent of selenium is not defined at locations 46-611630, 46-611632, 46-611633, 46-611634, 46-611635, 46-611636, and 46-611638 (Plate 12). The vertical extent of bis(2-ethylhexyl)phthalate is not defined at location 46-611631, 46-611633, 46-611637, 46-611638, 46-611640, and 46-611641 (Plate 21). The vertical extent of cesium-137 is not defined at location 46-611640 (Plate 22).

4.2.26.3 Proposed Sampling at SWMU 46-005

Shallow subsurface samples will be collected at 13 previously sampled locations (46-611628 through 46-611638, 46-611640, and 46-611641), extending the depth at these locations to define the vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137. Samples from locations 46-611628 and 46-611629 will be analyzed for cesium. Samples from locations 46-611630, 46-611632, 46-611634, and 46-611635 will be analyzed for selenium. Samples from location 46-611631 will be analyzed for cesium and bis(2-ethylhexyl)phthalate. Samples from location 46-611633 will be analyzed for selenium and bis(2-ethylhexyl)phthalate. Samples from location 46-611636 will be analyzed for selenium and cesium. Samples from locations 46-611637 and 46-611641 will be analyzed for cesium and bis(2-ethylhexyl)phthalate. Samples from location 46-611638 will be analyzed for selenium and bis(2-ethylhexyl)phthalate. Samples from location 46-611640 will be analyzed for mercury, cesium, bis(2-ethylhexyl)phthalate, and cesium-137.

The proposed sampling and analyses at SWMU 46-005 are presented in Table 4.2-57, and the proposed sampling locations are shown in Figure 4.2-5.

4.2.27 SWMU 46-006(a), Area of Potential Soil Contamination

4.2.27.1 Site Description and Operational History

SWMU 46-006(a) is a 70-ft × 100-ft area located at the north end of the parking lot between buildings 46-1 and 46-42 at TA-46 (Figure 4.2-7). The area is paved with asphalt and drains to an adjacent ditch on the north side of the area. The ditch is approximately 5 ft deep and 10 to 15 ft wide, and drains through a storm drain culvert into Cañada del Buey. During a 1986 site visit, fifteen 55-gal. drums

containing dielectric oil were observed to be stored on the pavement. Some of the drums were leaking, and oil had migrated into the drainage ditch next to the asphalt pad (LANL 1996, 054929, p. 140).

4.2.27.2 Previous Investigations

SWMU 46-006(a) and AOC 46-004(e2) are located within a common drainage. Data obtained from samples collected at AOC 46-004(e2) (section 4.2.15) were used to characterize both sites. Sampling activities during the 2010 investigation are described in section 4.2.15 as part of AOC 46-004(e2).

4.2.27.3 Proposed Sampling at SWMU 46-006(a)

The proposed sampling and analyses at SWMU 46-006(a) are presented in section 4.2.15.3 as part of the Phase II investigation of AOC 46-004(e2).

4.2.28 SWMU 46-006(c), Storage Area

4.2.28.1 Site Description and Operational History

SWMU 46-006(c) is a paved 15-ft × 30-ft storage area located between the northeast corner of building 46-158 and the southeast side of building 46-208 at TA-46 (Figure 4.2-5). Asphalt curbing directs runoff into a storm drain discharging to SWSC Canyon. During a 1986 site visit, drums were observed to be leaking, and oil was noted to be draining into the storm drain. The drums were removed before 1994 (LANL 1993, 020952, pp. 5-77–5-78, 5-104). The area is currently used to store laboratory equipment and supplies.

4.2.28.2 Previous Investigations

In 2010, 18 samples (15 soil and 3 tuff) were collected from nine locations at SWMU 46-006(c). Previously sampled locations are shown in Figure 4.2-5. Table 4.2-58 presents the samples collected and analyses requested for SWMU 46-006(c). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-006(c) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two locations within the storage area (locations 46-611298 and 46-611299) from two depth intervals: 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from seven locations downgradient of SWMU 46-006(c) (locations 46-611300 through 46-611306) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 182–185), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-006(c), except for the vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240.

The vertical extent of barium is not defined at location 46-611302 (Plate 12). The vertical extent of acetone and 2-butanone is not defined at location 46-611298 (Plate 21). The vertical extent of Aroclor-1254, Aroclor-1260 is not defined at locations 46-611298 and 46-611306 (Plate 21). The vertical extent of TPH-DRO is not defined at locations 46-611298, 46-611301, 46-611303, and 46-611306 (Plate 21). The vertical extent of cesium-137 is not defined at location 46-611298 (Plate 22). The vertical extent of plutonium-239/240 is not defined at locations 46-611298 and 46-611300 (Plate 22).

4.2.28.3 Proposed Sampling at SWMU 46-006(c)

Shallow subsurface samples will be collected at six previously sampled locations (46-611298, 46-611300 through 46-611303, and 46-611306), extending the depth at these locations to define the vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240. Samples from location 46-611298 will be analyzed for acetone, 2-butanone, PCBs, TPH-DRO, cesium-137, and isotopic plutonium. Samples from location 46-611300 will be analyzed for isotopic plutonium. Samples from locations 46-611301 and 46-611303 will be analyzed for TPH-DRO. Samples from location 46-611302 will be analyzed for barium. Samples from location 46-611306 will be analyzed for PCBs and TPH-DRO.

The proposed sampling and analyses at SWMU 46-006(c) are presented in Table 4.2-59, and the proposed sampling locations are shown in Figure 4.2-5.

4.2.29 SWMU 46-006(d), Storage Area

4.2.29.1 Site Description and Operational History

SWMU 46-006(d) is an area of potential soil contamination located on the north side of building 46-31 at TA-46 (Figure 4.2-3). The area is approximately 50 ft × 300 ft and is level near building 46-31 but drops steeply towards the northern perimeter fence of TA-46 and into Cañada del Buey. With the exception of two asphalt-paved delivery and parking areas located at the eastern and western boundaries of the SWMU, most of the area is unpaved. Oils and possibly other materials spilled in the area. Engineering drawings show that a drain from room 111A in building 45-31 also discharged to this SWMU. During a 1986 site visit, 55-gal. drums, cans, rusty chemical storage containers, and a thick layer of oil were observed on the northern slope of the site (LANL 1993, 020952, p. 5-78). SWMUs 46-004(a,b,c) are located within the SWMU 46-006(d) boundary. Drainages that flow into Cañada del Buey, north of TA-46 perimeter fence, receive runoff from SWMU 46-006(d).

4.2.29.2 Previous Investigations

In 2010, 40 samples (34 soil and 6 tuff) were collected from 20 locations at SWMU 46-006(d). Previously sampled locations are shown in Figure 4.2-3. Table 4.2-60 presents the samples collected and analyses requested for SWMU 46-006(d). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-006(d) consisted of the following activities in 2010:

- Soil and tuff samples were collected from four locations within the SWMU boundary (locations 46-611568 through 46-611571) along the north wall of building 46-31 from two depth intervals: 0.0–1.0 ft and 4.0–5.0 ft (beneath the asphalt). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

- Soil and tuff samples were collected from 16 locations within and north of the SWMU boundary (locations 46-611572 through 46-611587) on the mesa top and slope (outside of the drainages) 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 188–193), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-006(d), except for the vertical extent of barium, calcium, mercury, perchlorate, silver, acenaphthene, acetone, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2 butanone, chrysene, fluoranthene, indeno(1,2,3 cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238.

The vertical extent of barium and calcium is not defined at location 46-611587, and the vertical extent of mercury is not defined at location 46-611576 (Plate 5). The vertical extent of perchlorate is not defined at locations 46-611573, 46-611578, 46-611580, 46-611581, and 46-611584 (Plate 5). The vertical extent of silver is not defined at location 46-611573 (Plate 5).

The vertical extent of acetone is not defined at locations 46-611570 and 46-611573 (Plate 6). The vertical extent of acenaphthene is not defined at locations 46-611573 and 46-611584 (Plate 6). The vertical extent of Aroclor-1260, 2-butanone, and 4-isopropyltoluene is not defined at location 46-611573 (Plate 6). The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and indeno(1,2,3 cd)pyrene is not defined at location 46-611581 (Plate 6). The vertical extent of chrysene is not defined at locations 46-611573, 46-611581, and 46-611584 (Plate 6). The vertical extent of fluoranthene, phenanthrene, and pyrene is not defined at locations 46-611570, 46-611573, 46-611581, and 46-611584 (Plate 6).

The vertical extent of cesium-137 is not defined at location 46-611573, and the vertical extent of plutonium-239/240 is not defined at location 46-611583 (Plate 7). The vertical extent of uranium-234, uranium-235/236, and uranium-238 is not defined at location 46-611582 (Plate 7).

4.2.29.3 Proposed Sampling at SWMU 46-006(d)

Shallow subsurface samples will be collected at 10 previously sampled locations (46-611570, 46-611573, 46-611576, 46-644578, 46-611580 through 46-611584, and 46-611587), extending the depth at these locations to define the vertical extent of barium, calcium, mercury, perchlorate, silver, acenaphthene, acetone, Aroclor 1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, indeno(1,2,3 cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, TPH-DRO, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238. Samples from location 46-611570 will be analyzed for acetone, fluoranthene, phenanthrene, and pyrene. Samples from location 46-611573 will be analyzed for silver, perchlorate, acetone, 2-butanone, 4-isopropyltoluene, acenaphthene, chrysene, fluoranthene, phenanthrene, pyrene, PCBs, and cesium-137. Samples from location 46-611576 will be analyzed for mercury. Samples from locations 46-611578 and 46-611580 will be analyzed for perchlorate. Samples from location 46-611581 will be analyzed for perchlorate and PAHs. Samples from location 46-611582 will be analyzed for isotopic uranium. Samples from location 46-611583 will be analyzed for isotopic plutonium. Samples from location 46-611584 will be analyzed for perchlorate, acenaphthene, chrysene, fluoranthene, phenanthrene, and pyrene. Samples from location 46-611587 will be analyzed for barium and calcium.

TPH-DRO analyses were inadvertently omitted during the 2010 investigation at SWMU 46-006(d). Samples will be collected from all previously sampled locations (46-611568 through 46-611587) and analyzed for TPH-DRO.

The investigation report stated that the vertical extent of zinc is not defined but did not specify a sampling location (LANL 2011, 203410, p. 189). As stated in the investigation report, zinc was detected above the soil BV (48.8 mg/kg) in seven samples at seven locations at SWMU 46-006(d). The maximum concentration of 252 mg/kg was detected at location 46-611571 from 0.0–1.0 ft bgs, and zinc concentrations decreased with depth at six locations (46-611570, 46-611571, 46-611572, 46-611577, 46-611579, and 46-611584) and were below the maximum soil background concentration (75.5 mg/kg) at the seventh location (46-611573). Therefore, no additional sampling to define the vertical extent of zinc is necessary at SWMU 46-006(d).

The proposed sampling and analyses at SWMU 46-006(d) are presented in Table 4.2-61, and the proposed sampling locations are shown in Figure 4.2-3.

4.2.30 SWMU 46-006(f), Storage Shed

4.2.30.1 Site Description and Operational History

SWMU 46-006(f) is a storage shed (building 46-36) located approximately 50 ft east of building 46-1 at TA-46 (Figure 4.2-7). The 20-ft × 30-ft metal storage shed was constructed in 1955 (Meeker et al. 1990, 054783.34, p. 39). The floor of the storage shed is paved and sits approximately 6 to 8 in. belowgrade. The area surrounding the storage shed also has been a storage area as well as a staging area for equipment and materials awaiting disposal and an unloading area for new equipment. The areas on the west and south sides of the storage shed are paved; the areas on the north and east are unpaved. Stored materials may have included oils (possibly containing PCBs), alkali metals, asbestos-containing products, beryllium alloys, potassium dichromate, lead bricks, lead shot, and mercury (LANL 1993, 020952, p. 5-79). Because the floor of building 46-36 is belowgrade, frequent flooding of the storage shed occurs during the rainy season (LANL 1996, 054929, pp. 189–190). The surrounding area slopes north to a storm drain culvert that discharges into Cañada del Buey.

4.2.30.2 Previous Investigations

In 2010, eight samples (four soil and four tuff) were collected from four locations at SWMU 46-006(f). Previously sampled locations are shown in Figure 4.2-7. Table 4.2-62 presents the samples collected and analyses requested for SWMU 46-006(f). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-006(f) consisted of the following activities in 2010:

- Soil and tuff samples were collected from two locations next to the storage area (locations 46-611737 and 46-611738) from two depth intervals: 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from two locations downgradient of the storage area (locations 46-611739 and 46-611740) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total

cyanide, perchlorate, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 195–196), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-006(f), except for the vertical extent of chromium at location 46-611739 (Plate 20).

4.2.30.3 Proposed Sampling at SWMU 46-006(f)

Shallow subsurface samples will be collected at one previously sampled location (46-611739), extending the depth at this location to define the vertical extent of chromium. Samples from location 46-611739 will be analyzed for chromium.

The proposed sampling and analyses at SWMU 46-006(f) are presented in Table 4.2-63, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.31 SWMU 46-007, Area of Potential Soil Contamination

4.2.31.1 Site Description and Operational History

SWMU 46-007 is an area of potential soil contamination associated with a partially paved ditch on the south and southeast sides of building 46-1 at TA-46 (Figure 4.2-7). The ditch drains north into a storm drain culvert that discharges into Cañada del Buey. The ditch also received effluent from the SWMU 46-004(s) outfall that previously discharged to the south side of building 46-1. The drainage path has been altered several times to accommodate construction projects at TA-46. During the late 1950s and early 1960s, the ditch was used to clean equipment from a cesium-plasma diode operation using butanol and kerosene. The ditch also received copper-containing material from heat-pipe research, and green staining was noted on outcropping tuff during early site visits. This SWMU may also have received a variety of chlorinated and hydrocarbon solvents. Mercury was known to have spilled in the south bay of building 46-1, and some floor drains from this area discharged to the SWMU 46-004(s) outfall, which emptied into the ditch (LANL 1993, 020952, pp. 5-79–5-80).

4.2.31.2 Previous Investigations

In 2010, 10 samples (5 soil and 5 tuff) were collected from five locations at SWMU 46-007. Previously sampled locations are shown in Figure 4.2-7. Table 4.2-64 presents the samples collected and analyses requested for SWMU 46-007. The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-007 consisted of the following activities in 2010:

- Soil and tuff samples were collected from five locations in the drainage ditch south of building 46-1 (locations 46-611754 through 46-611758) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, cesium, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 202–204), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-007, except for the vertical extent of cesium, chromium, copper, lead, mercury,

Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, cesium-137, and plutonium-239/240.

The vertical extent of chromium is not defined at locations 46-611754 and 46-611757 (Plate 20). The vertical extent of copper, lead, mercury, and cesium is not defined at location 46-611755 (Plate 20). The vertical extent of Aroclor-1254, Aroclor-1260, fluoranthene, phenanthrene, and pyrene is not defined at location 46-611755 (Plate 15). The vertical extent of benzo(a)pyrene and benzo(b)fluoranthene is not defined at locations 46-611755 and 46-611757 (Plate 15). The vertical extent of cesium-137 and plutonium-239/240 is not defined at location 46-611755 (Plate 23).

4.2.31.3 Proposed Sampling at SWMU 46-007

Shallow subsurface samples will be collected at three previously sampled locations (46-611754, 46-611755, and 46-611757), extending the depth at these locations to define the vertical extent of cesium, chromium, copper, lead, mercury, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, cesium-137, and plutonium-239/240. Samples from location 46-611754 will be analyzed for chromium. Samples from location 46-611755 will be analyzed for copper, lead, mercury, cesium, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, PCBs, cesium-137, and isotopic plutonium. Samples from location 46-611757 will be analyzed for chromium, benzo(a)pyrene, and benzo(b)fluoranthene.

The investigation report states that concentrations of fluoranthene and pyrene increased with depth at location 46-611756 and that vertical extent is not defined at that location (LANL 2011, 203410, p. 204). Fluoranthene concentrations at location 46-611756 actually decreased from 0.438 mg/kg at 0.0–1.0 ft bgs to 0.0413 mg/kg at 2.0–3.0 ft bgs and pyrene concentrations decreased from 0.438 mg/kg at 0.0–1.0 ft bgs to 0.0387 mg/kg at 2.0–3.0 ft bgs (LANL 2011, 203410, pp. 446–447). Therefore, additional sampling and analysis for fluoranthene and pyrene at location 46-611756 is not necessary.

The proposed sampling and analyses at SWMU 46-007 are presented in Table 4.2-65, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.32 SWMU 46-008(a), Storage Area

4.2.32.1 Site Description and Operational History

SWMU 46-008(a) is a storage area located along the south and east sides of building 46-88 at TA-46 (Figure 4.2-2). During a 1986 site visit, drums containing nitric acid, cyclohexane, pump oil, and methanol were observed in the SWMU 46-008(a) storage area. One of the drums was leaking (LANL 1993, 020952, p. 5-80). The storage area is paved with asphalt and is currently used to store laboratory equipment and supplies. In the late 1960s and early 1970s, building 46-88 housed a structural test laboratory where pressure vessels associated with the Rover Program were tested. Starting in the mid-1970s, the building was used for process chemistry work to isolate nonradioactive isotopes of carbon, oxygen, and nitrogen (LANL 1993, 020952, p. 5-126).

4.2.32.2 Previous Investigations

In 2010, 10 soil samples were collected from five locations at SWMU 46-008(a). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-66 presents the samples collected and analyses requested for SWMU 46-008(a). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(a) consisted of the following activities in 2010:

- Soil samples were collected from five locations next to the storage area (locations 46-611338 through 46-611342) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 206–207), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(a), except for the vertical extent of TPH-DRO at locations 46-611339 and 46-611340 (Plate 11).

4.2.32.3 Proposed Sampling at SWMU 46-008(a)

Shallow subsurface samples will be collected at two previously sampled locations (46-611339 and 46-611340), extending the depth at these locations to define the vertical extent of TPH-DRO. Samples from locations 46-611339 and 46-611340 will be analyzed for TPH-DRO.

The proposed sampling and analyses at SWMU 46-008(a) are presented in Table 4.2-67, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.33 SWMU 46-008(b), Storage Area

4.2.33.1 Site Description and Operational History

SWMU 46-008(b) is a former drum storage area located on the east side of building 46-1 at TA-46 (Figure 4.2-7). The storage area was unpaved, measured approximately 20 ft × 20 ft, and sloped east to a storm drainage ditch and culvert that discharge into Cañada del Buey (LANL 1993, 020952, pp. 5-76, 5-80).

4.2.33.2 Previous Investigations

In 2010, eight samples (seven soil and one tuff) were collected from five locations at SWMU 46-008(b). Previously sampled locations are shown in Figure 4.2-7. Table 4.2-68 presents the samples collected and analyses requested for SWMU 46-008(b). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(b) consisted of the following activities in 2010:

- Soil and tuff samples were collected from four locations within and downgradient of the storage area (locations 46-611200 through 46-611203) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 209–212), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(b), except for the vertical extent of antimony, lead, selenium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene,

indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236.

The vertical extent of antimony is not defined at location 46-611202, the vertical extent of lead is not defined at location 46-611201, and the vertical extent of selenium is not defined at location 46-611200 (Plate 20).

The vertical extent of 2,4-dinitrotoluene, phenanthrene, and pyrene is not defined at location 46-611202 (Plate 15). 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, and pyrene is not defined at location 46-611203 (Plate 15).

The vertical extent of cesium-137 is not defined at location 46-611202, and the vertical extent of uranium-235/236 is not defined at location 46-611200 (Plate 23).

4.2.33.3 Proposed Sampling at SWMU 46-008(b)

Shallow subsurface samples will be collected at four previously sampled locations (46-611200 through 46-611203), extending the depth at these locations to define the vertical extent of antimony, lead, selenium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236. Samples from location 46-611200 will be analyzed for selenium and isotopic uranium. Samples from location 46-611201 will be analyzed for lead. Samples from location 46-611202 will be analyzed for antimony, 2,4-dinitrotoluene, phenanthrene, pyrene, and cesium-137. Samples from location 46-611203 will be analyzed for benzo(a)pyrene, dibenzofuran, 2-methylnaphthalene, and PAHs.

The results of the previous sampling at location 46-611203 showed benzo(a)pyrene detected above the industrial SSL (2.34 mg/kg) at 12 mg/kg in the sample from 2.0–3.0 ft bgs. Therefore, the top 5.0 ft of soil will be removed from a 2.5-ft radius around location 46-611203. Confirmation samples will be collected north, south, east and west of the location 46-611203 excavation at new locations 8b-1, 8b-2, 8b-3, and 8b-4 and analyzed for benzo(a)pyrene. Data from new locations 8b-1, 8b-2, 8b-3, and 8b-4 will confirm cleanup to the north, south, east, and west of the location 46-611203 excavation. Samples collected from deeper depths at location 46-611203 will also be analyzed for benzo(a)pyrene to confirm cleanup.

The proposed sampling and analyses at SWMU 46-008(b) are presented in Table 4.2-69, and the proposed sampling locations are shown in Figure 4.2-7.

4.2.34 SWMU 46-008(d), Storage Area

4.2.34.1 Site Description and Operational History

SWMU 46-008(d) is a paved storage area located on the south side of building 46-24 at TA-46 (Figure 4.2-2). This area stored laboratory equipment and supplies. A 1986 site visit noted two unlabeled drums of oil on the south side of building 46-24 (LANL 1990, 007513, p. 125).

4.2.34.2 Previous Investigations

In 2010, 12 samples (5 soil and 7 tuff) were collected from six locations at SWMU 46-008(d). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-70 presents the samples collected and analyses requested for SWMU 46-008(d). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(d) consisted of the following activities in 2010:

- Soil and tuff samples were collected from six locations next to the storage area (locations 46-611343 through 46-611348) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 213–216), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(d), except for the vertical extent of copper, nickel, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene.

The vertical extent of copper and nickel is not defined at location 46-611348 (Plate 3). The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene is not defined at location 46-611346 (Plate 11). The vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene and pyrene is not defined at locations 46-611346 and 46-611348 (Plate 11).

4.2.34.3 Proposed Sampling at SWMU 46-008(d)

Shallow subsurface samples will be collected at two previously sampled locations (46-611346 and 46-611348), extending the depth at these locations to define the vertical extent of copper, nickel, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. Samples from location 46-611346 will be analyzed only for 2-methylnaphthalene and PAHs. Samples from location 46-611348 will be analyzed for copper, nickel, and PAHs.

The proposed sampling and analyses at SWMU 46-008(d) are presented in Table 4.2-71, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.35 SWMU 46-008(e), Storage Area

4.2.35.1 Site Description and Operational History

SWMU 46-008(e) is an unpaved storage area located south of an office transportable (building 46-187) at TA-46 (Figure 4.2-9). The 20-ft × 35-ft area has been used for storage since the 1950s. A storage shed (structure 46-79) formerly occupied the site but was removed sometime before 1988. Four drums of what may have been waste vacuum oil were noted to be stored at the site during a 1986 site visit (LANL 1993, 020952, p. 5-81). Traces of asphalt in the soil indicate the area may have been paved previously. An office transportable (building 46-555) currently occupies the site. Drainage from the area flows east into a

storm drainage that discharges to SWSC Canyon outside the TA-46 perimeter fence (LANL 1993, 020952, p. 5-81).

4.2.35.2 Previous Investigations

In 2010, 14 samples (6 soil and 8 tuff) were collected from seven locations at SWMU 46-008(e). Previously sampled locations are shown in Figure 4.2-9. Table 4.2-72 presents the samples collected and analyses requested for SWMU 46-008(e). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(e) consisted of the following activities in 2010:

- Soil and tuff samples were collected from seven locations within, next to, and downgradient of the storage area (locations 46-611349 through 46-611355) from two depth intervals: 0.0–0.5, 0.0–0.75 ft, or 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 218–220), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(e), except for the vertical extent of calcium, chromium, and TPH-DRO.

The vertical extent of chromium is not defined at location 46-611349 (Plate 24). The vertical extent of calcium is not defined at location 46-611353 (Plate 24). The vertical extent of TPH-DRO is not defined at location 46-611354 (Plate 25).

4.2.35.3 Proposed Sampling at SWMU 46-008(e)

Shallow subsurface samples will be collected at three previously sampled locations (46-611349, 46-611353, and 46-611354), extending the depth at these locations to define the vertical extent of calcium, chromium, and TPH-DRO. Samples from location 46-611349 will be analyzed for chromium. Samples from location 46-611353 will be analyzed for calcium. Samples from location 46-611354 will be analyzed for TPH-DRO.

The proposed sampling and analyses at SWMU 46-008(e) are presented in Table 4.2-73, and the proposed sampling locations are shown in Figure 4.2-9.

4.2.36 SWMU 46-008(f), Storage Area

4.2.36.1 Site Description and Operational History

SWMU 46-008(f) is a paved storage area located next to the southeast corner of building 46-31 at TA-46 (Figure 4.2-6). During a 1986 site visit, four drums of oil, which could have been product or waste oil, were observed at this location (LANL 1993, 020952, p. 5-81).

4.2.36.2 Previous Investigations

In 2010, 14 samples (8 soil and 6 tuff) were collected from seven locations at SWMU 46-008(f). Previously sampled locations are shown in Figure 4.2-6. Table 4.2-74 presents the samples collected and analyses requested for SWMU 46-008(f). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(f) consisted of the following activities in 2010:

- Soil and tuff samples were collected from five locations within and next to the storage area (locations 46-611550 and 46-611553 through 46-611556) from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from two locations downgradient of the storage area (locations 46-611551 and 46-611552) from 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 222–224), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(f), except for the vertical extent of Aroclor-1242, TPH-DRO, and uranium-235/236.

The vertical extent of Aroclor-1242 is not defined at location 46-611551, and the vertical extent of TPH-DRO is not defined at location 46-611555 (Plate 14). The vertical extent of uranium-235/236 is not defined at location 46-611555 (Plate 19).

4.2.36.3 Proposed Sampling at SWMU 46-008(f)

The investigation report states the vertical extent of cesium-137 is defined at SWMU 46-008(f) because activities decreased with depth at location 46-611551 (LANL 2011, 203410, p. 224). However, cesium-137 was detected in one soil sample at location 46-611551 in the sample from 0.0–1.0 ft and 2.0–3.0 ft bgs at an activity of 0.0483 pCi/g. Therefore, additional sampling for cesium-137 is required to define vertical extent at location 46-611551 at SWMU 46-004(a).

Shallow subsurface samples will be collected at two previously sampled locations (46-611551 and 46-611555), extending the depth at these locations to define the vertical extent of Aroclor-1242, TPH-DRO, cesium-137, and uranium-235/236. Samples from location 46-611551 will be analyzed for PCBs and cesium-137. Samples from location 46-611555 will be analyzed for TPH-DRO and isotopic uranium.

The proposed sampling and analyses at SWMU 46-008(f) are presented in Table 4.2-75, and the proposed sampling locations are shown in Figure 4.2-6.

4.2.37 SWMU 46-008(g), Storage Area

4.2.37.1 Site Description and Operational History

SWMU 46-008(g) is an unpaved storage area located south of a laser laboratory (building 46-76) at TA-46 (Figure 4.2-2). In 1990, 20 drums containing dielectric oil were reported to be stored directly on the ground at this location (LANL 1993, 020952, p. 5-82). The site is a level area bisected by a drainage that flows east into SWSC Canyon through a storm drain culvert.

4.2.37.2 Previous Investigations

In 2010, 14 samples (13 soil and 1 tuff) were collected from seven locations at SWMU 46-008(g). Previously sampled locations are shown in Figure 4.2-2. Table 4.2-76 presents the samples collected and analyses requested for SWMU 46-008(g). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-008(g) consisted of the following activities in 2010:

- Soil and tuff samples were collected from seven locations within, next to, and downgradient of the storage area (locations 46-611746 through 46-611752) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, pesticides, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 226–228), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-008(g), except for the vertical extent of lead, 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, phenanthrene, and pyrene.

The vertical extent of lead is not defined at location 46-611746 (Plate 3). The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at location 46-611748 (Plate 11). The vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at location 46-611749 (Plate 11).

4.2.37.3 Proposed Sampling at SWMU 46-008(g)

Shallow subsurface samples will be collected at three previously sampled locations (46-611746, 46-611748, and 46-611749), extending the depth at these locations to define the vertical extent of lead, 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, phenanthrene, and pyrene. Samples from location 46-611746 will be analyzed for lead. Samples from location 46-611748 will be analyzed for PCBs. Samples from location 46-611749 will be analyzed for PAHs.

TPH-DRO analyses were inadvertently omitted during the 2010 investigation at SWMU 46-008(g). Samples will be collected from all previously sampled 2010 locations (46-611746 through 46-611752) and analyzed for TPH-DRO.

The results of the previous sampling at location 46-611752 showed benzo(a)pyrene to be present above the industrial SSL (2.34 mg/kg) at 3 mg/kg in the sample from 0.0–1.0 ft bgs. Therefore, the top 1 ft of soil will be removed from a 2.5-ft radius around location 46-611752. Data from the 2.0–3.0 ft bgs sample previously collected at location 46-611752 will serve as the confirmation sample at the bottom of the location 46-611752 excavation. Confirmation samples will be collected north, south, east, and west of the location 46-611752 excavation at new locations 8g-1, 8g-2, 8g-3, and 8g-4 and analyzed for benzo(a)pyrene. Data from new locations 8g-1, 8g-2, 8g-3, and 8g-4 will confirm cleanup to the north, south, east, and west of the location 46-611752 excavation.

The proposed sampling and analyses at SWMU 46-008(g) are presented in Table 4.2-77, and the proposed sampling locations are shown in Figure 4.2-2.

4.2.38 SWMU 46-009(a), Surface Disposal Area

4.2.38.1 Site Description and Operational History

SWMU 46-009(a) is a surface disposal area located at the head of SWSC Canyon near the southeastern corner of TA-46 (Figure 4.2-9). The surface disposal area covers approximately 5000 yd^2, extending from the canyon rim to the floor of SWSC Canyon. The disposal area contains a variety of material including asphalt, concrete, plywood, pipe, and other construction materials. The dates materials were disposed of at the site are not known. Aerial photographs of TA-46 taken in 1958 show the presence of the surface disposal area (LANL 1993, 020952, pp. 5-164–5-167), confirming that disposal had started by at least 1958.

4.2.38.2 Previous Investigations

In 2010, 38 samples (33 soil and 5 tuff) were collected from 16 locations at SWMU 46-009(a). Previously sampled locations are shown in Figure 4.2-9. Table 4.2-78 presents the samples collected and analyses requested for SWMU 46-009(a). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-009(a) consisted of the following activities in 2010:

- Soil and tuff samples were collected from six locations within the landfill (locations 46-610983 through 46-610988) from three depth intervals: 4.0–5.0 ft, 9.0–10.0 ft, and 14.0–15.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, total cyanide, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from ten locations downgradient of the landfill and in SWSC Canyon (locations 46-610989 through 46-610998) 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, nitrate, total cyanide, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 231–234), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-009(a), except for the vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137.

The vertical extent of nitrate is not defined at locations 46-610984 and 46-610991 (Plate 24). The vertical extent of zinc is not defined at location 46-610998 (Plate 24).

The vertical extent of Aroclor-1260 is not defined at locations 46-610987 and 46-610988 (Plate 25). The vertical extent Aroclor-1242 and Aroclor-1254 is not defined at location 46-610988 (Plate 25). The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, naphthalene, phenanthrene, and pyrene is not defined at locations 46-610990 and 46-610991 (Plate 25). The vertical extent of indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and TPH-DRO is not defined at location 46-610990 (Plate 25).

The vertical extent of cesium-137 is not defined at locations 46-610996 and 46-610997 (Plate 26).

4.2.38.3 Proposed Sampling at SWMU 46-009(a)

Shallow subsurface samples will be collected at eight previously sampled locations (46-610984, 46-610987, 46-610988, 46-610990, 46-610991, 46-610996, 46-610997, and 46-610998), extending the depth at these locations to define the vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137. Samples from location 46-610984 will be analyzed for nitrate. Samples from locations 46-610987 and 46-610988 will be analyzed for PCBs only. Samples from location 46-610990 will be analyzed for 2-methylnaphthalene, PAHs, and TPH-DRO. Samples from location 46-610991 will be analyzed for nitrate and PAHs. Samples from locations 46-610996 and 46-610997 will be analyzed for cesium-137. Samples from location 46-610998 will be analyzed for zinc. The steep slope at locations 46-610984, 46-610987, and 46-610988 prevents access by a drill rig; therefore, sample collection is limited to one depth at these locations.

The proposed sampling and analyses at SWMU 46-009(a) are presented in Table 4.2-79, and the proposed sampling locations are shown in Figure 4.2-9.

4.2.39 SWMU 46-009(b), Surface Disposal Area

4.2.39.1 Site Description and Operational History

SWMU 46-009(b) is a surface disposal area located approximately 325 ft southeast of building 46-77 at TA-46 (Figures 4.2-1 and 4.2-10). The surface disposal area received discarded sand from the sand filters associated with the SWMU 46-002 surface impoundment system. The sand filters operated from 1973 to 1990. During operation, the top 6 in. of sand and sludge was removed from the filters every 2 to 3 mo and disposed of at Material Disposal Area G at TA-54. The sand beneath the top layer was pushed over the side of the canyon, and the filters were replenished with clean sand (LANL 1993, 020952, p. 5-166). In 1990, the sand filters were taken offline (LANL 1993, 020952, p. 5-56).

4.2.39.2 Previous Investigations

In 2010, 32 samples (31 soil and 1 tuff) were collected from 16 locations at SWMU 46-009(b). Previously sampled locations are shown in Figures 4.2-1 and 4.2-10. Table 4.2-80 presents the samples collected and analyses requested for SWMU 46-009(b). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-009(b) consisted of the following activities in 2010:

- Soil samples were collected from six locations within and next to the former surface disposal area (locations 46-610999 through 46-611004) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil and tuff samples were collected from 10 locations downgradient of the former surface disposal area (locations 46-611005 through 46-611014) from two depth intervals: 0.0–0.5 ft 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, total cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 236–237), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-009(b), except for the vertical extent of zinc, cesium-137, and plutonium-239/240.

The vertical extent of zinc is not defined at locations 46-611007 and 46-611008 (Plate 1). The vertical extent of cesium-137 and plutonium-239/240 is not defined at location 46-611010 (Plate 27).

4.2.39.3 Proposed Sampling at SWMU 46-009(b)

Shallow subsurface samples will be collected at three previously sampled locations (46-611007, 46-611008, and 46-611010), extending the depth at these locations to define the vertical extent of zinc, cesium-137, and plutonium-239/240. Samples from locations 46-611007 and 46-611008 will be analyzed for zinc. Samples from location 46-611010 will be analyzed for cesium-137 and isotopic plutonium only.

The proposed sampling and analyses at SWMU 46-009(b) are presented in Table 4.2-81, and the proposed sampling locations are shown in Figure 4.2-10.

4.2.40 SWMU 46-010(d), Storage Area

4.2.40.1 Site Description and Operational History

SWMU 46-010(d) is a partially paved storage area located on the south side of the Laser Isotope Support Facility (building 46-41) at TA-46 (Figure 4.2-9). During a 1986 site visit, unmarked, rusty drums were observed at this 10-ft × 25-ft area (LANL 1993, 020952, p. 5-82). After 1986, the area was operated as a satellite accumulation area.

4.2.40.2 Previous Investigations

In 2010, 10 soil samples were collected from five locations at SWMU 46-010(d). Previously sampled locations are shown in Figure 4.2-9. Table 4.2-82 presents the samples collected and analyses requested for SWMU 46-010(d). The sampling results are presented in the approved investigation report (LANL 2011, 203410; NMED 2011, 203617).

Sampling at SWMU 46-010(d) consisted of the following activities in 2010:

- Soil samples were collected from two locations next to the storage area (locations 46-611463 and 46-611464) from two depth intervals: 0.0–1.0 ft and 3.0–4.0 ft beneath the asphalt. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.
- Soil samples were collected from three locations downgradient of the storage area (locations 46-611465 through 46-611467) from two depth intervals: 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, total cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

Based on the sampling results presented in the investigation report (LANL 2011, 203410, pp. 239–241), the lateral and vertical extent of all inorganic chemicals, organic chemicals, and radionuclides are defined at SWMU 46-010(d), except for the vertical extent of acenaphthene, anthracene, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene at location 46-611463 (Plate 25).

4.2.40.3 Proposed Sampling at SWMU 46-010(d)

Shallow subsurface samples will be collected at one previously sampled location (46-611463), extending the depth at this location to define the vertical extent of acenaphthene, anthracene, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene. Samples from location 46-611463 will be analyzed for 2-methylnaphthalene and PAHs.

The proposed sampling and analyses at SWMU 46-010(d) are presented in Table 4.2-83, and the proposed sampling locations are shown in Figure 4.2-9.

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/wes.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 and sediment accumulation areas). The coordinates of 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 determining sampling locations will be conducted in accordance with the latest version of 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 SOP-5028.

5.3 Surface and Shallow Subsurface Sampling

Soil, sediment, and tuff 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. The deepest sample collected at every location shall be from undisturbed soil or unweathered tuff; sample collection depths will be adjusted accordingly in the field and recorded on sample collection logs (SCLs).

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. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is typically placed in a clean stainless-steel bowl for transfer into various sample containers.

5.3.2 Hand Auger

Hand augers may be used to advance 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. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is typically placed in a clean stainless-steel bowl for transfer into various sample containers.

5.4 Subsurface Sampling

Subsurface sampling is proposed to include surface soil and fill, sediment, and tuff. Any adjustments will be noted in 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. The deepest sample collected at every location shall be from undisturbed soil or unweathered tuff; sample collection depths will be adjusted accordingly in the field and recorded on SCLs.

Samples for VOC analysis will be collected immediately upon retrieval of the split-spoon core barrel or hand auger to minimize the loss of VOCs during the sample-collection process. The remaining material will then be field screened for radioactivity and visually inspected. After collection of VOC samples and field screening, the remaining sample material will be placed in a stainless-steel bowl, and the material broken, if necessary, with a decontaminated rock hammer or stainless-steel spoon to allow material to fit into the sample containers.

A stainless-steel scoop and bowl will be used to transfer samples to sterile sample collection jars or bags for transport to the Sample Management Office (SMO). The sample collection tools will be decontaminated immediately before each sample is collected in accordance with an approved subcontractor procedure technically equivalent to SOP-5061, Field Decontamination of Equipment.

5.4.1 Hollow-Stem Auger

A hollow-stem auger may be used to drill holes deeper than approximately 15 ft or to drill 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; 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.

If samples are to be collected for VOC analysis, the sampler will be lined with brass sleeves. Immediately upon retrieval of the sampler, it will be opened and a sleeve from the desired depth interval will be collected for VOC analysis. The ends of the sleeve will immediately be covered with Teflon film and capped with plastic caps. Tape will then be used to seal the ends of the cap to the sleeve. Material from the remaining sleeves will then be field screened, visually inspected, and placed in a stainless-steel bowl. Samples for the remaining analysis will then be transferred to appropriate sample containers, depending upon the analytical method requirement.

5.4.2 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 or advanced by methods other than a drill rig) 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 Cleanup Activities

SWMUs 46-004(b2), 46-008(b), and 46-008(g) and AOC 04-004 are proposed for remediation under this Phase II investigation work plan. Excavation of waste, contaminated media, waste disposition, and confirmation sampling will be completed at these sites. This section summarizes proposed remediation activities. The general sequence of activities for waste excavation, transportation, disposal, and confirmation sampling is summarized below. Specific details are provided for each site in section 4.

5.5.1 Removal of Contaminated Soil

The general sequence of soil-removal activities is as follows.

- Mobilization
    - ❖ Assemble construction documents
    - ❖ Conduct construction readiness assessment
    - ❖ Conduct preconstruction meeting
    - ❖ Construct access roads
    - ❖ Construct staging area
    - ❖ Install temporary field trailers
    - ❖ Determine boundaries of contamination after surveying and staking coordinates of the area to be excavated, as identified in this Phase II investigation work plan.
    - ❖ Mobilize heavy equipment to site
    - ❖ Identify underground utilities
- Site preparation
    - ❖ Install fencing
    - ❖ Install stormwater controls
    - ❖ Abandon/relocate utilities
    - ❖ Conduct preexcavation survey
- Removal of contaminated soil
    - ❖ Excavate contaminated soil
    - ❖ Stockpile and load rolloff container
    - ❖ Survey boundaries of excavation
    - ❖ Perform confirmation sampling
    - ❖ Characterize for dispositioning
    - ❖ Establish subgrade and conduct survey
    - ❖ Transport to off-site disposal facility

- Backfill
    - ❖ Backfill and compact
    - ❖ Vegetate surface
    - ❖ Survey finished surface
- Demobilize

5.5.2 Waste Management and Disposal

Management of all investigation waste, including waste generated during cleanup, is described in Appendix B.

5.5.3 Confirmation Sampling

Confirmation sampling will be performed at all remediated sites (section 4).

5.6 Chain of Custody and Sample Collection Logs

The collection, screening, and transport of samples will be documented on standard forms generated by the 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.

5.7 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.

5.7.1 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. of 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.

5.7.2 Organic Vapor Field Screening

Based on 2010 investigation results, significant VOC contamination is not expected to be encountered, and screening will be conducted primarily for health and safety purposes.

Screening will be conducted using a PID capable of measuring quantities as low as 1.0 ppm. Vapor screening of soil, sediment, and subsurface core will be conducted using a PID equipped with an 11.7 electronvolt lamp. All samples will be screened for organic vapors 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 and Logbook Documentation for Environmental Directorate Technical and Field Activities.

5.8 Quality Assurance/Quality Control Samples

Quality assurance (QA)/quality control (QC) 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 samples for VOC analysis are collected.

5.9 Laboratory Analytical Methods

The analytical suites for laboratory analyses and the specific analytical methods to be used are summarized in Table 5.9-1. 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.

5.10 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 fieldwork is conducted.

5.11 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.

5.12 IDW

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 04-003(a), 46-003(b), 46-003(c), 46-003(e), 46-004(a2), 46-004(b), 46-004(c2), 46-004(d2), 46-004(g), 46-004(h), 46-004(f), 46-004(q), 46-004(s), 46-004(t), 46-004(u), 46004(v), 46-004(x), 46004(y), 46-004(z), 46-006(d), 46-006(f), 46-008(f), 46-008(g), and 46-009(a) and AOCs 04-004 and 46-004(e2) are subject to the stormwater monitoring requirements of the Laboratory's NPDES individual permit for stormwater discharges from SWMUs and AOCs. Stormwater discharges from these 26 sites are monitored using nine site monitoring areas and monitoring results are reported to EPA annually.

7.0 SCHEDULE

Preparation for investigation activities is scheduled to start by January 2014. Fieldwork is expected to start in March 2014 and be completed by July 2014. A submittal date of no later than September 30, 2014, 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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LANL (Los Alamos National Laboratory), May 18, 1993. "Drain Modifications, Mech: Removal Plumbing Plan, Bldg. 31, TA-46," Engineering Drawing C46364, sheet number 4 of 11, Los Alamos, New Mexico. (LANL 1993, 101823)

LANL (Los Alamos National Laboratory), August 1993. "RFI Work Plan for Operable Unit 1140," Los Alamos National Laboratory document LA-UR-93-1940, Los Alamos, New Mexico. (LANL 1993, 020952)

LANL (Los Alamos National Laboratory), April 23, 1996. "Utility Record Drawings, Sanitary Sewer System, TA-46," Engineering Drawing AB584, sheet number 4 of 6, Los Alamos, New Mexico. (LANL 1996, 101813)

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LANL (Los Alamos National Laboratory), June 1996. "RFI Report for Potential Release Sites in TA-46, 46-003(h), 46-004(b), 46-004(g), 46-004(h), 46-004(m), 46-004(q), 46-004(s), 46-004(u), 46-004(v), 46-004(x), 46-004(y), 46-004(z), 46-004(a2), 46-004(b2), 46-004(c2), 46-004(d2), 46-004(e2), 46-004(f2), 46-006(a), 46-006(b), 46-006(c), 46-006(d), 46-006(f), 46-006(g), 46-007, 46-008(b), 46-010(d), C-46-002, C-46-003," Los Alamos National Laboratory document LA-UR-96-1957, Los Alamos, New Mexico. (LANL 1996, 054929)

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LANL (Los Alamos National Laboratory), May 25, 2008. "Structure Searches for 46-86 and 46-87," online search results from the MOADS internal database at Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 101882)

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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.

Legend Item	Data Source
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.

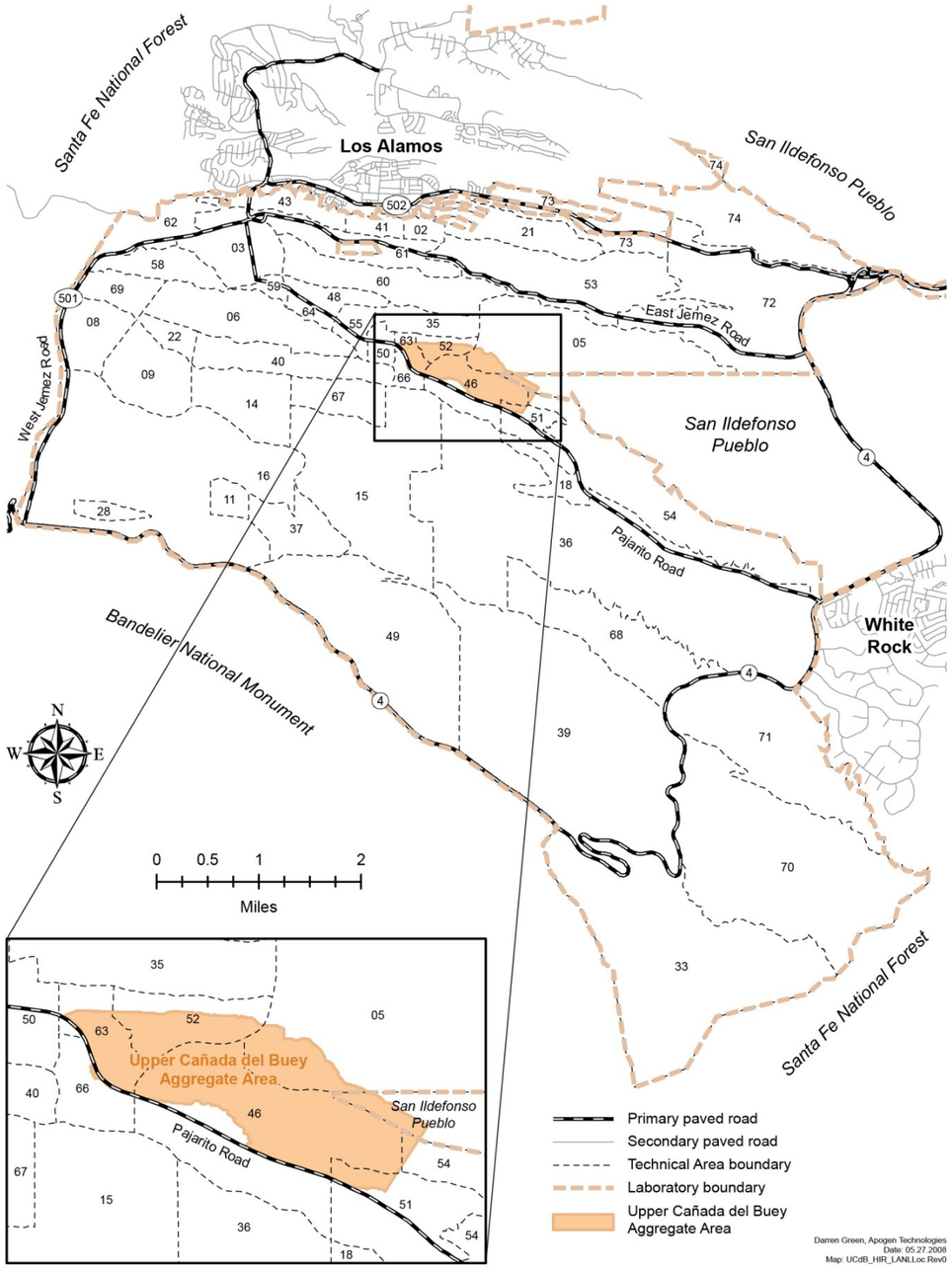

Figure 1.0-1 Location of Upper Cañada del Buey Aggregate Area with respect to Laboratory TAs

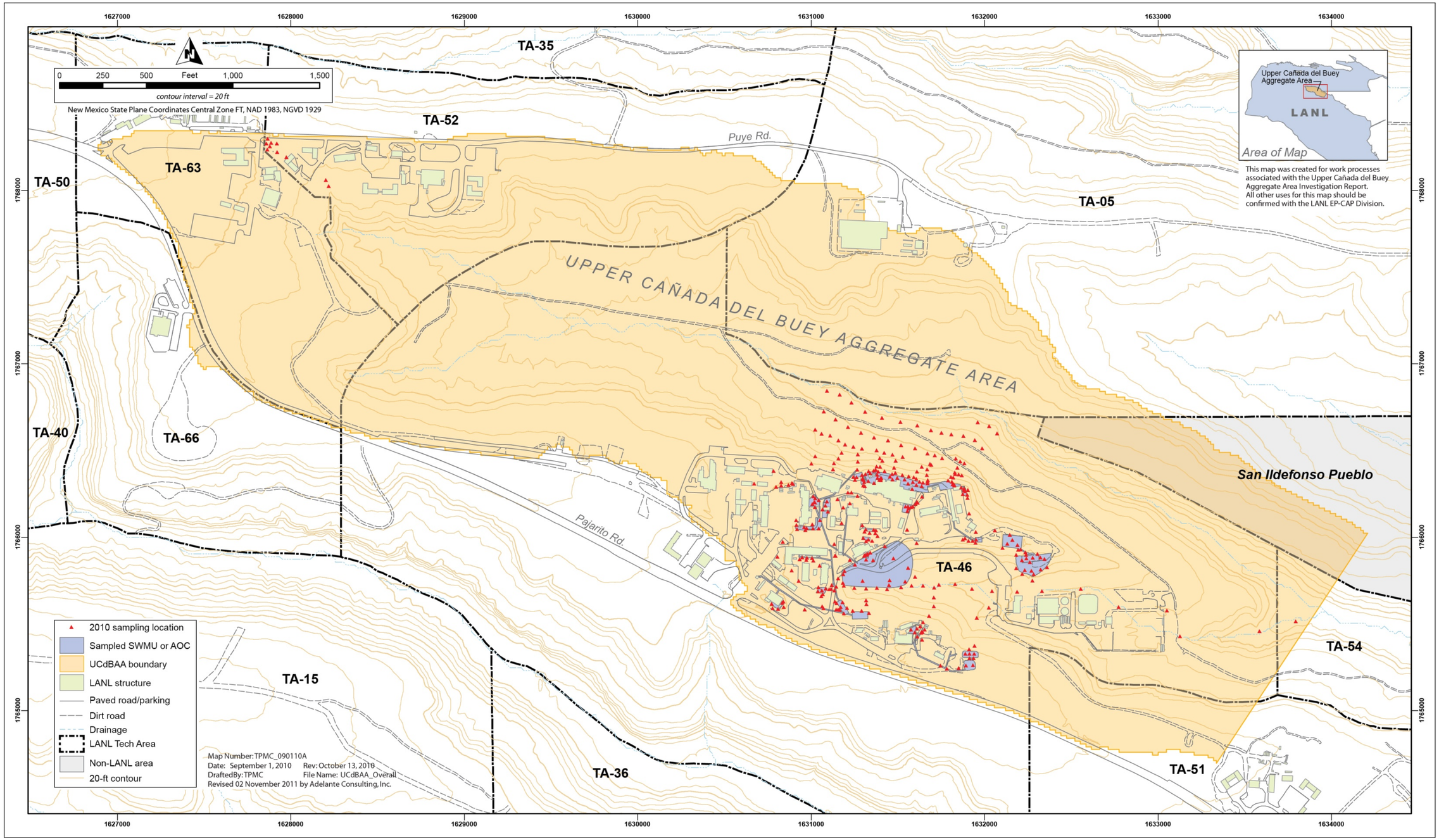

Figure 1.0-2 Location of Upper Cañada del Buey Aggregate Area and surrounding landholdings

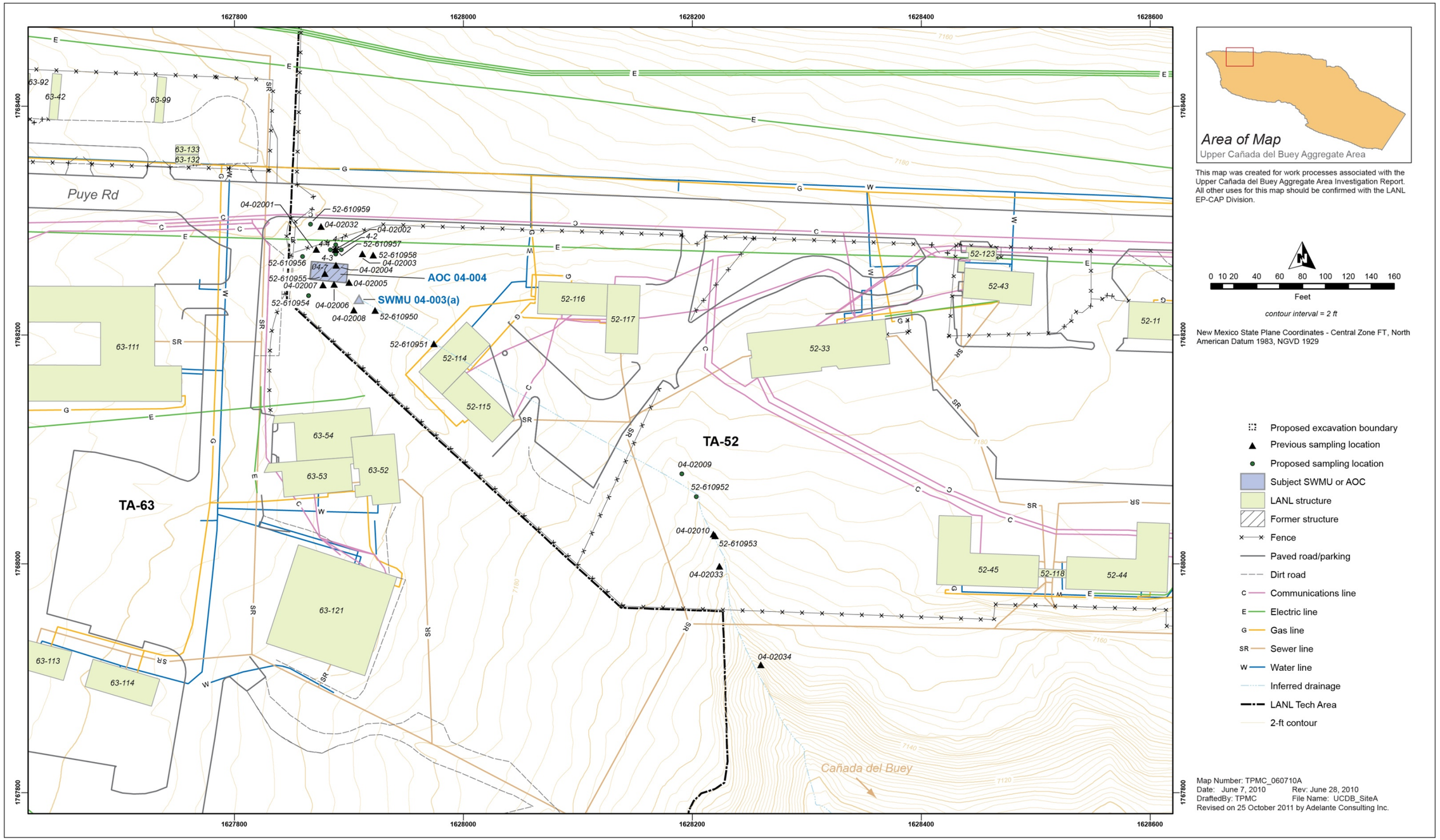

Figure 4.1-1 Site map with existing and proposed sampling locations at SWMU 04-003(a) and AOC 04-004

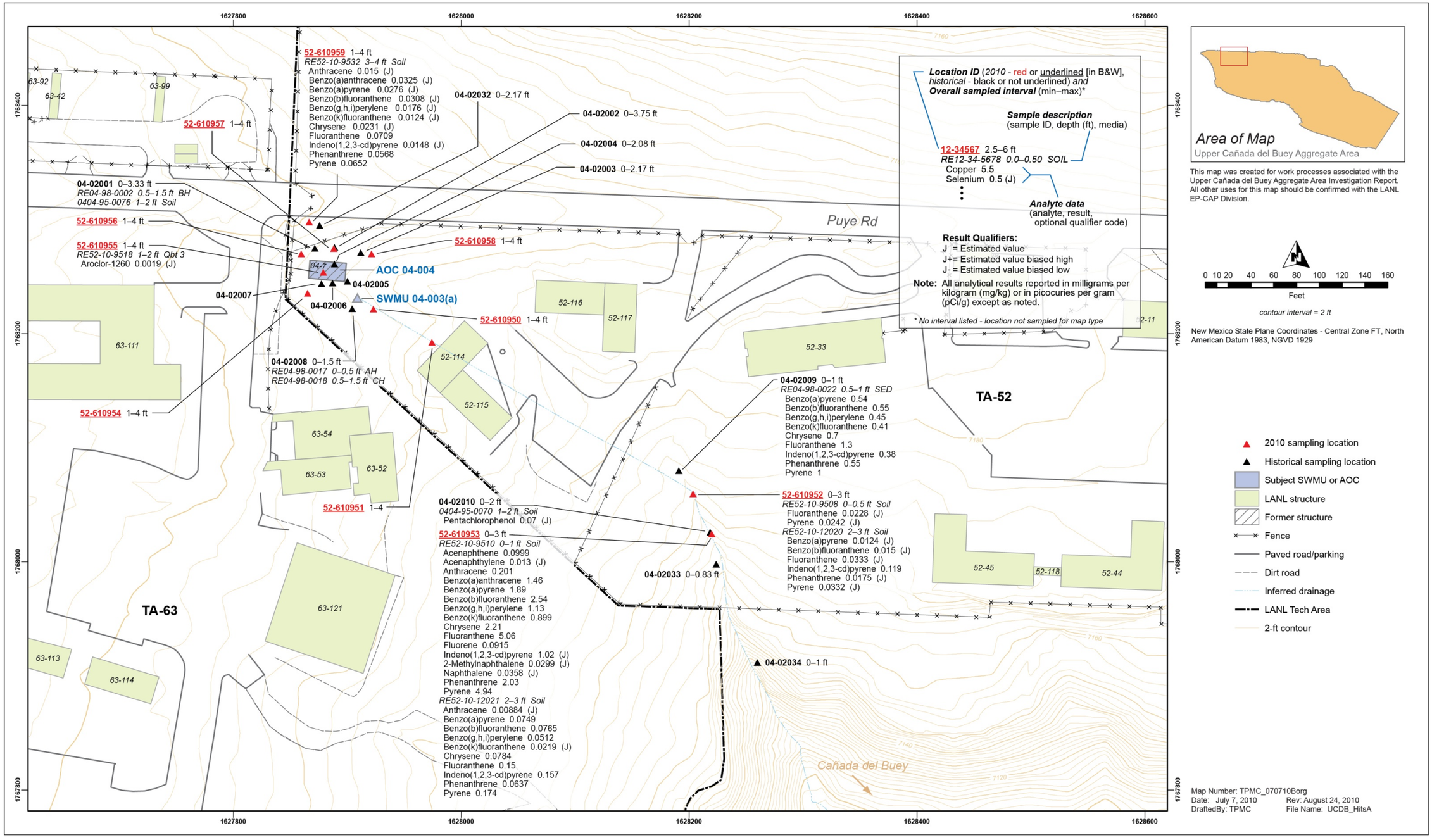

Figure 4.1-2 Organic chemical concentrations detected at SWMU 04-003(a)

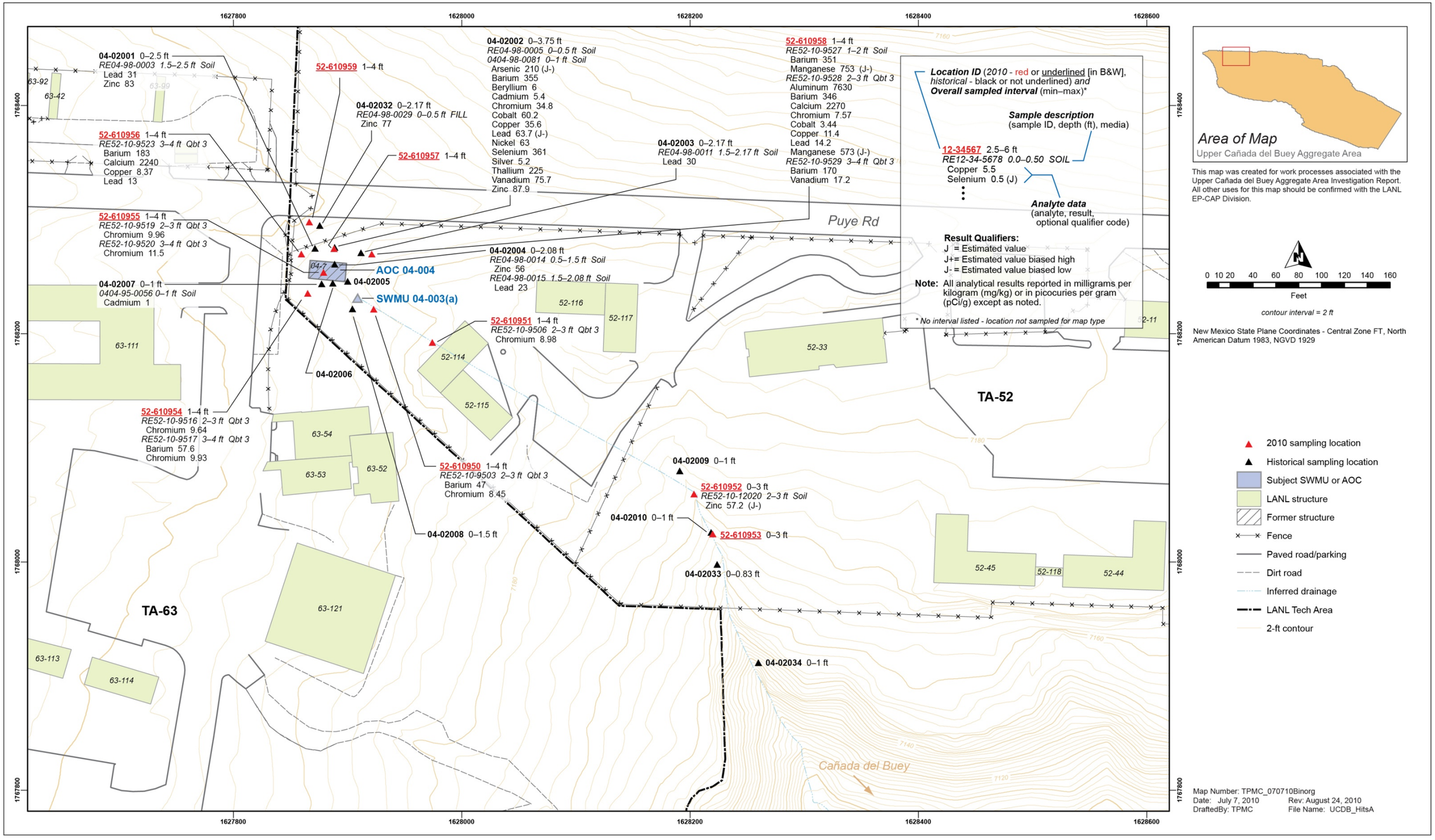

Figure 4.1-3 Inorganic chemical concentrations detected or detected above BVs at AOC 04-004

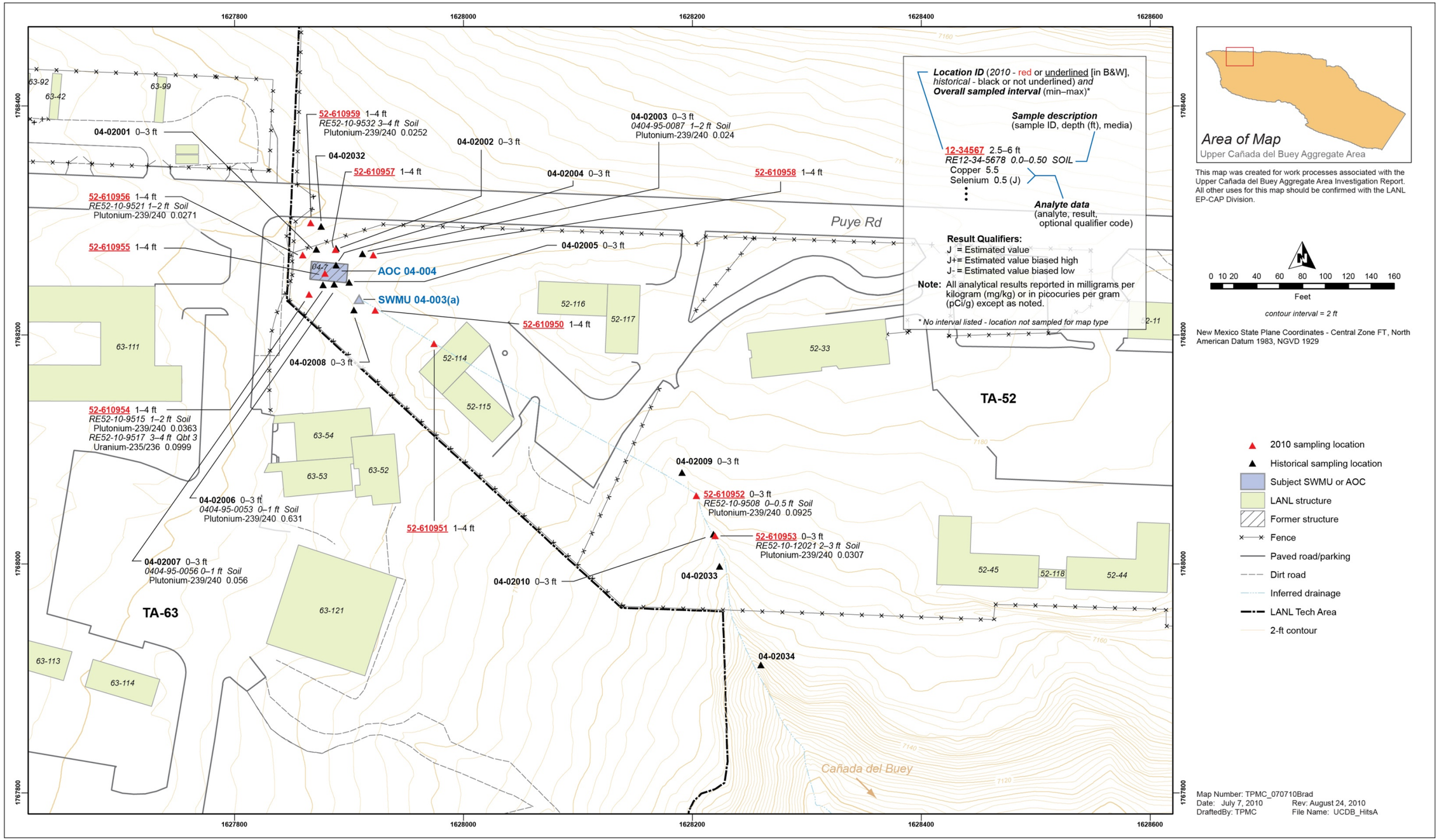

Figure 4.1-4 Radionuclides detected or detected above BVs/FVs at AOC 04-004

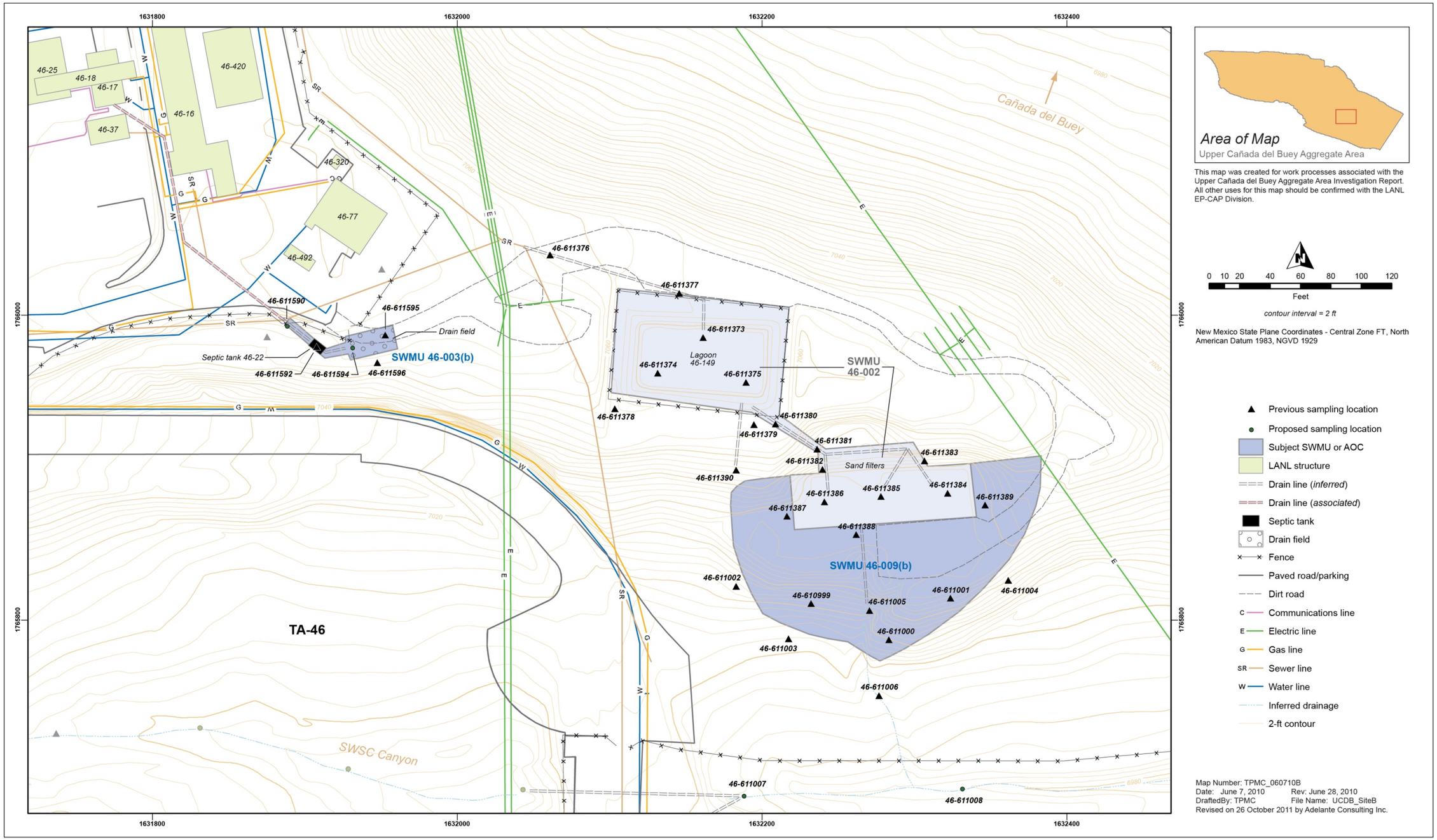

Figure 4.2-1 Site map with existing and proposed sampling locations at SWMUs 46-003(b) and 46-009(b)

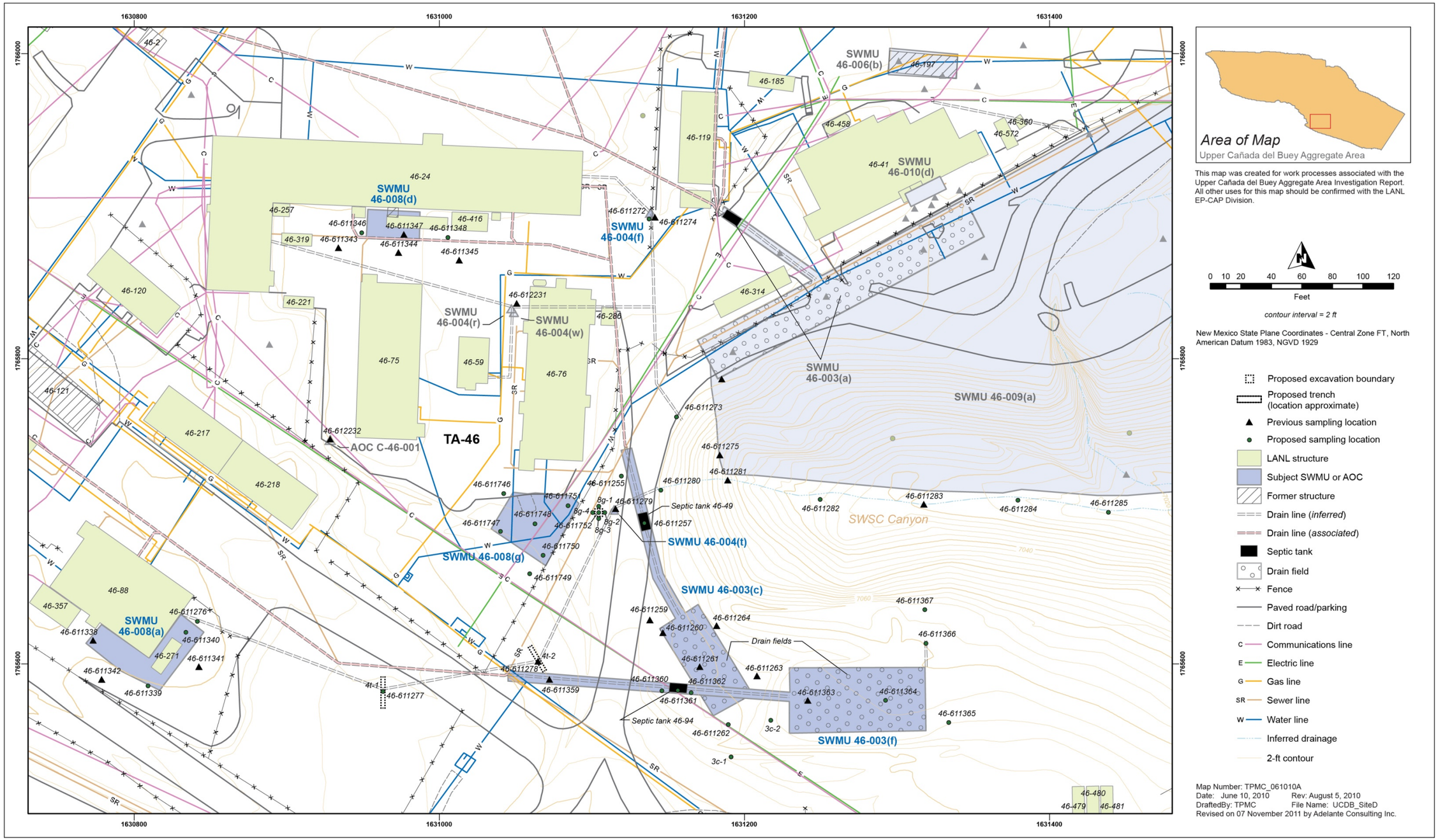

Figure 4.2-2 Site map with existing and proposed sampling locations at SWMUs 46-003(c), 46-003(f), 46-004(f), 46-004(t), 46-008(a), 46-008(d), and 46-008(g)

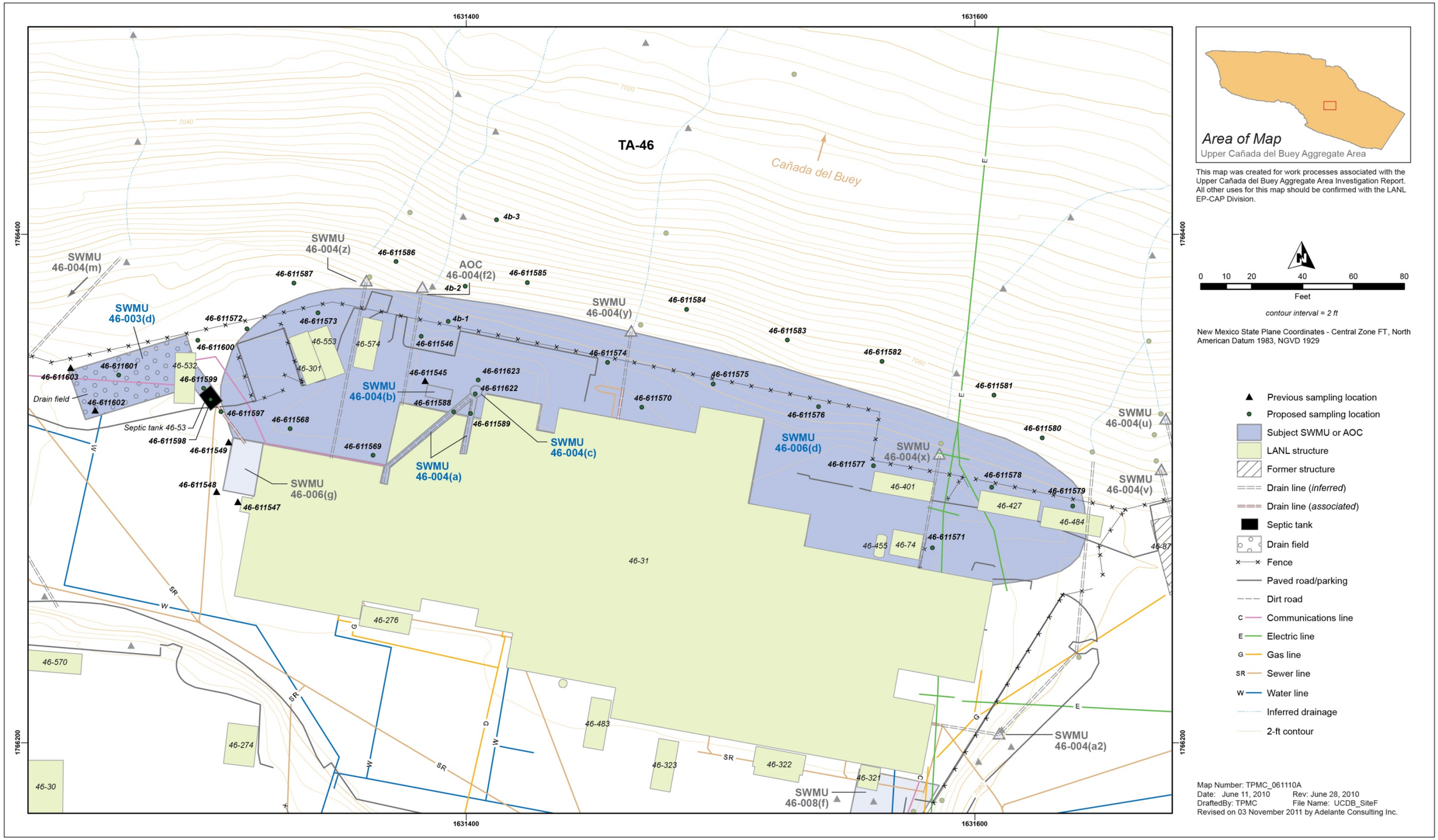

Figure 4.2-3 Site map with existing and proposed sampling locations at SWMUs 46-003(d), 46-004(a), 46-004(b), 46-004(c), and 46-006(d)

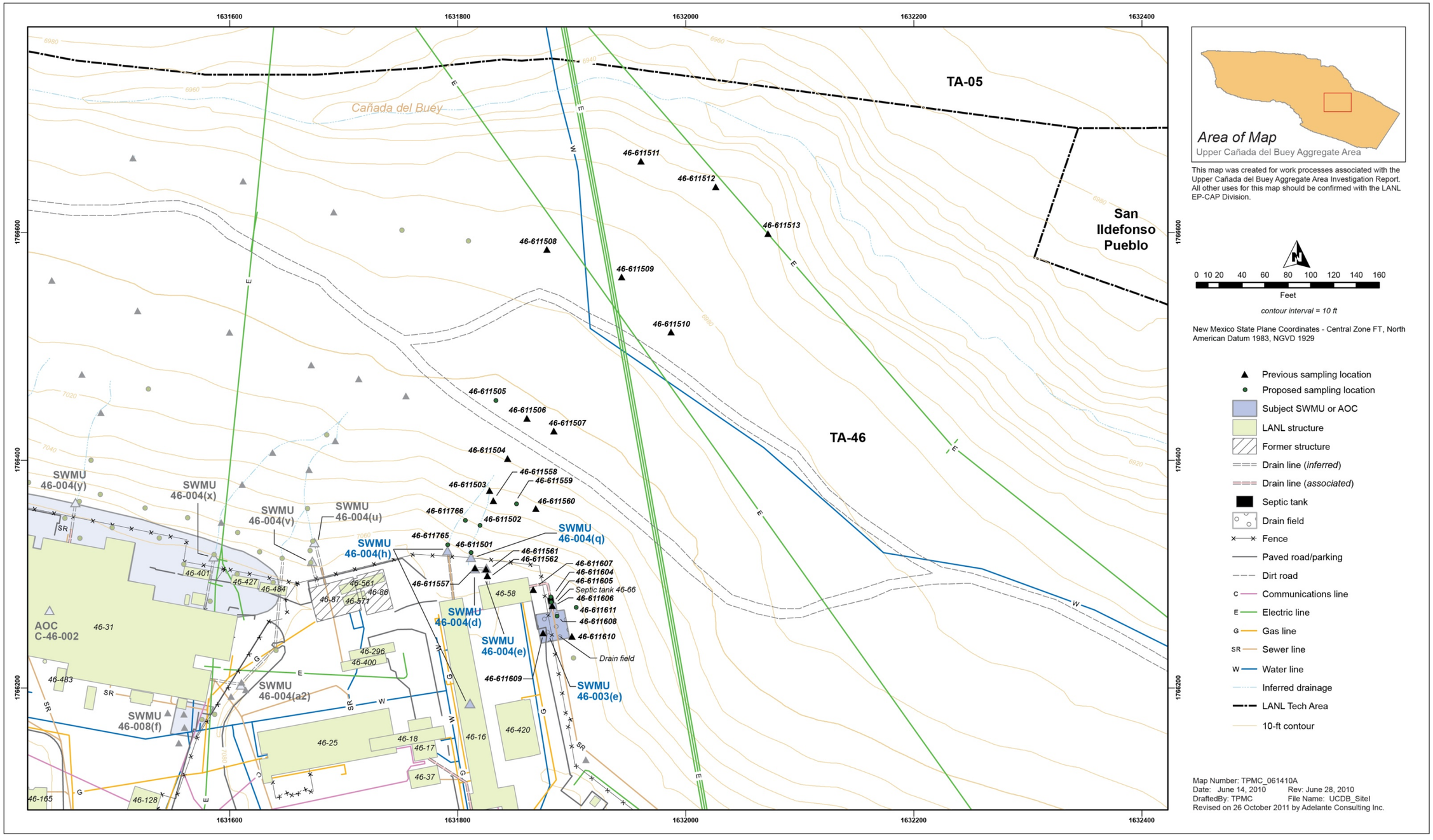

Figure 4.2-4 Site map with existing and proposed sampling locations at SWMUs 46-003(e), 46-004(d), 46-004(e), 46-004(h), and 46-004(q)

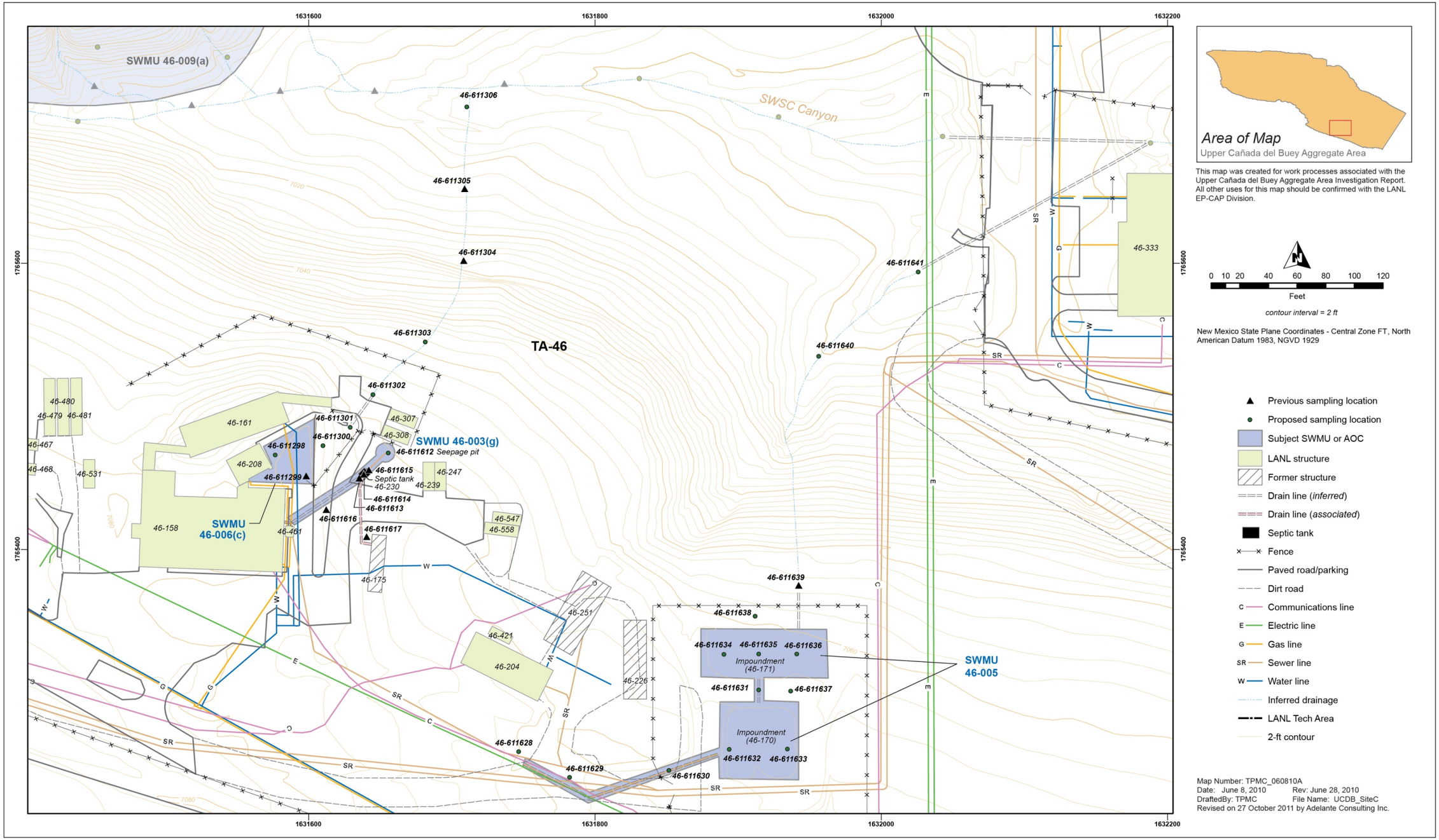

Figure 4.2-5 Site map with existing and proposed sampling locations at SWMUs 46-003(g), 46-005, and 46-006(c)

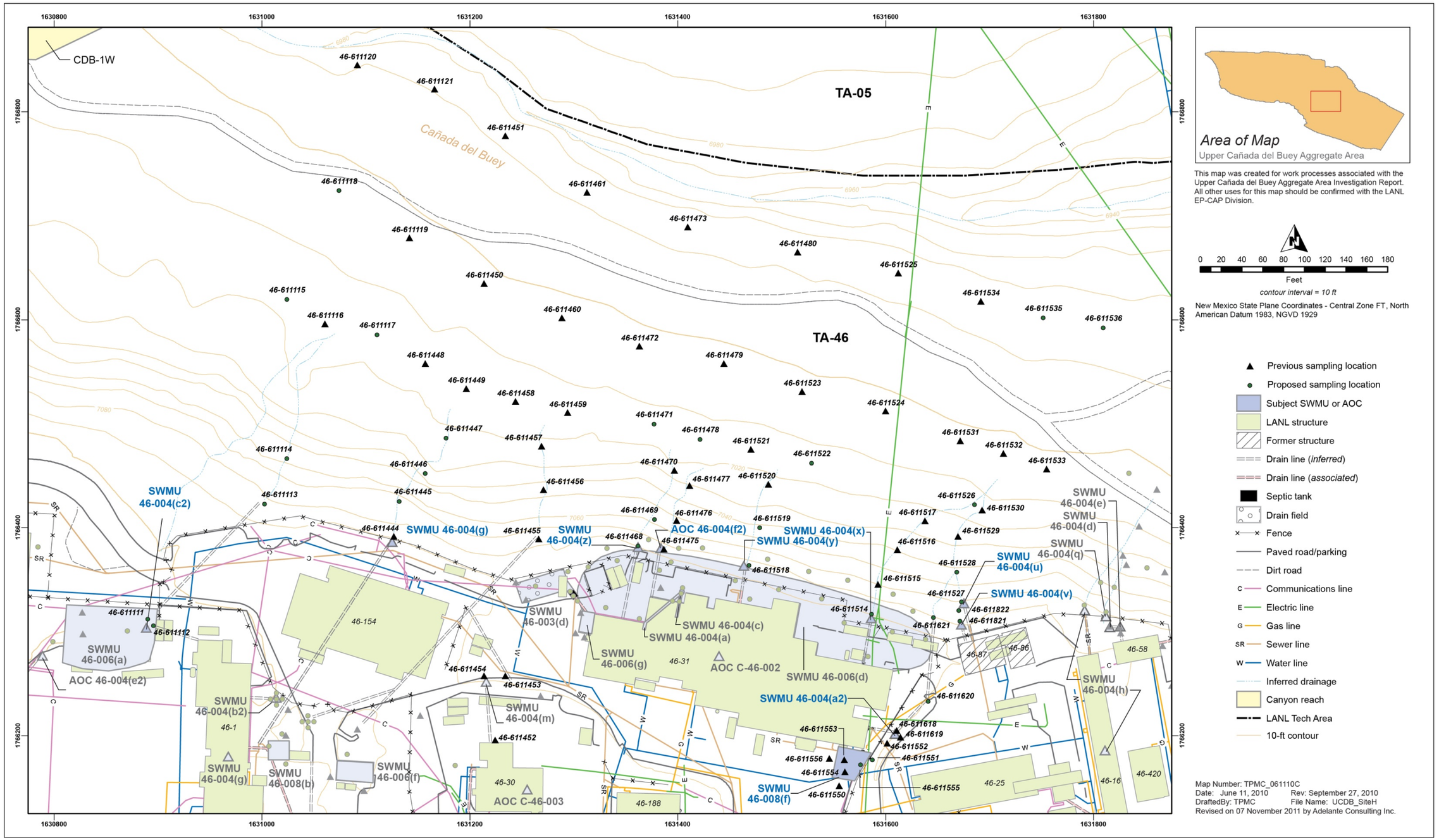

Figure 4.2-6 Site map with existing and proposed sampling locations at SWMUs 46-004(a2), 46-004(c2), 46-004(g), 46-004(u), 46-004(v), 46-004(x),46-004(y), 46-004(z), and 46-008(f) and AOC 46-004(f2)

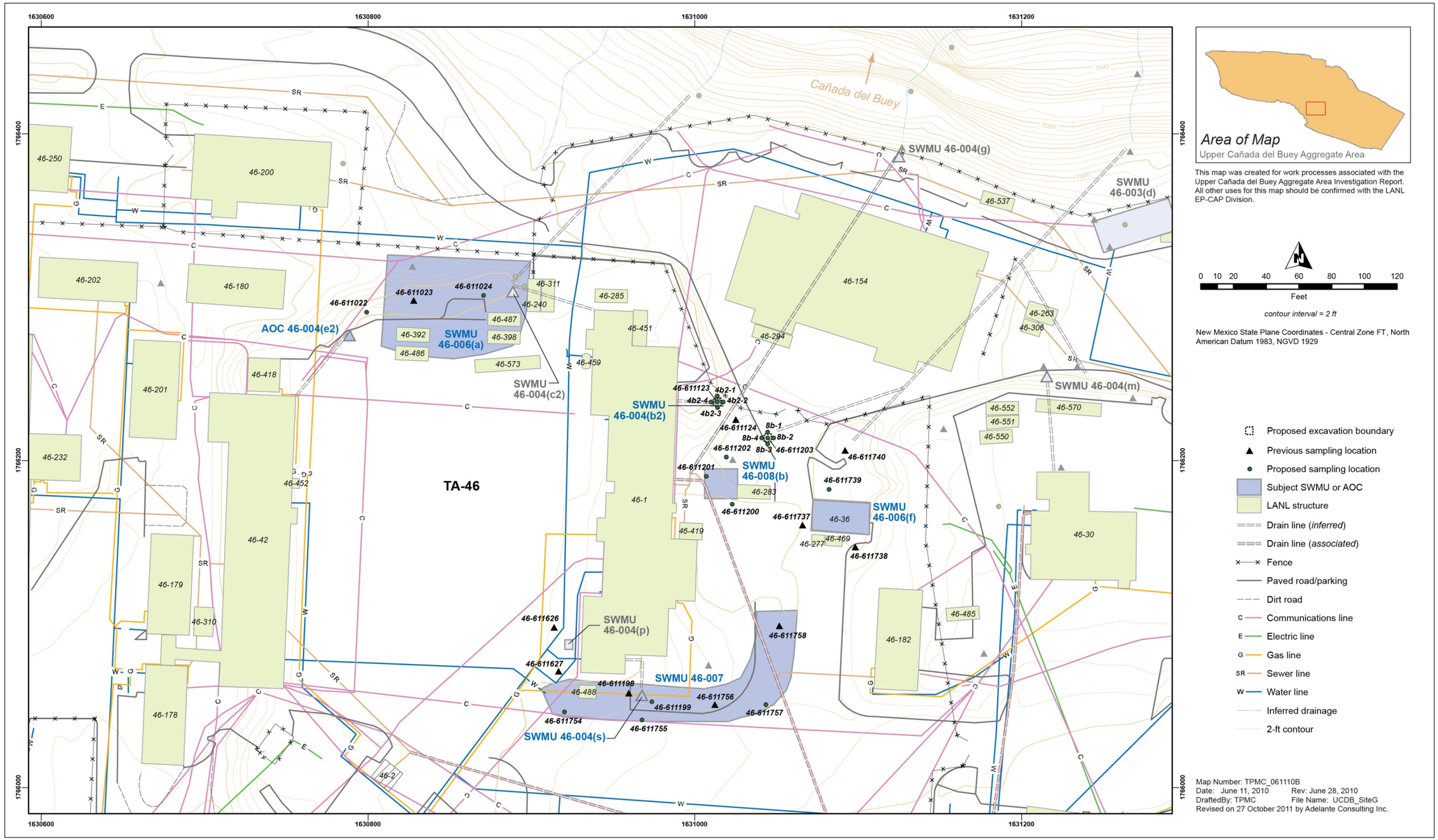

Figure 4.2-7 Site map with existing and proposed sampling locations at SWMUs 46-004(b2), 46-004(e2), 46-004(s), 46-006(a), 46-006(f), 46-007, and 46-008(b)

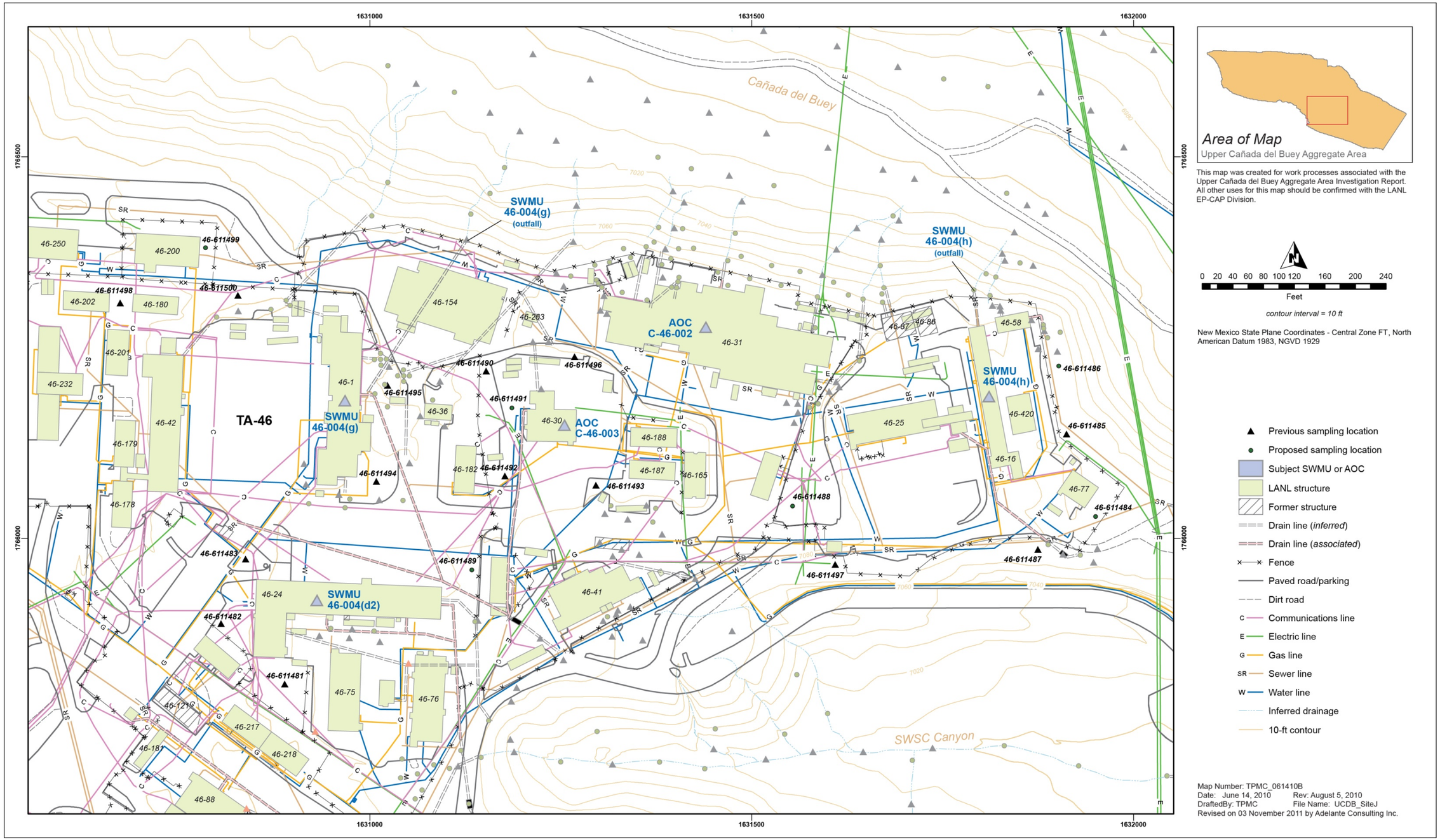

Figure 4.2-8 Site map with existing and proposed sampling locations at Consolidated Unit 46-004(d2)-99

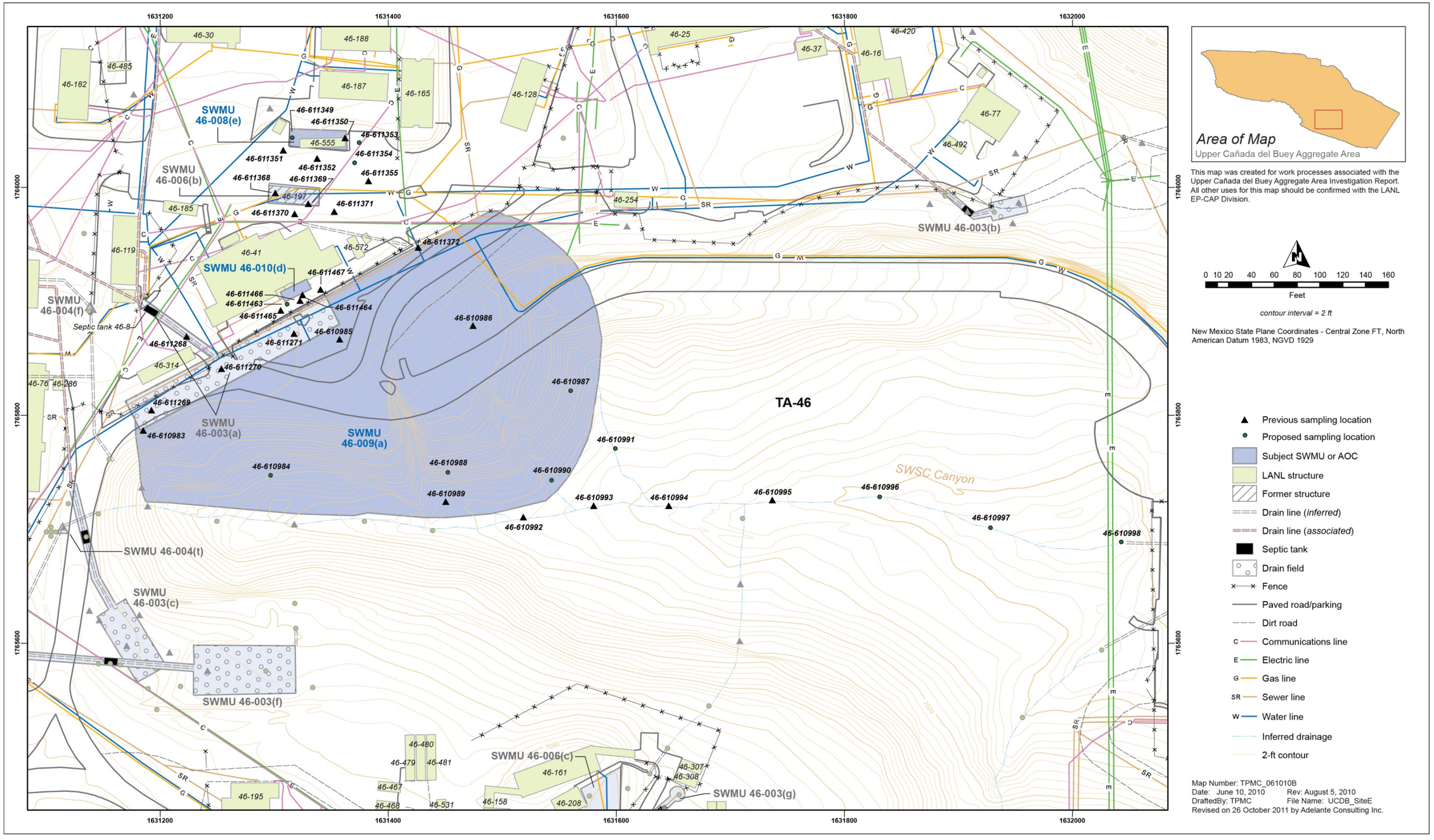

Figure 4.2-9 Site map with existing and proposed sampling locations at SWMUs 46-008(e), 46-009(a), and 46-010(d)

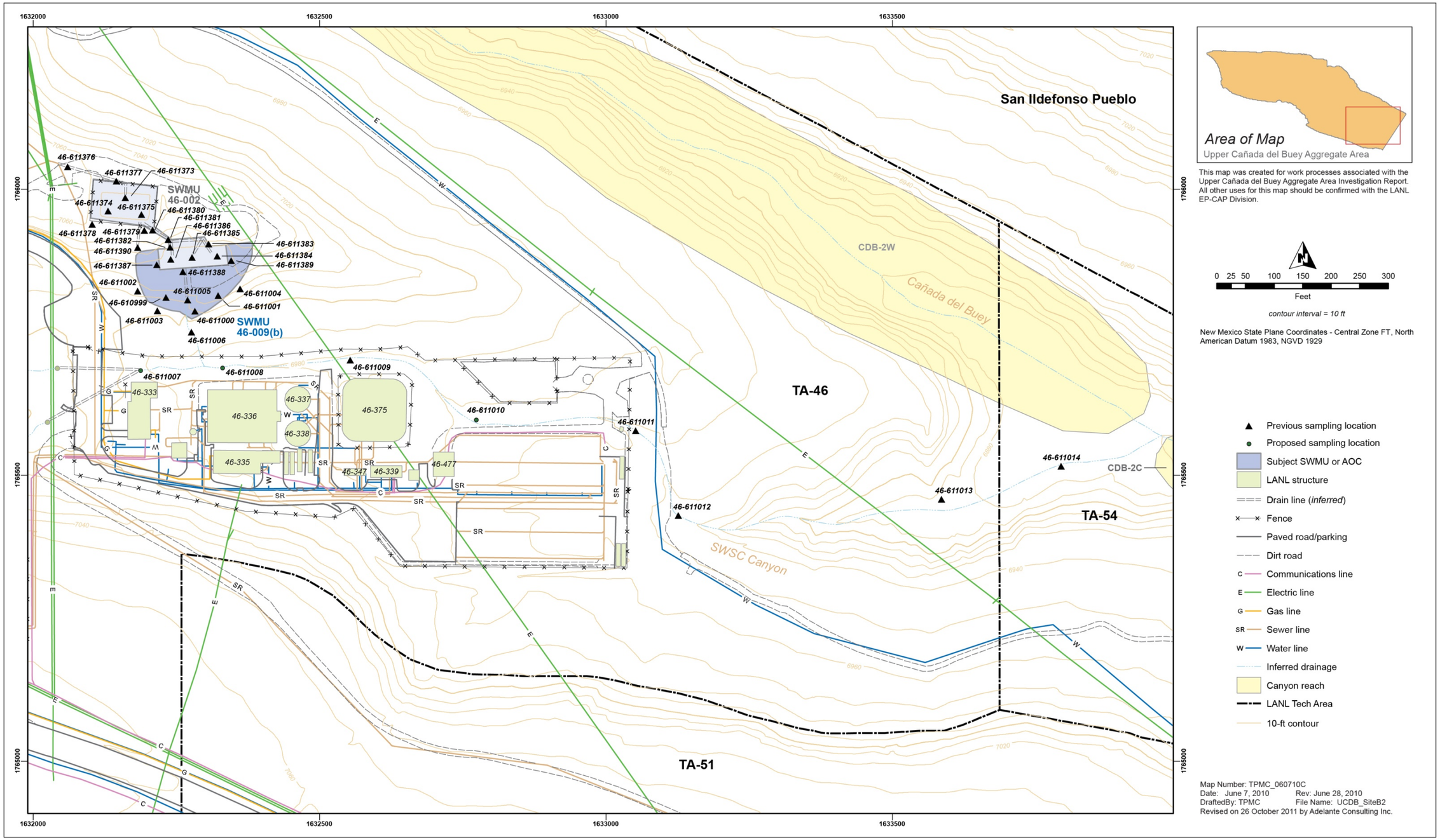

Figure 4.2-10 Site map with existing and proposed sampling locations at SWMU 46-009(b)

Table 1.1-1
Sites under Phase II Investigation in the Upper Cañada del Buey Aggregate Area

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
Former TA-04				
04-003(a)-00	SWMU 04-003(a)	Inactive outfall and associated drainline from former building 04-7	Extent not defined: vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	Additional sampling to define extent
	AOC 04-004	Area of potential soil contamination associated with former building 04-7	Extent not defined: vertical extent of barium, copper, plutonium-239/240, and uranium-235/236	Additional sampling to define extent. Removal of arsenic above industrial SSLs.
TA-46				
	SWMU 46-003(b)	Inactive septic system	Extent not defined: vertical extent of calcium and 2-hexanone	Additional sampling to define extent
	SWMU 46-003(c)	Inactive septic system	Extent not defined: lateral and vertical extent of antimony, cadmium, chromium, cobalt, copper; vertical extent of uranium-235/236	Additional sampling to define extent
	SWMU 46-003(d)	Inactive septic system	Extent not defined: vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, uranium-234, and uranium-235/236	Additional sampling to define extent
	SWMU 46-003(e)	Inactive septic system	Extent not defined: vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236	Additional sampling to define extent
	SWMU 46-003(f)	Inactive septic system	Extent not defined: vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236	Additional sampling to define extent
	SWMU 46-003(g)	Inactive septic system	Extent not defined: vertical extent of cobalt and copper	Additional sampling to define extent

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
	SWMU 46-004(a)	Drainlines from former sinks in building 46-31 that discharged to a dry well north of building 46-31	Extent not defined: lateral extent of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene; vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)phthalate, and n-butylbenzene	Additional sampling to define extent
	SWMU 46-004(a2)	Inactive outfall located on the east side of building 46-31	Extent not defined: vertical extent of copper, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260	Additional sampling to define extent
	SWMU 46-004(b)	Former alkali-metal cleaning tank	Extent not defined: lateral extent of TPH-DRO; vertical extent of cesium, 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, phenanthrene, and pyrene	Additional sampling to define extent
	SWMU 46-004(b2)	Inactive outfall located east of building 46-1	Extent not defined: vertical extent of Aroclor-1254 and Aroclor-1260	Additional sampling to define extent. Removal of benzo(a)pyrene above industrial SSLs.
	SWMU 46-004(c)	Inactive dry well located north of building 46-31	Extent not defined: vertical extent of cesium, copper, mercury, and Aroclor-1242	Additional sampling to define extent
	SWMU 46-004(c2)	Inactive outfall located north of building 46-1	Extent not defined: vertical extent of cesium, lead, lithium, perchlorate, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	Additional sampling to define extent
46-004(d)-99	SWMU 46-004(d)	Inactive dry well that received overflow from the adjacent SWMU 46-004(e) dry well	Extent not defined: vertical extent of acenaphthene	Additional sampling to define extent
	SWMU 46-004(e)	Inactive dry well connected to building 46-58	Extent not defined: vertical extent of acenaphthene	Additional sampling to define extent

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
46-004(d2)-99	SWMU 46-004(d2)	Area of potential soil contamination associated with exhaust emissions from stacks on building 46-24	Extent not defined for stack emmissions: vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234	Additional sampling to define extent
	SWMU 46-004(g)	Area of potential soil contamination associated with exhaust emissions from stacks on building 46-1 and inactive outfall from building 46-1	Extent not defined for stack emmissions: vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234 Extent not defined for outfall: vertical extent of copper, mercury, silver, acenaphthene, anthracene, Aroclor-1254, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236	Additional sampling to define extent
	SWMU 46-004(h)	Area of potential soil contamination associated with exhaust emissions from stacks on building 46-16 and an inactive outfall from building 46-16	Extent not defined for stack emmissions: vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234 Extent not defined for outfall: vertical extent of mercury and Aroclor-1254. VOCs and pesticides analyses inadvertently excluded during 2010 investigation.	Additional sampling to define extent
	AOC C-46-002	Area of potential soil contamination associated with a one-time release of uranium-235 from a stack on building 46-31	Extent not defined for stack emmissions: vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234	Additional sampling to define extent
	AOC C-46-003	Area of potential soil contamination associated with a one-time release of depleted uranium hexafluoride containing uranium-237 from a stack on building 46-30	Extent not defined for stack emmissions: vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234	Additional sampling to define extent

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
	AOC 46-004(e2)	Outfall located northeast of building 46-42; currently receives stormwater from building 46-42 roof drains	Extent not defined: vertical extent of copper, fluoranthene, phenanthrene, and pyrene	Additional sampling to define extent
	SWMU 46-004(f)	Inactive outfall located east of building 46-24	Extent not defined: vertical extent of lead, Aroclor-1254, and Aroclor-1260	Additional sampling to define extent
	AOC 46-004(f2)	Inactive outfall located north of the northwest corner of building 46-31	Extent not defined: vertical extent of cesium-137 and plutonium-239/240	Additional sampling to define extent
	SWMU 46-004(q)	Inactive outfall located north of building 46-58	Extent not defined: vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60	Additional sampling to define extent
	SWMU 46-004(r)	Outfall located south of building 46-24	Extent defined; risk-screening assessment not performed	Perform risk-screening assessment
	SWMU 46-004(s)	Outfall located south of building 46-1; currently receives stormwater from building 46-1 high bay roof drains	Extent not defined: vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	Additional sampling to define extent
	SWMU 46-004(t)	Inactive outfall located southeast of building 46-76	Extent not defined: vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236	Additional sampling to define extent. Sampling where the location of the drainline could not be verified during the 2010 investigation.
	SWMU 46-004(u)	Inactive outfall located north of former building 46-87	Extent not defined: vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254	Additional sampling to define extent
	SWMU 46-004(v)	Inactive outfall located north of former building 46-87	Extent not defined: vertical extent of selenium and zinc	Additional sampling to define extent
	SWMU 46-004(w)	Inactive outfall located south of building 46-24	Extent defined; risk-screening assessment not performed	Perform risk-screening assessment

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
	SWMU 46-004(x)	Outfall located north of building 46-31, currently receives stormwater from building 46-31 roof drains	Extent not defined: vertical extent of copper and plutonium-239/240	Additional sampling to define extent
	SWMU 46-004(y)	Inactive outfall located north of building 46-31	Extent not defined: vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240	Additional sampling to define extent
	SWMU 46-004(z)	Inactive outfall located northwest of building 46-31	Extent not defined: vertical extent of perchlorate, plutonium-239/240, uranium-234, and uranium-235/236	Additional sampling to define extent
	SWMU 46-005	Surface impoundments	Extent not defined: vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137	Additional sampling to define extent
	SWMU 46-006(a)	Area of potential soil contamination located between buildings 46-1 and 46-42	Extent not defined: vertical extent of copper, fluoranthene, phenanthrene, and pyrene SWMU 46-006(a) and AOC 46-004(e2) are located within a common drainage. Data obtained from samples collected at AOC 46-004(e2) were used to characterize both sites.	Additional sampling to define extent
	SWMU 46-006(c)	Storage area located between the northeast corner of building 46-158 and the southeast side of building 46-208	Extent not defined: vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240	Additional sampling to define extent
	SWMU 46-006(d)	Area of potential soil contamination located on the north side of building 46-31	Extent not defined: vertical extent of barium, calcium, mercury, perchlorate, silver, acenaphthene, acetone, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238. TPH-DRO analyses inadvertently excluded during 2010 investigation.	Additional sampling to define extent
	SWMU 46-006(f)	Storage shed located east of building 46-1	Extent not defined: vertical extent of chromium	Additional sampling to define extent

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
	SWMU 46-007	Area of potential soil contamination located on the south and southeast sides of building 46-1	Extent not defined: vertical extent of cesium, chromium, copper, lead, mercury, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, cesium-137, and plutonium-239/240	Additional sampling to define extent
	SWMU 46-008(a)	Storage area located along the south and east sides of building 46-88	Extent not defined: vertical extent of TPH-DRO	Additional sampling to define extent
	SWMU 46-008(b)	Former drum storage area located on the east side of building 46-1	Extent not defined: vertical extent of antimony, lead, selenium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236	Additional sampling to define extent. Removal of benzo(a)pyrene above industrial SSLs.
	SWMU 46-008(d)	Storage area located on the south side of building 46-24	Extent not defined: vertical extent of copper, nickel, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene	Additional sampling to define extent
	SWMU 46-008(e)	Storage area located south of transportable building 46-187	Extent not defined: vertical extent of calcium, chromium, and TPH-DRO	Additional sampling to define extent
	SWMU 46-008(f)	Storage area located on the southeast side of building 46-31	Extent not defined: vertical extent of Aroclor-1242, TPH-DRO, and uranium-235/236	Additional sampling to define extent
	SWMU 46-008(g)	Storage area located south building 46-76	Extent not defined: vertical extent of lead, 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, phenanthrene, and pyrene. TPH-DRO analyses inadvertently excluded during 2010 investigation.	Additional sampling to define extent. Removal of benzo(a)pyrene above industrial SSLs.

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Site Description	2010 Investigation Results	Proposed Activities
	SWMU 46-009(a)	Surface disposal area located at the head of SWSC Canyon near the southeastern corner of TA-46	Extent not defined: vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137	Additional sampling to define extent
	SWMU 46-009(b)	Surface disposal area southeast of building 46-77	Extent not defined: vertical extent of zinc, cesium-137, and plutonium-239/240	Additional sampling to define extent
	SWMU 46-010(d)	Storage area located on the south side of building 46-41	Extent not defined: vertical extent of acenaphthene, anthracene, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene	Additional sampling to define extent

Table 4.1-1
Samples Collected and Analyses Requested at SWMU 04-003(a)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Explosive Compounds	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
0404-95-0049	04-02005	0–1	Soil	—[a]	—	—	—	—	—	585[b]	585	—	—	—
0404-95-0051	04-02005	1–2	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
0404-95-0052	04-02005	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
0404-95-0053	04-02006	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
0404-95-0054	04-02006	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
0404-95-0055	04-02006	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
0404-95-0056	04-02007	0–1	Soil	584	—	—	—	—	—	585	585	—	—	—
0404-95-0058	04-02007	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
0404-95-0059	04-02007	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0017	04-02008	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0062	04-02008	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0018	04-02008	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0063	04-02008	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
0404-95-0064	04-02008	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0021	04-02009	0–0.5	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
0404-95-0065	04-02009	0–1	Sed	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0022	04-02009	0.5–1	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
0404-95-0066	04-02009	1–2	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
0404-95-0067	04-02009	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0025	04-02010	0–0.5	Soil	4391R	—	4390R	—	—	4392R	—	—	—	—	—

Table 4.1-1 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Explosive Compounds	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
0404-95-0068	04-02010	0–1	Soil	—	583	—	—	—	—	585	585	—	—	—
RE04-98-0026	04-02010	0.5–0.83	Soil	4391R	—	4390R	—	—	4392R	—	—	—	—	—
0404-95-0070	04-02010	1–2	Soil	—	—	583	—	—	—	585	585	—	585	585
0404-95-0073	04-02010	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0033	04-02033	0–0.5	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
RE04-98-0034	04-02033	0.5–0.83	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
RE04-98-0037	04-02034	0–0.5	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
RE04-98-0038	04-02034	0.5–1	Sed	4391R	—	4390R	—	—	4392R	—	—	—	—	—
RE52-10-9502	52-610950	1–2	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9503	52-610950	2–3	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9504	52-610950	3–4	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9505	52-610951	1–2	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9506	52-610951	2–3	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9507	52-610951	3–4	Qbt 3	10-1119	—	10-1118	—	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9508	52-610952	0–0.5	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-12020	52-610952	2–3	Soil	10-1532	—	10-1532	10-1532	10-1532	—	10-1532	10-1532	10-1532	—	—
RE52-10-9510	52-610953	0–1	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-12021	52-610953	2–3	Soil	10-1532	—	10-1532	10-1532	10-1532	—	10-1532	10-1532	10-1532	—	—

[a] — = No sample collected.

[b] Analytical request number.

Table 4.1-2
Proposed Sampling at SWMU 04-003(a)

Sampling Objective	Location ID	Depth (ft bgs)	SVOCs
Define vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	04-02009 52-610952	5–6, 9–10 5–6, 9–10	X[a,b] X[c]

[a] X = Analysis will be performed.

[b] PAHs only.

[c] Indeno(1,2,3-cd)pyrene only.

Table 4.1-3
Samples Collected and Analyses Requested at AOC 04-004

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Explosive Compounds	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
RE04-98-0001	04-02001	0–0.5	Soil	4383R[a]	—[b]	4381R	—	—	4382R-1, 4382R-2	—	—	—	—	—
0404-95-0075	04-02001	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0002	04-02001	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0076	04-02001	1–2	Soil	—	—	583	—	—	—	585	585	—	—	—
RE04-98-0003	04-02001	1.5–2.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0078	04-02001	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0004	04-02001	2.5–3.33	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0005	04-02002	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0081	04-02002	0–1	Soil	584	—	—	—	—	—	585	585	—	—	—
RE04-98-0006	04-02002	0.5–1.5	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0083	04-02002	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0007	04-02002	1.5–2.5	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0084	04-02002	2–3	Soil	—	—	—	—	—	—	585	585	—	585	585
RE04-98-0008	04-02002	2.5–3.75	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0009	04-02003	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Explosive Compounds	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
0404-95-0086	04-02003	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0010	04-02003	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0087	04-02003	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0011	04-02003	1.5–2.17	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0088	04-02003	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0013	04-02004	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0090	04-02004	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0014	04-02004	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0091	04-02004	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0015	04-02004	1.5–2.08	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0092	04-02004	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0029	04-02032	0–0.5	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0030	04-02032	0.5–1.5	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0031	04-02032	1.5–2.17	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE52-10-9515	52-610954	1–2	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9516	52-610954	2–3	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9517	52-610954	3–4	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9518	52-610955	1–2	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—

Table 4.1-3 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Explosive Compounds	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
RE52-10-9519	52-610955	2–3	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9520	52-610955	3–4	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9521	52-610956	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9522	52-610956	2–3	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9523	52-610956	3–4	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9524	52-610957	1–2	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9525	52-610957	2–3	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9526	52-610957	3–4	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9527	52-610958	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9528	52-610958	2–3	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9529	52-610958	3–4	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9530	52-610959	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9531	52-610959	2–3	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9532	52-610959	3–4	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—

[a] Analytical request number.

[b] — = No sample collected.

Table 4.1-4
Proposed Sampling at AOC 04-004

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Isotopic Plutonium	Isotopic Uranium
Define vertical extent of barium, copper, plutonium-239/240, and uranium-235/236	52-610954 52-610956 52-610959	6–7, 10–11 6–7, 10–11 6–7, 10–11	X[a,b] X[d] —	—[c] — X	X — —
Confirm removal of arsenic to industrial SSL to the north, south, east, and west of sampling location 04-02002	4-1, 4-2, 4-3, 4-4	0–1	X[e]	—	—

[a] X = Analysis will be performed.

[b] Barium only.

[c] — = Analysis will not be performed.

[d] Barium and copper only.

[e] Arsenic only.

Table 4.2-1
Samples Collected and Analyses Requested at SWMU 46-003(b)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13420	46-611590	5–6	Soil	10-2883*	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13421	46-611590	10–11	Qbt 3	10-2928	10-2927	10-2927	10-2927	10-2928	10-2928	10-2928	10-2929	10-2929	10-2929	10-2929
RE46-10-13424	46-611592	3.5–4.5	Soil	10-2913	10-2912	10-2912	10-2912	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913
RE46-10-13425	46-611592	8.5–9.5	Qbt 3	10-2913	10-2912	10-2912	10-2912	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913
RE46-10-13428	46-611594	1.5–2.5	Soil	10-2913	10-2912	10-2912	10-2912	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913
RE46-10-13429	46-611594	6.5–7.5	Qbt 3	10-2913	10-2912	10-2912	10-2912	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913	10-2913
RE46-10-13430	46-611595	0–1	Soil	10-2928	10-2927	10-2927	10-2927	10-2928	10-2928	10-2928	10-2929	10-2929	10-2929	10-2929
RE46-10-13431	46-611595	5–6	Qbt 3	10-2928	10-2927	10-2927	10-2927	10-2928	10-2928	10-2928	10-2929	10-2929	10-2929	10-2929
RE46-10-13432	46-611596	5–6	Soil	10-2928	10-2927	10-2927	10-2927	10-2928	10-2928	10-2928	10-2929	10-2929	10-2929	10-2929
RE46-10-13433	46-611596	10–11	Qbt 3	10-2928	10-2927	10-2927	10-2927	10-2928	10-2928	10-2928	10-2929	10-2929	10-2929	10-2929

*Analytical request number.

Table 4.2-2
Proposed Sampling at SWMU 46-003(b)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	VOCs
Define vertical extent of calcium and 2-hexanone. The presence of a permanent guardrail adjacent to location 46-611590 prevents access by a drill rig; therefore, a sample will be collected as deep as possible.	46-611590 46-611594	15–16 12–13, 17–18	X[a,b] —	—[c] X[d]

[a] X = Analysis will be performed.

[b] Calcium only.

[c] — = Analysis will not be performed.

[d] 2-Hexanone only.

Table 4.2-3
Samples Collected and Analyses Requested at SWMU 46-003(c)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11481	46-611255	7–8	Soil	10-3239*	10-3238	10-3238	10-3238	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239
RE46-10-11482	46-611255	11.5–12.5	Qbt 3	10-3239	10-3238	10-3238	10-3238	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239
RE46-10-11485	46-611257	9–10	Soil	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231
RE46-10-11486	46-611257	10–11	Qbt 3	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231	10-3231
RE46-10-11489	46-611259	5–6	Soil	10-3239	10-3238	10-3238	10-3238	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239
RE46-10-11490	46-611259	10–11	Qbt 3	10-3239	10-3238	10-3238	10-3238	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239	10-3239
RE46-10-11491	46-611260	4.5–5.5	Soil	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11492	46-611260	9.5–10.5	Qbt 3	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11493	46-611261	2–3	Soil	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11494	46-611261	7–8	Qbt 3	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11495	46-611262	0.3–1.3	Soil	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11496	46-611262	5.3–6.3	Qbt 3	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11497	46-611263	3–4	Soil	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11498	46-611263	8–9	Qbt 3	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11499	46-611264	3–4	Soil	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674
RE46-10-11500	46-611264	8–9	Qbt 3	10-1673	10-1672	10-1672	10-1672	10-1673	10-1673	10-1673	10-1674	10-1674	10-1674	10-1674

*Analytical request number.

Table 4.2-4
Proposed Sampling at SWMU 46-003(c)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Isotopic Uranium
Define vertical extent of antimony, cadmium, chromium, cobalt, copper, and uranium-235/236	46-611255 46-611257 46-611262	16–17, 21–22 15–16, 20–21 10–11, 15–16	X[a,b] — X[d]	—[c] X —
Define lateral extent of antimony, cadmium, chromium, cobalt, and copper to the south of the drain field	3c-1, 3c-2	10–11, 15–16	X[d]	—

[a] X = Analysis will be performed.
[b] Chromium only.
[c] — = Analysis will not be performed.
[d] Antimony, cadmium, chromium, cobalt, and copper only.

Table 4.2-5
Samples Collected and Analyses Requested at SWMU 46-003(d)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13434	46-611597	4–5	Soil	10-2397*	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13435	46-611597	9–10	Qbt 3	10-2397	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13436	46-611598	7–8	Qbt 3	10-2397	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13437	46-611598	12–13	Qbt 3	10-2397	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13438	46-611599	4–5	Soil	10-2397	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13439	46-611599	9–10	Qbt 3	10-2397	10-2398	10-2398	10-2398	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397	10-2397
RE46-10-13440	46-611600	4–5	Soil	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13441	46-611600	9–10	Qbt 3	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13442	46-611601	4–5	Qbt 3	10-2866	10-2865	10-2865	10-2865	10-2866	10-2866	10-2866	10-2867	10-2867	10-2867	10-2867	10-2867
RE46-10-13443	46-611601	9–10	Qbt 3	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13444	46-611602	4–5	Qbt 3	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13445	46-611602	9–10	Qbt 3	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883
RE46-10-13446	46-611603	4–5	Qbt 3	10-2866	10-2865	10-2865	10-2865	10-2866	10-2866	10-2866	10-2867	10-2867	10-2867	10-2867	10-2867
RE46-10-13447	46-611603	9–10	Qbt 3	10-2883	10-2882	10-2882	10-2882	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883	10-2883

*Analytical request number.

Table 4.2-6
Proposed Sampling at SWMU 46-003(d)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	VOCs	SVOCs	PCBs	Americium-241	Isotopic Uranium
Define vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, uranium-234, and uranium-235/236	46-611597	14–15, 19–20	X[a,b]	—[c]	X[d]	X	—	X
	46-611598	17–18, 22–23	X[e]	—	X[f]	—	X	X
	46-611599	14–15, 19–20	X[g]	X[h]	—	X	X	X
	46-611600	14–15, 19–20	—	—	—	—	—	X
	46-611601	14–15, 19–20	X[i]	—	—	—	—	—

[a] X = Analysis will be performed.

[b] Barium, calcium, copper, and zinc only.

[c] — = Analysis will not be performed.

[d] Benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4 dichlorobenzene, fluoranthene, and pyrene only.

[e] Zinc only.

[f] 1,4-Dichlorobenzene, fluoranthene, and pyrene only.

[g] Copper and mercury only.

[h] Acetone only.

[i] Chromium only.

Table 4.2-7
Samples Collected and Analyses Requested at SWMU 46-003(e)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13448	46-611604	3–4	Soil	10-2965*	10-2964	10-2964	10-2964	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965
RE46-10-13449	46-611604	8–9	Qbt 3	10-2965	10-2964	10-2964	10-2964	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965
RE46-10-13466	46-611605	8–9	Qbt 3	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909
RE46-10-13467	46-611605	13–14	Qbt 3	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909
RE46-10-13468	46-611606	3–4	Soil	10-2965	10-2964	10-2964	10-2964	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965
RE46-10-13469	46-611606	15–16	Qbt 3	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909	10-3909
RE46-10-13470	46-611607	2–3	Qbt 3	10-2965	10-2964	10-2964	10-2964	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965
RE46-10-13471	46-611607	7–8	Qbt 3	10-2965	10-2964	10-2964	10-2964	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965	10-2965
RE46-10-13472	46-611608	6–7	Soil	10-2983	10-2982	10-2982	10-2982	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983
RE46-10-13473	46-611608	11–12	Qbt 3	10-2983	10-2982	10-2982	10-2982	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983
RE46-10-13474	46-611609	0–1	Soil	10-2957	10-2956	10-2956	10-2956	10-2957	10-2957	10-2957	10-2958	10-2958	10-2958	10-2958
RE46-10-13475	46-611609	5–6	Qbt 3	10-2957	10-2956	10-2956	10-2956	10-2957	10-2957	10-2957	10-2958	10-2958	10-2958	10-2958
RE46-10-13476	46-611610	4–5	Soil	10-2957	10-2956	10-2956	10-2956	10-2957	10-2957	10-2957	10-2958	10-2958	10-2958	10-2958
RE46-10-13477	46-611610	9–10	Qbt 3	10-2957	10-2956	10-2956	10-2956	10-2957	10-2957	10-2957	10-2958	10-2958	10-2958	10-2958
RE46-10-13478	46-611611	4–5	Qbt 3	10-2983	10-2982	10-2982	10-2982	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983
RE46-10-13479	46-611611	9–10	Qbt 3	10-2983	10-2982	10-2982	10-2982	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983	10-2983

*Analytical request number.

Table 4.2-8
Proposed Sampling at SWMU 46-003(e)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Perchlorate	VOCs	SVOCs	PCBs	Isotopic Uranium
Define vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236	46-611604	13–14, 18–19	—[a]	X[b]	—	—	—	—
	46-611605	18–19, 23–24	—	—	X[c]	—	—	X
	46-611608	16–17, 21–22	—	X	—	X[d]	X	—
	46-611611	14–15, 20–21	X[e]	—	—	—	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Acetone only.

[d] Pyrene only.

[e] Lead only.

Table 4.2-9
Samples Collected and Analyses Requested at SWMU 46-003(f)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11875	46-611359	3–4	Soil	10-3035*	10-3034	10-3034	10-3034	10-3035	10-3035	10-3035	10-3035	10-3035	10-3035	10-3035
RE46-10-11876	46-611359	5–6	Qbt 3	10-3035	10-3034	10-3034	10-3034	10-3035	10-3035	10-3035	10-3035	10-3035	10-3035	10-3035
RE46-10-11877	46-611360	8–9	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11878	46-611360	13–14	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11879	46-611361	12–13	Qbt 3	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11880	46-611361	17–18	Qbt 3	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11881	46-611362	11–12	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11882	46-611362	16–17	Qbt 3	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1460	10-1461	10-1461	10-1461	10-1461
RE46-10-11883	46-611363	5–6	Qbt 3	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11884	46-611363	10–11	Qbt 3	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11885	46-611364	3–4	Soil	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319
RE46-10-11886	46-611364	8.5–9.5	Qbt 3	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319	10-2319
RE46-10-11887	46-611365	5–6	Soil	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11888	46-611365	10–11	Qbt 3	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11889	46-611366	5–6	Qbt 3	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11890	46-611366	10–11	Qbt 3	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11891	46-611367	0–1	Soil	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651
RE46-10-11892	46-611367	1–2	Soil	10-1650	10-1649	10-1649	10-1649	10-1650	10-1650	10-1650	10-1651	10-1651	10-1651	10-1651

*Analytical request number.

Table 4.2-10
Proposed Sampling at SWMU 46-003(f)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	VOCs	PCBs	Isotopic Uranium
Define vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236	46-611360	18–19, 23–24	—[a]	—	X[b]	—
	46-611361	22–23, 26–27	—	—	X	—
	46-611362	21–22, 26–27	—	—	—	X
	46-611364	13–14, 18–19	X[c]	X[d]	—	—
	46-611365	15–16, 20–21	—	—	—	X
	46-611366	15–16, 20–21	—	—	—	X
	46-611367	5–6, 9–10	—	X[e]	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Lead only.

[d] Acetone only.

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

Table 4.2-11
Samples Collected and Analyses Requested at SWMU 46-003(g)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13507	46-611612	4–5	Soil	10-2866*	10-2865	10-2865	10-2865	10-2866	10-2866	10-2866	10-2867	10-2867	10-2867	10-2867
RE46-10-13508	46-611612	17–18	Qbt 3	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327	10-3327
RE46-10-13509	46-611613	4–5	Soil	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13510	46-611613	9–10	Qbt 3	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13511	46-611614	10–11	Qbt 3	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13512	46-611614	15–16	Qbt 3	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13513	46-611615	4–5	Soil	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13514	46-611615	9–10	Qbt 3	10-2106	10-2105	10-2105	10-2105	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106	10-2106
RE46-10-13515	46-611616	6–7	Soil	10-2853	10-2852	10-2852	10-2852	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853
RE46-10-13516	46-611616	11–12	Qbt 3	10-2853	10-2852	10-2852	10-2852	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853
RE46-10-13517	46-611617	6–7	Qbt 3	10-2853	10-2852	10-2852	10-2852	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853	10-2853
RE46-10-13518	46-611617	11–12	Qbt 3	10-2866	10-2865	10-2865	10-2865	10-2866	10-2866	10-2866	10-2867	10-2867	10-2867	10-2867

*Analytical request number.

Table 4.2-12
Proposed Sampling at SWMU 46-003(g)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals
Define vertical extent of cobalt and copper	46-611612	22–23, 27–28	X[a,b]

[a] X = Analysis will be performed.

[b] Cobalt and copper only.

Table 4.2-13
Samples Collected and Analyses Requested at SWMU 46-004(a)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13379	46-611588	3–4	Soil	10-1944*	10-1944	10-1943	10-1943	10-1943	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944
RE46-10-13380	46-611588	8–9	Qbt 3	10-1965	10-1965	10-1964	10-1964	10-1964	10-1965	10-1965	10-1966	10-1966	10-1966	10-1966	10-1966
RE46-10-13381	46-611589	3–4	Soil	10-1944	10-1944	10-1943	10-1943	10-1943	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944
RE46-10-13382	46-611589	8–9	Qbt 3	10-1944	10-1944	10-1943	10-1943	10-1943	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944	10-1944

*Analytical request number.

Table 4.2-14
Proposed Sampling at SWMU 46-004(a)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Cesium	VOCs	SVOCs
Define vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)phthalate, and n-butylbenzene	46-611588 46-611589	13–14, 18–19 13–14, 18–19	X[a,b] X[d]	X X	—[c] X[e]	— X[f]

[a] X = Analysis will be performed.

[b] Chromium and copper only.

[c] — = Analysis will not be performed.

[d] Copper, lead, and selenium only.

[e] n-Butylbenzene only.

[f] Bis(2-ethylhexyl)phthalate only.

Table 4.2-15
Samples Collected and Analyses Requested at SWMU 46-004(a2)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13534	46-611618	0–1	Soil	10-2146*	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13535	46-611618	2–3	Qbt 3	10-2146	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13536	46-611619	0–1	Qbt 3	10-2146	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13537	46-611619	2–3	Qbt 3	10-2146	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13538	46-611620	0–1	Qbt 3	10-2146	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13539	46-611620	2–3	Qbt 3	10-2146	10-2145	10-2145	10-2145	10-2146	10-2146	10-2145	10-2147	10-2147	10-2147	10-2147	10-2147
RE46-10-13540	46-611621	0–1	Soil	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081
RE46-10-13541	46-611621	2–3	Soil	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081	10-3081

*Analytical request number.

Table 4.2-16
Proposed Sampling at SWMU 46-004(a2)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Perchlorate	PCBs
Define vertical extent of copper, perchlorate, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260	46-611620 46-611621	5–6, 9–10 5–6, 9–10	—[a] X[c]	— X	X[b] X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Copper and zinc only.

Table 4.2-17
Samples Collected and Analyses Requested at SWMU 46-004(b)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Total Cyanide	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13172	46-611545	0–1	Soil	10-3279*	10-3279	10-3278	10-3278	10-3278	10-3279	10-3278	10-3280	10-3280	10-3280	10-3280
RE46-10-13173	46-611545	2–3	Soil	10-3279	10-3279	10-3278	10-3278	10-3278	10-3279	10-3278	10-3280	10-3280	10-3280	10-3280
RE46-10-13174	46-611546	0–1	Soil	10-3279	10-3279	10-3278	10-3278	10-3278	10-3279	10-3278	10-3280	10-3280	10-3280	10-3280
RE46-10-13175	46-611546	2–3	Soil	10-3279	10-3279	10-3278	10-3278	10-3278	10-3279	10-3278	10-3280	10-3280	10-3280	10-3280

*Analytical request number.

Table 4.2-18
Proposed Sampling at SWMU 46-004(b)

Sampling Objective	Location ID	Depth (ft bgs)	Cesium	SVOCs	PCBs	TPH-DRO
Define vertical extent of cesium, 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, phenanthrene, and pyrene	46-611546	5–6, 9–10	X[a]	X[b]	X	—[c]
Define lateral extent of TPH-DRO downgradient of location 46-611546	4b-1, 4b-2, 4b-3	0–1, 2–3	—	—	—	X

[a] X = Analysis will be performed.

[b] PAHs only.

[c] — = Analysis will not be performed.

Table 4.2-19
Samples Collected and Analyses Requested at SWMU 46-004(b2)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11167	46-611123	0–1	Soil	10-1300*	10-1299	10-1299	10-1299	10-1299	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-11168	46-611123	1–2	Soil	10-1300	10-1299	10-1299	10-1299	10-1299	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-11169	46-611124	0–1	Soil	10-1300	10-1299	10-1299	10-1299	10-1299	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-12044	46-611124	1–2	Soil	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530

*Analytical request number.

Table 4.2-20
Proposed Sampling at SWMU 46-004(b2)

Sampling Objective	Location ID	Depth (ft bgs)	SVOCs	PCBs
Define vertical extent of Aroclor-1254 and Aroclor-1260; confirm removal of benzo(a)pyrene to industrial SSL	46-611123	3–4, 5–6, 9–10	X[a,b]	X
Confirm removal of benzo(a)pyrene to industrial SSL the north, south, east, and west of sampling location 46-611123	4b2-1, 4b2-2, 4b2-3, 4b2-4	0–1, 2–3	X[b]	—[c]

[a] X = Analysis will be performed.
[b] Benzo(a)pyrene only.
[c] — = Analysis will not be performed.

Table 4.2-21
Samples Collected and Analyses Requested at SWMU 46-004(c)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Asbestos	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13546	46-611622	8–9	Qbt 3	10-2303*	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13547	46-611622	13–14	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13548	46-611622	18–19	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13549	46-611622	23–24	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13550	46-611623	8–9	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13551	46-611623	13–14	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13552	46-611623	18–19	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304
RE46-10-13553	46-611623	23–24	Qbt 3	10-2303	10-2303	10-2302	10-2302	10-2302	10-2303	10-2303	10-2303	10-2301	10-2304	10-2304	10-2304	10-2304	10-2304

*Analytical request number.

Table 4.2-22
Proposed Sampling at SWMU 46-004(c)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Cesium	PCBs
Define vertical extent of cesium, copper, mercury, and Aroclor-1242	46-611622 46-611623	28–29, 33–34 28–29, 33–34	X[a,b] —	X —	—[c] X

[a] X = Analysis will be performed.
[b] Copper and mercury only.
[c] — = Analysis will not be performed.

Table 4.2-23
Samples Collected and Analyses Requested at SWMU 46-004(c2)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	Lithium	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11132	46-611111	0–1	Soil	10-1234*	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11133	46-611111	1–2	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11134	46-611112	0–1	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11135	46-611112	1–2	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11136	46-611113	0–1	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11137	46-611113	1–2	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11138	46-611114	0–1	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-12043	46-611114	1–2	Soil	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601
RE46-10-11140	46-611115	0–1	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11141	46-611115	1–2	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11142	46-611116	0–1	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11143	46-611116	1–2	Soil	10-1234	10-1234	10-1234	10-1233	10-1233	10-1233	10-1234	10-1234	10-1234	10-1233	10-1235	10-1235	10-1235	10-1235	10-1235
RE46-10-11144	46-611117	0–1	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-11145	46-611117	1–2	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-11146	46-611118	0–0.25	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-12040	46-611118	1–2	Qbt 3	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601
RE46-10-11148	46-611119	0–1	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-12039	46-611119	1–2	Qbt 3	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601	10-1601
RE46-10-11150	46-611120	0–0.25	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-12041	46-611120	1–2	Qbt 3	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530
RE46-10-11152	46-611121	0–1	Soil	10-1257	10-1257	10-1257	10-1256	10-1256	10-1256	10-1257	10-1257	10-1257	10-1256	10-1257	10-1257	10-1257	10-1257	10-1257
RE46-10-12042	46-611121	1–2	Qbt 3	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530	10-1530

*Analytical request number.

Table 4.2-24
Proposed Sampling at SWMU 46-004(c2)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Cesium	Lithium	Perchlorate	SVOCs
Define vertical extent of cesium, lead, lithium, perchlorate, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	46-611111	5–6, 9–10	—[a]	X[b]	X	X	—
	46-611112	5–6, 9–10	—	X	X	X	X[c]
	46-611113	5–6, 9–10	X[d]	—	—	X	—
	46-611114	5–6, 9–10	—	—	—	—	X[e]
	46-611115	5–6, 9–10	X[f]	X	X	X	—
	46-611117	5–6, 9–10	—	—	—	X	—
	46-611118	5–6, 9–10	—	X	—	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Benzo(g,h,i)perylene only.

[d] Lead only.

[e] PAHs only.

[f] Zinc only.

Table 4.2-25
Samples Collected and Analyses Requested at SWMU 46-004(d)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13214	46-611557	8–9	Soil	10-3269*	10-3268	10-3268	10-3268	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269
RE46-10-13215	46-611557	13–14	Qbt 3	10-3279	10-3278	10-3278	10-3278	10-3279	10-3279	10-3280	10-3280	10-3280	10-3280	10-3280
RE46-10-13226	46-611557	18–19	Qbt 3	10-3279	10-3278	10-3278	10-3278	10-3279	10-3279	10-3280	10-3280	10-3280	10-3280	10-3280
RE46-10-13227	46-611557	23–24	Qbt 3	10-3279	10-3278	10-3278	10-3278	10-3279	10-3279	10-3280	10-3280	10-3280	10-3280	10-3280
RE46-10-13216	46-611558	0–1	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13217	46-611558	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13218	46-611559	0–1	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13219	46-611559	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13220	46-611560	0–1	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13221	46-611560	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432

*Analytical request number.

Table 4.2-26
Proposed Sampling at SWMUs 46-004(d) and 46-004(e)

Sampling Objective	Location ID	Depth (ft bgs)	SVOCs
Define vertical extent of acenaphthene	46-611559	5–6, 9–10	X[a,b]

[a] X = Analysis will be performed.

[b] Acenaphthene only.

Table 4.2-27
Samples Collected and Analyses Requested at SWMU 46-004(e)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13216	46-611558	0–1	Soil	10-2431*	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13217	46-611558	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13218	46-611559	0–1	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13219	46-611559	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13220	46-611560	0–1	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13221	46-611560	1–2	Soil	10-2431	10-2433	10-2433	10-2433	10-2431	10-2431	10-2432	10-2432	10-2432	10-2432	10-2432
RE46-10-13222	46-611561	7.5–8.5	Soil	10-3269	10-3268	10-3268	10-3268	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269
RE46-10-13223	46-611561	12.5–13.5	Qbt 3	10-3269	10-3268	10-3268	10-3268	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269
RE46-10-13228	46-611561	17.5–18.5	Qbt 3	10-3269	10-3268	10-3268	10-3268	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269
RE46-10-13229	46-611561	22.5–23.5	Qbt 3	10-3269	10-3268	10-3268	10-3268	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269	10-3269
RE46-10-13224	46-611562	0–1	Soil	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078
RE46-10-13225	46-611562	3–4	Qbt 3	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078	10-3078

*Analytical request number.

Table 4.2-28
Samples Collected and Analyses Requested at Consolidated Unit 46-004(d2)-99

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	SVOCs	PCBs	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12923	46-611481	0–1	Soil	10-2412*	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12924	46-611481	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12925	46-611482	0–1	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12926	46-611482	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12927	46-611483	0–1	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12928	46-611483	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12929	46-611484	0–1	Soil	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12930	46-611484	1–2	Qbt 3	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12931	46-611485	0–1	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12932	46-611485	1–2	Qbt 3	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12933	46-611486	0–1	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12934	46-611486	1–2	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12935	46-611487	0–1	Soil	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12936	46-611487	1–2	Qbt 3	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12937	46-611488	0–1	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12938	46-611488	1–2	Qbt 3	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12939	46-611489	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12940	46-611489	1–2	Qbt 3	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12941	46-611490	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12942	46-611490	1–2	Qbt 3	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12943	46-611491	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12944	46-611491	1–2	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12945	46-611492	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942

Table 4.2-28 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	SVOCs	PCBs	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12946	46-611492	1–2	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12947	46-611493	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12948	46-611493	1–2	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12949	46-611494	0–1	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12950	46-611494	1–2	Qbt 3	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12951	46-611495	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12952	46-611495	1–2	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12953	46-611496	0–1	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12954	46-611496	1–2	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12955	46-611497	0–1	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12956	46-611497	1–2	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12957	46-611498	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12958	46-611498	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12959	46-611499	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12960	46-611499	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12961	46-611500	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12962	46-611500	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813

*Analytical request number.

Table 4.2-29
Proposed Sampling at Consolidated Unit 46-004(d2)-99

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Perchlorate	SVOCs	Isotopic Uranium
Define vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234	46-611484	5–6, 9–10	X[a,b]	—[c]	—	—
	46-611486	5–6, 9–10	—	—	—	X
	46-611488	5–6, 9–10	X[b]	—	—	—
	46-611489	5–6, 9–10	X[d]	—	—	—
	46-611491	5–6, 9–10	—	—	X[e]	—
	46-611499	5–6, 9–10	—	X	—	—

[a] X = Analysis will be performed.

[b] Chromium only.

[c] — = Analysis will not be performed.

[d] Selenium only.

[e] Fluoranthene, phenanthrene, and pyrene only.

Table 4.2-30
Samples Collected and Analyses Requested at SWMU 46-004(g)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12637	46-611444	0–1	Soil	10-2506*	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12638	46-611444	1–2	Soil	10-2506	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12639	46-611445	0–1	Soil	10-2506	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12640	46-611445	1–2	Qbt 3	10-2506	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12641	46-611446	0–1	Soil	10-2506	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12642	46-611446	1–2	Soil	10-2506	10-2505	10-2505	10-2505	10-2506	10-2506	10-2505	10-2507	10-2507	10-2507	10-2507	10-2507
RE46-10-12643	46-611447	0–1	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12644	46-611447	1–2	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12645	46-611448	0–1	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12646	46-611448	1–2	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12647	46-611449	0–1	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12648	46-611449	1–2	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12649	46-611450	0–1	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12650	46-611450	1–2	Qbt 3	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12651	46-611451	0–1	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712
RE46-10-12652	46-611451	1–2	Soil	10-1711	10-1710	10-1710	10-1710	10-1711	10-1711	10-1710	10-1712	10-1712	10-1712	10-1712	10-1712

*Analytical request number.

Table 4.2-31
Proposed Sampling at SWMU 46-004(g)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs	PCBs	Isotopic Uranium
Define vertical extent of copper, mercury, silver, acenaphthene, anthracene, Aroclor-1254, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236	46-611445 46-611446 46-611447	5–6, 9–10 5–6, 9–10 5–6, 9–10	—[a] — X[e]	X[b,c] X[d] X[f]	— — X	— — X

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Dibenz(a,h)anthracene only.

[d] 2-Methylnaphthalene and PAHs only.

[e] Copper, mercury, and silver only.

[f] Benzo(b)fluoranthene only.

Table 4.2-32
Samples Collected and Analyses Requested at SWMU 46-004(h)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	SVOCs	PCBs	Total Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13963	46-611765	0–1	Soil	10-2430*	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430
RE46-10-13964	46-611765	1–2	Soil	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430
RE46-10-13966	46-611766	0–1	Soil	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430
RE46-10-13965	46-611766	1–2	Soil	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430	10-2430

*Analytical request number.

Table 4.2-33
Proposed Sampling at SWMU 46-004(h)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	VOCs	PCBs	Pesticides
Perform VOC and pesticide analyses inadvertently omitted during 2010 investigation	46-611765	0–1, 1–2, 5–6	—[a]	X[b]	—	X
Perform VOC and pesticide analyses inadvertently omitted during 2010 investigation. Define vertical extent of mercury and Aroclor-1254	46-611766	0–1, 1–2, 5–6, 9–10	X[c]	X	X	X

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

Table 4.2-34
Samples Collected and Analyses Requested at AOC 46-004(e2) and SWMU 46-006(a)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-10827	46-611022	0–1	Soil	10-1300*	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-10828	46-611022	2–3	Qbt 3	10-1300	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-10829	46-611023	0–1	Soil	10-1300	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-10830	46-611023	2–3	Qbt 3	10-1300	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-10831	46-611024	0–1	Soil	10-1300	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299
RE46-10-10832	46-611024	2–3	Qbt 3	10-1300	10-1299	10-1299	10-1299	10-1300	10-1300	10-1299	10-1299	10-1299	10-1299	10-1299

*Analytical request number.

Table 4.2-35
Proposed Sampling at AOC 46-004(e2) and SWMU 46-006(a)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs
Define vertical extent of copper, fluoranthene, phenanthrene, and pyrene	46-611022 46-611024	5–6, 9–10 5–6, 9–10	X[a,b] —	—[c] X[d]

[a] X = Analysis will be performed.

[b] Copper only.

[c] — = Analysis will not be performed.

[d] Fluoranthene, phenanthrene, and pyrene only.

Table 4.2-36
Samples Collected and Analyses Requested at SWMU 46-004(f)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11531	46-611272	0–1	Soil	10-3080*	10-3079	10-3079	10-3079	10-3080	10-3080	10-3079	10-3080	10-3080	10-3080	10-3080
RE46-10-11532	46-611272	2–3	Qbt 3	10-3080	10-3079	10-3079	10-3079	10-3080	10-3080	10-3079	10-3080	10-3080	10-3080	10-3080
RE46-10-11533	46-611273	0–1	Soil	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166
RE46-10-11534	46-611273	2–3	Soil	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166	10-2166
RE46-10-11535	46-611274	0–1	Soil	10-3080	10-3079	10-3079	10-3079	10-3080	10-3080	10-3079	10-3080	10-3080	10-3080	10-3080
RE46-10-11536	46-611274	2–3	Soil	10-3080	10-3079	10-3079	10-3079	10-3080	10-3080	10-3079	10-3080	10-3080	10-3080	10-3080
RE46-10-11537	46-611275	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11538	46-611275	2–3	Qbt 3	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366

*Analytical request number.

Table 4.2-37
Proposed Sampling at SWMU 46-004(f)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	PCBs
Define vertical extent of lead, Aroclor-1254, and Aroclor-1260	46-611272 46-611273	5–6, 9–10 5–6, 9–10	—[a] X[c]	X[b] —

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Lead only.

Table 4.2-38
Samples Collected and Analyses Requested at AOC 46-004(f2)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12750	46-611475	0–1	Soil	10-2579*	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579
RE46-10-12751	46-611475	1–2	Soil	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579	10-2579
RE46-10-12752	46-611476	0–1	Qbt 3	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260
RE46-10-12753	46-611476	1–2	Qbt 3	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260	10-3260
RE46-10-12754	46-611477	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12755	46-611477	1–2	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12756	46-611478	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12757	46-611478	1–2	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12758	46-611479	0–1	Soil	10-1770	10-1769	10-1769	10-1769	10-1770	10-1770	10-1769	10-1771	10-1771	10-1771	10-1771	10-1771
RE46-10-12759	46-611479	1–2	Soil	10-1770	10-1769	10-1769	10-1769	10-1770	10-1770	10-1769	10-1771	10-1771	10-1771	10-1771	10-1771
RE46-10-12760	46-611480	0–1	Soil	10-1770	10-1769	10-1769	10-1769	10-1770	10-1770	10-1769	10-1771	10-1771	10-1771	10-1771	10-1771
RE46-10-12761	46-611480	1–2	Qbt 3	10-1770	10-1769	10-1769	10-1769	10-1770	10-1770	10-1769	10-1771	10-1771	10-1771	10-1771	10-1771

*Analytical request number.

Table 4.2-39
Proposed Sampling at AOC 46-004(f2)

Sampling Objective	Location ID	Depth (ft bgs)	Gamma-Emitting Radionuclides	Isotopic Plutonium
Define vertical extent of cesium-137 and plutonium-239/240	46-611478	5–6, 9–10	X[a,b]	X

[a] X = Analysis will be performed.

[b] Cesium-137 only.

Table 4.2-40
Samples Collected and Analyses Requested at SWMU 46-004(q)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-12967	46-611501	0–1	Soil	10-2434*	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12968	46-611501	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12969	46-611502	0–1	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12970	46-611502	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12971	46-611503	0–1	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12972	46-611503	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12973	46-611504	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12974	46-611504	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12975	46-611505	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12976	46-611505	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12977	46-611506	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820

Table 4.2-40 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-12978	46-611506	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12979	46-611507	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12980	46-611507	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12981	46-611508	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12982	46-611508	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12983	46-611509	0–1	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12984	46-611509	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12985	46-611510	0–1	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12986	46-611510	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12987	46-611511	0–1	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12988	46-611511	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12989	46-611512	0–1	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12990	46-611512	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12991	46-611513	0–1	Soil	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12992	46-611513	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833

*Analytical request number.

Table 4.2-41
Proposed Sampling at SWMU 46-004(q)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	PCBs	Gamma-Emitting Radionuclides
Define vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60	46-611501 46-611502 46-611505	5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] — X[e]	X — —	—[c] X[d] —

[a] X = Analysis will be performed.

[b] Lead and mercury only.

[c] — = Analysis will not be performed.

[d] Cobalt-60 only.

[e] Barium only.

Table 4.2-42
Samples Collected and Analyses Requested at SWMU 46-004(s)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11305	46-611198	0–1	Soil	10-1293*	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1293	10-1293	10-1293	10-1293
RE46-10-11306	46-611198	1–2	Qbt 3	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1293	10-1293	10-1293	10-1293
RE46-10-11307	46-611199	0–1	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1293	10-1293	10-1293	10-1293
RE46-10-11308	46-611199	1–2	Qbt 3	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1293	10-1293	10-1293	10-1293

*Analytical request number.

Table 4.2-43
Proposed Sampling at SWMU 46-004(s)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs
Define vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene	46-611199	5–6, 9–10	X[a,b]	X[c]

[a] X = Analysis will be performed.

[b] Chromium only.

[c] PAHs only.

Table 4.2-44
Samples Collected and Analyses Requested at SWMU 46-004(t)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11548	46-611276	4.5–5.5	Soil	10-2763*	10-2762	10-2762	10-2762	10-2763	10-2763	10-2762	10-2763	10-2763	10-2763	10-2763
RE46-10-11549	46-611276	9.5–10.5	Qbt 3	10-2763	10-2762	10-2762	10-2762	10-2763	10-2763	10-2762	10-2763	10-2763	10-2763	10-2763
RE46-10-11550	46-611277	2.5–3.5	Soil	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11551	46-611277	4.5–5.5	Qbt 3	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11552	46-611278	3–4	Soil	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11553	46-611278	5–6	Qbt 3	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11554	46-611279	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11555	46-611279	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11556	46-611280	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366

Table 4.2-44 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11557	46-611280	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11558	46-611281	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11559	46-611281	2–3	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11560	46-611282	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11561	46-611282	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11562	46-611283	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11563	46-611283	2–3	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11564	46-611284	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11565	46-611284	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11566	46-611285	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11567	46-611285	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349

*Analytical request number.

Table 4.2-45
Proposed Sampling at SWMU 46-004(t)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Total Cyanide	Perchlorate	VOCs	SVOCs	PCBs	Pesticides	Gamma-Emitting Radionuclides	Americium-241	Isotopic Plutonium	Isotopic Uranium
Define vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236	46-611276 46-611277 46-611280 46-611282 46-611284 46-611285	14–15, 19–20 9–10, 14–15 5–6, 9–10 5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] — — — X[h] X[i]	—[c] — — — — —	— — — X[f] X[f] —	— — X[d] X[g] — —	— — — — — —	— — — — — —	— — — — — —	— — X[e] — — —	— — — — — —	— X — — — X
Additional samples will not be collected if the drainline is located within 2 ft of sampling locations 46-611277 and 46-611278 Samples will be collected from two new locations below the bottom of drainline joints if the drainline is located and sampling locations 46-611277 and 46-611278 are more than 2 ft from the drainline	4t-1, 4t-2	0–1 and 5–6 ft below bottom of drainline.	X	X	X	X	X	X	X	X	X	X	X

[a] X = Analysis will be performed.

[b] Selenium only.

[c] — = Analysis will not be performed.

[d] PAHs only.

[e] Cesium-137 only.

[f] 4-Isopropyltoluene only.

[g] Bis(2-ethylhexyl)phthalate only.

[h] Barium only.

[i] Aluminum, barium, calcium, cobalt, nickel, and vanadium only.

Table 4.2-46
Samples Collected and Analyses Requested at SWMU 46-004(u)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13044	46-611527	0–1	Soil	10-2546*	10-2545	10-2545	10-2545	10-2546	10-2546	10-2545	10-2547	10-2547	10-2547	10-2547	10-2547
RE46-10-13045	46-611527	1–2	Qbt 3	10-2546	10-2545	10-2545	10-2545	10-2546	10-2546	10-2545	10-2547	10-2547	10-2547	10-2547	10-2547
RE46-10-13046	46-611528	0–1	Soil	10-2546	10-2545	10-2545	10-2545	10-2546	10-2546	10-2545	10-2547	10-2547	10-2547	10-2547	10-2547
RE46-10-13047	46-611528	1–2	Qbt 3	10-2546	10-2545	10-2545	10-2545	10-2546	10-2546	10-2545	10-2547	10-2547	10-2547	10-2547	10-2547
RE46-10-13048	46-611529	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13049	46-611529	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13050	46-611530	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13051	46-611530	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13052	46-611531	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13053	46-611531	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13054	46-611532	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13055	46-611532	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13056	46-611533	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13057	46-611533	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13058	46-611534	0–1	Qbt 3	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13059	46-611534	1–2	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13060	46-611535	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13061	46-611535	1–2	Qbt 3	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13062	46-611536	0–1	Soil	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810
RE46-10-13063	46-611536	1–2	Qbt 3	10-1809	10-1808	10-1808	10-1808	10-1809	10-1809	10-1808	10-1810	10-1810	10-1810	10-1810	10-1810

*Analytical request number.

Table 4.2-47
Proposed Sampling at SWMU 46-004(u)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	PCBs
Define vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254	46-611527	5–6, 9–10	X[a,b]	X
	46-611528	5–6, 9–10	X[c]	—[d]
	46-611535	5–6, 9–10	X[e]	X
	46-611536	5–6, 9–10	X[f]	—

[a] X = Analysis will be performed.

[b] Copper, lead, selenium, thallium, and zinc only.

[c] Copper and selenium only.

[d] — = Analysis will not be performed.

[e] Chromium only.

[f] Barium, cobalt, and copper only.

Table 4.2-48
Samples Collected and Analyses Requested at SWMU 46-004(v)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-14229	46-611821	0–1	Soil	10-2543*	10-2542	10-2542	10-2542	10-2543	10-2543	10-2542	10-2544	10-2544	10-2544	10-2544	10-2544
RE46-10-14230	46-611821	1–2	Soil	10-2543	10-2542	10-2542	10-2542	10-2543	10-2543	10-2542	10-2544	10-2544	10-2544	10-2544	10-2544
RE46-10-14231	46-611822	0–1	Qbt 3	10-2543	10-2542	10-2542	10-2542	10-2543	10-2543	10-2542	10-2544	10-2544	10-2544	10-2544	10-2544
RE46-10-14232	46-611822	1–2	Qbt 3	10-2543	10-2542	10-2542	10-2542	10-2543	10-2543	10-2542	10-2544	10-2544	10-2544	10-2544	10-2544

*Analytical request number.

Table 4.2-49
Proposed Sampling at SWMU 04-004(v)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals
Define vertical extent of selenium and zinc	46-611821 46-611822	5–6, 9–10 5–6, 9–10	X[a,b] X[c]

[a] X = Analysis will be performed.

[b] Zinc only.

[c] Selenium only.

Table 4.2-50
Samples Collected and Analyses Requested at SWMU 46-004(x)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13006	46-611514	0–1	Soil	10-2487*	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13007	46-611514	1–2	Soil	10-2487	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13008	46-611515	0–1	Soil	10-2487	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13009	46-611515	1–2	Soil	10-2487	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13010	46-611516	0–1	Soil	10-2487	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13011	46-611516	1–2	Soil	10-2487	10-2486	10-2486	10-2486	10-2487	10-2487	10-2486	10-2488	10-2488	10-2488	10-2488	10-2488
RE46-10-13012	46-611517	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13013	46-611517	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13030	46-611526	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13031	46-611526	1–2	Soil	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833	10-1833

*Analytical request number.

Table 4.2-51
Proposed Sampling at SWMU 46-004(x)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Isotopic Plutonium
Define vertical extent of copper and plutonium-239/240	46-611514 46-611526	5–6, 9–10 5–6, 9–10	—[a] X[c]	X[b] —

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Copper only.

Table 4.2-52
Samples Collected and Analyses Requested at SWMU 46-004(y)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13014	46-611518	0–1	Soil	10-2472*	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13015	46-611518	1–2	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13016	46-611519	0–1	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13017	46-611519	1–2	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13018	46-611520	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13019	46-611520	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13020	46-611521	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13021	46-611521	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13022	46-611522	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13023	46-611522	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13024	46-611523	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835

Table 4.2-52 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13025	46-611523	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13026	46-611524	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13027	46-611524	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13028	46-611525	0–1	Qbt 3	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13029	46-611525	1–2	Qbt 3	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835

*Analytical request number.

Table 4.2-53
Proposed Sampling at SWMU 46-004(y)

Sampling Objective	Location ID	Depth (ft bgs)	Perchlorate	VOCs	SVOCs	Isotopic Plutonium
Define vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240	46-611518 46-611519 46-611522	5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a] —[d] —	X[b] — X[f]	X[c] X[e] —	X X —

[a] X = Analysis will be performed.

[b] Trichloroethene only.

[c] Acenaphthene only.

[d] — = Analysis will not be performed.

[e] Benzo(a)anthracene and pyrene only.

[f] Acetone only.

Table 4.2-54
Samples Collected and Analyses Requested at SWMU 46-004(z)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12728	46-611468	0–1	Soil	10-2490*	10-2489	10-2489	10-2489	10-2490	10-2490	10-2489	10-2490	10-2490	10-2490	10-2490	10-2490
RE46-10-12729	46-611468	1–2	Soil	10-2490	10-2489	10-2489	10-2489	10-2490	10-2490	10-2489	10-2490	10-2490	10-2490	10-2490	10-2490
RE46-10-12730	46-611469	0–1	Soil	10-2490	10-2489	10-2489	10-2489	10-2490	10-2490	10-2489	10-2490	10-2490	10-2490	10-2490	10-2490
RE46-10-12731	46-611469	1–2	Soil	10-2490	10-2489	10-2489	10-2489	10-2490	10-2490	10-2489	10-2490	10-2490	10-2490	10-2490	10-2490
RE46-10-12732	46-611470	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12733	46-611470	1–2	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12734	46-611471	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12735	46-611471	1–2	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12736	46-611472	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12737	46-611472	1–2	Qbt 3	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12738	46-611473	0–1	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768
RE46-10-12739	46-611473	1–2	Qbt 3	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1768	10-1768	10-1768	10-1768	10-1768

*Analytical request number.

Table 4.2-55
Proposed Sampling at SWMU 46-004(z)

Sampling Objective	Location ID	Depth (ft bgs)	Perchlorate	Isotopic Plutonium	Isotopic Uranium
Define vertical extent of perchlorate, plutonium-239/240, uranium-234, and uranium-235/236	46-611468 46-611469 46-611471	5–6, 9–10 5–6, 9–10 5–6, 9–10	—[a] — X	— X —	X[b] — —

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

Table 4.2-56
Samples Collected and Analyses Requested at SWMU 46-005

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13673	46-611628	0–1	Soil	10-3106*	10-3106	10-3105	10-3105	10-3105	10-3106	10-3106	10-3106	10-3105	10-3106	10-3106	10-3106	10-3106
RE46-10-13674	46-611628	2–3	Soil	10-3106	10-3106	10-3105	10-3105	10-3105	10-3106	10-3106	10-3106	10-3105	10-3106	10-3106	10-3106	10-3106
RE46-10-13675	46-611629	0–1	Soil	10-3106	10-3106	10-3105	10-3105	10-3105	10-3106	10-3106	10-3106	10-3105	10-3106	10-3106	10-3106	10-3106
RE46-10-13676	46-611629	2–3	Soil	10-3106	10-3106	10-3105	10-3105	10-3105	10-3106	10-3106	10-3106	10-3105	10-3106	10-3106	10-3106	10-3106
RE46-10-13677	46-611630	0–1	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13678	46-611630	2–3	Qbt 3	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13679	46-611631	0–1	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13680	46-611631	2–3	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13681	46-611632	0–1	Soil	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13682	46-611632	5–6	Qbt 3	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13683	46-611633	0–1	Soil	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13684	46-611633	5–6	Qbt 3	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13685	46-611634	0–1	Soil	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13686	46-611634	5–6	Qbt 3	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13687	46-611635	0–1	Soil	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13688	46-611635	5–6	Qbt 3	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13689	46-611636	0–1	Qbt 3	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13690	46-611636	5–6	Qbt 3	10-3169	10-3169	10-3168	10-3168	10-3168	10-3169	10-3169	10-3169	10-3168	10-3170	10-3170	10-3170	10-3170
RE46-10-13691	46-611637	0–1	Soil	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13692	46-611637	3–4	Soil	10-3178	10-3178	10-3177	10-3177	10-3177	10-3178	10-3178	10-3178	10-3177	10-3179	10-3179	10-3179	10-3179
RE46-10-13693	46-611638	0–1	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13694	46-611638	3–4	Qbt 3	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13695	46-611639	0–1	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13696	46-611639	2–3	Soil	10-3145	10-3145	10-3144	10-3144	10-3144	10-3145	10-3145	10-3145	10-3144	10-3146	10-3146	10-3146	10-3146
RE46-10-13697	46-611640	0–1	Soil	10-3190	10-3190	10-3189	10-3189	10-3189	10-3190	10-3190	10-3190	10-3189	10-3190	10-3190	10-3190	10-3190
RE46-10-13698	46-611640	1–2	Soil	10-3190	10-3190	10-3189	10-3189	10-3189	10-3190	10-3190	10-3190	10-3189	10-3190	10-3190	10-3190	10-3190
RE46-10-13699	46-611641	0–1	Soil	10-3190	10-3190	10-3189	10-3189	10-3189	10-3190	10-3190	10-3190	10-3189	10-3190	10-3190	10-3190	10-3190
RE46-10-13700	46-611641	1–2	Soil	10-3190	10-3190	10-3189	10-3189	10-3189	10-3190	10-3190	10-3190	10-3189	10-3190	10-3190	10-3190	10-3190

*Analytical request number.

Table 4.2-57
Proposed Sampling at SWMU 46-005

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Cesium	SVOCs	Gamma-Emitting Radionuclides
Define vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137	46-611628	5–6, 9–10	—[a]	X[b]	—	—
	46-611629	5–6, 9–10	—	X	—	—
	46-611630	5–6, 9–10	X[c]	—	—	—
	46-611631	5–6, 9–10	—	X	X[d]	—
	46-611632	9–10, 14–15	X[c]	—	—	—
	46-611633	9–10, 14–15	X[c]	—	X[d]	—
	46-611634	9–10, 14–15	X[c]	—	—	—
	46-611635	9–10, 14–15	X[c]	—	—	—
	46-611636	9–10, 14–15	X[c]	X	—	—
	46-611637	6–7, 10–11	—	X	X[d]	—
	46-611638	6–7, 10–11	X[c]	—	X[d]	—
	46-611640	5–6, 9–10	X[e]	X	X[d]	X[f]
	46-611641	5–6, 9–10	—	X	X[d]	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Selenium only.

[d] Bis(2-ethylhexyl)phthalate only.

[e] Mercury only.

[f] Cesium-137 only.

Table 4.2-58
Samples Collected and Analyses Requested at SWMU 46-006(c)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11590	46-611298	0–1	Soil	10-1348*	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1347	10-1349	10-1349	10-1349	10-1349	10-1349
RE46-10-11591	46-611298	3–4	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11592	46-611299	0–1	Soil	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605
RE46-10-11593	46-611299	3–4	Qbt 3	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605	10-1605
RE46-10-11594	46-611300	0–1	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11595	46-611300	2–3	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11596	46-611301	0–1	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11597	46-611301	2–3	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11598	46-611302	0–1	Soil	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11599	46-611302	2–3	Qbt 3	10-1351	10-1350	10-1350	10-1350	10-1351	10-1351	10-1350	10-1350	10-1352	10-1352	10-1352	10-1352	10-1352
RE46-10-11600	46-611303	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11601	46-611303	2–3	Qbt 3	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11602	46-611304	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11603	46-611304	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11604	46-611305	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11605	46-611305	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11606	46-611306	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366
RE46-10-11607	46-611306	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1364	10-1366	10-1366	10-1366	10-1366	10-1366

*Analytical request number.

Table 4.2-59
Proposed Sampling at SWMU 46-006(c)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	VOCs	PCBs	TPH-DRO	Gamma-Emitting Radionuclides	Isotopic Plutonium
Define vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240	46-611298	5–6, 9–10	—[a]	X[b,c]	X	X	X[d]	X
	46-611300	5–6, 9–10	—	—	—	—	—	X
	46-611301	5–6, 9–10	—	—	—	X	—	—
	46-611302	5–6, 9–10	X[e]	—	—	—	—	—
	46-611303	5–6, 9–10	—	—	—	X	—	—
	46-611306	5–6, 9–10	—	—	X	X	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Acetone and 2-butanone only.

[d] Cesium-137 only.

[e] Barium only.

Table 4.2-60
Samples Collected and Analyses Requested at SWMU 46-006(d)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13321	46-611568	0–1	Soil	10-1991*	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13322	46-611568	4–5	Qbt 3	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13323	46-611569	0–1	Soil	10-1965	10-1964	10-1964	10-1964	10-1965	10-1965	10-1964	10-1966	10-1966	10-1966	10-1966	10-1966
RE46-10-13324	46-611569	4–5	Qbt 3	10-1965	10-1964	10-1964	10-1964	10-1965	10-1965	10-1964	10-1966	10-1966	10-1966	10-1966	10-1966
RE46-10-13325	46-611570	0–1	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13326	46-611570	4–5	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13327	46-611571	0–1	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13328	46-611571	4–5	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13329	46-611572	0–1	Soil	10-2035	10-2034	10-2034	10-2034	10-2035	10-2035	10-2034	10-2035	10-2035	10-2035	10-2035	10-2035
RE46-10-13330	46-611572	1–2	Soil	10-2035	10-2034	10-2034	10-2034	10-2035	10-2035	10-2034	10-2035	10-2035	10-2035	10-2035	10-2035
RE46-10-13331	46-611573	0–1	Soil	10-2035	10-2034	10-2034	10-2034	10-2035	10-2035	10-2034	10-2035	10-2035	10-2035	10-2035	10-2035
RE46-10-13332	46-611573	1–2	Soil	10-2035	10-2034	10-2034	10-2034	10-2035	10-2035	10-2034	10-2035	10-2035	10-2035	10-2035	10-2035
RE46-10-13333	46-611574	0–1	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13334	46-611574	1–2	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13335	46-611575	0–1	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13336	46-611575	1–2	Soil	10-1991	10-1990	10-1990	10-1990	10-1991	10-1991	10-1990	10-1992	10-1992	10-1992	10-1992	10-1992
RE46-10-13337	46-611576	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13338	46-611576	1–2	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13339	46-611577	0–1	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13340	46-611577	1–2	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13341	46-611578	0–1	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13342	46-611578	1–2	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13343	46-611579	0–1	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13344	46-611579	1–2	Soil	10-2016	10-2015	10-2015	10-2015	10-2016	10-2016	10-2015	10-2017	10-2017	10-2017	10-2017	10-2017
RE46-10-13345	46-611580	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13346	46-611580	1–2	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13347	46-611581	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13348	46-611581	1–2	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13349	46-611582	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13350	46-611582	1–2	Qbt 3	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13351	46-611583	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066

Table 4.2-60 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13352	46-611583	1–2	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13353	46-611584	0–1	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13354	46-611584	1–2	Soil	10-3067	10-3060	10-3060	10-3060	10-3067	10-3067	10-3060	10-3066	10-3066	10-3066	10-3066	10-3066
RE46-10-13355	46-611585	0–1	Soil	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578
RE46-10-13356	46-611585	1–2	Qbt 3	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578
RE46-10-13357	46-611586	0–1	Soil	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578
RE46-10-13358	46-611586	1–2	Qbt 3	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578
RE46-10-13359	46-611587	0–1	Soil	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578
RE46-10-13360	46-611587	1–2	Qbt 3	10-2577	10-2576	10-2576	10-2576	10-2577	10-2577	10-2576	10-2578	10-2578	10-2578	10-2578	10-2578

*Analytical request number.

Table 4.2-61
Proposed Sampling at SWMU 46-006(d)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Perchlorate	VOCs	SVOCs	PCBs	TPH-DRO	Gamma-Emitting Radionuclides	Isotopic Plutonium	Isotopic Uranium
Define vertical extent of barium, calcium, mercury, perchlorate, silver, acenaphthene, acetone, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238, and perform TPH-DRO analyses inadvertently omitted during 2010 investigation at all locations	46-611568	0–1, 4–5, 9–10	—[a]	—	—	—	—	X[b]	—	—	—
	46-611569	0–1, 4–5, 9–10	—	—	—	—	—	X	—	—	—
	46-611570	0–1, 4–5, 9–10, 14–15	—	—	X[c]	X[d]	—	X	—	—	—
	46-611571	0–1, 4–5, 9–10	—	—	—	—	—	X	—	—	—
	46-611572	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611573	0–1, 1–2, 5–6, 9–10	X[e]	X	X[f]	X[g]	X	X	X[h]	—	—
	46-611574	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611575	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611576	0–1, 1–2, 5–6, 9–10	X[i]	—	—	—	—	X	—	—	—
	46-611577	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611578	0–1, 1–2, 5–6, 9–10	—	X	—	—	—	X	—	—	—
	46-611579	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611580	0–1, 1–2, 5–6, 9–10	—	X	—	—	—	X	—	—	—
	46-611581	0–1, 1–2, 5–6, 9–10	—	X	—	X[j]	—	X	—	—	—
	46-611582	0–1, 1–2, 5–6, 9–10	—	—	—	—	—	X	—	—	X
	46-611583	0–1, 1–2, 5–6, 9–10	—	—	—	—	—	X	—	X	—
	46-611584	0–1, 1–2, 5–6, 9–10	—	X	—	X[g]	—	X	—	—	—
	46-611585	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611586	0–1, 1–2, 9–10	—	—	—	—	—	X	—	—	—
	46-611587	0–1, 1–2, 5–6, 9–10	X[k]	—	—	—	—	X	—	—	—

[a] — = Analysis will not be performed.
[b] X = Analysis will be performed.
[c] Acetone only.
[d] Fluoranthene, phenanthrene, and pyrene only.
[e] Silver only.
[f] Acetone, 2-butanone, and 4-isopropyltoluene only.
[g] Acenaphthene, chrysene, fluoranthene, phenanthrene, and pyrene only.
[h] Cesium-137 only.
[i] Mercury only.
[j] PAHs only.
[k] Barium and calcium only.

Table 4.2-62
Samples Collected and Analyses Requested at SWMU 46-006(f)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13775	46-611737	0–1	Soil	10-2313*	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13776	46-611737	3–4	Qbt 3	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13777	46-611738	0–1	Soil	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13778	46-611738	3–4	Qbt 3	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13779	46-611739	0–1	Soil	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13780	46-611739	2–3	Qbt 3	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13781	46-611740	0–1	Soil	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313
RE46-10-13782	46-611740	2–3	Qbt 3	10-2313	10-2314	10-2314	10-2314	10-2313	10-2313	10-2314	10-2314	10-2323	10-2313	10-2313	10-2313	10-2313

*Analytical request number.

Table 4.2-63
Proposed Sampling at SWMU 46-006(f)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals
Define vertical extent of chromium	46-611739	5–6, 9–10	X[a,b]

[a] X = Analysis will be performed.

[b] Chromium only.

Table 4.2-64
Samples Collected and Analyses Requested at SWMU 46-007

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13860	46-611754	0–1	Soil	10-2299*	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13861	46-611754	2–3	Qbt 3	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13863	46-611755	0–1	Soil	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13862	46-611755	2–3	Qbt 3	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13864	46-611756	0–1	Soil	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13865	46-611756	2–3	Qbt 3	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13866	46-611757	0–1	Soil	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13867	46-611757	2–3	Qbt 3	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13868	46-611758	0–1	Soil	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300
RE46-10-13869	46-611758	2–3	Qbt 3	10-2299	10-2299	10-2298	10-2298	10-2298	10-2299	10-2299	10-2298	10-2298	10-2300	10-2300	10-2300	10-2300

*Analytical request number.

Table 4.2-65
Proposed Sampling at SWMU 46-007

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Cesium	SVOCs	PCBs	Gamma-Emitting Radionuclides	Isotopic Plutonium
Define vertical extent of cesium, chromium, copper, lead, mercury, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, phenanthrene, pyrene, cesium-137, and plutonium 239/240	46-611754 46-611755 46-611757	5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] X[d] X[b]	—[c] X —	— X[e] X[g]	— X —	— X[f] —	— X —

[a] X = Analysis will be performed.

[b] Chromium only.

[c] — = Analysis will not be performed.

[d] Copper, lead, mercury only.

[e] Benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene only.

[f] Cesium-137 only.

[g] Benzo(a)pyrene and benzo(b)fluoranthene only.

Table 4.2-66
Samples Collected and Analyses Requested at SWMU 46-008(a)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11793	46-611338	0–1	Soil	10-1460*	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11794	46-611338	2–3	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11795	46-611339	0–1	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11796	46-611339	2–3	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11797	46-611340	0–1	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11798	46-611340	2–3	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11799	46-611341	0–1	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11800	46-611341	2–3	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11801	46-611342	0–1	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461
RE46-10-11802	46-611342	2–3	Soil	10-1460	10-1459	10-1459	10-1459	10-1460	10-1460	10-1459	10-1459	10-1461	10-1461	10-1461	10-1461

*Analytical request number.

Table 4.2-67
Proposed Sampling at SWMU 46-008(a)

Sampling Objective	Location ID	Depth (ft bgs)	TPH-DRO
Define vertical extent of TPH-DRO	46-611339 46-611340	5–6, 9–10 5–6, 9–10	X* X

*X = Analysis will be performed.

Table 4.2-68
Samples Collected and Analyses Requested at SWMU 46-008(b)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11313	46-611200	0–1	Soil	10-1293*	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11314	46-611200	2–3	Qbt 3	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11315	46-611201	0–1	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11316	46-611201	2–3	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11317	46-611202	0–1	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11318	46-611202	2–3	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11319	46-611203	0–1	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293
RE46-10-11320	46-611203	2–3	Soil	10-1293	10-1292	10-1292	10-1292	10-1293	10-1293	10-1292	10-1292	10-1293	10-1293	10-1293	10-1293	10-1293

*Analytical request number.

Table 4.2-69
Proposed Sampling at SWMU 46-008(b)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs	Gamma-Emitting Radionuclides	Isotopic Uranium
Define vertical extent of antimony, lead, selenium, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236	46-611200 46-611201 46-611202 46-611203	5–6, 9–10 5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] X[d] X[e] —	—[c] — X[f] X[h]	— — X[g] —	X — — —
Confirm removal of benzo(a)pyrene to industrial SSL to the north, south, east, and west of sampling location 46-611203	8b-1, 8b-2, 8b-3, 8b-4	0–1, 2–3 5–6, 9–10	—	X[i]	—	—

[a] X = Analysis will be performed.

[b] Selenium only.

[c] — = Analysis will not be performed.

[d] Lead only.

[e] Antimony only.

[f] 2,4-Dinitrotoluene, phenanthrene, and pyrene only.

[g] Cesium-137 only.

[h] Benzo(a)pyrene), dibenzofuran, 2-methylnaphthalene, and PAHs only.

[i] Benzo(a)pyrene only.

Table 4.2-70
Samples Collected and Analyses Requested at SWMU 46-008(d)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11803	46-611343	0–1	Soil	10-1373*	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11804	46-611343	2–3	Qbt 3	10-1373	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11805	46-611344	0–1	Soil	10-1373	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11806	46-611344	2–3	Qbt 3	10-1373	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11807	46-611345	0–1	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418
RE46-10-11808	46-611345	2–3	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418
RE46-10-11809	46-611346	0–1	Soil	10-1373	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11810	46-611346	2–3	Qbt 3	10-1373	10-1372	10-1372	10-1372	10-1373	10-1373	10-1372	10-1372	10-1373	10-1373	10-1373	10-1373
RE46-10-11811	46-611347	0–1	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418
RE46-10-11812	46-611347	2–3	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418
RE46-10-11813	46-611348	0–1	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418
RE46-10-11814	46-611348	2–3	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418

*Analytical request number.

Table 4.2-71
Proposed Sampling at SWMU 46-008(d)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs
Define vertical extent of copper, nickel, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene	46-611346 46-611348	5–6, 9–10 5–6, 9–10	—[a] X[d]	X[b,c] X[e]

[a] — = Analysis will not be performed
[b] X = Analysis will be performed.
[c] 2-Methylnaphthalene and PAHs only.
[d] Copper and nickel only.
[e] PAHs only.

Table 4.2-72
Samples Collected and Analyses Requested at SWMU 46-008(e)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11815	46-611349	0–1	Soil	10-1417*	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-11816	46-611349	2–3	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-11817	46-611350	0–1	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-11818	46-611350	2–3	Qbt 3	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-11819	46-611351	0–0.5	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-12048	46-611351	2–3	Qbt 3	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603
RE46-10-11821	46-611352	0–1	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-12050	46-611352	2–3	Qbt 3	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603
RE46-10-11823	46-611353	0–1	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-12049	46-611353	2–3	Qbt 3	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603
RE46-10-11825	46-611354	0–0.75	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-12047	46-611354	2–3	Qbt 3	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603
RE46-10-11827	46-611355	0–1	Soil	10-1417	10-1416	10-1416	10-1416	10-1417	10-1417	10-1416	10-1416	10-1418	10-1418	10-1418	10-1418	10-1418
RE46-10-12051	46-611355	2–3	Qbt 3	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603

*Analytical request number.

Table 4.2-73
Proposed Sampling at SWMU 46-008(e)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	TPH-DRO
Define vertical extent of calcium, chromium, and TPH-DRO	46-611349 46-611353 46-611354	5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] X[d] —	—[c] — X

[a] X = Analysis will be performed.

[b] Chromium only.

[c] — = Analysis will not be performed.

[d] Calcium only.

Table 4.2-74
Samples Collected and Analyses Requested at SWMU 46-008(f)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13192	46-611550	0–1	Soil	10-2103*	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13193	46-611550	3–4	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13194	46-611551	0–1	Soil	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13195	46-611551	2–3	Soil	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13196	46-611552	0–1	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13197	46-611552	2–3	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13199	46-611553	0–1	Soil	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13198	46-611553	3–4	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13201	46-611554	0–1	Soil	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13200	46-611554	3–4	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13203	46-611555	0–1	Soil	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264
RE46-10-13202	46-611555	3–4	Soil	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264	10-2264
RE46-10-13205	46-611556	0–1	Soil	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104
RE46-10-13204	46-611556	3–4	Qbt 3	10-2103	10-2102	10-2102	10-2102	10-2103	10-2103	10-2102	10-2102	10-2104	10-2104	10-2104	10-2104

*Analytical request number.

Table 4.2-75
Proposed Sampling at SWMU 46-008(f)

Sampling Objective	Location ID	Depth (ft bgs)	PCBs	TPH-DRO	Isotopic Uranium	Gamma Spectroscopy
Define vertical extent of Aroclor-1242, TPH-DRO, and uranium-235/236	46-611551	5–6, 9–10	X[a]	—[b]	—	X[c]
	46-611555	5–6, 9–10	—	X	X	—

[a] X = Analysis will be performed.

[b] — = Analysis will not be performed.

[c] Cesium-137 only.

Table 4.2-76
Samples Collected and Analyses Requested at SWMU 46-008(g)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Pesticides	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13797	46-611746	0–1	Soil	10-2262*	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13798	46-611746	2–3	Qbt 3	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13799	46-611747	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13800	46-611747	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13801	46-611748	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13802	46-611748	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13803	46-611749	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13804	46-611749	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13805	46-611750	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13806	46-611750	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13807	46-611751	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13808	46-611751	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13809	46-611752	0–1	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263
RE46-10-13810	46-611752	2–3	Soil	10-2262	10-2261	10-2261	10-2261	10-2262	10-2261	10-2260	10-2263	10-2263	10-2263	10-2263

*Analytical request number.

Table 4.2-77
Proposed Sampling at SWMU 46-008(g)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	SVOCs	PCBs	TPH-DRO
Define vertical extent of lead, 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, phenanthrene, and pyrene; and perform TPH-DRO analyses inadvertently omitted during 2010 investigation.	46-611746 46-611747 46-611748 46-611749 46-611750 46-611751 46-611752	0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10 0–1, 2–3, 5–6, 9–10	X[a,b] — — — — — —	—[c] — — X[d] — — —	— — X — — — —	X X X X X X X
Confirm removal of benzo(a)pyrene to industrial SSL the north, south, east, and west of sampling location 46-611752	8g-1, 8g-2, 8g-3, 8g-4	0–1, 1–2	—	X[e]	—	—

[a] X = Analysis will be performed.

[b] Lead only.

[c] — = Analysis will not be performed.

[d] PAHs only.

[e] Benzo(a)pyrene only

Table 4.2-78
Samples Collected and Analyses Requested at SWMU 46-009(a)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Pesticides	TPH-DRO	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-10012	46-610983	4–5	Soil	10-1230*	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10013	46-610983	9–10	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10014	46-610983	14–15	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10015	46-610984	4–5	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10016	46-610984	9–10	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10017	46-610984	14–15	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10018	46-610985	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10019	46-610985	9–10	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10020	46-610985	14–15	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10021	46-610986	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10022	46-610986	9–10	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10023	46-610986	14–15	Qbt 3	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10024	46-610987	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10025	46-610987	9–10	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10026	46-610987	14–15	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10027	46-610988	4–5	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10028	46-610988	9–10	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10029	46-610988	14–15	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10030	46-610989	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12029	46-610989	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10032	46-610990	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10033	46-610990	1–2	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10034	46-610991	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10035	46-610991	1–2	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10036	46-610992	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12027	46-610992	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10038	46-610993	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12028	46-610993	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10040	46-610994	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12026	46-610994	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10042	46-610995	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12025	46-610995	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10044	46-610996	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12024	46-610996	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523

Table 4.2-78 (continued)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Total Cyanide	Pesticides	TPH-DRO	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-10046	46-610997	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12023	46-610997	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10048	46-610998	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12022	46-610998	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523

*Analytical request number.

Table 4.2-79
Proposed Sampling at SWMU 46-009(a)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Anions	SVOCs	PCBs	TPH-DRO	Gamma-Emitting Radionuclides
Define vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, 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, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137. The steep slope at locations 46-610984, 46-610987, and 46-610988 prevents access by a drill rig; therefore, sample collection depths are limited to one depth interval.	46-610984	19–20	—[a]	X[b,c]	—	—	—	—
	46-610987	19–20	—	—	—	X	—	—
	46-610988	19–20	—	—	—	X	—	—
	46-610990	5–6, 9–10	—	—	X[d]	—	X	—
	46-610991	5–6, 9–10	—	X[c]	X[e]	—	—	—
	46-610996	5–6, 9–10	—	—	—	—	—	X[f]
	46-610997	5–6, 9–10	—	—	—	—	—	X[f]
	46-610998	5–6, 9–10	X[g]	—	—	—	—	—

[a] — = Analysis will not be performed.

[b] X = Analysis will be performed.

[c] Nitrate only.

[d] 2-Methylnaphthalene and PAHs only.

[e] PAHs only.

[f] Cesium-137 only.

[g] Zinc only.

Table 4.2-80
Samples Collected and Analyses Requested at SWMU 46-009(b)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-10066	46-610999	0–1	Soil	10-1272*	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10067	46-610999	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10068	46-611000	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10069	46-611000	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10070	46-611001	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10071	46-611001	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10072	46-611002	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10073	46-611002	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10074	46-611003	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10075	46-611003	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10076	46-611004	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10077	46-611004	2–3	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10078	46-611005	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10079	46-611005	1–2	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10080	46-611006	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10081	46-611006	1–2	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-10082	46-611007	0–1	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-12034	46-611007	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1523	10-1523	10-1523	10-1523
RE46-10-10084	46-611008	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-12033	46-611008	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1523	10-1523	10-1523	10-1523
RE46-10-10086	46-611009	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-12032	46-611009	1–2	Qbt 3	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1523	10-1523	10-1523	10-1523
RE46-10-10088	46-611010	0–1	Soil	10-1272	10-1271	10-1271	10-1271	10-1272	10-1272	10-1271	10-1273	10-1273	10-1273	10-1273
RE46-10-12030	46-611010	1–2	Soil	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531
RE46-10-10090	46-611011	0–0.5	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-12031	46-611011	1–2	Soil	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531	10-1531
RE46-10-10092	46-611012	0–1	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-10093	46-611012	1–2	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-10094	46-611013	0–1	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-10095	46-611013	1–2	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-10096	46-611014	0–1	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255
RE46-10-10097	46-611014	1–2	Soil	10-1254	10-1253	10-1253	10-1253	10-1254	10-1254	10-1253	10-1255	10-1255	10-1255	10-1255

*Analytical request number.

Table 4.2-81
Proposed Sampling at SWMU 46-009(b)

Sampling Objective	Location ID	Depth (ft bgs)	TAL Metals	Gamma-Emitting Radionuclides	Isotopic Plutonium
Define vertical extent of zinc, cesium-137, and plutonium-239/240	46-611007 46-611008 46-611010	5–6, 9–10 5–6, 9–10 5–6, 9–10	X[a,b] X[b] —	—[c] — X[d]	— — X

[a] X = Analysis will be performed.
[b] Zinc only.
[c] — = Analysis will not be performed.
[d] Cesium-137 only.

Table 4.2-82
Samples Collected and Analyses Requested at SWMU 46-010(d)

Sample ID	Location ID	Depth (ft bgs)	Media	TAL Metals	VOCs	SVOCs	PCBs	Total Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-12714	46-611463	0–1	Soil	10-1782*	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12715	46-611463	3–4	Soil	10-1767	10-1766	10-1766	10-1766	10-1767	10-1767	10-1766	10-1766	10-1768	10-1768	10-1768	10-1768
RE46-10-12716	46-611464	0–1	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12717	46-611464	3–4	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12718	46-611465	0–1	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12719	46-611465	2–3	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12720	46-611466	0–1	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12721	46-611466	2–3	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12722	46-611467	0–1	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783
RE46-10-12723	46-611467	2–3	Soil	10-1782	10-1781	10-1781	10-1781	10-1782	10-1782	10-1781	10-1781	10-1783	10-1783	10-1783	10-1783

*Analytical request number.

Table 4.2-83
Proposed Sampling at SWMU 46-010(d)

Sampling Objective	Location ID	Depth (ft bgs)	SVOCs
Define vertical extent of acenaphthene, anthracene, 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, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene	46-611463	5–6, 9–10	X[a,b]

[a] X = Analysis will be performed.

[b] 2-Methylnaphthalene and PAHs 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 (e.g., approximately 0.0–12.0 in.) soil or sediment samples. The spade-and-scoop method involves digging a hole to the desired depth, as prescribed in the sampling and analysis plan, and collecting a discrete grab sample. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is typically placed in a clean stainless-steel bowl for transfer into various sample containers.
Hand-Auger Sampling	This method is typically used for sampling soil or sediment at depths of less than 10.0–15.0 ft but may in some cases be used for collecting samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in. inside diameter), creating a vertical hole that can be advanced to the desired sampling depth. When the desired depth is reached, the auger is decontaminated before the hole is advanced to the sampling depth. The sample for VOC analysis is transferred immediately from the sampler to the sample container to minimize the loss of VOCs during the sample collection process. Containers for VOC samples are filled as completely as possible, leaving no or minimal headspace, and sealed with a Teflon-lined cap. The remaining sample material is transferred from the auger bucket to a stainless-steel sampling bowl before the various required sample containers are filled. Carbon-steel auger buckets may be used, particularly in cases where chromium and nickel are the primary constituents of interest and cross-contamination from stainless-steel equipment is a concern.
Handling, Packaging, and Shipping of Samples	Field team members seal and label samples before packing and ensure that the sample containers and the containers used for transport are free of external contamination. Field team members package all samples so as to minimize the possibility of breakage during transportation. After all environmental samples are collected, packaged, and preserved, a field team member transports the samples either to the SMO or to an SMO-approved radiation screening laboratory under COC. The SMO arranges to ship samples to the analytical laboratories. The field team member must inform the SMO and/or the radiation screening laboratory coordinator when levels of radioactivity are in the action-level or limited-quantity ranges.

Table 5.0-1 (continued)

Method	Summary
Sample Control and Field Documentation	The collection, screening, and transport of samples are documented on standard forms generated by the SMO. These include sample container labels and combined SCL/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. COC forms are completed and assigned to verify that the samples are not left unattended. Site attributes (e.g., former and proposed soil sampling locations, sediment sampling locations) are located by using a GPS. Horizontal locations will be measured to the nearest 0.5 ft. The survey results for this field event will be presented as part of the investigation report. Sample coordinates will be uploaded into the Sample Management Database.
Field Quality-Control Samples	Field quality-control samples are collected as follows. *Field duplicate*: At a frequency of 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, which is 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 are containers of certified clean sand that are opened and kept with the other sample containers during the sampling process.
Field Decontamination of Drilling and Sampling Equipment	Dry decontamination is the preferred method to minimize generating liquid waste. Dry decontamination may include using a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by using a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes. 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.
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 QA. Specific requirements for each sample are printed on the sample collection logs provided by the SMO (size and type of container [glass, amber glass, polyethylene, preservative, etc.]). All samples are preserved by placing them in insulated containers with ice to maintain a temperature of 4°C. Other requirements such as nitric acid or other preservatives may apply to different media or analytical requests.
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 the characterization approach for each waste stream managed. Waste characterization complies with on-site or off-site waste acceptance criteria. All stored IDW will be marked with appropriate signage and labels, as appropriate. Drummed IDW will be stored on pallets to prevent the containers from deteriorating. Generators are required to reduce the volume of waste generated as much as technically and economically feasible. Means to store, control, and transport each potential waste type and classification shall be determined before field operations that generate waste begin. A waste storage area will be established before waste is generated. Waste storage areas located in controlled areas of the Laboratory will be controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. Each container of waste generated will be individually labeled as to waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste shall be segregated by classification and compatibility to prevent cross-contamination. Appendix B describes the management of IDW.

Table 5.0-1 (continued)

Method	Summary
Geodetic Surveys	This method describes the procedure for coordinating and evaluating geodetic surveys and establishing QA and QC for geodetic survey data. The procedure covers evaluating geodetic survey requirements, preparing to perform a geodetic survey, performing geodetic survey field activities, preparing geodetic survey data for QA review, performing QA review of geodetic survey data, and submitting geodetic survey data.
Hollow-Stem Auger Drilling Methods	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 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. If samples are to be collected for VOC analysis, the sampler will be lined with brass sleeves. Immediately upon retrieval of the sampler, it will be opened and a sleeve from the desired depth interval will be collected for VOC analysis. The ends of the sleeve will immediately be covered with Teflon film and capped with plastic caps. Tape will then be used to seal the ends of the cap to the sleeve. Material from the remaining sleeves will then be field screened, visually inspected, and placed in a stainless-steel bowl. Samples for the remaining analysis will then be transferred to appropriate sample containers, depending upon the analytical method requirement.

Table 5.0-2
Summary of Analytical Methods

Analyte	Analytical Method
TAL metals	SW-846:6010B; SW-846:6020; SW-846:7471A (Mercury)
Cesium	SW-846:6020
Lithium	SW-846:6020
Total cyanide	EPA SW-846:9012A
Perchlorate	SW-846:6850
Anions	EPA 300
PCBs	SW-846:8082
Pesticides	SW-846:8081B
SVOCs	SW-846:8270C
VOCs	SW-846:8260B
TPH-DRO	SW-846:8015M
Americium-241	HASL-300:AM-241
Gamma-emitting radionuclides	EPA:901.1
Isotopic plutonium	HASL-300:ISOPU
Isotopic uranium	HASL-300:ISOU
Americium-241	HASL-300: AM241
pH	SW-846:9045C

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

AOC	area of concern
bgs	below ground surface
BV	background value
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
EPA	Environmental Protection Agency (U.S.)
FV	fallout value
GPS	global positioning system
HE	high explosives
ID	identification
IDW	investigation-derived waste
LANL	Los Alamos National Laboratory
MSW	municipal solid waste
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PID	photoionization detector
PPE	personal protective equipment
QA	quality assurance
QC	quality control
RFI	Resource Conservation and Recovery Act facility investigation
RPF	Record 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 Consolidation
TA	technical area
TAL	target analyte list
TPH	total petroleum hydrocarbon
VCP	vitrified clay pipe
VOC	volatile organic compound
WCSF	waste characterization strategy form

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 (QA/QC) parameters.

Appendix B

Management Plan for Investigation-Derived Waste

B-1.0 INTRODUCTION

This appendix describes how investigation-derived waste (IDW) generated during the Upper Cañada del Buey Aggregate Area Phase II investigation will be managed by Los Alamos National Laboratory (the Laboratory). IDW may include, but is not limited to, drill cuttings, excavated media, 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 (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.

Wastes will be characterized in accordance with an approved waste characterization strategy form (WCSF) per requirements of SOP-5238. The WCSF will provide detailed information on IDW characterization methods, management, containerization, and potential volumes. IDW characterization is completed through review of sampling 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 to NMED for approval.

All IDW will be containerized and placed in clearly marked, appropriately constructed waste accumulation areas. 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 Municipal Solid Waste

This waste stream consists of noncontact trash and debris and empty sample preservation containers. Municipal solid waste (MSW) will be stored in stored and characterized in accordance with the approved WCSF.

The Laboratory expects most of the noncontact waste to be designated as nonhazardous, nonradioactive MSW that will be disposed of in accordance with the approved WCSF. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.2 Drill Cuttings

This waste stream consists of soil and tuff chips generated by the drilling of boreholes to collect samples. Drill cuttings include excess core samples 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 for a receiving facility or if visual observations indicate additional contaminants may be present.

Cuttings will be land applied if they meet 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 disposed of in accordance with the approved WCSF. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.3 Excavated Environmental Media

Excavated environmental media will consist of soil and tuff removed to meet the proposed cleanup levels where cleanup is proposed. The excavated material will be field screened and examined for visible evidence of contamination during the excavation process. The excavated material will be placed in appropriate containers in accordance with the approved WCSF.

A minimum of one direct sample will be collected from each 50 yd^3 or each container of material excavated and will be submitted for laboratory analyses for the analytical suites specified in the WCSF. The Laboratory expects most of the excavated environmental media to be designated as nonhazardous, hazardous, industrial, or low-level radioactive waste that will be disposed of in accordance with the approved WCSF. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.4 Contact Waste

The contact waste stream consists of potentially contaminated materials that came in 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 approved 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, etc.). The Laboratory expects most of the contact waste to be designated as nonhazardous, nonradioactive waste that will be disposed of in accordance with the approved WCSF. Table B-2.0-1 presents the estimated volumes, characterization and management methods, and expected disposition of this waste stream.

B-2.5 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 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. The decontamination fluids will be characterized by direct sampling of the containerized waste for the suites specified in approved WCSF. The Laboratory expects most of these wastes to be nonhazardous liquid waste that will be sent to one of the Laboratory's wastewater treatment facilities in accordance with the approved 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
Municipal solid	MSW	1.5 yd^3	Acceptable knowledge	Plastic bags	Off-site municipal landfill
Drill cuttings	Industrial waste, nonhazardous, nonradioactive	<20 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, permitted off-site facility for which waste meets acceptance criteria, or Technical Area 54 (TA-54), Area G
Excavated environmental media	Industrial waste, nonhazardous, hazardous, low-level radioactive, nonradioactive	<20 yd^3	Analytical results from direct sampling of waste	On ground within site boundary or accumulation in 55-gal. drums, covered rolloff containers, or other appropriate containers	Permitted off-site facility for which waste meets acceptance criteria or 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	<10 gal.	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