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Investigation Report for Potrillo and Fence Canyons Aggregate Area, Revision 1



Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

This report presents the investigation activities at 27 solid waste management units (SWMUs) and areas of concern in the Potrillo and Fence Canyons Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Of the 27 sites, 16 are located in Technical Area 15 (TA-15) and 11 are located in TA-36. One site is a duplicate of another site and was not investigated. Seven of the sites are deferred per Table IV-2 of the Compliance Order on Consent, two sites are located within a deferred site and therefore are delayed, one site is delayed because of active open detonation site operations, and one site was sampled to support future corrective actions.

The objectives of this investigation are to define the nature and extent of contamination at 14 sites and, if defined, to determine whether the sites pose a potential unacceptable risk to human health or the environment; to characterize SWMU 15-004(f) to support future corrective actions and to determine if residual contamination poses an unacceptable risk based on an industrial scenario; and, for the 10 sites deferred and/or delayed, to determine if contamination is migrating from the site. This report presents the results of site characterization activities conducted during the 2010 investigation, as directed by the approved investigation work plan for the Potrillo and Fence Canyons Aggregate Area.

The 2010 investigation activities included removal of surface debris and confirmation sampling at SWMUs 15-008(a) and 36-006; excavation and remediation of Material Disposal Area N at SWMU 15-007(a); characterization sampling only at SWMU 36-001; and collection of soil, sediment, and rock samples from the surface to a maximum depth of 12 ft below ground surface at the remaining sites. Data from samples collected during the 2010 investigation were evaluated with data collected during previous investigations that meet current Laboratory data-quality requirements.

Sampling to determine the nature and extent of contamination was not conducted at the 10 sites that are deferred or delayed. Samples collected from drainages downgradient of these sites indicate concentrations of inorganic chemicals and organic chemicals and activities of radionuclides either decreased in the drainages or decreased downgradient in Potrillo or Fence canyons.

The sampling data presented in this report indicate the extent of contamination has not been defined at 14 sites investigated to determine nature and extent. The Laboratory will provide a Phase II investigation work plan to address the additional sampling required to complete characterization at these sites. Once additional data are available and extent is defined, human health and ecological risk screening assessments will be conducted to determine if the sites pose a potential unacceptable risk to human health and the environment. The Phase II investigation work plan will also include proposed corrective actions and additional sampling for SWMUs 15-004(f) and 36-001.

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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 ft to 7800 ft above mean sea level.

The Laboratory is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the Laboratory's effort is to ensure that past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the Laboratory is currently investigating sites potentially contaminated by past Laboratory operations. These sites are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

This investigation report addresses SWMUs and AOCs within the Potrillo and Fence Canyons Aggregate Area at the Laboratory (Figures 1.1-1 and 1.1-2; Plate 1). These sites are potentially contaminated with both hazardous and radioactive components. Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). The New Mexico Environment Department (NMED), pursuant to the New Mexico Hazardous Waste Act, regulates cleanup of hazardous wastes and hazardous constituents. DOE regulates cleanup of radioactive contamination, pursuant to DOE Order 5400.5, Radiation Protection of the Public and the Environment; DOE Order 435.1, Radioactive Waste Management; and DOE Order 458.1, Administrative Change 1, Radiation Protection of the Public and the Environment. Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to NMED in accordance with DOE policy.

1.1 General Site Information

The Potrillo and Fence Canyons Aggregate Area, primarily located in Technical Area 15 (TA-15), TA-36, and TA-71 at the Laboratory (Figures 1.1-1 and 1.1-2; Plate 1), consists of 18 SWMUs and 24 AOCs. Of these 42 sites, 15 have been previously investigated and/or remediated and have been approved for no further action (NFA). The remaining 27 SWMUs and AOCs were addressed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Historical details of previous investigations and data for all 42 sites are provided in the historical investigation report (HIR) for the Potrillo and Fence Canyons Aggregate Area (LANL 2009, 105251). This investigation report describes the investigation status and results from sampling activities conducted to date for the 27 sites. Table 1.1-1 lists the 27 sites and provides a brief description, summary of previous investigations, and investigation activities conducted in 2010 for each site.

1.2 Purpose of Investigation

Twenty-seven SWMUs and AOCs within the Potrillo and Fence Canyons Aggregate Area were addressed during the 2010 investigation because these sites are potentially contaminated with hazardous chemicals and/or radionuclides, and final assessments of site contamination, associated risks, and recommendations for additional corrective actions are incomplete. For each site, the objectives of the 2010 investigation were to (1) define the nature and extent of contamination, or for deferred, delayed

and/or active sites, to determine if contamination is migrating from the site; (2) determine whether current site conditions pose a potential unacceptable risk to human health or the environment; and (3) assess whether any additional sampling and/or corrective actions are required.

Sampling was conducted during the 2010 investigation at the remaining SWMUs and AOCs not previously approved for NFA in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Complete investigations were not conducted at 10 of the sites that are deferred per Table IV-2 of the Consent Order, delayed because they are located within a deferred site, or delayed because of ongoing site activities. Sampling was conducted at these 10 sites only to determine if contaminants are migrating from the sites.

All analytical data collected during the 2010 investigation activities are presented and evaluated in this report in conjunction with decision-level data from previous investigations. If nature and extent were defined during a historical investigation but the data have not been previously presented and evaluated for risk, the evaluation is performed in this report.

1.3 Document Organization

This report is organized into 10 sections, including this introduction, with multiple supporting appendixes. Section 2 provides details of the site conditions (surface and subsurface) of the aggregate area. Section 3 provides an overview of the scope of the activities performed during the implementation of the work plan. Section 4 describes the regulatory criteria used to evaluate potential risk to ecological and human receptors. Section 5 describes the data review methods. Sections 6 and 7 present an overview of the operational history of each site, historical releases, summaries of previous investigations, results of the field activities performed during the 2010 investigation, site contamination, evaluation of the nature and extent of contamination for TA-15 and TA-36, respectively. Section 8 presents the conclusions of the nature and extent of contamination for each technical area. Section 9 discusses recommendations based on applicable data. Section 10 includes a list of references cited and the map data sources used in all figures and plates.

Appendixes include acronyms, a metric conversion table, and definitions of the data qualifiers used in this report (Appendix A); field methods (Appendix B); investigation-derived waste (IDW) management (Appendix C); radiological survey results (Appendix D); geophysical survey results (Appendix E); analytical program descriptions and summaries of data quality (Appendix F); analytical suites and results and analytical reports (Appendix G) provided on DVD; and box plots and statistical comparisons (Appendix H). A risk-screening assessment appendix is not provided at this time because nature and extent are not defined for any of the sites.

2.0 AGGREGATE AREA SITE CONDITIONS

2.1 Surface Conditions

2.1.1 Soil

Soil on the Pajarito Plateau was initially mapped and described by Nyhan et al. (1978, 005702). The soil on the slopes between the mesa tops and canyon floors was mapped as mostly steep rock outcrops consisting of approximately 90% bedrock outcrop and patches of shallow, weakly developed colluvial soil. South-facing canyon walls are generally steep and usually have shallow soil in limited, isolated patches between rock outcrops. In contrast, the north-facing canyon walls generally have more extensive areas of shallow, dark-colored soil under thicker forest vegetation. The canyon floors generally contain poorly

developed, deep, well-drained soil on floodplain terraces or small alluvial fans (Nyhan et al. 1978, 005702).

The soil in the bottom of Potrillo and Fence Canyons consists of well-drained soil of the Totavi series. The Totavi series consists of deep, well-drained soil that formed in alluvium in canyon bottoms. The surface soil is a brown gravelly loamy sand, or sandy loam, with 15% to 20% gravel. The permeability of this soil is high, runoff is very slow, and erosion hazard rating is low (Nyhan et al. 1978, 005702, p. 31).

The eastern half of the top of Mesita del Potrillo is classified as rock outcrop, mesic land type, which is found on moderately sloping to steep mesa tops and edges and consists of about 65% tuff rock outcrop with small areas of very shallow undeveloped soil. The western half of the top of Mesita del Potrillo consists of very shallow to shallow, well-drained soil of the Hackroy series; a Hackroy rock outcrop complex; moderately deep, well-drained soil of the Nyjack series; and deep well-drained soil of the fine-loamy Typic Eutroboralfs (LANL 1994, 034756, p. 3-23). The surface layer of the Hackroy soil is a brown sandy loam or loam that has medium runoff and moderate erosion hazard. The Hackroy rock outcrop complex has moderate to severe erosion hazard and medium to high runoff (Nyhan et al. 1978, 005702, p. 25). The surface layer of the Nyjack soil is a brown loam, very fine sandy loam, or sandy loam. This soil has moderate permeability, slow runoff, and slight erosion hazard (Nyhan et al. 1978, 005702, p. 25). The surface layer of the fine-loamy Typic Eutroboralfs soil is a very dark grayish brown loam, sandy loam, or very fine sandy loam. This soil exhibits slow runoff and moderate erosion hazard (Nyhan et al. 1978, 005702, p. 32).

2.1.2 Surface Water

Most surface water in the Los Alamos area occurs as ephemeral, intermittent, or interrupted streams in canyons cut into the Pajarito Plateau. Springs on the flanks of the Jemez Mountains, west of the Laboratory's western boundary, supply flow to the upper reaches of Cañon de Valle and to Guaje, Los Alamos, Pajarito, and Water canyons (Purtymun 1975, 011787; Stoker 1993, 056021). These springs discharge water perched in the Bandelier Tuff and Tschicoma Formation at rates from 2 to 135 gal./min (Abeele et al. 1981, 006273). The volume of flow from the springs maintains natural perennial reaches of varying lengths in each of the canyons.

Mesas of the Pajarito Plateau are generally dry, both on the surface and within the bedrock forming the mesas. The surface water and alluvial groundwater hydrology of the south canyons watersheds is related to several primary factors, including the location and discharge volume of natural and anthropogenic water sources, seasonal events (e.g., snowmelt runoff and stormwater runoff), and general regional climatic conditions. Surface water flow in the south canyons system is generally ephemeral and occurs primarily as short-duration stormwater runoff. Locally persistent surface water has been observed in bedrock pools or where alluvial groundwater discharges from springs or seeps. Intermittent flow also occurs during snowmelt runoff or is associated with the discharge of alluvial groundwater from stream beds. Surface water supports small wetlands in three locations in the south canyons watersheds: in Fishladder Canyon, in S-Site Canyon, and in an additional mesa-top location in TA-16 (USACE 2005, 092220).

Most stream channels that drain the south canyons watersheds are dry for most of the year and are characterized by ephemeral or intermittent flow with only localized areas of perennial flow. In the south canyons watersheds, only Cañon de Valle and Water Canyon support perennial flow. Perennial flow is derived from springs in the eastern Jemez Mountains or the western Pajarito Plateau, but the volume is insufficient to maintain surface flows across the Laboratory before the water is depleted by evaporation, transpiration, and infiltration (LANL 2005, 091523, p. 24). In Water Canyon, snowmelt runoff can extend

from the Jemez Mountains to the Rio Grande following heavy winter snowfalls. Stormwater runoff also occasionally extends across the Laboratory to the Rio Grande in the south canyons but is transient and associated with heavy rainfall events.

The mesa-top portion of the Potrillo and Fence Canyons Aggregate Area is currently an industrially developed area. No natural surface water is present in this area. During summer thunderstorms and spring snowmelt, runoff flows from the mesa top down the hillsides and into the ephemeral streams in Potrillo and Fence canyons. Surface runoff from the mesa top enters both canyons by way of several drainages (LANL 1992, 007672).

Potrillo Canyon has a relatively small drainage area (3.4 mi^2) that originates at TA-15 at an elevation of approximately 7280 ft. The canyon extends southeast from TA-15 to the Rio Grande for a distance of approximately 6.5 mi. Stream flow in Potrillo Canyon is ephemeral and results primarily from natural runoff. The Potrillo Canyon watershed has no perennial springs or tributaries on Laboratory property (LANL 1997, 055622, p. 3-27). Fence Canyon also has a small drainage (1.1 mi^2) that originates near the boundary between TA-36 and TA-68 at an elevation of approximately 7094 ft. The canyon extends southeast before joining Potrillo Canyon in TA-71. Stream flow in Fence Canyon is ephemeral and results primarily from natural runoff. The Fence Canyon watershed has no perennial springs or tributaries on Laboratory property (LANL 1997, 055622, p. 3-27).

2.1.3 Land Use

Currently, land use of the Potrillo and Fence Canyons Aggregate Area is industrial. TA-15 has been used since the 1940s, and TA-36 has been used from the 1950s to the present for explosive experiments. The TAs are remote, with small office and Laboratory buildings, utilities, paved and unpaved roads, and firing site structures scattered throughout the area. Most of the sites in this aggregate area are located on the mesa top of Mesita del Potrillo on the northern and southern edges of Potrillo Canyon. The Lower Slobbovia Firing Site, also known as the Skunk Works Firing Site, and three burn pits in central TA-36 are located in Potrillo Canyon. Fence Canyon borders the southern half of TA-36. TA-15 and TA-36 are located within the high explosives (HE) areas, and access is controlled and restricted to Laboratory badge holders. Public access is controlled through physical and administrative controls such as fencing and access control.

2.2 Subsurface Conditions

2.2.1 Stratigraphic Units of the Bandelier Tuff

The stratigraphy of the Potrillo and Fence Canyons Aggregate Area is summarized in this section. Additional information on the geologic setting of the area and information on the Pajarito Plateau can be found in the hydrogeologic conceptual site model for the Laboratory (LANL 2010, 109830).

The bedrock at or near the surface of the mesa top is the Bandelier Tuff (Qbt). There are approximately 1250 ft of volcanic and sedimentary materials between any potential contaminant-bearing units at the mesa-top surface and the regional aquifer. The stratigraphic units encountered during investigation of the Potrillo and Fence Canyons Aggregate Area are described briefly in the following sections. The descriptions begin with the oldest (deepest) and proceed to the youngest (topmost). The stratigraphic units encountered during the Potrillo and Fence Canyons Aggregate Area investigation were Qbt 4, Qbt 3, and Qbt 2 of the Tshirege Member of the Bandelier Tuff (LANL 2010, 109830). Stratigraphic units comprising the Bandelier Tuff are shown in Figure 2.2-1.

2.2.1.1 Guaje Pumice Bed

The Guaje Pumice Bed occurs at the base of the Otowi Member, making a significant and extensive marker horizon. The Guaje Pumice Bed (Bailey et al. 1969, 021498; Self et al. 1986, 021579) contains well-sorted pumice fragments whose mean size varies between 0.8 and 1.6 in. Its thickness averages approximately 28 ft below most of the Pajarito Plateau, with local areas of thickening and thinning. Its distinctive white color and texture make it easily identifiable in borehole cuttings and core, and it is an important marker bed for the base of the Bandelier Tuff.

2.2.1.2 Otowi Member

Griggs and Hem (1964, 092516), Smith and Bailey (1966, 021584), Bailey et al (1969, 021498), and Smith et al. (1970, 009752) described the Otowi Member. It consists of moderately consolidated (indurated), porous, and nonwelded vitric tuff (ignimbrite) that forms gentle colluvium-covered slopes along the base of canyon walls. The Otowi ignimbrites contain light gray to orange pumice that is supported in a white to tan ash matrix (Broxton et al. 1995, 050121; Broxton et al. 1995, 050119; Goff 1995, 049682). The ash matrix consists of glass shards, broken pumice, crystal fragments, and fragments of perlite.

2.2.1.3 Tephra and Volcaniclastic Sediment of the Cerro Toledo Interval

The Cerro Toledo interval is an informal name given to a sequence of volcaniclastic sediment and tephra of mixed provenance that separates the Otowi and Tshirege Members of the Bandelier Tuff (Broxton et al. 1995, 050121; Broxton and Reneau 1995, 049726; Goff 1995, 049682). Although it is located between the two members of the Bandelier Tuff, it is not considered part of that formation (Bailey et al. 1969, 021498). The unit contains primary volcanic deposits described by Smith et al. (1970, 009752) as well as reworked volcaniclastic sediment. The occurrence of the Cerro Toledo interval is widespread; however, its thickness is variable, ranging between several feet to more than 100 ft.

The predominant rock types in the Cerro Toledo interval are rhyolitic tuffaceous sediment and tephra (Heiken et al. 1986, 048638; Stix et al. 1988, 049680; Broxton et al. 1995, 050121; Goff 1995, 049682). The tuffaceous sediment is the reworked equivalent of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate at least two periods of soil development occurred within the Cerro Toledo deposits. Because the soil is rich in clay, it may act as a barrier to the movement of vadose zone moisture. Some of the deposits contain both crystal-poor and crystal-rich varieties of pumice. The pumice deposits tend to form porous and permeable horizons within the Cerro Toledo interval and locally may provide important pathways for moisture transport in the vadose zone. A subordinate lithology within the Cerro Toledo interval includes clast-supported gravel, cobble, and boulder deposits derived from the Tschicoma Formation (Broxton et al. 1995, 050121; Goff 1995, 049682; Broxton and Reneau 1996, 055429).

2.2.1.4 Tshirege Member

The Tshirege Member of the Bandelier Tuff is the upper member and is the most widely exposed bedrock unit of the Pajarito Plateau (Griggs and Hem 1964, 092516; Smith and Bailey 1966, 021584; Bailey et al. 1969, 021498; Smith et al. 1970, 009752). Emplacement of this unit occurred during eruptions of the Valles Caldera approximately 1.2 million years ago (Izett and Obradovich 1994, 048817; Spell et al. 1996, 055542). The Tshirege Member is a multiple-flow, ash-and-pumice sheet that forms the prominent cliffs in most of the canyons on the Pajarito Plateau. It is a cooling unit whose physical properties vary vertically and laterally. The consolidation in this member is largely from compaction and welding at high temperatures after the tuff was emplaced. Its light brown, orange-brown, purplish, and white cliffs have

numerous, mostly vertical fractures that may extend from several feet up to several tens of feet. The Tshirege Member includes thin but distinctive layers of bedded, sand-sized particles called surge deposits that demark separate flow units within the tuff. The Tshirege Member is generally over 200 ft thick.

The Tshirege Member differs from the Otowi Member most notably in its generally greater degree of welding and compaction. Time breaks between the successive emplacement of flow units caused the tuff to cool as several distinct cooling units. For this reason, the Tshirege Member consists of at least four cooling subunits that exhibit variable physical properties vertically and horizontally (Smith and Bailey 1966, 021584; Crowe et al. 1978, 005720; Broxton et al. 1995, 050121). The welding and crystallization variability in the Tshirege Member produce recognizable vertical variations in its properties, such as density, porosity, hardness, composition, color, and surface-weathering patterns. The subunits are mappable based on a combination of hydrologic properties and lithologic characteristics.

Broxton et al. (1995, 050121) provide extensive descriptions of the Tshirege Member cooling units. The following paragraphs describe, in ascending order, subunits of the Tshirege Member present at the Potrillo and Fence Canyons Aggregate Area.

The Tsankawi Pumice Bed forms the base of the Tshirege Member. Where exposed, it is commonly 20 to 30 in. thick. This pumice-fall deposit contains moderately well-sorted pumice lapilli (diameters reaching about 2.5 in.) in a crystal-rich matrix. Several thin ash beds are interbedded with the pumice-fall deposits.

Subunit Qbt 1g is the lowermost tuff subunit of the Tshirege Member. It consists of porous, nonwelded, and poorly sorted ash-flow tuff. This unit is poorly indurated but nonetheless forms steep cliffs because of a resistant bench near the top of the unit; the bench forms a harder protective cap over the softer underlying tuff. A thin (4 to 10 in.) pumice-poor surge deposit commonly occurs at the base of this unit.

Subunit Qbt 1v forms alternating clifflike and sloping outcrops composed of porous, nonwelded, crystallized tuff. The base of this unit is a thin horizontal zone of preferential weathering that marks the abrupt transition from glassy tuff below (in unit Qbt 1g) to the crystallized tuff above. This feature forms a widespread marker horizon (locally termed the vapor-phase notch) throughout the Pajarito Plateau. The lower part of Qbt 1v is orange-brown, resistant to weathering, and has distinctive columnar (vertical) joints; hence, the term “colonnade tuff” is appropriate for its description. A distinctive white band of alternating cliff- and slope-forming tuffs overlies the colonnade tuff. The tuff of Qbt 1v is commonly nonwelded (pumices and shards retain their initial equant shapes) and has an open, porous structure.

Unit Qbt 2 forms a distinctive medium-brown vertical cliff that stands out in marked contrast to the slope-forming, lighter-colored tuff above and below. It displays the greatest degree of welding in the Tshirege Member. A series of surge beds commonly mark its base. It typically has low porosity and permeability relative to the other units of the Tshirege Member.

Unit Qbt 3 is a nonwelded to partially welded, vapor-phase altered tuff that forms the upper cliffs. Its base consists of a purple-gray, unconsolidated, porous, and crystal-rich nonwelded tuff that forms a broad, gently sloping bench developed on top of Qbt 2. Abundant fractures extend through the upper units of the Bandelier Tuff, including the ignimbrite of Qbt 3 of the Tshirege. The origin of the fractures has not been fully determined, but the most probable cause is brittle failure of the tuff caused by cooling contraction soon after initial emplacement (Vaniman 1991, 009995.1; Wohletz 1995, 054404).

Unit Qbt 4 comprises a series of variably welded vitric to devitrified ash-flow tuffs characterized by localized thin, discontinuous, crystal-rich, fine- to coarse-grained, volcanic surge deposits. The lower, more indurated parts of Qbt 4 are also significantly fractured. These fractures and surge beds are potential groundwater pathways (LANL 2006, 091698).

2.2.2 Hydrogeology

The hydrogeology of the Pajarito Plateau is generally separable in terms of mesas and canyons forming the plateau. Mesas are generally devoid of water, both on the surface and within the rock forming the mesa. Canyons range from wet to relatively dry; the wettest canyons contain continuous streams and contain perennial groundwater in the canyon-bottom alluvium. Dry canyons have only occasional streamflow and may lack alluvial groundwater. Intermediate perched groundwater has been found at certain locations on the plateau at depths ranging between 100 and 700 ft. The regional aquifer is found at depths of about 600 to 1200 ft (Collins et al. 2005, 092028).

The hydrogeologic conceptual site model for the Laboratory (LANL 2010, 109830) shows that, under natural conditions, relatively small volumes of water move beneath mesa tops because of low rainfall, high evaporation, and efficient water use by vegetation. Atmospheric evaporation may extend into mesas, further inhibiting downward flow.

2.2.2.1 Groundwater

In the Los Alamos area, groundwater occurs as (1) water in shallow alluvium in some of the larger canyons, (2) intermediate perched groundwater (a perched groundwater body lies above a less permeable layer and is separated from the underlying aquifer by an unsaturated zone), and (3) the regional aquifer (Collins et al. 2005, 092028). Numerous wells have been installed at the Laboratory and in the surrounding area to investigate the presence of groundwater in these zones and to monitor groundwater quality.

The Laboratory formulated a comprehensive groundwater protection plan for an enhanced set of characterization and monitoring activities. The Laboratory's Interim Facility-Wide Groundwater Monitoring Plan (LANL 2010, 109830) details the implementation of extensive groundwater characterization across the Pajarito Plateau within an area potentially affected by past and present Laboratory operations.

Alluvial Groundwater

Intermittent and ephemeral streamflow in the canyons of the Pajarito Plateau have deposited alluvium that can be as thick as 100 ft. The alluvium in canyons of the Jemez Mountains is generally composed of sand, gravel, pebbles, cobbles, and boulders derived from the Tschicoma Formation and Bandelier Tuff. The alluvium in canyons of the Pajarito Plateau is finer grained, consisting of clay, silt, sand, and gravel derived from the Bandelier Tuff (Purtymun 1995, 045344).

In contrast to the underlying volcanic tuff and sediment, alluvium is relatively permeable. Ephemeral runoff in some canyons infiltrates the alluvium until downward movement is impeded by the less permeable tuff and sediment, which results in the buildup of a shallow alluvial groundwater body. Depletion by evapotranspiration and movement into the underlying rock limit the horizontal and vertical extent of the alluvial water (Purtymun et al. 1977, 011846). The limited saturated thickness and extent of the alluvial groundwater preclude its use as a viable source of water for municipal and industrial needs. Lateral flow of the alluvial perched groundwater is in an easterly, downcanyon direction (Purtymun et al. 1977, 011846).

Regional Aquifer

The regional aquifer for the Los Alamos area is the only aquifer capable of large-scale municipal water supply (Purtymun 1984, 006513). The surface of the regional aquifer rises westward from the Rio Grande

within the Santa Fe Group into the lower part of the Puye Formation beneath the central and western part of the Pajarito Plateau. The depths to groundwater below the mesa tops range between about 1200 ft along the western margin of the plateau and about 600 ft at the eastern margin. The locations of wells and the generalized water-level contours on top of the regional aquifer are described in the Interim Facility-Wide Groundwater Monitoring Plan (LANL 2010, 109830). The regional aquifer is typically separated from the alluvial groundwater and intermediate-perched groundwater by 350 to 620 ft of tuff, basalt, and sediment (LANL 1993, 023249).

Groundwater in the regional aquifer flows east-southeast toward the Rio Grande. The velocity of groundwater flow ranges from about 20 to 250 ft/yr (LANL 1998, 058841, pp. 2–7). Details of depths to the regional aquifer, flow directions and rates, and well locations are presented in various Laboratory documents (Purtymun 1995, 045344; LANL 1997, 055622; LANL 2000, 066802).

2.2.2.2 Vadose Zone

The unsaturated zone from the mesa surface to the top of the regional aquifer is referred to as the vadose zone. The source of moisture for the vadose zone is precipitation, but much of it runs off, evaporates, or is absorbed by plants. The subsurface vertical movement of water is influenced by properties and conditions of the materials that make up the vadose zone.

Although water moves slowly through the unsaturated tuff matrix, it can move rapidly through fractures if saturated conditions exist (Hollis et al. 1997, 063131). Fractures may provide conduits for fluid flow but probably only in discrete, disconnected intervals of the subsurface. Because they are open to the passage of both air and water, fractures can have both wetting and drying effects, depending on the relative abundance of water in the fractures and the tuff matrix.

The Bandelier Tuff is very dry and does not readily transmit moisture. Most of the pore spaces in the tuff are of capillary size and have a strong tendency to hold water against gravity by surface-tension forces. Vegetation is very effective at removing moisture near the surface. During the summer rainy season when rainfall is highest, near-surface moisture content is variable because of higher rates of evaporation and of transpiration by vegetation, which flourishes during this time.

The various units of the Bandelier Tuff tend to have relatively high porosities. Porosity ranges between 30% and 60% by volume, generally decreasing for more highly welded tuff. Permeability varies for each cooling unit of the Bandelier Tuff. The moisture content of native tuff is low, generally less than 5% by volume throughout the profile (Kearl et al. 1986, 015368; Purtymun and Stoker 1990, 007508).

3.0 SCOPE OF ACTIVITIES

This section presents an overview of field activities performed during the implementation of the approved investigation work plan for Potrillo and Fence Canyons Aggregate Area (LANL 2009, 106657.8; NMED 2009, 106677); field investigation results are presented in detail in sections 6 and 7 and in the Appendixes D and E. The scope of activities for the 2010 investigation included site access and premobilization activities; geodetic, geophysical, and radiological surveys; surface and shallow subsurface sampling; landfill excavation, and surface debris removal; health and safety monitoring; and waste management activities.

All activities were conducted in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). The applicable field methods are summarized below and are detailed in

Appendix B. Any deviations from the approved investigation work plan are noted in sections 6 and 7 and are described in detail in Appendix B.

3.1 Site Access and Premobilization Activities

The area encompassing the Potrillo and Fence Canyons Aggregate Area is currently used for Laboratory operations, and some areas are used by Laboratory personnel for road and foot traffic. Before field mobilization, the issue of Laboratory worker access (e.g., traffic control plan, notifications) was reviewed as part of the management self-assessment process. All efforts were made to provide a secure and safe work area and to reduce impacts to Laboratory personnel, cultural resources, and the environment.

3.2 Field Activities

The following sections describe the field activities conducted during the 2010 investigation, including surface surveys, field screening, surface and shallow subsurface sampling, landfill excavation, and surface debris and septic tank removals. Details regarding the field methods and procedures used to perform these field activities are presented in Appendix B.

3.2.1 Geodetic Survey

Geodetic surveys were conducted during the Potrillo and Fence Canyons Aggregate Area investigation to locate surface and subsurface sampling locations. Initial geodetic surveys were performed to establish and mark the planned sampling locations in the field. Geodetic surveys were conducted in accordance with Standard Operating Procedure (SOP) 5028, Coordinating and Evaluating Geodetic Surveys, using a Trimble 5700 differential global positioning system (GPS). The surveyed coordinates for all sampling locations are presented in Table 3.2-1. All geodetic coordinates are expressed as State Plane Coordinate System 1983, New Mexico Central, U.S.

3.2.2 Radiological Surveys

A radiological survey was performed at the site of two inactive landfills [SWMUs 15-007(a) and 36-001] to identify anomalies in order to locate and define the landfill boundaries, and at an inactive firing site [SWMU 15-004(f)] to identify all areas with elevated radioactivity from depleted uranium (DU) and radiologically contaminated metals. Multiple radiological instruments and methods were used to optimize the survey including a Trimble Pro XRS mapping-grade GPS, an Alpha Spectra Field Instrument for Detection of Low-Energy Radiation (FIDLER) detector, a Ludlum Model 44-10 2-in. by 2-in. sodium iodide detector, and a Ludlum Model 2221 ratemeter/scaler. Formal surveying was conducted over spatial control and data acquisition grids, which were established utilizing a GPS. Survey results at SWMU 15-007(a) showed a small area near the middle of the SWMU with elevated radiological readings above background. Survey results at SWMU 15-004(f) showed that the maximum count rates above background were located at the firing-site soil berms (mounds) and east of the mounds. Survey results at SWMU 36-001 showed four locations with values above background. Appendix D presents the radiological report with individual profile results.

3.2.3 Geophysical Surveys

A geophysical survey was performed at the site of two inactive landfills [SWMUs 15-007(a) and 36-001] to identify anomalies in order to locate and define the landfill boundaries. Multiple geophysical instruments and methods were used to optimize the survey, including a Geometrics Inc. G-858 magnetometer,

Geonics Ltd. EM-31 ground conductivity meter, Geonics Ltd. EM-61 high-resolution metal detector, Sensors & Software Ltd. 250 MHz ground-penetrating radar (GPR), and Advanced Geosciences, Inc. MiniSting Memory Earth resistivity and induced polarization meter. Formal surveying was conducted over spatial control and data acquisition grids, which were established utilizing a transit and tape. Survey results at SWMU 15-007(a) showed buried wastes and disturbed soil wider (east-west) and shorter (north-south) than the anticipated landfill boundaries. Survey results at SWMU 36-001 showed three distinct landfill trenches containing significant buried metal. Appendix E presents the geophysics report with individual profile results.

3.2.4 Field Screening

Field screening for organic vapors and radioactivity was conducted for health and safety purposes and to guide sampling if elevated readings were encountered. Field screening for metals and explosive compounds was performed in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677) to guide sample collection. The field-screening results are discussed below.

3.2.4.1 Organic Vapor

Environmental samples were field screened for headspace organic vapors with a MiniRAE 2000 photoionization detector equipped with an 11.7-electronvolt lamp. Calibration was performed in accordance with the manufacturer's specifications and SOP-06.33, Headspace Vapor Screening with a Photoionization Detector, and recorded in the field logbook. After it was collected, the sample was placed in a sealed plastic bag for approximately 5 min before it was screened. Screening measurements were recorded on the field sample collection logs (SCLs) and in the field logbook. The SCLs are provided on DVD in Appendix G. The organic vapor field-screening results are presented in Table 3.2-2. No additional samples were collected based on elevated organic vapor field-screening results.

3.2.4.2 Radioactivity

All samples collected were field screened for radioactivity before they were submitted to the Laboratory's Sample Management Office (SMO). A Laboratory radiation control technician (RCT) conducted radiological-screening using an Eberline E-600 radiation meter with an SHP-380AB alpha/beta scintillation detector held within 1 in. of the sample. All field results for alpha and beta/gamma radioactivity were recorded in disintegrations per minute (dpm) on the field SCL/chain of custody (COCs). The SCLs and COC forms are provided on DVD in Appendix G. The radiological-screening results are presented in Table 3.2-2.

If elevated radioactivity was encountered during field screening, samples were submitted to the American Radiation Services, Inc., laboratory in White Rock, New Mexico for gross-alpha, -beta, and -gamma analyses before shipment by the SMO to ensure compliance with U.S. Department of Transportation requirements.

3.2.4.3 Metals

All samples collected from SWMUs 15-004(b), 15-004(c), 15-007(a), 15-008(a), 36-001, and 36-006 were field screened for barium, copper, lead, and uranium using a handheld Thermo Fisher Scientific Niton XL3t 600 x-ray fluorescence (XRF) analyzer. A subset of the samples collected from SWMU 15-004(f) was also field screened for barium, copper, lead, and uranium using a handheld Thermo Fisher Scientific Niton XL3t 600 XRF analyzer. Calibration was performed in accordance with the manufacturer's

specifications and recorded in the field logbook. The metals-screening results are presented in Table 3.2-2 and Appendix B (Table B-3.0-1). Additional samples were collected if XRF results for barium, copper, lead, or uranium exceeded 2 times the background value (BV) of the sample matrix.

3.2.4.4 Explosive Compounds

All samples collected from SWMUs 15-002, 15-004(b), 15-004(c), 15-007(a), 15-008(a), 15-010(a), 36-001, 36-005, and 36-006 were field screened quantitatively for RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) and TNT (2,4,6-trinitrotoluene) using Strategic Diagnostics, Inc. ENSYS immunoassay test kits. A subset of samples collected from SWMU 15-004(f) was also field screened for RDX and TNT. The screening results for explosive compounds are presented in Table 3.2-2 and Appendix B (Table B-3.0-1). No TNT or RDX results exceeded industrial soil screening levels (SSLs) (NMED 2009, 108070); therefore, no additional samples were collected based on field screening for explosive compounds.

3.2.5 Surface and Shallow Subsurface Soil Investigation

Samples were collected according to the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Surface samples were collected using the spade-and-scoop method in accordance with SOP-06.09, Spade and Scoop Method for Collection of Soil Samples, or with a hand auger in accordance with SOP-06.10, Hand Auger and Thin-Wall Tube Sampler. The samples were collected in stainless-steel bowls and transferred to sample collection bottles with a stainless-steel spoon. No exploratory drilling characterization was conducted during the 2010 investigation; therefore, no borehole abandonment activities were conducted.

All surface and shallow subsurface samples were placed in appropriate sample containers and submitted to the analytical laboratory for the analyses specified by the approved investigation work plan. Standard quality assurance/quality control samples (field duplicates, field trip blanks, and rinsate blanks) were also collected in accordance with SOP-5059, Field Quality Control Samples.

All sample collection activities were coordinated with the SMO. After the samples were collected, they remained in the controlled custody of the field team at all times until they were delivered to the SMO. Sample custody was then relinquished to the SMO for delivery to a preapproved off-site analytical laboratory (SCLs and COC forms on DVD in Appendix G).

3.2.6 Landfill Excavation and Debris Pile Surface Removals

Remediation of the inactive landfill at SWMU 15-007(a) (Material Disposal Area [MDA] N) and confirmation sampling were completed in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). An excavator was used to remove concrete, soil and tuff, rebar, wire, and conduit pipe from the inactive landfill at SWMU 15-007(a). Following the removal and stockpiling of soil, tuff, concrete, and debris, confirmation samples were collected from 10 locations (LANL 2009, 106657.8; NMED 2009, 106677).

Removal of surface debris at the SWMU 15-008(a) surface disposal areas and confirmation sampling were completed in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Surface debris consisting of metal, concrete, cable, and wire was removed from two surface disposal areas; confirmation samples were collected from 12 locations.

During the 2010 investigation, the landfill at SWMU 36-001 (MDA AA) could not be removed because of unanticipated elevated radioactivity encountered during excavation of test pits and associated health and

safety issues. In lieu of conducting the excavation and removal of debris at SWMU 36-001, characterization samples were collected (LANL 2010, 111304; NMED 2010, 111464) (see section 7.2 and deviations in Appendix B).

Removal of surface debris at SWMU 36-006 surface disposal area and confirmation sampling were completed in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). A long-reach excavator was used to remove concrete, soil, rebar, pipe, and other metal debris from the hillslope; confirmation samples were collected from 11 locations.

Management of waste generated from the remediation activities described above, and associated IDW is described in Appendix C.

3.2.7 Septic Tank Removal

During the 2010 investigation, the decommissioned septic tank at SWMU 15-010(a) was not found at the location indicated in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Test pits were excavated at and around the anticipated location of the septic tank and confirmed that the septic tank was not present. Subsequent discussions with knowledgeable site personnel confirmed the septic tank had been removed. The excavation area was backfilled and characterization samples were collected from five locations associated with the former septic system (see deviations in Appendix B).

3.2.8 Equipment Decontamination

All field equipment that could have come in contact with potentially contaminated environmental media (e.g., hand augers, sampling scoops, bowls, breaker bars) was decontaminated between sample collection and between sampling locations to prevent cross-contamination of samples and sampling equipment. Decontamination was performed in accordance with SOP-5061, Field Decontamination of Equipment. Rinsate blanks were collected on sampling equipment to check the effectiveness of decontamination. The dry decontamination methods used are described in Appendix B. All field equipment and heavy equipment used in the posted beryllium areas at SWMUs 15-004(f), 15-008(a), and 36-001 also underwent dry decontamination and were swiped for beryllium before they were released from the site. Beryllium swipes were analyzed by Test America and equipment released from the site when detected concentrations of beryllium were at or below the beryllium release criteria of 0.2 µg/100 cm^2.

3.2.9 Chemical and Radiological Sample Analyses

All samples were shipped by the SMO to contract analytical laboratories for the requested analyses. The analyses requested were as specified by the approved work plan (LANL 2009, 106657.8; NMED 2009, 106677). The samples were analyzed for all or a subset of the following: target analyte list (TAL) metals, total cyanide, nitrate, perchlorate, volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), explosive compounds, dioxins/furans, polychlorinated biphenyls (PCBs), total petroleum hydrocarbons (TPH), isotopic uranium, isotopic thorium, isotopic plutonium , gamma-emitting radionuclides, and americium-241. Samples collected from SWMU 36-001 were also analyzed for gross-alpha/beta radioactivity, strontium-90, and toxicity characteristic leaching procedure (TCLP) metals.

3.2.10 Health and Safety Measures

All 2010 investigation activities were conducted in accordance with a site-specific health and safety plan (SSHASP) and an integrated work document that detailed work steps, potential hazards, hazard controls,

and required training to conduct work. These health and safety measures included using modified Level D personal protective equipment in areas where elevated radioactivity was expected and field monitoring for organic vapor, gross-alpha and gross-beta/gamma radiation, and dust-particulate matter using both portable and personal air-monitoring systems.

3.2.11 IDW Storage and Disposal

All IDW generated during the Potrillo and Fence Canyons Aggregate Area investigation was managed in accordance with SOP-5238, Characterization and Management of Environmental Program Waste. This procedure incorporates the requirements of all applicable U.S. Environmental Protection Agency (EPA) and NMED regulations, DOE orders, and Laboratory implementation requirements, policies, and/or procedures. IDW was also managed in accordance with the approved waste characterization strategy form (WCSF). Details of IDW management for the Potrillo and Fence Canyons Aggregate Area investigation are presented in Appendix C.

The waste streams associated with the investigation included contact waste; excavated environmental media consisting of overburden spoils of soil and rock removed from within or next to areas excavated; excavated man-made debris consisting of concrete, metal, wire, connectors, and miscellaneous metal; municipal solid waste; and spent explosives test kits consisting of spent solvent (acetone, water, and soil-crushed tuff). Each waste stream was containerized and placed in an accumulation area appropriate for the regulatory classification of the waste, in accordance with the approved WCSF (Appendix C).

3.3 Deviations

Deviations occurred while field activities were conducted as defined in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). The deviations resulted in a delay of the remediation at SWMU 36-001 and a delay in determining the nature and extent of contamination beneath the structures and drainline at SWMUs 15-009(e) and 36-003(b). Specific deviations are summarized in sections 6 and 7 and are described in Appendix B, section B-11.

4.0 REGULATORY CRITERIA

This section describes the criteria that will be used for evaluating potential risk to ecological and human receptors when nature and extent are defined for the Potrillo and Fence Canyons Aggregate Area AOCs and SWMUs. Regulatory criteria identified by medium in the Consent Order include cleanup standards, risk-based screening levels, and risk-based cleanup goals.

When nature and extent are defined, human health risk screening assessments will be conducted for the Potrillo and Fence Canyons Aggregate Area sites using NMED guidance (NMED 2009, 108070). Ecological risk screening assessments will be performed using Laboratory guidance (LANL 2004, 087630).

4.1 Current and Future Land Use

The specific screening levels used in the risk evaluation and corrective action decision process at a site depend on the current and reasonably foreseeable future land use. The current and reasonably foreseeable future land use for a site determines the receptors and exposure scenarios used to select screening and cleanup levels. The land use within and surrounding the Potrillo and Fence Canyons Aggregate Area is currently industrial and is expected to remain industrial for the reasonably foreseeable

future. The construction worker scenario will be evaluated because underground sewer lines are present near or within the boundaries of the consolidated units, and maintenance or repair on these lines is a reasonable possibility in the foreseeable future. The residential scenario will be evaluated per the Consent Order.

4.2 Screening Levels

Human health and ecological risk screening assessments were not conducted during the Potrillo and Fence Canyons Aggregate Area investigation because extent was not defined for any of the sites.

4.3 Cleanup Standards

As specified in the Consent Order, SSLs for inorganic and organic chemicals (NMED 2009, 108070) are used as soil cleanup levels unless they are determined to be impracticable or values do not exist for current and reasonably foreseeable future land use. Screening action levels (SALs) (LANL 2009, 107655) are used as soil cleanup levels for radionuclides. Screening assessments compare chemical of potential concern (COPC) concentrations for each site with industrial, residential, and construction worker SSLs and SALs.

The cleanup goals specified in Section VIII of the Consent Order are a target risk of 10^{-5} for carcinogens or a hazard index of 1 for noncarcinogens. For radionuclides, the target dose is 15 mrem/yr based on DOE guidance (DOE 2000, 067489). The SSLs/SALs that will be used in the risk-screening assessments once nature and extent are defined are based on these cleanup goals.

5.0 DATA REVIEW METHODOLOGY

The purpose of the data review is to identify COPCs for each SWMU and AOC in the Potrillo and Fence Canyons Aggregate Area where the nature and extent of contamination have been defined.

Extent is determined for inorganic chemicals and radionuclides by spatial analysis of detections above BVs or fallout values (FVs) and by detection for organic chemicals. For inorganic chemicals and radionuclides, statistical comparisons are performed, as described in section 5.2, to determine if concentrations are comparable with background and to aid in defining extent. Across a site, extent is defined for inorganic chemicals and radionuclides whose concentrations decreased with depth and distance from the AOC or SWMU, are below BVs/FVs, or maximum BVs for inorganic chemicals, or are not different from background.

Inorganic chemical data from the Potrillo and Fence Canyons Aggregate Area AOCs and SWMUs may include locations where samples were collected from both soil and tuff, which have different inorganic chemical BVs. Most inorganic chemicals in soil occur at a naturally higher background concentration than the same inorganic chemicals in tuff. Therefore, determining vertical extent requires analysis of the results tables provided in Appendix G in addition to the tables, figures, and plates where only inorganic chemicals above BVs are presented.

For inorganic chemicals and radionuclides detected at locations where the sample media change from soil to tuff with depth, decreasing trends can occur when the detected concentrations in the shallow soil sample are below the respective soil BV or FV but above the detected concentration in the deeper tuff sample. Because the inorganic and radionuclide data results in the shallow soil sample are below the respective soil BV or FV, those results are not presented in the tables, figures, and plates; therefore, the results tables in Appendix G (e.g., Tables G-1 and G-2) are referenced for clarification.

Concentrations of certain naturally occurring inorganic chemicals (e.g., nitrate) that do not have an established BV likely reflect naturally occurring concentrations and not a contaminant release.

For organic chemicals, extent is defined if concentrations decreased with depth and distance away from an AOC or SWMU. Organic chemicals detected at or below the estimated quantitation limit (EQL) for the analytical method are considered present at "trace" concentrations, and extent is defined.

All samples at sites where the operational history indicated dioxins and furans could have been produced were analyzed for dioxins and furans. Only one or a few of the samples collected were analyzed for dioxins and furans at sites where no evidence indicated operational history could have produced dioxins and furans. As a result, nature and extent are discussed only for sites where adequate dioxin and furan data are available. For sites with minimal dioxin and furan data, the discussion focuses on whether additional sampling and analysis of dioxins and furans are warranted.

For dioxins/furans, if the site data consist exclusively of the hepta- and octa- congeners, then the presence of these congeners does not reflect a release of dioxins and furans from the site. EPA's exposure and human health reassessment of 2,3,7,8-TCDD (tetrachlorodibenzodioxin) (http://www.epa.gov/ncea/pdfs/dioxin/nas-review/pdfs/part1_vol2/dioxin_pt1_vol2_ch03_dec2003.pdf) indicates these congeners predominate in rural and urban background soil. EPA further states that concentrations of the hepta- and octa- congeners are generally higher than the tetra-, penta-, and hexa-congeners in background soil. The lack of other detected congeners, particularly the penta- and tetra-congeners, indicates that a release associated with site activities has not occurred and the observed results are indicative of background conditions. Therefore, no additional sampling and analysis for dioxins/furans are warranted. However, detected dioxin and furan congeners are not eliminated as COPCs at a site and are retained for inclusion in the risk-screening assessments.

If the nature and extent of inorganic chemicals, organic chemicals, and/or radionuclides have been defined for a site, COPC identification is performed for that site. If nature and extent are not defined for all analytes, COPCs are not identified for that site and further investigation, including Phase II sampling, is recommended.

5.1 Identification of COPCs

Inorganic COPCs are identified by comparing site data with BVs (LANL 1998, 059730) or are based on detection status if no BVs are available. Organic chemicals are identified as COPCs based on detection status. Radionuclides are identified as COPCs based on comparisons to BVs or FVs or are based on detection status if no BVs or FVs are available.

For inorganic chemicals, data are evaluated by sample media to facilitate the comparison with media-specific background data. Background data are generally available for soil, sediment, and tuff (LANL 1998, 059730). However, some analytes (e.g., nitrate, perchlorate, and hexavalent chromium) have no BVs. A BV may be either a calculated value from the background data set (upper tolerance limit or the 95% upper confidence bound on the 95th quantile) or a detection limit (DL). When a BV is based on a DL, there is no corresponding background data set for that analyte/media combination.

To identify inorganic COPCs, the first step is to compare the sample result with the BV, if available. If sample results are above BVs and sufficient data are available (10 or more sample results), statistical tests are used to compare the site sample data with the background data set for the appropriate media. If statistical tests cannot be performed because of insufficient data (less than 10 samples) or a high percentage of nondetects, the sample results are compared with the BV and the maximum background concentration of the chemical in the appropriate media. If sample results are above the BV and the

maximum background concentration, the chemical is identified as a COPC. The same evaluation is performed using sample DLs when a constituent is not detected but has DLs above the BV. If no BV is available, detected inorganic chemicals are identified as COPCs.

Radionuclides are identified as COPCs based on comparisons to BVs for naturally occurring radionuclides or to FVs for fallout radionuclides. Isotopic thorium and isotopic uranium are naturally occurring radionuclides. Americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and tritium are fallout radionuclides. FVs apply only to surface soil samples (0 to 1 ft below ground surface [bgs]), so fallout radionuclides detected below 1 ft bgs are identified as COPCs. Fallout radionuclides in tuff are identified as COPCs based on detection status.

Sample media encountered during the Potrillo and Fence Canyons Aggregate Area investigation include soil (all soil horizons, designated by the media code ALLH or SOIL); fill material (media code FILL); alluvial sediment (media code SED), and Bandelier Tuff (media codes QBT 4, QBT 3, and QBT 2). Because no separate BVs are available for fill material, fill samples are evaluated by comparison with soil BVs (LANL 1998, 059730). The discussions of site contamination in soil include fill samples with soil samples in sample counts and comparisons with background.

5.2 Overview of Statistical Methods

A variety of statistical methods may be applied to each of the data sets but generally include distributional comparisons and box plots comparing site data with background data. In cases where no background data are available, fewer than 10 samples were analyzed for a specific constituent, or more than 80% of the site samples and background samples are nondetects, statistical tests are not valid. In such cases, COPC identification is based on detection status, direct comparison to the BV or FV (if one is available), and subsequent comparison to the maximum background concentration if it is greater than the BV or FV. If no BV or FV is available, the constituent is identified as a COPC if it was detected in any samples at the site.

Comparisons between site data sets and the Laboratory background data sets are performed using statistical methods when 10 or more sample results are available for the sample media. All comparisons begin with a simple comparison of site-specific data to media-specific BVs or FVs (LANL 1998, 059730). BV/FV comparisons are followed, when appropriate, by statistical tests that evaluate potential differences between the distributions. These tests are used for testing hypotheses about data from two potentially different distributions (e.g., a test of the hypothesis that site concentrations are different from background levels).

Nonparametric tests most commonly performed include the two-sample Wilcoxon Rank Sum test (the Wilcoxon test), the Gehan test (modification of the Wilcoxon test), and the quantile test (Gehan 1965, 055611; Gilbert and Simpson 1990, 055612). The Gehan test is best suited for assessing complete shifts in distributions, and accounts for nondetected concentrations at multiple DLs in a statistically robust manner. If the data have no nondetected concentrations, the Gehan test is equivalent to the Wilcoxon test. The quantile test is better suited for assessing shifts of a subset of the data. Most types of differences between distributions can be identified. Occasionally, if the differences between two distributions appear to occur far into the tails, the slippage test might be performed. This test evaluates the potential for some of the site data to be greater than the maximum concentration in the background data set if, in fact, the site data and background data came from the same distribution.

Observed significance levels (p-values) are obtained from the Gehan, quantile, or slippage tests. If a p-value is less than a specified probability (e.g., 0.05, a nominal significance level), then there is some reason to suspect that a difference exists between the distributions. If the p-value is greater than 0.05, no

difference is indicated. The standard set of tests is run whenever the detection rate for both the site data set and the Laboratory background data set is greater than 50%; if there are fewer than 50% detections in either set, then the Gehan test is not applicable. If all sample data are nondetects, statistical tests are not performed.

Paired tests are used to test whether site data are different from background. Specifically, the Gehan test (or the Wilcoxon Rank Sum test if all sample results are detects) is the preferred initial test. If the result of the Gehan test indicates that the site data are not different from background (i.e., $p > 0.05$), the quantile test is performed. Site data must pass (i.e., $p > 0.05$) both tests to eliminate an inorganic chemical as a COPC. If the p-value from either the Gehan (or Wilcoxon) or the quantile test is less than 0.05, the constituent is identified as a COPC for the specific medium tested. If the Gehan test is not applicable because either the site or background data set includes more than 50% nondetects, the quantile test is performed first. If the p-value from the quantile test is greater than 0.05, the slippage test is performed next. Again, the p-value from both tests must be greater than 0.05 to eliminate an inorganic chemical as a COPC. If the p-value from the first test is less than 0.05, indicating the site data are different from background, the second test does not need to be performed, and the inorganic chemical is identified as a COPC. Results of statistical tests are presented in Appendix H.

Box plots provide a visual representation of the data and may identify the presence of outliers or other anomalous data that might affect statistical results and interpretations. The plots allow a visual comparison between site and background concentration distributions. The plots are generally used in conjunction with the statistical tests (distributional comparisons) described above. A box plot consists of a box, a line across the box, whiskers (lines extended beyond the box and terminated with a short perpendicular line), and points outside the whiskers. The box area of the plot is the region between the 25th percentile and the 75th percentile of the data, which is the interquartile range or middle half of the data. The horizontal line within the box represents the median (50th percentile) of the data. The whiskers give an interval of 1.5 times the interquartile range, outside of which data may be evaluated for their potential to be outliers. The concentrations of individual samples are plotted as points overlaying the box plot. When a data set contains both detected and nondetected concentrations reported as DLs, the detected concentrations are plotted as Xs, and the nondetected concentrations are plotted as Os. The medium-specific BV is also illustrated by a dashed line in each box plot. All box plots are presented in Appendix H.

6.0 TA-15 BACKGROUND AND FIELD-INVESTIGATION RESULTS

6.1 Background TA-15

TA-15, also known as R-Site, occupies portions of Threemile Mesa on the Pajarito Plateau near the southwestern boundary of the Laboratory in a roughly rectangular area approximately 1.3 mi wide by 1.5 mi long. TA-15 occupies approximately 1200 acres and is bounded by TA-66 and TA-67 to the north, TA-14, TA-16, TA-37, and TA-49 to the west and south, and TA-36 to the east. The eastern portion of TA-15 is located within the Potrillo and Fence Canyons Aggregate Area; Potrillo Canyon intersects the eastern half of TA-15 (Figures 1.1-1 and 1.1-2; Plate 1).

6.1.1 Operational History

TA-15 has been used from the mid-1940s to the present for explosives experiments. In that capacity, test explosions ranging from a few kilograms of HE to as much as 650 kg were conducted. These experiments used natural uranium metal, DU metal, lesser quantities of beryllium, and other metals. In most cases, the tests were carried out aboveground, which resulted in the test materials being scattered

over areas. Based on Laboratory records, it is estimated that some 75 metric tons of natural uranium and DU have been expended at the TA-15 firing sites since the mid-1940s (LANL 1993, 020946, pp. E2, E9). TA-15 was used for HE research, development, and testing, primarily through hydrodynamic testing and dynamic experimentation. TA-15 contains the Pulsed High-Energy Radiographic Machine Emitting X-rays (PHERMEX) facility, the Dual Axis Radiographic Hydrodynamic Test (DARHT) facility, and building 15-0206, all of which are or were formerly used for testing weapons under development. Other activities at TA-15 include the investigation of weapons functioning and systems behavior in nonnuclear testing.

6.1.2 Summary of Releases

Potential contaminants at TA-15 may have been released into the environment through drainages downgradient of active firing sites, inactive landfills, inactive surface disposal areas, former firing sites, former septic systems, former storage areas, former transformer platforms, or former building locations.

6.1.3 Current Site Usage and Status

Much of TA-15 is undeveloped and has been used since the 1940s to the present for explosive experiments. TA-15 is remote with small office and Laboratory buildings, utilities, paved and unpaved roads, and firing site–structures scattered throughout the area. TA-15 is located within the HE area and access is controlled and restricted to Laboratory badge holders.

6.2 SWMU 15-002, Former Burn Pits

6.2.1 Site Description and Operational History

SWMU 15-002 is described in the 1990 SWMU report as an inactive burn pit west of E-F Firing Site at TA-15 (LANL 1990, 007512, p. 88) (Figure 6.2-1). The burn pit was surrounded on three sides by a 3-ft-high, 10-ft-diameter earthen berm (LANL 1993, 020946, p. 8-28). A recent review of engineering drawings and aerial photographs demonstrates that SWMU 15-002 actually consists of two former burn pits. The burn pit originally identified in the 1990 SWMU report is located south of building 15-0534. The second burn pit is an approximate 5- to 10-ft rectangular area located east of former buildings 15-0001 and 15-0023.

The originally identified pit is shown on a 1948 engineering drawing (ENG C-15208) and aerial photographs taken between 1946 and 1974 (SNL 1946, 015400; LASL 1948, 105275; USAF 1958, 015825; LASL 1974, 017204). The 1948 aerial photograph shows a bermed area surrounding the pit on three sides (north, west, and south). A small dirt road led to this bermed area. Aerial photographs taken in 1958 still show the bermed area; however, in the photograph the road appears not to have been used for some time and is overgrown with vegetation, indicating the burn site was no longer used (USAF 1958, 015825). Although former employees were not able to provide the exact location for this burn pit, they described it as a site used to burn oil/uranium mixtures and HE (DOE 1986, 036409, p. TA15-7).

Engineering drawings ENG-C 1481 and SK-1301 show a second burn pit east of former buildings 15-0001 and 15-0023 (LASL 1951, 105277; LASL 1951, 105278).

6.2.2 Relationship to Other SWMUs and AOCs

One SWMU 15-002 burn pit was located south of building 15-0534 and the second burn pit, located east of former building 15-0001, is approximately 10 ft north of SWMU 15-010(a) and approximately 50 ft

northwest of SWMU 15-007(a). Together with SWMU 15-007(a), SWMU 15-002 comprises Consolidated Unit 15-002-00.

6.2.3 Summary of Previous Investigations

An aerial radiological survey conducted in 1982 by EG&G Energy Measurements detected no radionuclides at levels above background at the burn pit south of building 15-0534 (LANL 1993, 020946, p. 8-28).

During the 1995 and 1996 Phase I Resource Conservation and Recovery Act (RCRA) facility investigations (RFIs) conducted at the burn pit south of building 15-0534, a radiological survey was conducted at the site and samples were collected from depths of 0–0.5 ft and 1.5–2.0 ft bgs at each of two locations from within the pit (LANL 1996, 054977, pp. 5-6–5-8). All four samples were submitted for analysis of TAL metals and SVOCs; the two subsurface samples were also analyzed for VOCs. Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected VOCs, and isotopic thorium detected above the BVs.

6.2.4 Site Contamination

6.2.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; and explosive compounds (TNT and RDX). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of 30 samples were collected from 10 locations (5 locations at each of the former burn pits) from 0–1 ft, 3–4 ft, and 6–7 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, dioxins/furans, explosive compounds, VOCs, SVOCs, total petroleum hydrocarbons (TPH) diesel range organics (DRO), TPH-gasoline range organics (GRO), isotopic uranium, and isotopic thorium. Two of the 30 samples (1 from each of the two former burn pits) were also analyzed for PCBs.

Sampling locations with decision-level data for SWMU 15-002 are shown in Figure 6.2-1. Table 6.2-1 presents the samples collected and analyses requested for SWMU 15-002. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.2.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-002, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-002 consisted of 30 samples (16 soil and 14 tuff) collected from 10 locations.

Inorganic Chemicals

Thirty samples (16 soil and 14 tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.2-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Thirty samples (16 soil and 14 tuff) were analyzed for explosive compounds, SVOCs, VOCs, dioxins/furans, TPH-DRO, and TPH-GRO. Two samples (one soil and one tuff) were also analyzed for PCBs. Table 6.2-3 presents the detected organic chemicals. Plate 3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Thirty samples (16 soil and 14 tuff) were analyzed for isotopic thorium and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at SWMU 15-002.

6.2.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in four samples at four locations. The maximum concentration of 12,500 mg/kg was detected above BV at location 15-613675 from 6–7 ft bgs. Aluminum concentrations decreased with depth at locations 15-613318 and 15-613322; decreased with depth at locations 15-613671 and 15-613675 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of aluminum are defined.

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 12.5 mg/kg at location 15-613671 from 0–1 ft bgs. Antimony also had DLs (0.68 mg/kg to 0.73 mg/kg) above the tuff BV (0.5 mg/kg) in two samples at two locations. Antimony concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in four samples at three locations. The maximum concentration of 6 mg/kg was detected above BV at location 15-613674 from 3–4 ft bgs. Arsenic concentrations decreased with depth at locations 15-613318 and 15-613674; decreased with depth at location 15-613671 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in three samples at two locations and above the tuff BV (46 mg/kg) in six samples at six locations. The maximum concentration of 18,200 mg/kg was detected above BV at location 15-613671 from 0–1 ft bgs. Barium concentrations decreased with depth at locations 15-613318, 15-613322, 15-613671, and 15-613674; decreased with depth at locations 15-613320 and 15-613675 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in one sample at a concentration of 2.2 mg/kg at location 15-613671 from 6–7 ft bgs. Beryllium concentrations increased with depth at location 15-613671 and decreased downgradient. The lateral extent of beryllium is defined, but the vertical extent is not defined.

Calcium was detected above the tuff BV (2200 mg/kg) in six samples at five locations. The maximum concentration of 9850 mg/kg was detected above BV at location 15-613322 from 3–4 ft bgs. Calcium concentrations decreased with depth at locations 15-613318, 15-613322 and 15-613674; decreased with depth at location 15-613320 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613671; and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in 12 samples at nine locations. The maximum concentration of 32.6 mg/kg was detected above BV at location 15-613671 from 6–7 ft bgs. Chromium concentrations decreased with depth at locations 15-613318, 15-613322, 15-613672, 15-613673, and 15-613674; decreased with depth at locations 15-613319 and 15-613320 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum tuff background concentration (13 mg/kg) at location 15-613675 (Figure H-1, Appendix H); increased with depth at location 15-613671; and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in three samples at three locations and above the tuff BV (3.14 mg/kg) in three samples at three locations. The maximum concentration of 23.6 mg/kg was detected above BV at location 15-613321 from 0–1 ft bgs. Cobalt concentrations decreased with depth at locations 15-613318, 15-613320, 15-613321, and 15-613673; decreased with depth at locations 15-613671 and 15-613675 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in three samples at two locations. The maximum concentration of 795 mg/kg was detected above BV at location 15-613671 from 6–7 ft bgs. Copper concentrations decreased with depth at location 15-613318; decreased with depth at location 15-613675 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613671; and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Cyanide was detected above the soil BV (0.5 mg/kg) in one sample at a concentration of 1.9 mg/kg at location 15-613671 from 0–1 ft bgs. Cyanide also had DLs (0.51 mg/kg to 0.68 mg/kg) above the tuff BV (0.5 mg/kg) in 13 samples at nine locations. Cyanide concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of cyanide are defined.

Iron was detected above the tuff BV (14,500 mg/kg) in one sample at a concentration of 15,300 mg/kg at location 15-613675 from 6–7 ft bgs. Iron concentrations increased with depth but were below the maximum tuff background concentration (19,500 mg/kg) at this location (Figure H-1, Appendix H); and decreased downgradient. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in four samples at three locations and above the tuff BV (11.2 mg/kg) in nine samples at six locations. The maximum concentration of 170 mg/kg was detected

above BV at location 15-613671 from 0–1 ft bgs. Lead concentrations decreased with depth at locations 15-613318, 15-613319, 15-613321, 15-613322, 15-613671, and 15-613674; increased with depth at location 15-613672; and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in four samples at four locations. The maximum concentration of 3200 mg/kg was detected above BV at location 15-613675 from 6–7 ft bgs. Magnesium concentrations decreased with depth at locations 15-613318 and 15-613322; increased with depth but were below the maximum tuff background concentration (2820 mg/kg) at location 15-613671 (Figure H-2, Appendix H); increased with depth at location 15-613675; and decreased downgradient. The lateral extent of magnesium is defined, but the vertical extent is not defined.

Manganese was detected above the soil BV (671 mg/kg) in two samples at two locations. The maximum concentration of 2400 mg/kg was detected above BV at location 15-613321 from 0–1 ft bgs. Manganese concentrations decreased with depth at locations 15-613320 and 15-613321 and decreased downgradient. The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil and tuff BV (0.1 mg/kg) in 15 samples at six locations. The maximum concentration of 1120 mg/kg was detected above BV at location 15-613671 from 0–1 ft bgs. Mercury concentrations decreased with depth at locations 15-613318, 15-613319, 15-613320, 15-613321, 15-613322, and 15-613671; and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in eight samples at seven locations. The maximum concentration of 21 mg/kg was detected above BV at location 15-613671 from 6–7 ft bgs. Nickel concentrations decreased with depth at locations 15-613318, 15-613322, 15-613673, and 15-613674; decreased with depth at location 15-613320 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth at locations 15-613671 and 15-613675; and decreased downgradient. The lateral extent of nickel is defined, but the vertical extent of nickel is not defined.

Nitrate was detected in 16 soil samples at 10 locations and in 12 tuff samples at 10 locations. The maximum concentration of 5.2 mg/kg was detected at location 15-613321 from 3–4 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in two soil samples at two locations and in one tuff sample. The maximum concentration of 0.0032 mg/kg was detected at location 15-613320 from 3–4 ft bgs. Perchlorate concentrations decreased with depth at locations 15-613320, 15-613671, and 15-613674 and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Potassium was detected above the soil BV (3460 mg/kg) in one sample and above the tuff BV (3500 mg/kg) in one sample. The maximum concentration of 4440 mg/kg was detected above BV at location 15-613671 from 3–4 ft bgs. The Gehan and quantile tests indicated site concentrations of potassium in soil and tuff are not different from background (Figures H-2 and H-3 and Tables H-1 and H-2, Appendix H). The lateral and vertical extent of potassium are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in 4 samples at 4 locations and above the tuff BV (0.3 mg/kg) in 14 samples at 10 locations. The maximum concentration of 2.9 mg/kg was detected above BV at location 15-613671 from 6–7 ft bgs. Selenium concentrations increased slightly with depth at all

10 locations. The concentrations of selenium are essentially the same across the site. The lateral and vertical extent of selenium are not defined.

Thallium was detected above the tuff BV (1.1 mg/kg) in one sample at a concentration of 1.3 mg/kg at location 15-613322 from 3–4 ft bgs. Thallium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of thallium are defined.

Vanadium was detected above the tuff BV (17 mg/kg) in one sample at a concentration of 18.7 mg/kg at location 15-613318 from 3–4 ft bgs. Vanadium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 112 mg/kg at location 15-613671 from 0–1 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected in one soil sample at a concentration of 0.083 mg/kg at location 15-613321 from 3–4 ft bgs. Acetone concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of acetone are defined.

Amino-2,6-dinitrotoluene[4-] and 2-amino-4,6-dinitrotoluene were detected in two to three samples at location 15-613671. The maximum concentrations of 0.15 mg/kg and 0.12 mg/kg of 4-amino-2,6-dinitrotoluene and 2-amino-4,6-dinitrotoluene were detected from 0–1 ft bgs. Concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Dinitroaniline[3,5-]; bis(2-ethylhexyl)phthalate; diethylphthalate; 2,4-dinitrotoluene; TPH-DRO; and 1,3,5-trinitrobenzene were detected in one to nine samples at one to six locations at concentrations below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Di-n-butylphthalate was detected in two samples at two locations. The maximum concentration of 0.69 mg/kg was detected at location 15-613318 from 0–1 ft bgs. Di-n-butylphthalate concentrations decreased with depth at locations 15-613318 and 15-613320 and decreased downgradient. The lateral and vertical extent of di-n-butylphthalate are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] was detected in 15 samples at 10 locations. The maximum concentration of 0.0000386 mg/kg was detected at location 15-613671 from 0–1 ft bgs. Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of 1,2,3,4,6,7,8-heptachlorodibenzodioxin are defined.

Heptachlorodibenzofuran[1,2,3,4,6,7,8-] was detected in eight samples at six locations. The maximum concentration of 0.0000073 mg/kg was detected at location 15-613671 from 0–1 ft bgs. Heptachlorodibenzofuran[1,2,3,4,6,7,8-] concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of 1,2,3,4,6,7,8-heptachlorodibenzofuran are defined.

Hexachlorodibenzodioxin[1,2,3,4,7,8-]; 1,2,3,6,7,8-hexachlorodibenzodioxin; 1,2,3,7,8,9-hexachlorodibenzodioxin; 2,3,4,6,7,8-hexachlorodibenzofuran; 1,2,3,7,8-pentachlorodibenzodioxin; and 2,3,7,8-tetrachlorodibenzodioxin were detected in one sample at concentrations below EQLs. The lateral and vertical extent of these organic chemicals are defined.

HMX (octahydro-1,3,5,7-tetranitro-1,3,5,7 tetrazocine) was detected in three samples at one location. The maximum concentration of 0.6 mg/kg was detected at location 15-613671 from 0–1 ft bgs. HMX concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of HMX are defined.

Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-] was detected in 19 samples at nine locations. The maximum concentration of 0.000251 mg/kg was detected at location 15-613671 from 0–1 ft bgs. Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-] concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of 1,2,3,4,6,7,8,9-octachlorodibenzodioxin are defined.

Octachlorodibenzofuran[1,2,3,4,6,7,8,9-] was detected in seven samples at five locations. The maximum concentration of 0.0000226 mg/kg was detected at location 15-613671 from 0–1 ft bgs. Octachlorodibenzofuran[1,2,3,4,6,7,8,9-] concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of 1,2,3,4,6,7,8,9-octachlorodibenzofuran are defined.

RDX was detected in three samples at one location. The maximum concentration of 2.6 mg/kg was detected at location 15-613671 from 0–1 ft bgs. RDX concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of RDX are defined.

Trinitrotoluene[2,4,6-] was detected in one sample at a concentration of 0.11 mg/kg at location 15-613671 from 0–1 ft bgs. Trinitrotoluene[2,4,6-] concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of 2,4,6-trinitrotoluene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 15-002.

Summary of Nature and Extent

The vertical extent of beryllium, calcium, chromium, copper, lead, magnesium, and nickel is not defined at SWMU 15-002, and the lateral and vertical extent of selenium are not defined at SWMU 15-002. The extent of all organic chemicals and radionuclides is defined at SWMU 15-002.

6.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 15-002 because extent is not defined for the site.

6.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 15-002 because extent is not defined for the site.

6.3 SWMU 15-007(a), MDA N

6.3.1 Site Description and Operational History

SWMU 15-007(a), the former location of an inactive landfill known as MDA N, was located west of buildings 15-0563 and 15-0565 and east of R-Site Road at TA-15 (Figure 6.3-1). MDA N was reported to be approximately 300 ft long × 30 ft wide (LASL 1974, 038450). MDA N was used between 1962 and

1965 to dispose of debris from the demolition of buildings 15-0001 and 15-0007 (LANL 1993, 020946, p. 9-2). Building 15-0001 housed a laboratory and shop, and building 15-0007 housed a control room and darkroom. Hazardous materials known to be present in these buildings included thorium in building 15-0001 and mercury and photographic chemicals in building 15-0007. Based on a 1965 aerial photograph, MDA N was closed by 1965 (Koogle and Pouls Engineering 1965, 016374). MDA N was excavated and removed during the 2010 investigation (section 6.3.4.1).

6.3.2 Relationship to Other SWMUs and AOCs

SWMU 15-007(a) is located southeast of AOC C-15-005 and south of SWMU 15-010(a) and one of the SWMU 15-002 burn pits. Together with SWMU 15-002, SWMU 15-007(a) comprises Consolidated Unit 15-002-00.

6.3.3 Summary of Previous Investigations

An aerial radiological survey of SWMU 15-007(a) was conducted in 1982. The survey identified no radiation above background at this site (LANL 1993, 020946, p. 9-2).

During the 1995 and 1996 Phase I RFIs conducted at SWMU 15-007(a), sampling was preceded by a surface radiological survey and geophysical surveys (magnetometry, electromagnetic [EM], and resistivity) intended to define the boundaries of the landfill. One surface and two subsurface samples were collected from each of seven locations identified based on the geophysical survey results (LANL 1996, 054977, pp. 5-11, 5-16). Twenty-two samples were collected from seven locations from depth intervals ranging from 0–0.5 ft to 50–56 ft bgs. Thirteen samples were submitted for analysis of isotopic thorium, TAL metals, VOCs, and SVOCs. Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Based on a review of the 1951 TA-15 Structure Location Plan and engineering drawing ENG-R4470, MDA N was determined to be located east-southeast of former building 15-0023, not to the north as concluded from the previous geophysical survey (LASL 1951, 105389; LASL 1974, 038450). Therefore, the 1995 and 1996 RFI sampling for MDA N was conducted at the incorrect location, and the samples are not representative of this site.

6.3.4 Site Contamination

6.3.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- The landfill boundary was defined and excavated in accordance with the approved work plan (LANL 2009, 106657.8; NMED 2009, 106677). When excavated, the actual boundaries of MDA N were approximately 170 ft long × 50 ft × 4 to 5 ft deep. Management of waste generated from the excavation of the landfill and associated IDW is described in Appendix C.
- Twenty screening samples were collected from the bottom and sides of the excavation and field screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds (TNT and RDX); and metals (barium, copper, lead, and uranium). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.
- Eight confirmation samples were collected from four locations from approximately 0–1 ft and 4–5 ft below the bottom of the 4–5-ft-deep excavation.
- Twelve confirmation samples were collected from six locations around the excavation boundary

from 2–3 ft and 5–6 ft bgs. Sampling locations were sited approximately 8 to 25 ft from the excavation boundary (see deviations in Appendix B).

- All confirmation samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and isotopic thorium. Three of the 20 samples (2 from below the bottom of the excavation and 1 next to the eastern boundary of the excavation) were also analyzed for dioxins/furans and PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 15-007(a) are shown in Figure 6.3-1. Table 6.3-1 presents the samples collected and analyses requested for SWMU 15-007(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.3.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-007(a), a maximum concentration of 0.1 ppm was detected at location 15-613395 from 2–3 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.

One metals-screening sample exceeded the screening threshold for lead (greater than 2 times the sample media BV) at the base of the excavation. In accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677), one confirmation sample was collected at location 15-613391 from 4–5 ft bgs and analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and isotopic thorium.

6.3.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-007(a) consisted of results from 20 samples (10 soil and 10 tuff) collected from 10 locations.

Inorganic Chemicals

Twenty samples (10 soil and 10 tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.3-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty samples (10 soil and 10 tuff) were analyzed for explosive compounds, SVOCs, and VOCs. Three samples (one soil and two tuff) were analyzed for dioxins/furans and PCBs. Table 6.3-3 presents the detected organic chemicals. Plate 3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty samples (10 soil and 10 tuff) were analyzed for isotopic thorium and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at SWMU 15-007(a).

6.3.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in four samples at four locations. The maximum concentration of 11,600 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Aluminum concentrations decreased with depth at location 15-613393; decreased with depth at locations 15-613392, 15-613397, and 15-613398 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of aluminum are defined.

Antimony was not detected above BVs but had DLs (0.52 mg/kg to 0.53 mg/kg) above the tuff BV (0.5 mg/kg) in two samples at two locations. Because antimony was not detected above the tuff BV, the lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in one sample at a concentration of 3.4 mg/kg at location 15-613397 from 5–6 ft bgs. Arsenic concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of arsenic are defined.

Barium was detected above the tuff BV (46 mg/kg) in six samples at five locations. The maximum concentration of 178 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Barium concentrations decreased with depth at locations 15-613393 and 15-613399; decreased with depth at locations 15-613392, 15-613397, and 15-613398 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) at a concentration of 1.3 mg/kg in two samples at locations 15-613392 and 15-613397 from 9–10 ft and 5–6 ft bgs, respectively. The Gehan and quantile tests indicated site concentrations are not different from tuff background (Figure H-4 and Table H-3, Appendix H). The lateral and vertical extent of beryllium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in two samples at two locations. The maximum concentration of 4180 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Calcium concentrations decreased with depth at location 15-613399, increased with depth at location 15-613397, and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 10 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Chromium concentrations decreased with depth at locations 15-613397 and 15-613398 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1), and decreased downgradient. The lateral and vertical extent of chromium are defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in one sample at a concentration of 3.4 mg/kg at location 15-613397 from 5–6 ft bgs. Cobalt concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the

deeper tuff sample (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of cobalt are defined.

Copper was detected above the tuff BV (4.66 mg/kg) in one sample at a concentration of 5.2 mg/kg at location 15-613397 from 5–6 ft bgs. Copper concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.54 mg/kg to 0.56 mg/kg) above the soil BV in seven samples at six locations and DLs (0.52 mg/kg to 0.59 mg/kg) above the tuff BV in eight samples at seven locations. Because cyanide was not detected above the soil or tuff BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in three samples at three locations and was detected above the tuff BV (11.2 mg/kg) in six samples at five locations. The maximum concentration of 168 mg/kg was detected above BV at location 15-613396 from 5–6 ft bgs. Lead concentrations decreased with depth at location 15-613391 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum soil background concentration (28 mg/kg) at location 15-613400 (Figure H-4, Appendix H); increased with depth at locations 15-613392, 15-613393, 15-613394, 15-613396, and 15-613397; and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in four samples at four locations. The maximum concentration of 2780 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Magnesium concentrations decreased with depth at locations 15-613392, 15-613393, and 15-6133998; increased with depth but were below the maximum tuff background concentration (2820 mg/kg) at location 15-613397 (Figure H-5, Appendix H); and decreased downgradient. The lateral and vertical extent of magnesium are defined.

Mercury was detected above the tuff BV (0.1 mg/kg) in one sample at a concentration of 0.104 mg/kg at location 15-613391 from 8–9 ft bgs. Mercury concentrations increased with depth at location 15-613391 and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in five samples at five locations. The maximum concentration of 10 mg/kg was detected above BV at location 15-613397 from 5–6 ft bgs. Nickel concentrations decreased with depth at locations 15-613393 and 15-613399; decreased with depth at locations 15-613392, 15-613397, and 15-613398 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of nickel are defined.

Nitrate was detected in 10 soil samples at eight locations, and in 8 tuff samples at six locations. The maximum concentration of 17.1 mg/kg was detected at location 15-613400 from 5–6 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples at three locations and in two tuff samples at two locations. The maximum concentration of 0.0033 mg/kg was detected at location 15-613396 from 2–3 ft bgs.

Perchlorate concentrations were detected at or below EQLs. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in 10 samples at eight locations. The maximum concentration of 2.4 mg/kg was detected above BV at location 15-613391 from 8–9 ft bgs. Selenium concentrations remained the same with depth at location 15-613395, increased with depth at the remaining locations, and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at two locations and was detected above the tuff BV (63.5 mg/kg) in one sample at one location. The maximum concentration of 125 mg/kg was detected above BV at location 15-613396 from 5–6 ft bgs. Zinc concentrations decreased with depth at location 15-613391; increased with depth but were below the maximum soil background concentration (75.5 mg/kg) at location 15-613400 (Figure H-5, Appendix H); increased with depth at 15-613396, but the Gehan and quantile tests indicated site concentrations are not different from tuff background (Figure H-6 and Table H-3, Appendix H). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected in five samples at three locations. The maximum concentration of 0.14 mg/kg was detected at location 15-613393 from 5.5–6.5 ft bgs. Acetone concentrations are below EQL at location 15-613391, increased with depth at location 15-613392, and decreased with depth at 15-613393. The lateral extent of acetone is defined, but the vertical extent is not defined.

Bis(2-ethylhexyl)phthalate was detected in two samples at two locations at concentrations below the EQL. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Only 1,2,3,4,6,7,8-heptachlorodibenzodioxin and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one to three samples at one to three locations at concentrations below the EQLs. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 15-007(a).

Summary of Nature and Extent

The vertical extent of acetone, calcium, lead, mercury, and selenium is not defined at SWMU 15-007(a). Radionuclides were not detected or detected above BVs/FVs at SWMU 15-007(a).

6.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 15-007(a) because extent is not defined for the site.

6.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 15-007(a) because extent is not defined for the site.

6.4 SWMU 15-003, PHERMEX Steel Firing Pad

6.4.1 Site Description and Operational History

SWMU 15-003 is a steel firing pad located within the PHERMEX firing site at TA-15 [SWMU 15-006(a)] (Figure 6.4-1) and consists of a 6-in.-thick steel pad approximately 12 ft wide × 24 ft long (LANL 1990, 007512, p. 68). SWMU 15-003 is deferred for investigation per Table IV-2 of the Consent Order. Together with SWMU 15-006(a) (also deferred), this SWMU comprises Consolidated Unit 15-003-00.

Although the SWMU 15-003 steel firing pad was originally intended for the treatment of hazardous explosive waste by open detonation (OD) and had been granted RCRA interim status designation under hazardous waste regulations, the steel pad was never actually used to treat hazardous explosives waste. Additionally, the operating division determined that this unit was not needed for future waste-treatment activities. Therefore, in 1998, the Laboratory requested that this unit be withdrawn from the Laboratory's Part B application as an OD site, and NMED concurred (LANL 1998, 087452; DOE 1999, 063048; NMED 1999, 065076).

The steel pad was used for experimental test shots not related to waste treatment (LANL 1998, 087452). The exact dates of use of the steel pad are not known; however, operations at the PHERMEX facility began in approximately 1961 (LANL 1993, 020946, p. 6-3).

6.4.2 Relationship to Other SWMUs and AOCs

SWMU 15-003 is located next to and southeast of SWMU 15-006(a). No other SWMUs or AOCs are associated with SWMU 15-003.

6.4.3 Summary of Previous Investigations

Past environmental surveys at the PHERMEX firing site include an aerial radiological survey conducted in 1982 that identified elevated levels of uranium-238. A 1991 surface radiation survey identified elevated contact exposure rates believed to be associated with chunks of DU at the PHERMEX firing site (LANL 1993, 020946, p. 6-5). No RFI sampling was conducted at SWMU 15-003.

6.4.4 Site Contamination

Investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although an investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections. As described in the approved investigation work plan, data from samples collected in the drainage downgradient of SWMU 15-003 were also collected to determine potential migration from SWMU 15-006(a) (LANL 2009, 106657.8; NMED 2009, 106677).

6.4.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations in sediment catchment areas in the drainage downgradient of the site from two depth intervals (0–0.25 ft, 0–0.75 ft, or 0–1 ft bgs and 0.25–0.5 ft, 0.75–1.5 ft, or 1–2 ft bgs) at each location (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides. One of the 10 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 15-003 are shown in Figure 6.4-1. Table 6.4-1 presents the samples collected and analyses requested for SWMU 15-003. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.4.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-003, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.4.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for SWMU 15-003 consisted of results from 10 sediment samples collected from five locations in sediment catchment areas in the drainage downgradient of the site. The locations sampled downgradient of SWMU 15-003 also address potential contaminant migration from SWMU 15-006(a).

Inorganic Chemicals

Ten sediment samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.4-2 presents the inorganic chemicals detected or detected above BVs. Figure 6.4-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Ten sediment samples were analyzed for VOCs, SVOCs, and explosive compounds, and one sediment sample was analyzed for dioxins/furans and PCBs. Table 6.4-3 presents the detected organic chemicals. Figure 6.4-3 shows the spatial distribution of detected organic chemicals. Because the investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Ten sediment samples were analyzed for isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides. Table 6.4-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.4-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and radionuclide COPCs have not been identified.

6.4.4.4 Spatial Distribution of Contaminants

Inorganic Chemicals

Aluminum was detected above the sediment BV (15,400 mg/kg) in one sample at a concentration of 18,200 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Aluminum concentrations decreased downgradient.

Arsenic was detected above the sediment BV (3.98 mg/kg) in one sample at a concentration of 5.4 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Arsenic concentrations decreased downgradient.

Barium was detected above the sediment BV (127 mg/kg) in two samples at one location. The maximum concentration of 480 mg/kg was detected above BV at location 15-613328 from 0.75–1.5 ft bgs. Barium concentrations decreased downgradient.

Beryllium was detected above the sediment BV (1.31 mg/kg) in one sample at a concentration of 1.9 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Beryllium concentrations decreased downgradient.

Calcium was detected above the sediment BV (4420 mg/kg) in one sample at a concentration of 11400 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Calcium concentrations decreased downgradient.

Chromium was detected above the sediment BV (10.5 mg/kg) in one sample at a concentration of 16.5 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Chromium concentrations decreased downgradient.

Cobalt was detected above the sediment BV (4.73 mg/kg) in six samples at five locations. The maximum concentration of 5.8 mg/kg was detected above BV at locations 15-613326 and 15-613327 from 0–1 ft bgs at both locations. Cobalt concentrations decreased in the drainage downgradient of SWMU 15-003; however, cobalt was detected above the sediment BV at 4.8 mg/kg at location 15-613324 at the bottom the drainage. Cobalt was detected at 5.97 mg/kg in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-2); however, cobalt concentrations decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507).

Iron was detected above the sediment BV (13,800 mg/kg) in two samples at two locations. The maximum concentration of 18,400 mg/kg was detected above BV at location 15-613328 from 0.75–1.5 ft bgs. Iron concentrations decreased downgradient.

Magnesium was detected above the sediment BV (2370 mg/kg) in one sample at a concentration of 4180 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Magnesium concentrations decreased downgradient.

Nickel was detected above the sediment BV (9.38 mg/kg) in two samples at two locations. The maximum concentration of 15.1 mg/kg was detected above BV at location 15-613328 from 0.75–1.5 ft bgs. Nickel concentrations decreased downgradient.

Nitrate was detected in nine sediment samples at five locations. The maximum concentration of 0.58 mg/kg was detected at location 15-613325 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Potassium was detected above the sediment BV (2690 mg/kg) in one sample at a concentration of 3230 mg/kg at location 15-613328 from 0.75–1.5 ft bgs. Potassium concentrations decreased downgradient.

Selenium was detected above the sediment BV (0.3 mg/kg) in 10 samples at five locations. The maximum concentration of 3.2 mg/kg was detected above BV at location 15-613328 from 0.75–1.5 ft bgs. Selenium concentrations decreased in the drainage downgradient of SWMU 15-003; however, selenium was detected above the sediment BV at a concentration of 1.1 mg/kg at location 15-613324 in the bottom of the drainage. Selenium concentrations increased slightly in downgradient Potrillo Canyon Reaches PO-2 and PO-3 (1.27 mg/kg and 1.63 mg/kg, respectively), and selenium was not detected above the sediment BV but had DLs above BV in Reach PO-4 (LANL 2010, 111507, p. 56). Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches. Although these averages are affected by the high frequency of nondetects and elevated DLs, the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Vanadium was detected above the sediment BV (19.7 mg/kg) in four samples at three locations. The maximum concentration of 24.9 mg/kg was detected above BV at location 15-613328 from 0.75–1.5 ft bgs. Vanadium concentrations decreased downgradient.

Organic Chemicals

Acenaphthene was detected in two samples at location 15-613326 at concentrations below EQL.

Benzoic acid and bis(2-ethylhexyl)phthalate were detected in one to four samples at one to three locations at concentrations below the EQLs.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample at concentrations below the EQLs. As discussed in section 5.0, the presence of only hepta- and octa-congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Uranium-238 was detected above the sediment BV (2.29 pCi/g) in three samples at two locations in the drainage downgradient of SWMU 15-003. The maximum activity of 4.11 pCi/g was detected above BV at location 15-613324 from 0.25–0.5 ft bgs at the bottom of the drainage; therefore, uranium-238 is likely migrating off-site. Uranium-238 was not detected above the sediment BV at the three locations

(15-613328, 15-613327, and 15-613326) in the drainage directly downgradient of SWMU 15-003. Uranium-238 was detected at an activity of 13.9 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-2); however, uranium-238 concentrations decreased in Reach PO-2 from upgradient Potrillo Canyon Reaches PO-1 and POS-1 (LANL 2010, 111507). The concentration of uranium-238 decreased in downgradient Potrillo Canyon Reach PO-3; uranium-238 was not detected in sediment samples from Reach PO-3 (LANL 2010, 111507, p. 63).

Summary of Contaminant Distribution

The concentrations of detected inorganic chemicals decreased or were unchanged in the drainage downgradient of SWMU 15-003. The concentration of cobalt decreased in downgradient reaches in Potrillo Canyon. Selenium concentrations decreased to below the sediment BV downgradient in Potrillo Canyon Reach PO-4 (LANL 2010, 111507, p. 56).

Organic chemicals were not detected above EQLs in the drainage downgradient of SWMU 15-003. The detected concentrations of dioxin and furan congeners are not indicative of a release.

Uranium-238 was detected in samples from the bottom of the drainage below SWMU 15-003, indicating it has migrated into Potrillo Canyon. The activities in the drainage are slightly above BV, but the extent of uranium-238 has been defined downgradient in Potrillo Canyon Reach PO-3 (LANL 2010, 111507, p. 63).

The migration of potential contaminants from SWMU 15-003 is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

6.4.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for SWMU 15-003.

6.4.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of SWMU 15-003 is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for SWMU 15-003.

6.5 SWMU 15-006(a), PHERMEX Firing Site

6.5.1 Site Description and Operational History

SWMU 15-006(a) is the PHERMEX firing site at TA-15 that consists of a firing chamber (structure 15-0184) and related equipment (Figure 6.4-1). The PHERMEX firing site and associated facilities were built in the early 1960s (LANL 1993, 020946, p. 2-3). SWMU 15-006(a) is deferred per Table IV-2 of the Consent Order. Together with SWMU 15-003 (also deferred), this SWMU comprises Consolidated Unit 15-003-00.

6.5.2 Relationship to Other SWMUs and AOCs

SWMU 15-006(a) is located next to and northwest of SWMU 15-003. No other SWMUs or AOCs are associated with SWMU 15-006(a).

6.5.3 Summary of Previous Investigations

Past environmental surveys at the PHERMEX firing site include an aerial radiological survey conducted in 1982 that identified elevated levels of uranium-238. A 1991 surface radiation survey identified elevated contact exposure rates believed to be associated with chunks of DU at the PHERMEX firing site (LANL 1993, 020946, p. 6-5). No RFI sampling has been conducted at SWMU 15-006(a).

6.5.4 Site Contamination

Investigation of SWMU 15-006(a) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). The samples collected to determine potential migration from SWMU 15-003 were also collected to determine potential migration from SWMU 15-006(a) (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in section 6.4.

6.5.4.1 Soil, Rock, and Sediment Sampling

No sampling was proposed for SWMU 15-006(a) in the approved work plan because stormwater runoff from SWMUs 15-003 and 15-006(a) flows to the same drainage. Data from the samples collected at SWMU 15-003 were used to evaluate both sites. Sampling activities, results, and potential contaminant migration are described in section 6.4.4 as part of SWMU 15-003.

6.6 SWMUs 15-004(b) and 15-004(c), Firing Sites A and B

6.6.1 Site Description and Operational History

SWMU 15-004(b) is inactive Firing Site A, located approximately 450 ft southeast of building 15-0183, and SWMU 15-004(c) is inactive Firing Site B, located approximately 525 ft southeast of building 15-0183, at TA-15 (Figure 6.6-1). Both SWMUs comprise Consolidated Unit 15-004(b)-99. Firing Sites A and B are located approximately 75 ft apart. Firing Site A was among the first firing sites to be used at the Laboratory and operated from 1945 to 1953. Aerial photographs taken in 1958 show that the areas of land cleared of vegetation and affected by explosives at these two firing sites were relatively small and located approximately 400 ft south of the bunker (former structure 15-0014) and control building (former building 15-0074) associated with Firing Sites A and B (USAF 1958, 015826). Both firing sites and associated structures were removed and the ground surface was regraded in 1967. Before they were removed, the bunker and the control building were surveyed and were found to contain no detectable levels of HE or radionuclides (Buckland 1965, 005305; Courtright 1965, 005282).

Information is limited concerning the materials used in tests at Firing Site A, SWMU 15-004(b). Most of the experiments conducted at SWMU 15-004(b) involved small amounts of HE (i.e., up to 50 lb). Tests involving larger quantities of HE were conducted at Firing Site B, SWMU 15-004(c) (LANL 1995, 050294, p. 4-3). Other materials used as Firing Sites A and B included natural uranium, beryllium, lead, mercury, and HE. The amount of uranium used in any one test was a few kilograms (LANL 1993, 020946, p. 8-5).

6.6.2 Relationship to Other SWMUs and AOCs

SWMUs 15-004(b) and 15-004(c) are not associated with any other SWMUs or AOCs.

6.6.3 Summary of Previous Investigations

Past environmental surveys at this site include an aerial radiological survey conducted in 1982 that identified background levels of radiation (LANL 1993, 020946, p. 8-5).

Because of their close proximity, SWMUs 15-004(b) and 15-004(c) were investigated as a combined area during the 1995 Phase I RFI (LANL 1995, 050294, pp. 4-3–4-12). Four samples were collected from two depths (0–0.5 ft and 1.5–2 ft bgs) at two locations at SWMU 15-004(b), and four samples were collected from two depths (0–0.5 ft and 1.5–2 ft bgs) at two locations at SWMU 15-004(c); the samples were submitted for analysis of TAL metals. Based on the analytical results, the RFI report recommended that an expedited cleanup be implemented at SWMU 15-004(b) to remove lead contamination (LANL 1996, 054977, p. 4-12). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, and cesium-137 and europium-152 detected or detected above the FVs.

A voluntary corrective action (VCA) was conducted at SWMU 15-004(b) in 1996 to determine the extent of lead contamination at the site and to remove soil with lead above the Laboratory-adopted lead preliminary remediation goal (PRG) of 1000 mg/kg (LANL 1996, 055046). A photograph discovered after the Operable Unit (OU) 1086 RFI work plan was prepared indicated the firing site was located farther west than the location described in the work plan; VCA sampling locations were adjusted to reflect the revised site location (LANL 1993, 020946, p. 8-6). The VCA consisted of XRF sampling to determine the extent of lead contamination and HE spot testing. Based upon these results and the Phase I RFI results, soil was removed until the lead concentrations met the 1000 mg/kg PRG. Five confirmation soil samples were collected and submitted for analysis of TAL metals, HE, and isotopic uranium; one sample also was analyzed for TCLP metals for waste characterization purposes (LANL 1996, 055046, p. 8). However, review of historical aerial photographs during the preparation of the HIR and investigation work plan revealed that the locations of Firing Sites A and B [SWMUs 15-004(b) and 15-004(c)] are south of the areas investigated during the 1995 RFI and the 1996 VCA (LANL 2009, 105251). The RFI and VCA were conducted near the former control building (former building 15-0074) and former bunker (former structure 15-0014), approximately 400 ft north of the actual locations of the two former firing sites. The data from samples collected during the 1996 VCA are not representative of the former firing site locations but are located within the proposed sampling grid in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677) and therefore are included in this report.

6.6.4 Site Contamination

6.6.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- A grid (100 ft × 100 ft) was established over the entire area around the former control building and bunker locations and south to include the two firing points and the area around the firing points to the mesa edge.
- A total of 162 field-screening samples were collected at 81 grid locations from 0–1 ft and 3–4 ft bgs and screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds (TNT and RDX); and metals (barium, copper, lead and uranium). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.
- A total of 14 samples were collected from seven locations from 0–1 ft and 3–4 ft bgs based on elevated metals field-screening results (see section 6.6.4.2 below).

- A total of 24 samples were collected from 12 random locations across the site; 22 samples were collected from 11 locations from 0–1 ft and 3–4 ft bgs, and 2 samples were collected from 1 location from 0–1 ft and 1–2 ft bgs (see deviations in Appendix B).
- Two samples were collected at one location from SWMU 15-004(b) from 0–1 ft and 3–4 ft bgs.
- Two samples were collected at one location from SWMU 15-004(c) from 0–1 ft and 3–4 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, americium-241, isotopic uranium, and gamma-emitting radionuclides. Two of the 42 samples were also analyzed for dioxins/furans and PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMUs 15-004(b) and 15-004(c) are shown in Figure 6.6-1. Table 6.6-1 presents the samples collected and analyses requested for SWMUs 15-004(b) and 15-004(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.6.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMUs 15-004(b) and 15-004(c), a maximum concentration of 1.4 ppm was detected at location 15-613334 from 0–1 ft and 3–4 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.

Metals field-screening results for barium, lead, and uranium exceeded the metals-screening threshold (greater than 2 times the media BV) in eight field-screening samples collected from seven locations. Specifically, barium, lead, and/or uranium exceeded the metals-screening threshold in one or two samples collected at locations 15-613330, 15-613346, 15-613347, 15-613348, 15-613349, 15-613350, and 15-613351. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1. In accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677), samples were collected from 0–1 ft and 3–4 ft bgs at these seven locations and analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, americium-241, isotopic uranium, and gamma-emitting radionuclides.

6.6.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMUs 15-004(b) and 15-004(c) consisted of results from 47 samples (42 soil and 5 tuff) collected from 25 locations.

Inorganic Chemicals

Forty-seven samples (42 soil and 5 tuff) were analyzed for TAL metals. Forty-two samples (37 soil and 5 tuff) were also analyzed for nitrate, cyanide, and perchlorate. One 1996 soil sample was analyzed for TCLP metals only. Table 6.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Forty-seven samples (42 soil and 5 tuff) were analyzed for explosive compounds. Forty-two samples (37 soil and 5 tuff) were analyzed for VOCs and SVOCs. Two soil samples were also analyzed for dioxins/furans and PCBs. Table 6.6-3 presents the organic chemicals detected. Plate 5 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Forty-seven samples (42 soil and 5 tuff) were analyzed for isotopic uranium. Forty-two samples (37 soil and 5 tuff) were analyzed for americium-241 and gamma-emitting radionuclides. Table 6.6-4 presents the radionuclides detected or detected above BVs/FVs. Plate 6 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.6.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in two tuff samples at two locations. The maximum concentration of 16,600 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Aluminum concentrations decreased with depth at location 15-613330 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613351; and decreased downgradient. The lateral extent of aluminum is defined, but the vertical extent is not defined.

Antimony was not detected above BV but had DLs (11 mg/kg to 12 mg/kg) above the soil BV (0.83 mg/kg) in five samples and DLs (0.51 mg/kg to 0.55 mg/kg) above the tuff BV (0.5 mg/kg) in four samples. Because antimony was not detected above the soil or tuff BV, the lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in two samples at two locations. The maximum concentration of 5.5 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Arsenic concentrations increased with depth at locations 15-613330 and 15-613351 and decreased downgradient. The lateral extent of arsenic is defined, but the vertical extent is not defined.

Barium was detected above the soil BV (295 mg/kg) in 10 samples at eight locations and was detected above the tuff BV (46 mg/kg) in 2 samples at two locations. The maximum concentration of 1000 mg/kg was detected above BV at location 15-613346 from 0–1 ft bgs. Barium concentrations decreased with depth at locations 15-02444, 15-613346, 15-613347, 15-613348, 15-313349, and 15-613350; decreased with depth at locations 15-61330 and 15-613351 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); were below the maximum soil background concentration (410 mg/kg) in a single sample at location 15-02434 (Figure H-7, Appendix H); increased with depth at location 15-613341; and decreased downgradient. The lateral extent of barium is defined, but vertical extent is not defined.

Beryllium was detected above the soil BV (1.83 mg/kg) in one sample at a concentration of 1.9 mg/kg at location 15-613341 from 3–4 ft bgs. Beryllium concentrations increased with depth but were below the maximum soil background concentration (3.95 mg/kg) at this location (Figure H-7, Appendix H) and decreased downgradient. The lateral and vertical extent of beryllium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in nine samples at six locations. The maximum concentration of 87 mg/kg was detected above BV at location 15-613349 from 0–1 ft bgs. Cadmium also had DLs above the soil BV in two samples. Cadmium concentrations decreased with depth at locations 15-02444, 15-613346, 15-613347, 15-613348, and 15-313349; were below the maximum soil background concentration (2.6 mg/kg) in a single sample at location 15-02434 (Figure H-8, Appendix H); and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample and above the tuff BV (2200 mg/kg) in one sample. The maximum concentration of 8140 mg/kg was detected above BV at location 15-613340 from 3–4 ft bgs. Calcium concentrations increased with depth but were below the maximum soil background concentration (14,000 mg/kg) at location 15-613340 (Figure H-8, Appendix H); increased with depth at location 15-613351; and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample and was detected above the tuff BV (7.14 mg/kg) in three samples at three locations. The maximum concentration of 30.1 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Chromium concentrations decreased with depth at location 15-613330 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum soil background concentration (36.5 mg/kg) at location 15-613350 (Figure H-9, Appendix H); increased with depth but were below the maximum tuff background concentration (13 mg/kg) at location 15-613343 (Figure H-9, Appendix H); increased with depth at location 15-613351; and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in eight samples at six locations and above the tuff BV (3.14 mg/kg) in one sample. The maximum concentration of 14.8 mg/kg was detected above BV at location 15-613347 from 0–1 ft bgs. Cobalt concentrations decreased with depth at locations 15-02444, 15-613344, 15-613347, 15-613348, 15-613350, and 15-613351 and decreased downgradient. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in 11 samples at six locations and above the tuff BV (4.66 mg/kg) in one sample. The maximum concentration of 700 mg/kg was detected above BV at location 15-02444 from 0.83–1.17 ft bgs. Copper concentrations decreased with depth at locations 15-613346, 15-613347, 15-613348, 15-613349, and 15-613350; increased with depth at locations 15-02444 and 15-613351; and decreased downgradient. A single sample was collected at location 15-02434. The lateral extent of copper is defined, but the vertical extent is not defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.53 mg/kg to 0.61 mg/kg) above the soil BV in 36 samples at 21 locations and DLs (0.51 mg/kg to 0.55 mg/kg) above the tuff BV in 5 samples at 5 locations. Because cyanide was not detected above the soil or tuff BV, the lateral and vertical extent of cyanide are defined.

Iron was detected above the tuff BV (14,500 mg/kg) in one sample at a concentration of 16,500 mg/kg at location 15-613351 from 3–4 ft bgs. Iron concentration decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in 17 samples at 11 locations and above the tuff BV (11.2 mg/kg) in 2 samples at 2 locations. The maximum concentration of 1520 mg/kg was detected above

BV at location 15-613349 from 0–1 ft bgs. Lead concentrations decreased with depth at locations 15-02444, 15-613332, 15-613346, 15-613347, 15-613348, 15-613349, and 15-613350; increased with depth but were below the maximum soil background concentration (28 mg/kg) at location 15-613341 (Figure H-10, Appendix H); increased with depth at locations 15-613330 and 15-613351; and decreased downgradient. Single samples were collected at locations 15-02428 and 15-02434. The lateral extent of lead is defined, but the vertical extent is not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in two samples at two locations. The maximum concentration of 3560 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Magnesium concentrations decreased with depth at location 15-613330 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613351; and decreased downgradient. The lateral extent of magnesium is defined, but the vertical extent is not defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample at a concentration of 699 mg/kg at location 15-613344 from 0–1 ft bgs. Manganese concentration decreased with depth at this location and downgradient. The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in three samples at three locations. The maximum concentration of 0.575 mg/kg was detected above BV at location 15-613332 from 0–1 ft bgs. Mercury also had DLs (0.11 mg/kg to 0.12 mg/kg) above the soil BV in four samples. Mercury concentrations decreased with depth at locations 15-613332, 15-613346, and 15-613347 and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in two samples at two locations and above the tuff BV (6.58 mg/kg) in two samples at two locations. The maximum concentration of 18.9 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Nickel concentrations decreased with depth at location 15-613330 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum soil background concentration (29 mg/kg) at locations 15-613347 and 15-613350 (Figure H-10, Appendix H); increased with depth at location 15-613351; and decreased downgradient. The lateral extent of nickel is defined, but the vertical extent is not defined.

Nitrate was detected in 37 soil samples at 21 locations, and 5 tuff samples at five locations. The maximum concentration of 2.4 mg/kg was detected at location 15-613332 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in 11 samples at eight locations and above the tuff BV (0.3 mg/kg) in 5 samples at five locations. The maximum concentration of 2.8 mg/kg was detected above BV at location 15-613351 from 3–4 ft bgs. Selenium concentrations decreased with depth at locations 15-613342, 15-613349, and 15-613350; were consistent with depth at location 15-613343; increased slightly with depth at locations 15-613330, 15-613334, 15-613338, 15-613341, 15-613345, 15-613348, and 15-613351; and decreased downgradient. The lateral and vertical extent of selenium are defined.

Silver was not detected above the soil BV (1 mg/kg) but had DLs (2.1 mg/kg to 2.4 mg/kg) above the soil BV in five samples at four locations. Because silver was not detected, the lateral and vertical extent of silver are defined.

Sodium was detected above the soil BV (915 mg/kg) in two samples at two locations. The maximum concentration of 1010 mg/kg was detected above BV at location 15-613340 from 3–4 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-11 and Table H-4, Appendix H). The lateral and vertical extent of sodium are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in two samples at two locations and above the tuff BV (1.1 mg/kg) in two samples at two locations. The maximum concentration of 5 mg/kg was detected above BV at location 15-613330 from 3–4 ft bgs. Thallium also had DLs (1.1 mg/kg to 1.3 mg/kg) above the soil BV in five samples at four locations. Thallium concentrations increased with depth but were below the maximum soil background concentration (1 mg/kg) at location 15-613341 (Figure H-11, Appendix H); increased with depth at locations 15-613330 and 15-613351; and decreased downgradient. The lateral extent of thallium is defined, but the vertical extent is not defined.

Vanadium was detected above the tuff BV (17 mg/kg) in one sample at a concentration of 21.4 mg/kg at location 15-613351 from 3–4 ft bgs. Vanadium concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1), and decreased downgradient. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in five samples at four locations. The maximum concentration of 78.5 mg/kg was detected above BV at location 15-613349 from 0–1 ft bgs. Zinc concentrations decreased with depth at locations 15-02444, 15-613346, and 15-613349; were below the maximum soil background concentration (75.5 mg/kg) in a single sample at location 15-02464 (Figure H-12, Appendix H); and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone; 4-amino-2,6-dinitrotoluene; 2-amino-4,6-dinitrotoluene; benzyl alcohol; HMX; 4-4-isopropyltoluene; 1,2,4 trimethylbenzene; 1,3,5 trimethylbenzene; 2,4,6 trinitrotoluene; and xylene (total) were detected in one to five samples at one to five locations at concentrations below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Bis(2-ethylhexyl)phthalate was detected in nine samples at eight locations. The maximum concentration of 0.47 mg/kg was detected at location 15-613341 from 0–1 ft bgs. Bis(2-ethylhexyl)phthalate concentration decreased with depth at location 15-613341 and decreased downgradient. All other concentrations were below EQL. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Di-n-butylphthalate was detected in four samples at three locations. The maximum concentration of 0.99 mg/kg was detected at location 15-613346 from 0–1 ft bgs. Di-n-butylphthalate concentrations decreased with depth at locations 15-613346, 15-613347, and 15-613349 and decreased downgradient. The lateral and vertical extent of di-n-butylphthalate are defined.

Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-] was detected in two samples at two locations at concentrations below the EQL. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

RDX was detected in one sample at a concentration of 0.31 mg/kg at location 15-613347 from 3–4 ft bgs. The concentration increased with depth and decreased downgradient. The lateral extent of RDX is defined, but the vertical extent is not defined.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 2.98 pCi/g at location 15-613347 from 0–1 ft bgs. Uranium-234 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 3.76 pCi/g at location 15-613347 from 0–1 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of aluminum, arsenic, barium, calcium, chromium, copper, lead, magnesium, nickel, RDX, and thallium are not defined at SWMUs 15-004(b) and 15-004(c). The lateral extent of inorganic and organic chemicals are defined, and the lateral and vertical extent of radionuclides are defined at SWMUs 15-004(b) and 15-004(c).

6.6.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMUs 15-004(b) and 15-004(c) because extent is not defined for the site.

6.6.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMUs 15-004(b) and 15-004(c) because extent is not defined for the site.

6.7 SWMU 15-004(f), E-F Firing Site

6.7.1 Site Description and Operational History

SWMU 15-004(f) is an inactive firing site, E-F Firing Site, that consists of three inactive firing points (D, E, and F) covering a total area of approximately 60 acres at TA-15 (Figure 6.7-1). E-F Firing Site began operating in 1946 and was last used in 1981. It was operated extensively from 1947 to 1973 and was the largest firing site at the Laboratory (LANL 1993, 020946, p. 7-3).

Originally, E-F Firing Site consisted of a single firing point (D) that was built in 1946 and that ceased to operate in 1949 (LANL 1990, 007512, p. 69). In 1947, the firing area was expanded to include Firing Point E, which was used for large-scale shots containing up to 2500 lb of HE, and Firing Point F, which was used for smaller-scale shots. Firing Points E and F were approximately 650 ft apart and were wired to an underground control bunker (structure 15-0027). Tests at the two firing points were conducted on the ground and created depressions in the ground. After test shots, the firing points were either regraded or backfilled with gravel to fill in the depressions. Eventually, nearby soil was mounded on the north and south sides of Firing Point E to protect TA-15 structures from shrapnel (LANL 1993, 020946, pp. 7-3–7-5). Tests at E-F Firing Site involved HE, uranium, beryllium, lead, and mercury (LANL 1993, 020946, p. 7-8).

6.7.2 Relationship to Other SWMUs and AOCs

The three inactive firing points (D, E, and F) of SWMU 15-004(f) are located north and west of SWMU 15-008(a). AOCs 15-008(f) and 36-004(e) are located southeast of SWMU 15-004(f). Together with SWMU 15-008(a), SWMU 15-004(f) comprises Consolidated Unit 15-004(f)-99.

6.7.3 Summary of Previous Investigations

The site was surveyed in 1982 by EG&G Energy Measurements with radiological detectors mounted in a helicopter as part of a survey of the entire Laboratory. Results of this effort identified elevated levels of radiation at the site (LANL 1993, 020946, p. 7-3).

During the 1994 Phase I RFI conducted at SWMU 15-004(f), a 200-ft grid was established over the site. Surface samples (0–0.5 ft bgs) were collected from 85 locations from selected grid points, and subsurface samples (1.5–2 ft bgs) were collected from a subset of 35 of the sampling locations (LANL 1995, 050294, pp. 4-23–4-57). Samples were field screened for radioactivity, metals, and HE. Based on the field-screening results, 43 surface samples and 17 subsurface samples collected from 53 locations were submitted for analysis of radionuclides and TAL metals (LANL 1995, 050294, pp. 4-23–4-57). All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.7.4.4. Table 6.7-1 presents the samples collected and analyses requested at SWMU 15-004(f).

In 1999, the Laboratory submitted a plan for a technology feasibility demonstration project at SWMU 15-004(f) to NMED (LANL 1999, 063100). An environmental pilot treatment study was conducted in 2001 at E-F Firing Site. The process was designed to selectively remove uranium by precipitation. The soil was sluiced to separate large uranium aggregates, heaped into containers, and leached with a sodium bicarbonate solution. The soil was then placed on a drying tray, and the leachate was pumped into a settling tank, where its pH was adjusted to 6.5 using phosphoric acid, followed by passage through a container of apatite mineral (DOE 2001, 070068, p. 6). Although the pilot treatment study was implemented, a report was never produced.

6.7.4 Site Contamination

The objective of the SWMU 15-004(f) investigation was not to determine the nature and extent of contamination but to identify areas and depths of soil requiring corrective actions. Samples were collected at the previous 1994 RFI grid sampling locations and at the two earthen mounds to characterize the site to support corrective actions and determine if residual contamination poses an unacceptable risk based on an industrial scenario. In addition, the two earthen mounds were characterized to determine waste disposition requirements and if any portion of the soil could be spread over the site as part of site restoration following corrective actions (LANL 2009, 106657.8; NMED 2009, 106677).

Samples were also collected from sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site. These investigation activities are discussed in the following sections.

6.7.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- The 1994 RFI grid sampling locations were reestablished across the site at 42 locations where screening-level and decision-level data from previous investigations showed inorganic chemicals detected above BVs and/or radionuclides detected or detected above BVs/FVs and at

51 locations where no inorganic chemicals or radionuclides were detected above BVs or BVs/FVs during previous investigations.

- A FIDLER survey was conducted over the E-F Firing Site during October 25, 2010, to October 28, 2010, and November 10, 2010, to November 12, 2010. Radiological survey results are presented in Figures 6.7-2 and 6.7-3 and Appendix D.
- All samples collected during the 2010 investigation were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.
- A total of 42 samples were collected at 42 grid sampling locations from two depth intervals (3–3.5 ft and 3–4 ft bgs) (see deviations in Appendix B). Specifically, 33 samples were collected from 3–4 ft bgs, and 9 samples were collected from 3–3.5 ft bgs. All 42 samples were analyzed for TAL metals, explosive compounds, and isotopic uranium. One of the 42 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.
- A total of 102 samples were collected from 51 grid sampling locations from depths of 0–1 ft bgs and 3–4 ft bgs and field screened for explosive compounds (TNT and RDX) using ENSYS test kits and metals (barium, copper, lead, and uranium) using XRF. Based on these field-screening results, a total of 30 samples were collected from 15 locations for off-site laboratory analysis. Specifically, 20 samples were collected from 10 locations from 0–1 ft and 3–4 ft bgs; 8 samples were collected at 4 locations from 0–1 ft bgs and 1–2 ft bgs; and 2 samples were collected from 1 location from 0–0.5 ft bgs and 0.5–1 ft bgs. All 30 samples were analyzed for TAL metals, explosive compounds, and isotopic uranium. One of the 30 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.
- A total of 57 samples were collected from 18 locations within the earthen mounds at Firing Point E. All samples were field screened for metals (barium, copper, lead, and uranium) using an XRF, and additional samples collected if field-screening results were elevated. Samples were collected from depths of 0–1 ft, 6–7 ft, and 9–10 ft bgs or deeper, based on field-screening results. Refusal was encountered at the base of several boreholes within the earthen mounds; therefore, it was not possible to collect samples from the bottom-most sampling depth interval at some locations (see deviations in Appendix B). All mound samples were analyzed for TAL metals, explosive compounds, and isotopic uranium. One of the 57 mound samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.
- Twelve sediment samples were collected from six drainage locations downgradient of the site from two depth intervals (0–0.5 ft or 0–1 ft bgs and 0.5–1 ft, 1–1.5 ft, 1–2 ft, or 2–3 ft bgs) at each location (see deviations in Appendix B). All sediment samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, and isotopic uranium. One of the 12 sample was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

The 2010 sampling locations at SWMU 15-004(f) are shown in Figure 6.7-1. Table 6.7-1 presents the samples collected and analyses requested for SWMU 15-004(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.7.4.2 Soil, Rock, and Sediment Field-Screening Results

The FIDLER is a specialized detector consisting of a thin layer of sodium or cesium iodide that is optimized to detect gamma radiation below 100 keV. It is most widely used to determine the presence of plutonium, americium-241, and DU and can be used to estimate radionuclide activities in the field. Natural uranium and DU are known to be present at SWMU 15-004(f) and are considered the primary contaminants. Before site investigation samples were collected, a radiological FIDLER survey was conducted at the E-F Firing Site over the approximately 60-acre area with a detector spacing of approximately 5 ft and a survey speed of 2.5 ft/sec. The highest count rates of more than 8 times the estimated site background value of 22,500 counts per minute (cpm) were detected in an area within the earthen mounds at Firing Point E and at an area located about 200 ft directly east of the two earthen mounds. The count rates for the site generally decreased with distance away from the earthen mound area. A number of isolated point sources were scattered throughout the 60-acre area. The density of these point sources also decreased with distance away from the earthen mounds (Figures 6.7-2 and 6.7-3 and Appendix D). Two tuff samples were collected at sampling location 15-02230 from 0–0.5 ft bgs and 0.5–1 ft bgs where radiological FIDLER survey results exceeded 2 times the background level. The two samples were submitted for analysis of TAL metals, explosive compounds, and isotopic uranium. FIDLER survey results are presented in Appendix D.

During headspace screening of collected samples for organic vapors at SWMU 15-004(f), a maximum concentration of 67.9 ppm was detected at location 15-02231 from 3–4 ft bgs. No radiological-screening results for collected samples exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.

Uranium exceeded the metals-screening threshold (greater than 2 times the media BV) at 14 of the 51 grid locations at SWMU 15-004(f) where XRF screening was conducted; therefore, 28 samples were collected at 14 locations from depths of 0–1 ft bgs and 3–4 ft bgs and submitted for analysis of TAL metals, explosive compounds, and isotopic uranium. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.

Copper, lead, and/or uranium exceeded the metals-screening threshold (greater than 2 times the media BV) at six of the earthen mound sampling locations (locations 15-613365, 15-613369, 15-613372, 15-613375, 15-613376, and 15-613381) at SWMU 15-004(f) where XRF screening was conducted. A deeper tuff sample was collected at each of the six locations and submitted for analysis of TAL metals, explosive compounds, and isotopic uranium. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.

6.7.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-004(f) consisted of results from 159 samples (97 soil, 50 tuff, and 12 sediment) collected from 83 locations.

Inorganic Chemicals

A total of 159 samples (97 soil, 50 tuff, and 12 sediment) were analyzed for TAL metals. Twelve sediment samples were analyzed for cyanide, nitrate, and perchlorate. Eighteen soil samples were analyzed for uranium. Table 6.7-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the purpose of this investigation was not to define extent but to characterize the site to support

corrective actions and determine if residual contamination poses an unacceptable risk based on the industrial scenario, inorganic COPCs have not been identified.

Organic Chemicals

A total of 141 samples (79 soil, 50 tuff, and 12 sediment) were analyzed for explosive compounds. Four samples (two soil, one tuff, and one sediment) were analyzed for dioxins/furans and PCBs. Table 6.7-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the purpose of this investigation was not to define extent but to characterize the site to support corrective actions and determine if residual contamination poses an unacceptable risk based on the industrial scenario, organic COPCs have not been identified.

Radionuclides

Eighteen soil samples were analyzed for gamma-emitting radionuclides. A total of 141 samples (79 soil, 50 tuff, and 12 sediment) were analyzed for isotopic uranium. Table 6.7-4 presents the radionuclides detected or detected above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the purpose of this investigation was not to define extent but to characterize the site to support corrective actions and determine if residual contamination poses an unacceptable risk based on the industrial scenario, radionuclide COPCs have not been identified.

6.7.4.4 Spatial Distribution of Contamination

E-F Firing Site covers a total area of approximately 60 acres and was operated for more than 30 yr as the largest firing site at the Laboratory. In addition, the two large soil mounds located in the approximate center of E-F Firing Site, on either side of Firing Point E, captured shrapnel and other debris from shots. Contaminant distributions were evaluated primarily to determine the spatial distribution of contaminants, what contaminants have been dispersed, and whether they are migrating off-site. Vertical distribution is not considered for samples collected in drainages downgradient of the site in sediment catchment areas where vertical mixing may occur. Future characterization of the nature and extent of contamination at the E-F Firing Site will include the assessment of the vertical profile.

Inorganic Chemicals

Aluminum was detected above the soil BV (29200 mg/kg) in one sample at one location and was detected above the tuff BV (7340 mg/kg) in six samples at six locations. The maximum concentration of 30,700 mg/kg was detected above BV at location 15-02137 from 1.5–2 ft bgs. Aluminum concentrations decreased with depth and decreased downgradient.

Antimony was detected above the soil BV (0.83 mg/kg) in nine samples at eight locations and was detected above the tuff BV (0.5 mg/kg) in three samples at three locations. The maximum concentration of 17.5 mg/kg was detected above BV at location 15-613368 from 0–1 ft bgs. Antimony also had DLs (3.7 mg/kg to 34.3 mg/kg) above the soil BV in 18 samples at 18 locations and DLs (0.51 mg/kg to 0.55 mg/kg) above the tuff BV in 27 samples at 23 locations. Antimony concentrations decreased with depth and decreased downgradient.

Arsenic was detected above the tuff BV (2.79 mg/kg) in seven samples at seven locations. The maximum concentration of 4.4 mg/kg was detected above BV at location 15-613365 from 9–10 ft bgs. Arsenic concentrations decreased with depth at 15-02150, 15-613365, 15-613376, and 15-613379; were below

the maximum tuff background concentration (5.0 mg/kg) in single samples collected at locations 15-02114, 15-02123, and 15-02125 (Figure H-13, Appendix H); and decreased downgradient.

Barium was detected above the soil BV (295 mg/kg) in 28 samples at 20 locations, above the tuff BV (46 mg/kg) in 24 samples at 22 locations, and above the sediment BV (127 mg/kg) in 5 samples at 4 locations. The maximum concentration of 857 mg/kg was detected above BV at location 15-613374 from 8.0–8.5 ft bgs. Single samples were collected at locations 15-02119, 15-02123, 15-02125, 15-02152, 15-02173, 15-02179, 15-02180, and 15-02182. Barium concentrations decreased with depth at locations 15-02113, 15-02137, 15-02148, 15-02150, 15-02156, 15-02162, 15-02171, 15-02172, 15-02295, 15-02299, 15-613365, 15-613366, 15-613368, 15-613369, 15-613371, 15-613372, 15-613375, 15-613376, 15-613377, 15-613379, 15-613381, and 15-613382; increased with depth but were below the maximum soil background concentration (410 mg/kg) at locations 15-613367 and 15-613373 (Figure H-13, Appendix H); were below the maximum tuff background concentration (51.6 mg/kg) in a single sample collected at location 15-02167 (Figure H-14, Appendix H); increased with depth at locations 15-02114, 15-613370, 15-613374, and 15-613380; and decreased downgradient.

Beryllium was detected above the soil BV (1.83 mg/kg) in 10 samples at nine locations, above the tuff BV (1.21 mg/kg) in 2 samples at one location, and above the sediment BV (1.31 mg/kg) in 1 sample at one location. The maximum concentration of 42.1 mg/kg was detected above BV at location 15-613367 from 0–1 ft bgs. A single sample was collected at location 15-02246. Beryllium concentrations decreased with depth at locations 15-613365, 15-613367, 15-613368, 15-613371, 15-613376, 15-613379, 15-613380, and 15-613381 and decreased downgradient.

Cadmium was detected above the soil BV (0.4 mg/kg) in 32 samples at 21 locations, and above the sediment BV (0.4 mg/kg) in 1 sample at 1 location. The maximum concentration of 44.9 mg/kg was detected above BV at location 15-613374 from 8–8.5 ft bgs. Cadmium also had DLs (0.43 mg/kg to 1 mg/kg) above the soil BV in 14 samples at 14 locations. A single sample was collected at location 15-02182. Cadmium concentrations decreased with depth at locations 15-02114, 15-02277, 15-02279, 15-613365, 15-613367, 15-613368, 15-613369, 15-613371, 15-613376, 15-613379, 15-613381, and 15-613382; increased with depth but were below the maximum soil background concentration (2.6 mg/kg) at locations 15-613366, 15-613372, 15-613373, 15-613375, 15-613377, and 15-613380 (Figure H-14, Appendix H); increased with depth at locations 15-613370 and 15-613374; and decreased downgradient.

Calcium was detected above the soil BV (6120 mg/kg) in 7 samples at 7 locations and above the tuff BV (2200 mg/kg) in 12 samples at 12 locations. The maximum concentration of 13,300 mg/kg was detected above BV at location 15-02180 from 3–4 ft. Single samples were collected at locations 15-02123, 15-02152, 15-02179, and 15-02180. Calcium concentrations decreased with depth at locations 15-02137, 15-02162, 15-613368, 15-613376, 15-613379, and 15-613382; increased with depth or were from a single simple collected at a location but were below the maximum soil background concentration (14,000 mg/kg) at locations 15-02101, 15-02157, 15-02240, and 15-613367 (Figure H-15, Appendix H); increased with depth at locations 15-02113, 15-02148, 15-02150, 15-02156, and 15-02295; and decreased downgradient.

Chromium was detected above the soil BV (19.3 mg/kg) in six samples at five locations and above the tuff BV (7.14 mg/kg) in 22 samples at 20 locations. The maximum concentration of 35.5 mg/kg was detected above BV at location 15-02166 from 3–3.5 ft bgs. Single samples were collected at locations 15-02152 and 15-02177. Chromium concentrations decreased with depth at locations 15-02137, 15-02203, 15-02295, 15-613365, 15-613376, and 15-613379; increased with depth or were from a single sample collected at a location but were below the maximum soil background concentration (36.5 mg/kg) at locations 15-02231, 15-613370, 15-613377, and 15-613380 (Figure H-15, Appendix H); increased with depth or were from a single sample collected at a location but were below the maximum tuff background

concentration (13 mg/kg) at locations 15-02123, 15-02125, 15-02150, 15-02173, 15-02180, 15-02191, and 15-02226 (Figure H-16, Appendix H); increased with depth at locations 15-02114, 15-02156, 15-02166, 15-02206, and 15-02279; and decreased downgradient.

Cobalt was detected above the soil BV (8.64 mg/kg) in 14 samples at nine locations, above the tuff BV (3.14 mg/kg) in 4 samples at four locations and above the sediment BV (4.73 mg/kg) in three samples at two locations. The maximum concentration of 16.8 mg/kg was detected above BV at location 15-613369 from 11–12 ft bgs. A single sample was collected at location 15-02123. Cobalt also had a DL (11.1 mg/kg) above the soil BV in one sample. Cobalt concentrations decreased with depth at locations 15-02114, 15-02162, 15-613365, 15-613372, 15-613376, 15-613380, and 15-613382; increased with depth but were below the maximum soil background concentration (9.5 mg/kg) at locations 15-613366 and 15-613370 (Figure H-16, Appendix H); increased with depth at locations 15-613369, 15-613377, and 15-613381; and decreased downgradient.

Copper was detected above the soil BV (14.7 mg/kg) in 54 samples at 30 locations, above the tuff BV (4.66 mg/kg) in 15 samples at 11 locations, and above the sediment BV (11.2 mg/kg) in 7 samples at 5 locations. The maximum concentration of 108,000 mg/kg was detected above BV at location 15-613370 from 6–7 ft bgs. Copper concentrations decreased with depth at locations 15-02112, 15-02113, 15-02114, 15-02150, 15-02156, 15-02166, 15-02171, 15-02229, 15-02240, 15-02246 (collocated with 15-613377), 15-02277, 15-02779, 15-02295, 15-613365, 15-613367, 15-613368, 15-613369, 15-613370, 15-613371, 15-613375, 15-613376, 15-613377, 15-613378, 15-613379, 15-613381, and 15-613382; were below the maximum tuff background concentration (6.2 mg/kg) in single samples collected at locations 15-02123 and 15-02228 (Figure H-17, Appendix H); increased with depth at locations 15-613366, 15-613372, 15-613373, 15-613374, 15-613380, and 15-613384; and decreased downgradient. Copper was detected above the sediment BV at 14.4 mg/kg at location 15-613384 at the head of Potrillo Canyon, indicating it has likely migrated into Potrillo Canyon. Copper was detected at 52 mg/kg in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-1); however, copper concentrations decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507).

Iron was detected above the soil BV (21500 mg/kg) in one sample and above the tuff BV (14,500 mg/kg) in two samples at two locations. The maximum concentration of 22,200 mg/kg was detected above BV at location 15-02162 from 0.0–1.0 ft bgs. Iron concentrations decreased with depth at locations 15-02150 and 15-02162; were below the maximum tuff background concentration (19,500 mg/kg) in a single sample collected at location 15-02123 (Figure H-17, Appendix H); and decreased downgradient.

Lead was detected above the soil BV (22.3 mg/kg) in 32 samples at 23 locations and above the tuff BV (11.2 mg/kg) in 4 samples at 4 locations. The maximum concentration of 375 mg/kg was detected above BV at location 15-613367 from 0–1 ft bgs. Lead concentrations decreased with depth at locations 15-02112, 15-02114, 15-02162, 15-02198, 15-02277, 15-02279, 15-613365, 15-613366, 15-613367, 15-613368, 15-613369, 15-613371, 15-613372, 15-613375, 15-613376, 15-613379, 15-613381, and 15-613382; increased with depth or were from a single sample collected at a location but were below the maximum soil background concentration (28 mg/kg) at locations 15-02123 and 15-02246 (Figure H-18, Appendix H); increased with depth at locations 15-613370, 15-613373, 15-613374, 15-613377, and 15-613380; and decreased downgradient.

Magnesium was detected above the tuff BV (1690 mg/kg) in nine samples at nine locations. The maximum concentration of 2450 mg/kg was detected above BV at location 15-02123 from 3–4 ft bgs. Magnesium concentrations decreased with depth at locations 15-02156, 15-613365, 15-613376, and 15-613379; increased with depth or were from a single sample collected at a location but were below the maximum soil background concentration (2820.0 mg/kg) at locations 15-02114, 15-02119, 15-02123, 15-02150, and 15-02167 (Figure H-18, Appendix H); and decreased downgradient.

Manganese was detected above the soil BV (671 mg/kg) in three samples at three locations. The maximum concentration of 893 mg/kg was detected above BV at location 15-613369 from 11–12 ft bgs. Manganese concentrations decreased with depth at location 15-02162; increased with depth but were below the maximum soil background concentration (1100.0 mg/kg) at locations 15-613369 and 15-613370 (Figure H-19, Appendix H); and decreased downgradient.

Mercury was detected above soil BV (0.1 mg/kg) in 13 samples at 12 locations and above the tuff BV (0.1 mg/kg) in 2 samples at 2 locations. The maximum concentration of 2.3 mg/kg was detected above BV at location 15-02113 from 0–1 ft bgs. Single samples were collected at locations 15-02170, 15-02180, 15-02182, and 15-02241. Mercury also had DLs (0.11 mg/kg) above the soil BV in five samples at five locations. Mercury concentrations decreased with depth at locations 15-02112, 15-02113, 15-02114, 15-02137, 15-02153, 15-02171, 15-02178, 15-02206, 15-02240, and 15-613375; and decreased downgradient.

Nickel was detected above soil BV (15.4 mg/kg) in 8 samples at 6 locations and above the tuff BV (6.58 mg/kg) in 20 samples at 19 locations. The maximum concentration of 27.5 mg/kg was detected above BV at location 15-613365 from 0–1 ft bgs. Single samples were collected at locations 15-02123, 15-02125, 15-02152, 15-02173, 15-02177, and 15-02180. Nickel concentrations decreased with depth at locations 15-02137, 15-02148, 15-02279, 15-02295, 15-613365, 15-613367, 15-613371, 15-613376, and 15-613379; increased with depth but were below the maximum soil background concentration (29 mg/kg) at locations 15-613370, 15-613377, and 15-613380 (Figure H-19, Appendix H); increased with depth but were below the maximum tuff background concentration (7 mg/kg) at location 15-02167 (Figure H-20, Appendix H); increased with depth at locations 15-02114, 15-02150, 15-02156, 15-02166, and 15-02206; and decreased downgradient.

Nitrate was detected in nine sediment samples at six locations. The maximum concentration of 0.52 mg/kg was detected at 15-613388 from 1–1.5 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Potassium was detected above the soil BV (3460 mg/kg) in one sample at a concentration of 3940 mg/kg at location 15-02182 from 1.5–2 ft bgs. The potassium concentration was below the maximum soil background concentration (6850 mg/kg).

Selenium was detected above the soil BV (1.52 mg/kg) in 38 samples at 20 locations, above the tuff BV (0.3 mg/kg) in 50 samples at 45 locations, and above the sediment BV (0.3 mg/kg) in 12 samples at 6 locations. The maximum concentration of 4.2 mg/kg was detected above BV at location 15-613379 from 9–10 ft bgs. Single samples were collected at locations 15-02119, 15-02123, 15-02125, 15-02139, 15-02141, 15-02144, 15-02149, 15-02152, 15-02155, 15-02157, 15-02167, 15-02170, 15-02173, 15-02177, 15-02179, 15-02180, 15-02191, 15-02226, 15-02228, 15-02231, and 15-02278. Selenium concentrations decreased with depth at locations 15-02142, 15-02150, 15-02162, 15-02171, 15-02203, 15-613365, 15-613366, 15-613368, 15-613369, 15-613372, 15-613374, 15-613375, 15-613376, 15-613377, 15-613378, 15-613380, and 15-613381; were the same with depth at location 15-02229; increased with depth at locations 15-02100, 15-02113, 15-02114, 15-02132, 15-02137, 15-02148, 15-02153, 15-02156, 15-02166, 15-02172, 15-02178, 15-02206, 15-02230, 15-02277, 15-02279, 15-02295, 15-02299, 15-613370, 15-613371, 15-613373, 15-613379, and 15-613382; and decreased downgradient.

Silver was detected above the soil BV (1 mg/kg) in seven samples at six locations and above the tuff BV (1 mg/kg) in one sample at one location. The maximum concentration of 25.5 mg/kg was detected above BV at location 15-613367 from 0–1 ft bgs. Silver concentrations decreased with depth and decreased downgradient.

Sodium was detected above the soil BV (915 mg/kg) in five samples at five locations. The maximum concentration of 1340 mg/kg was detected above BV at location 15-02137 from 1.5–2 ft bgs. Sodium concentrations decreased with depth at locations 15-02299, 15-02172, 15-02171, and 15-02137 and decreased downgradient.

Thallium was detected above the tuff BV (1.1 mg/kg) in two samples at two locations. The maximum concentration of 2.3 mg/kg was detected above BV at location 15-613379 from 9–10 ft bgs. A single sample was collected at location 15-02228 but was below the maximum tuff background concentration (1.7 mg/kg) (Figure H-20, Appendix H). Thallium also had a DL (0.75 mg/kg) above the soil BV (0.73 mg/kg) in one sample. Thallium concentrations increased with depth at location 15-613379 and decreased downgradient.

Uranium was detected above the soil BV (1.82 mg/kg) in 18 historical samples at 18 locations. The maximum concentration of 2763 mg/kg was detected above BV at location 15-02246 from 0–0.5 ft bgs. Total uranium was not included in 2010 analytical suite for SWMU 15-004(f). Uranium concentrations were evaluated using isotopic uranium data from the 2010 samples. Isotopic uranium was not detected above BV in the 2010 samples collected at 16 of the 18 locations from the deepest sampling interval (3–4 ft or 3–3.5 ft bgs) at these locations.

Vanadium was detected above the tuff BV (17 mg/kg) in two samples at two locations and above the sediment BV (19.7 mg/kg) in one sample. The maximum concentration of 22.8 mg/kg was detected above BV at location 15-02114 from 3–4 ft bgs. Vanadium concentrations decreased with depth and decreased downgradient.

Zinc was detected above the soil BV (48.8 mg/kg) in 24 samples at 16 locations and above the sediment BV (60.2 mg/kg) in 1 sample. The maximum concentration of 716 mg/kg was detected above BV at location 15-613367 from 0–1 ft bgs. Zinc concentrations decreased with depth at locations 15-02246 (collocated with 15-613377), 15-613365, 15-613367, 15-613368, 15-613369, 15-613371, 15-613372, 15-613376, 15-613379, 15-613381, and 15-613382; increased with depth but were below the maximum soil background concentration (75.5 mg/kg) at locations 15-613366, 15-613373 (Figure H-21, Appendix H); increased with depth at locations 15-613370, 15-613374, and 15-613380; and decreased downgradient.

Organic Chemicals

Amino-4,6-dinitrotoluene[2-]; 3,5-dinitroaniline; 2,4-dinitrotoluene; 2,6-dinitrotoluene; 1,2,3,4,6,7,8-heptachlorodibenzofuran; and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one to three samples at two to three locations at concentrations below the EQL.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] was detected in three samples at three locations, and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin was detected in four samples at four locations. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Tris (o-cresyl) phosphate was detected in two samples at one location. The maximum concentration of 0.064 mg/kg was detected at location 15-613367 from 0–1 ft bgs. Tris (o-cresyl) phosphate concentrations decreased with depth and decreased downgradient.

Radionuclides

Cesium-137 was detected in samples collected at depths where the soil FV (1.65 pCi/g) does not apply in one sample each at two locations. The maximum activity of 0.13 pCi/g was detected at location 15-02182 from 1.5–2 ft bgs. Because only one sample was collected and analyzed for cesium-137 at location 15-02182, vertical extent could not be assessed. Cesium-137 activities decreased with depth at location 15-02299 and decreased downgradient in Potrillo Canyon Reach PO-1 (LANL 2010, 111507).

Uranium-234 was detected above the soil BV (2.59 pCi/g) in 60 samples at 32 locations, above the tuff BV (1.98 pCi/g) in 8 samples at 5 locations, and above the sediment BV (2.59 pCi/g) in 8 samples at 5 locations. The maximum activity of 523 pCi/g was detected above BV at location 15-613367 from 0–1 ft bgs. Uranium-234 activities decreased with depth at locations 15-02113, 15-02124, 15-02132, 15-02136, 15-02142, 15-02145, 15-02148, 15-02150, 15-02156, 15-02162, 15-02171, 15-02203, 15-02229, 15-02279, 15-613365, 15-613366, 15-613367, 15-613368, 15-613369, 15-613371, 15-613373, 15-613375, 15-613376, 15-613377, 15-613378, 15-613379, 15-613381, and 15-613382; increased with depth at locations 15-613370, 15-613372, 15-613374, and 15-613380; and decreased downgradient. Uranium-234 was detected above the sediment BV/FV at an activity of 3.02 pCi/g at the head of Potrillo Canyon (location 15-613384), indicating it has likely migrated into Potrillo Canyon. Uranium-234 was detected at an activity of 44.3 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-1); however, uranium-234 activities decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507).

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in 55 samples at 32 locations, above the tuff BV (0.09 pCi/g) in 11 samples at 8 locations, and above the sediment BV (0.2 pCi/g) in 6 samples at 3 locations. The maximum activity of 73 pCi/g was detected above BV at location 15-613367 from 0–1 ft bgs. Uranium-235/236 activities decreased with depth at locations 15-02113, 15-02124, 15-02132, 15-02136, 15-02142, 15-02145, 15-02148, 15-02150, 15-02156, 15-02162, 15-02171, 15-02203, 15-02229, 15-02279, 15-613365, 15-613366, 15-613367, 15-613368, 15-613369, 15-613371, 15-613372, 15-613373, 15-613375, 15-613376, 15-613377, 15-613378, 15-613379, 15-613381, and 15-613382; increased with depth at locations 15-613370, 15-613374, and 15-613380; and decreased downgradient.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in 63 samples at 33 locations, above the tuff BV (1.93 pCi/g) in 13 samples at 9 locations, and above the sediment BV (2.29 pCi/g) in 9 samples at 5 locations. The maximum activity of 3140 pCi/g was detected above BV at location 15-613367 from 0–1 ft bgs. Uranium-238 activities decreased with depth at locations 15-02113, 15-02124, 15-02132, 15-02136, 15-02142, 15-02145, 15-02148, 15-02150, 15-02156, 15-02162, 15-02171, 15-02203, 15-02229, 15-02279, 15-613365, 15-613366, 15-613367, 15-613368, 15-613369, 15-613371, 15-613372, 15-613373, 15-613375, 15-613376, 15-613377, 15-613378, 15-613379, 15-613381, and 15-613382; increased with depth at locations 15-02240, 15-613370, 15-613374, and 15-613380; and decreased downgradient. Uranium-238 was detected above the sediment BV/FV at 3.37 pCi/g at location 15-613384 at the head of Potrillo Canyon, indicating it has likely migrated into Potrillo Canyon. Uranium-238 was detected at 57.4 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-1); however, uranium-238 activities decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507).

Summary of Contaminant Distribution

Inorganic chemicals and radionuclides are present above background in surface and near-surface soil and tuff at grid sampling locations throughout the site and particularly within the earthen mounds. The concentrations of barium, cadmium, calcium, chromium, cobalt, copper, lead, nickel, thallium, selenium,

zinc, uranium-234, uranium-235/236, and uranium-238 increased with depth at one or more sampling locations at SWMU 15-004(f).

The results of the FIDLER survey and characterization sampling at the earthen mounds, at the grid sampling locations, and in downgradient drainages are discussed below.

Earthen Mound Sampling

FIDLER survey results from the earthen mound area at Firing Point E showed two areas: one within the earthen mounds and one directly east of the earthen mounds where count rates were greater than 160,000 cpm or greater than 8 times estimated background levels (Figures 6.7-2 and 6.7-3 and Appendix D). The count rates generally decreased to background levels within 200 ft radially from the two earthen mounds area.

Similarly, the results of the inorganic chemical and radionuclide sampling from the 2010 and previous investigations were the most elevated between the two earthen mounds near Firing Point E and decreased in concentration and activity in samples collected from the top and back (to the northeast and southeast) of the mounds and in samples collected outside of the mound area.

Specifically, the highest inorganic chemical concentrations and radionuclide activities were detected at the locations (e.g. 15-613367, 15-613370, 15-613373, 15-613374, 15-613377, and 15-613380) between the two earthen mounds, near Firing Point E. Inorganic, organic, and radionuclide results were compared with industrial SSLs/SALs. Copper was detected above the industrial SSL (45,400 mg/kg) at a concentration of 108,000 mg/kg in the sample collected at location 15-613370 from 6–7 ft bgs. Organic chemicals were not detected above industrial SSLs. Uranium-238 was detected above the industrial SAL (430 pCi/g) at activities of 3140 pCi/g and 1850 pCi/g in two samples at location 15-613367 from 0–1 ft bgs and 2–3 ft bgs, respectively, and at an activity of 709 pCi/g in one sample at location 15-613365 from 0–1 ft bgs.

A comparison between the FIDLER survey data and the 2010 investigation sampling results at the area east of the earthen mounds cannot be made at this time because the investigation grid sampling spacing density was too low. The proposed sampling locations did not coincide with the FIDLER survey data collected east of the earthen mounds.

Grid Sampling

FIDLER survey data for the majority of the 60-acre area ranged from less than the estimated background levels to 4 times the background level. Generally, the count rate for the site decreased away from the earthen mounds. Several isolated point sources were scattered throughout the site where radiation counts were greater than 160,000 cpm or greater than 8 times background levels. The density of these point sources also decreased with distance away from the earthen mounds. Overall, the results of the inorganic chemical, organic chemical, and radionuclide data from the 2010 and previous investigations follow this pattern. Two characterization samples were collected at sampling location 15-02230 because of elevated radiological FIDLER survey results at this location. Isotopic uranium activities were not detected above BVs in samples collected at location 15-02230. Inorganic chemical and organic chemicals and radionuclides at the remaining grid sampling locations were not detected above industrial SSLs.

Downgradient Sediment Sampling

The concentrations of detected organic chemicals and most inorganic chemicals and radionuclides activities decreased downgradient of SWMU 15-004(f). Copper, uranium-234, and uranium-238 were detected above the sediment BV or sediment BVs/FVs at sampling location 15-613384 at the head of Potrillo Canyon, indicating these contaminants have likely migrated into Potrillo Canyon.

Copper was detected at 52 mg/kg, uranium-234 was detected at 44.3 pCi/g, and uranium-238 was detected at 57.4 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-1); however, copper concentrations and activities of uranium-234 and uranium-238 decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507). Concentrations decreased in downgradient reaches. The concentrations of detected organic chemicals and most inorganic chemicals and radionuclides decreased downgradient of SWMU 15-004(f). Copper, uranium-234, and uranium-238 were detected above the sediment BVs/FVs at a sampling location at the head of Potrillo Canyon, indicating these contaminants have likely migrated into Potrillo Canyon. Downcanyon extent of copper and the two uranium isotopes in Potrillo Canyon has been demonstrated downgradient in Potrillo Canyon Reach PO-3 (LANL 2010, 111507).

The migration of potential contaminants from SWMU 15-004(f) is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-3.

Summary

Although several constituents were detected above industrial SSLs/SALs, the site does not pose a current risk because of the administrative controls that are in place. Because of the distance between grid sampling locations, additional characterization sampling east of the earthen mounds is proposed to confirm the results of the radiological FIDLER survey (Figures 6.7-2 and 6.7-3 and Appendix D) and to determine if inorganic chemicals or radionuclides at concentrations above industrial SSLs/SALs may require remediation. Results of the additional sampling will be combined with the results of the characterization sampling performed during the 2010 investigation to design remediation activities to remove contamination that exceeds industrial SSLs/SALs, including the copper and uranium-238 at locations with detected concentrations above industrial SSLs/SALs.

SWMU 15-004(f) is also regulated under the Laboratory's National Pollutant Discharge Elimination System (NPDES) individual permit (IP) for stormwater discharges from SWMUs and AOCs. Future corrective actions at SWMU 15-004(f) will be coordinated with any corrective actions that may be required under the IP.

SWMU 15-004(f) is a posted beryllium area, and beryllium was detected in many of the samples collected from earthen mounds at Firing Point E and in one sediment sample at a drainage sampling location downgradient of the site. Although detected beryllium concentrations are below residential, industrial, and construction worker SSLs, site controls because of the presence of beryllium are necessary in accordance with Laboratory industrial hygiene requirements. All future work at SWMU 15-004(f) will be impacted by increased health and safety requirements associated with detected beryllium concentrations.

6.7.5 Summary of Human Health Risk Screening

The purpose of the sampling was to determine the spatial distribution of contaminants, to assess what contaminants have been dispersed, and to determine whether contaminants are migrating off-site. Therefore, a human health risk assessment was not performed for SWMU 15-004(f).

6.7.6 Summary of Ecological Risk Screening

The purpose of the sampling was to determine the spatial distribution of contaminants, to assess what contaminants have been dispersed, and to determine whether contaminants are migrating off-site. Therefore, an ecological risk assessment was not performed for SWMU 15-004(f).

6.8 SWMU 15-008(a), Two Surface Disposal Areas at E-F Firing Site

6.8.1 Site Description and Operational History

SWMU 15-008(a) consists of two small surface disposal areas located on the edge of Potrillo Canyon, one south and one east of E-F Firing Site [SWMU 15-004(f)], at TA-15 (Figure 6.8-1). The disposal areas are located within approximately 350 ft of each other, with each disposal area having dimensions of approximately 8 ft in diameter × 2 ft high. Both areas were used to dispose of debris from tests conducted at the E-F Firing Site, including soil, rock, pebbles, metal fragments, plastic, electrical cable, and electrical accessories. The exact period of operation of the surface disposal areas is not known but probably falls within the period of operation for E-F Firing Site (1946 to 1981) (LANL 1993, 020946, p. 7-20). All debris was removed from both surface disposal areas during the 2010 investigation.

6.8.2 Relationship to Other SWMUs and AOCs

SWMU 15-008(a) is located south of the three inactive firing points (D, E, and F) of SWMU 15-004(f) and northwest of AOCs 15-008(f) and 36-004(e). Together with SWMU 15-004(f), SWMU 15-008(a) comprises Consolidated Unit 15-004(f)-99.

6.8.3 Summary of Previous Investigations

An aerial radiological survey conducted in 1982 identified no areas of elevated levels of radioactivity at SWMU 15-008(a) (LANL 1993, 020946, p. 7-3).

During the 1994 Phase I RFI conducted at SWMU 15-008, three surface samples (0–0.5 ft bgs) were collected from each of the two debris piles, and four surface samples (0–0.5 ft bgs) were collected from nearby drainages) (LANL 1995, 050294, pp. 4-23–4-57). The samples were field screened for radioactivity, metals, and HE and submitted for analysis of radionuclides and TAL metals (LANL 1995, 050294, pp. 4-23–4-57). All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.4.4. Table 6.8-1 presents the samples collected and analyses requested at SWMU 15-008(a).

6.8.4 Site Contamination

6.8.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; and explosive compounds (TNT and RDX). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.
- Following the removal of the two surface debris piles, eight samples were collected from four locations beneath the former debris piles (two locations at each debris pile) from 0–1 ft and 1–2 ft bgs (see deviations in Appendix B).

- A total of 16 samples were collected from eight locations around the surface debris removal boundaries from two depths (0–1 ft bgs and 1–2 ft, 2–3 ft, or 3–4 ft bgs) (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, PCBs, and isotopic uranium. Two of the 24 samples (1 at each of the debris piles) were also analyzed for dioxins/furans. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data at SWMU 15-008(a) are shown in Figure 6.8-1. Table 6.8-1 presents the samples collected and analyses requested for SWMU 15-008(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.8.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-008(a), a maximum concentration of 3 ppm was detected at location 15-613413 from 0–1 ft bgs. Samples RE15-11-824 and RE15-11-825 collected at location 15-613407 from 0–1 ft and 1–2 ft bgs, respectively, exceeded the gross-alpha, -beta, and -gamma screening threshold. Detected gross-alpha and gross-beta/gamma levels for sample RE15-11-824 were 2460 dpm and 16,660 dpm, respectively. Detected gross-alpha and gross-beta/gamma levels for RE15-11-825 were 174 dpm and 10,610 dpm, respectively. None of the remaining radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1. No changes to sampling or other activities occurred because of the field-screening results.

6.8.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-008(a) consisted of results from 25 samples (13 soil and 12 tuff) collected from 13 locations.

Inorganic Chemicals

Twenty-five samples (13 soil and 12 tuff) were analyzed for TAL metals. Twenty-four samples (12 soil and 12 tuff) were analyzed for cyanide, nitrate, and perchlorate. One soil sample was analyzed for uranium. Table 6.8-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-four samples (12 soil and 12 tuff) were analyzed for explosive compounds, VOCs, SVOCs, and PCBs. Two of the 24 soil samples were also analyzed for dioxins/furans. Table 6.8-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

One soil sample was analyzed for gamma-emitting radionuclides. Twenty-four samples (12 soil and 12 tuff) were analyzed for isotopic uranium. Table 6.8-4 presents the radionuclides detected or detected

above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.8.4.4 Nature and Extent of Contamination

Stormwater runoff from SWMUs 15-008(a) and 15-004(f) flow to the same drainage; therefore, data from sediment samples collected from the drainage downgradient of SWMU 15-004(f) (section 6.7.4.4) will determine if any contaminants have migrated from SWMU 15-008(a).

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in four samples at four locations. The maximum concentration of 15,100 mg/kg was detected above BV at location 15-613406 from 1–2 ft bgs. Aluminum concentrations decreased with depth at locations 15-613405, 15-613407, and 15-613408 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613406; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of aluminium is defined, but the vertical extent is not defined.

Antimony was detected above soil BV (0.83 mg/kg) in four samples at four locations and was detected above the tuff BV (0.5 mg/kg) in one sample.The maximum concentration of 2.5 mg/kg was detected above BV at location 15-613406 from 0–1 ft bgs. Antimony also had DLs (1.1 mg/kg to 3.8 mg/kg) above the soil BV in two samples at two locations and a DL (0.81 mg/kg) above the tuff BV in one sample. Antimony concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in two samples at two locations. The maximum concentration of 3.6 mg/kg was detected above BV at location 15-613406 from 1–2 ft bgs. Arsenic concentrations decreased with depth at locations 15-613405 and 15-613406 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in three samples at three locations and was detected above the tuff BV (46 mg/kg) in six samples at six locations. The maximum concentration of 834 mg/kg was detected at location 15-02242 from 0–1 ft bgs. Barium concentrations decreased with depth at locations 15-613407 and 15-613414; decreased with depth at 15-613404, 15-613405, and 15-613408 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth at location 15-613406; and decreased downgradient in sediment samples collected at SWMU 15-004(f). Barium was detected above BV in a single historical sample collected at location 15-02242, but concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. The lateral extent of barium is defined, but the vertical extent is not defined.

Beryllium was detected above the soil BV (1.83 mg/kg) in two samples at two locations and was detected above the tuff BV (1.21 mg/kg) in two samples at two locations. The maximum concentration of 2.9 mg/kg was detected above BV at location 15-613410 from 0–1 ft bgs. Beryllium concentrations decreased with depth and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of beryllium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in six samples at six locations. The maximum concentration of 1.1 mg/kg was detected above BV at locations 15-613405 and 15-613407 from 0–1 ft bgs. Cadmium also had a DL (0.59 mg/kg) above the soil BV in one sample. Cadmium concentrations decreased with depth and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in four samples at four locations. The maximum concentration of 2980 mg/kg was detected above BV at location 15-613410 from 3–4 ft bgs. Calcium concentrations decreased with depth at locations 15-613405 and 15-613408 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth at locations 15-613407 and 15-613410; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in six samples at six locations. The maximum concentration of 18 mg/kg was detected above BV at location 15-613410 from 3–4 ft bgs. Chromium concentrations decreased with depth at locations 15-613405 and 15-613406 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum tuff background concentration (13 mg/kg) at locations 15-613407, 15-613408, and 15-613412 (Figure H-22, Appendix H); increased with depth at location 15-613410; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of chromium is defined, but the vertical extent is not defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in four samples at four locations. The maximum concentration of 4.5 mg/kg was detected above BV at location 15-613405 from 1–2 ft bgs. Cobalt concentrations decreased with depth at locations 15-613405, 15-613406, 15-613407, and 15-613408 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in nine samples at nine locations and was detected above the tuff BV (4.66 mg/kg) in seven samples at seven locations. The maximum concentration of 7720 mg/kg was detected above BV at location 15-02242 in a single sample collected from 0–1 ft bgs, but the concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. Copper concentrations decreased with depth at locations 15-613404, 15-613405, 15-613406, 15-613407, 15-613408, 15-613412, 15-613413, and 15-613414 and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and verical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.51 mg/kg to 0.55 mg/kg) above the soil BV in seven samples at seven locations and had DLs (0.51 mg/kg to 0.57 mg/kg) above the tuff BV in 12 samples at 12 locations. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Iron was detected above the tuff BV (14,500 mg/kg) in one sample at a concentration of 15,800 mg/kg at location 15-613406 from 1–2 ft bgs. Iron concentrations increased with depth but were below the maximum background concentration (19,500 mg/kg) at location 15-613406 (Figure H-22, Appendix H) and decreased downgradient. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in six samples at six locations and above the tuff BV (11.2 mg/kg) in three samples at three locations. The maximum concentration of 58.2 mg/kg was detected above BV at location 15-02242 in a single sample collected from 0–1 ft bgs, but concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. Lead concentrations decreased with depth at locations 15-613406, 15-613407, 15-613412, 15-613413, and 15-613414; increased with depth at location 15-613405; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of lead is defined, but the vertical extent is not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in two samples at two locations. The maximum concentration of 1980 mg/kg was detected above BV at location 15-613406 from 1–2 ft bgs. Magnesium concentrations decreased with depth at locations 15-613405 and 15-613406 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); and decreased downgradient. The lateral and vertical extent of magnesium are defined.

Mercury was detected above the soil and tuff BV (0.1 mg/kg) in 10 soil samples at 10 locations and in 11 tuff samples at 11 locations. The maximum concentration of 1.4 mg/kg was detected above BV at location 15-02242 in a single sample from 0–1 ft bgs, but concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. Mercury concentrations decreased with depth at locations 15-613403, 15-613404, 15-613409, 15-613410, 15-613411, 15-613412, and 15-613413; increased with depth at locations 15-613405, 15-613406, 15-613408, and 15-613414; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of mercury is defined, but the vertical extent is not defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample and above the tuff BV (6.58 mg/kg) in five samples at five locations. The maximum concentration of 57.3 mg/kg was detected above BV at location 15-02242 in a single sample collected from 0–1 ft bgs, but concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. Nickel concentrations decreased at locations 15-613405, 15-613406, and 15-613407 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth at locations 15-613408 and 15-613410; and decreased downgradient. The lateral extent of nickel is defined, but the vertical extent is not defined.

Nitrate was detected in 11 soil samples at 11 locations and in 10 tuff samples at 10 locations. The maximum concentration of 4.2 mg/kg was detected at location 15-613407 from 2–3 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in four soil samples at four locations and in five tuff samples at five locations. The maximum concentration of 0.0049 mg/kg was detected at location 15-613409 from 1–2 ft bgs. Perchlorate concentrations were below the EQL at all locations and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in two samples at two locations and above the tuff BV (0.3 mg/kg) in 12 samples at 12 locations. The maximum concentration of 3 mg/kg was detected above BV at location 15-613407 from 2–3 ft bgs. Selenium concentrations decreased with depth at location 15-613406; decreased with depth at locations 15-613411 and 15-613412 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased or remained the same with

depth at locations 15-613403, 15-613404, 15-613405, 15-613407, 15-613408, 15-613409, 15-613410, 15-613413, and 15-613414; and decreased downgradient in sediment samples collected at SWMU 15-004(f) and in Reach PO-1 in Potrillo Canyon (LANL 2010, 111507). The lateral extent of selenium is defined, but the vertical extent is not defined.

Silver was detected above the tuff BV (1 mg/kg) in one sample at a concentration of 3.1 mg/kg at location 15-613405 from 1–2 ft bgs. Silver concentrations increased with depth at location 15-613405 and decreased downgradient. The lateral extent of silver is defined, but the vertical extent is not defined.

Uranium was detected above the soil BV (1.82 mg/kg) in one sample at a maximum concentration of 2820 mg/kg at location 15-02242 in a single sample collected from 0–1 ft bgs. Only one sample was analyzed for total uranium, and extent was evaluated using isotopic uranium data for the 2010 samples. Isotopic uranium concentrations decreased in 2010 investigation samples collected at locations 15-613406 and 15-613407 located 10 ft and 30 ft southeast of historical location 15-02242, and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of uranium are defined.

Vanadium was detected above the tuff BV (17 mg/kg) in two samples at two locations. The maximum concentration of 20.8 mg/kg was detected above BV at location 15-613406 from 1–2 ft bgs. Vanadium concentrations decreased with depth at locations 15-613405 and 15-613406 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1) and decreased downgradient. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in five samples at five locations and above the tuff BV (63.5 mg/kg) in one sample. The maximum concentration of 309 mg/kg was detected in a single sample collected at location 15-02242 from 0–1 ft bgs, but concentrations decreased in samples collected at locations 15-613406 and 15-613407, located 10 ft and 30 ft southeast of historical location 15-02242. Zinc concentrations decreased with depth at locations 15-613406, 15-613407, 15-613412, and 15-613414; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, acetone, benzoic acid, bis(2-ethylhexyl)phthalate, diethylphthalate, di-n-butylphthalate, di-n-octylphthalate, 4-isopropyltoluene, and methylene chloride were detected in 1 to 13 samples at one to nine locations at concentrations below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,4,7,8-hexachlorodibenzodioxin; 1,2,3,6,7,8-hexachlorodibenzodioxin; 1,2,3,7,8,9-hexachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzofuran; 1,2,3,7,8-pentachlorodibenzodioxin; and 2,3,7,8-tetrachlorodibenzodioxin were detected in one to two samples at one to two locations at concentrations below the EQLs. Because all the dioxins and furans congeners sampled at the most contaminated locations were detected below the EQLs, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in 10 samples at 10 locations and above the tuff BV (1.98 pCi/g) in 7 samples at 7 locations. The maximum activity of 492 pCi/g was detected above BV at location 15-613407 from 0–1 ft bgs. Uranium-234 activities decreased with depth at locations 15-613404, 15-613406, 15-613407, 15-613408, 15-613409, 15-613410, 15-613412, 15-613413, and 15-613414; increased with depth at location 15-613405; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of uranium-234 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in 10 samples at 10 locations and above the tuff BV (0.09 pCi/g) in 7 samples at 7 locations. The maximum activity of 26.5 pCi/g was detected above BV at location 15-613407 from 0–1 ft bgs. Uranium-235/236 activities decreased with depth at locations 15-613404, 15-613406, 15-613407, 15-613408, 15-613409, 15-613410, 15-613412, 15-613413, and 15-613414; increased with depth at location 15-613405; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in 10 samples at 10 locations and above the tuff BV (1.93 pCi/g) in 7 samples at 7 locations. The maximum activity of 681 pCi/g was detected above BV at location 15-613407 from 0–1 ft bgs. Uranium-238 activities decreased with depth at locations 15-613404, 15-613406, 15-613407, 15-613408, 15-613409, 15-613410, 15-613412, 15-613413, and 15-613414; increased with depth at location 15-613405; and decreased downgradient in sediment samples collected at SWMU 15-004(f). The lateral extent of uranium-238 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of aluminum, barium, calcium, chromium, lead, mercury, nickel, selenium, silver, uranium-234, uranium-235/236, and uranium-238 is not defined at SWMU 15-008(a). The extent of organic chemicals is defined at SWMU 15-008(a).

6.8.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 15-008(a) because extent is not defined for the site.

6.8.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 15-008(a) because extent is not defined for the site.

6.9 AOC 15-005(b), Storage Area

6.9.1 Site Description and Operational History

AOC 15-005(b) is a former storage area located inside an HE make-up building (15-0242) at TA-15 (Figure 6.9-1). This area was used to store containers of waste HE. Experiments were assembled, approved adhesives were used during the assembly process, and solvents may have been used to clean

some of the parts. The period of operation of this site and the quantities of wastes stored are not known (LANL 1993, 020946, p. 9-12).

6.9.2 Relationship to Other SWMUs and AOCs

AOC 15-005(b) is located northeast of SWMUs 15-004(b) and 15-004(c) and is not associated with any SWMUs or AOCs.

6.9.3 Summary of Previous Investigations

During the 1995 Phase I RFI conducted at AOC 15-005(b), three surface samples (0–0.5 ft bgs) and two subsurface (1.5–2 ft bgs) samples were collected from two locations immediately outside building 15-0242 (LANL 1996, 054977, pp. 5-72–5-75). Samples were field screened for radioactivity, metals, and HE and submitted for analysis of TAL metals (LANL 1996, 054977, pp. 5-72–5-75). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs.

6.9.4 Site Contamination

6.9.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of eight samples were collected from four locations around building 15-0242 from 0–1 ft and 4–5 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, and explosive compounds. One of the eight samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

The 2010 sampling locations at AOC 15-005(b) are shown in Figure 6.9-1. Table 6.9-1 presents the samples collected and analyses requested for AOC 15-005(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.9.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 15-005(b), a maximum concentration of 1.0 ppm was detected at location 15-613254 from 4–5 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.9.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC 15-005(b) consisted of results from eight samples (six soil and two tuff) collected from four locations.

Inorganic Chemicals

Eight samples (six soil and two tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.9-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.9-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eight samples (six soil and two tuff) were analyzed for explosive compounds, VOCs, and SVOCs. One soil sample was also analyzed for dioxins/furans and PCBs. Table 6.9-3 presents the detected organic chemicals. Figure 6.9-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

No radiological analyses were proposed for AOC 15-005(b) per the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677).

6.9.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in one sample at a concentration of 10,400 mg/kg at location 15-613253 from 4–5 ft bgs. Aluminum concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1). The vertical extent of aluminum is defined, but the lateral extent is not defined.

Antimony was not detected above BV but had DLs (0.52 mg/kg to 0.58 mg/kg) above the tuff BV (0.5 mg/kg) in two samples at two locations. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in one sample at a concentration of 4.3 mg/kg at location 15-613253 from 4–5 ft bgs. Arsenic concentrations increased with depth but were below the maximum tuff background concentration (5.0 mg/kg) (Figure H-23, Appendix H). The vertical extent of arsenic is defined, but the lateral extent is not defined.

Barium was detected above the soil BV (295 mg/kg) in one sample and was detected above the tuff BV (46 mg/kg) in two samples at two locations. The maximum concentration of 310 mg/kg was detected above BV at location 15-613254 from 4–5 ft bgs. Barium concentrations decreased with depths at location 15-613252 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum soil background concentration (410 mg/kg) at location 15-613254; and increased with depth at location 15-613253. The lateral and vertical extent of barium are not defined.

Calcium was detected above the tuff BV (2200 mg/kg) in two samples at two locations. The maximum concentration of 4490 mg/kg was detected above BV at location 15-613253 from 4–5 ft bgs. Calcium concentrations increased with depth at locations 15-613252 and 15-613253. The lateral and vertical extent of calcium are not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 12.9 mg/kg was detected above BV at location 15-613253 from 4–5 ft bgs. Chromium concentrations decreased with depth at 15-613252 because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1) and increased with depth but were below the maximum tuff background concentration (13.0 mg/kg) at location 15-613253 (Figure H-23, Appendix H). The vertical extent of chromium is defined, but the lateral extent is not defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in one sample at a concentration of 11.9 mg/kg at location 15-613254 from 4–5 ft bgs. Cobalt concentrations increased with depth at this location. The lateral and vertical extent of cobalt are not defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.53 mg/kg to 0.62 mg/kg) above the soil BV in six samples at four locations and DLs (0.52 mg/kg to 0.58 mg/kg) above the tuff BV in two samples at two locations. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 27.6 mg/kg at location 15-613252 from 0–1 ft bgs. Lead concentrations decreased with depth at this location. The vertical extent of lead is defined, but the lateral extent is not defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample at a concentration of 776 mg/kg at location 15-613254 from 4–5 ft bgs. Manganese concentrations increased with depth but were below the maximum tuff background concentration (1100 mg/kg) (Figure H-24, Appendix H). The vertical extent of manganese is defined, but the lateral extent is not defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in one sample at a concentration of 7.6 mg/kg at location 15-613253 from 4–5 ft bgs. Nickel concentrations decreased with depth at this location because the concentration in the shallower sample was below the soil BV but above the concentration in the deeper tuff sample (see section 5.0 and Appendix G, Table G-1). The vertical extent of nickel is defined, but the lateral extent is not defined.

Nitrate was detected in six soil samples at four locations and two tuff samples at two locations. The maximum concentration of 2.5 mg/kg was detected at location 15-613251 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one tuff sample at a concentration of 0.0033 mg/kg at location 15-613253 from 4–5 ft bgs. The perchlorate concentration was below the EQL; therefore, the vertical and lateral extent of perchlorate are defined.

Selenium was detected above tuff BV (0.3 mg/kg) in two samples at two locations. The maximum concentration of 0.96 mg/kg was detected above BV at location 15-613252 from 4–5 ft bgs. Selenium concentrations decreased with depth at locations 15-613252 and 15-613253. The vertical extent of selenium is defined, but the lateral extent is not defined.

Organic Chemicals

Acenaphthene, bis(2-ethylhexyl)phthalate, dibenzofuran, fluorene, 2-methylnaphthalene, and naphthalene were detected in one to two samples at one to two locations at concentrations below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Anthracene; benzo(g,h,i)perylene; and indeno(1,2,3-cd)pyrene were detected in four samples at four locations. Anthracene; benzo(g,h,i)perylene; and indeno(1,2,3-cd)pyrene concentrations are below the EQL at three locations, decreased with depth at one location, and decreased downgradient at location 15-613253. The lateral and vertical extent of anthracene; benzo(g,h,i)perylene; and indeno(1,2,3-cd)pyrene are defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and phenanthrene were detected in five samples at four locations at concentrations below the EQLs at two locations, decreased with depth at two locations, and decreased downgradient at location 15-613253. Phenanthrene concentrations decreased with depth at all four locations and decreased downgradient at location 15-613253. The lateral and vertical extent of these organic chemicals are defined.

Dibenz(a,h)anthracene was detected in two samples at two locations. Dibenz(a,h)anthracene concentrations are below the EQL at one location, decreased with depth at the other location, and decreased downgradient at location 15-613253. The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Fluoranthene was detected in six samples at four locations. The maximum concentration of 6.2 mg/kg was detected at location 15-613252 from 0–1 ft bgs. Fluoranthene concentrations decreased with depth and decreased downgradient at location 15-613253. The lateral and vertical of fluoranthene are defined.

Methylene chloride was detected in eight samples at four locations. The maximum concentration of 0.0065 mg/kg was detected at location 15-613251 from 4–5 ft bgs. Methylene chloride concentrations were below EQLs at three locations, increased slightly with depth at location 15-613251, and decreased downgradient at location 15-613253. The lateral and vertical extent of methylene chloride are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8-heptachlorodibenzofuran were detected in one to two samples at one to two locations at concentrations below the EQLs. Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-] was detected in one sample. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Pyrene was detected in five samples at four locations. The maximum concentration of 3.4 mg/kg was detected at location 15-613252 from 0–1 ft bgs. Pyrene concentrations were below EQLs at one location, decreased with depth at all locations, and decreased downgradient at location 15-613253. The lateral and vertical extent of pyrene are defined.

Radionuclides

No radiological analyses were proposed for AOC 15-005(b) per the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677).

Summary of Nature and Extent

The vertical extent of barium, calcium, and cobalt is not defined at AOC 15-005(b). The lateral extent of aluminum, arsenic, barium, calcium, chromium, cobalt, lead, manganese, nickel and selenium is not defined at AOC 15-005(b). The lateral and vertical extent of organic chemicals are defined at AOC 15-005(b).

6.9.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 15-005(b) because extent is not defined for the site.

6.9.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 15-005(b) because extent is not defined for the site.

6.10 AOC 15-006(e), Projectile Test Area, Duplicate of AOC C-36-006(e)

6.10.1 Site Description and Operational History

AOC 15-006(e) is a former projectile test area that was located south of I-J Firing Site [AOC 36-004(e)]. AOC 15-006(e) is a duplicate of AOC C-36-006(e) (see section 7.12).

The 1990 SWMU report lists AOC 15-006(e) as an area where bullets containing DU were fired into a cliff face. Some of the projectile debris was recovered; however, most of the debris remains on the site. In 1981, the boundary of TA-36 was expanded to include the portion of TA-15 in which AOC 15-006(e) was located. AOC 15-006(e) was renamed AOC C-36-006(e) in the OU 1086 work plan because the projectile test area was within the boundaries of TA-36 when the work plan was written (LANL 1993, 020946, pp. 5-39–5-40). Therefore, AOC 15-006(e) is a duplicate of AOC C-36-006(e).

Sections 7.12.3 through 7.12.6 summarize the investigation of AOC C-36-006(e).

6.11 AOC 15-008(f), Sand Mounds at I-J Firing Site (TA-36)

6.11.1 Site Description and Operational History

AOC 15-008(f) consists of several sand mounds located next to the I-J Firing Site [AOC 36-004(e)] at TA-15 (Figure 6.11-1). AOC 15-008(f) is deferred for investigation per Table IV-2 of the Consent Order. The I-J Firing Site is located on a mesa overlooking Potrillo Canyon and was originally located in TA-15 when it was constructed in 1948 but is now part of TA-36 (LANL 1993, 015313, pp. 5-39–5-40, 5-43).

6.11.2 Relationship to Other SWMUs and AOCs

The I-J Firing Site [AOC 36-004(e)] is located east and northeast of the AOC 15-008(f) sand mounds, and AOC C-36-006(e) is located southeast of AOC 15-008(f).

6.11.3 Summary of Previous Investigations

Previous environmental investigations at AOC 15-008(f) include a surface radiological survey in 1991 that identified localized areas of elevated radiation levels (LANL 1993, 015313, p. 5-43).

Elevated radiological readings were observed in surface soil samples collected along the surface water runoff pathways from I-J Firing Site and the AOC 15-008(f) sand mounds during remediation of a septic tank [SWMU 36-003(b)] at the I-J Firing Site (LANL 1997, 062453, p. 1). No RFI sampling has been conducted at this site.

6.11.4 Site Contamination

Investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections. The data from these sampling locations also addresses potential migration from AOCs 36-004(e) (section 7.9.4) and C-36-006(e) (section 7.12.4).

6.11.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of 20 samples were collected from 10 locations in sediment catchments in the drainages downgradient of the site. Samples were collected from two depth intervals (0–0.5 ft or 0–1 ft bgs and 0.5–1 ft, 1–2 ft, or 1.5–2.5 ft bgs) at each location (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, isotopic uranium, isotopic plutonium, and gamma-emitting radionuclides. One of the 20 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC 15-008(f) are shown in Figure 6.11-1. Table 6.11-1 presents the samples collected and analyses requested for AOC 15-008(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.11.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 15-008(f), a maximum concentration of 0.4 ppm was detected at location 15-613261 from 1–2 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.11.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for AOC 15-008(f) consisted of results from 20 samples (10 soil, 7 tuff, and 3 sediment) collected in 2010 from 10 locations in the sediment catchment areas in the drainages downgradient of the site.

Inorganic Chemicals

Twenty samples (10 soil, 7 tuff, and 3 sediment) were analyzed for TAL metals, cyanide, perchlorate, and nitrate. Table 6.11-2 presents the inorganic chemicals detected or detected above BVs. Figure 6.11-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the

investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Twenty samples (10 soil, 7 tuff, and 3 sediment) were analyzed for VOCs, SVOCs, and explosive compounds, and one soil sample was also analyzed for dioxins/furans and PCBs. Table 6.11-3 presents the detected organic chemicals. Figure 6.11-3 shows the spatial distribution of detected organic chemicals. Because the investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Twenty samples (10 soil, 7 tuff, and 3 sediment) were analyzed for isotopic plutonium, isotopic uranium, and gamma-emitting radionuclides. Table 6.11-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.11-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and radionuclide COPCs have not been identified.

6.11.4.4 Spatial Distribution of Contaminants

The site is located within an active firing site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed not to determine the nature and extent but to determine whether off-site migration is occurring. Contaminant distributions were evaluated primarily to determine what contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in one sample at a concentration of 8340 mg/kg at location 15-613255 from 1–2 ft bgs. Aluminum concentrations decreased downgradient.

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 1.8 mg/kg at location 15-613261 from 1–2 ft bgs. Antimony also had DLs (1.7 mg/kg) above the soil BV (0.83 mg/kg) in three samples at three locations, and DLs (0.55 mg/kg to 0.57 mg/kg) above the tuff BV (0.5 mg/kg) in two samples at three locations. Antimony concentrations decreased downgradient.

Arsenic was detected above the tuff BV (2.79 mg/kg) in two samples at two locations. The maximum concentration of 3.8 mg/kg was detected above BV at location 15-613256 from 1–2 ft bgs. Arsenic concentrations decreased downgradient.

Barium was detected above the tuff BV (46 mg/kg) in three samples at three locations. The maximum concentration of 79.9 mg/kg was detected above BV at location 15-613256 from 1–2 ft bgs. Barium concentrations decreased downgradient.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 2910 mg/kg at location 15-613256 from 1–2 ft bgs. Calcium concentrations decreased downgradient.

Chromium was detected above the tuff BV (7.14 mg/kg) in five samples at five locations. The maximum concentration of 16.3 mg/kg was detected above BV at location 15-613260 from 0.5–1 ft bgs. Chromium concentrations decreased downgradient.

Cobalt was detected above the tuff BV (3.14 mg/kg) in one sample at location 15-613255 from 1–2 ft bgs. Cobalt concentrations decreased downgradient.

Copper was detected above the tuff BV (4.66 mg/kg) in three samples at three locations and above the soil BV (14.7 mg/kg) in one sample. The maximum concentration of 19.6 mg/kg was detected above BV at location 15-613257 from 0–1 ft bgs. Copper concentrations decreased downgradient.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.51 mg/kg to 0.56 mg/kg) above the soil BV in nine samples at nine locations and DLs (0.51 mg/kg to 0.54 mg/kg) above the tuff BV in seven samples at seven locations. Cyanide was not detected above the BV in sediment in any of the downgradient reaches in Potrillo Canyon (LANL 2010, 111507).

Magnesium was detected above the tuff BV (1690 mg/kg) in two samples at two locations. The maximum concentration of 2040 mg/kg was detected above BV at location 15-613256 from 1–2 ft bgs. Magnesium concentrations decreased downgradient.

Mercury was detected above the soil and tuff BV (0.1 mg/kg) in six soil samples at six locations and in five tuff samples at five locations. The maximum concentration of 0.186 mg/kg was detected above BV at location 15-613255 from 1–2 ft bgs. Mercury also had a DL (0.14 mg/kg) above the tuff BV in one sample. Mercury concentrations decreased downgradient.

Nickel was detected above the tuff BV (6.58 mg/kg) in four samples from four locations. The maximum concentration of 8.9 mg/kg was detected above BV at location 15-613260 from 0.5–1 ft bgs. Nickel concentrations decreased downgradient.

Nitrate was detected in six soil samples at five locations, in four tuff samples at four locations, and in three sediment samples at two locations. The maximum concentration of 2 mg/kg was detected at location 15-613262 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Perchlorate was detected in two tuff samples at two locations and in two soil samples at two locations. The maximum concentration of 0.0048 mg/kg was detected at location 15-613255 from 1–2 ft bgs. Perchlorate concentrations decreased downgradient, and were not detected in samples from locations near the bottom of the drainages downgradient of the site; therefore, perchlorate is not migrating off-site.

Selenium was detected above the tuff and sediment BV (0.3 mg/kg) in 10 samples at nine locations and above the soil BV (1.52 mg/kg) in 3 samples at three locations. The maximum concentration of 2.2 mg/kg was detected in at location 15-613256 from 1–2 ft bgs. Selenium was detected above the sediment BV at 1.1 mg/kg at location 15-613263 at the bottom of the AOC 15-008(f) drainage; however, selenium concentrations decreased downgradient of AOC 15-008(f) at locations 15-613262 and 15-613316 in Potrillo Canyon. Selenium concentrations increased slightly in downgradient Potrillo Canyon Reaches PO-2 and PO-3 (1.27 mg/kg and 1.63 mg/kg, respectively), and selenium was not detected above the sediment BV but had DLs above BV in Reach PO-4 (LANL 2010, 111507, p. 56). Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all

reaches. Although these averages are affected by the high frequency of nondetects and elevated DLs, the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 146 mg/kg at location 15-613261 from 1–2 ft bgs. Zinc concentrations decreased downgradient, and it was not detected in samples from locations at the bottom of drainages downgradient of the site.

Organic Chemicals

Aniline, benzoic acid, bis(2-ethylhexyl)phthalate, fluoranthene, PETN (pentaerythritol tetranitrate), phenanthrene, pyrene, and toluene were detected in one to four samples at one to three locations at concentrations below EQLs.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 2,3,4,6,7,8-hexachlorodibenzofuran; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; and 2,3,4,7,8-pentachlorodibenzofuran were detected in one sample at concentrations below EQLs. Because all the dioxins and furans congeners sampled at the most contaminated location were detected below the EQLs, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Cesium-137 was detected at depths where the soil FV (1.65 pCi/g) does not apply in two samples at two locations and was detected in one tuff sample. No background data are available for cesium-137 in tuff. The maximum activity of 0.496 pCi/g was detected at location 15-613262 from 1.5–2.5 ft bgs. Cesium-137 activities decreased downgradient.

Uranium-234 was detected above the soil and sediment BV (2.59 pCi/g) in six samples at six locations and above the tuff BV (1.98 pCi/g) in one sample. The maximum activity of 63.3 pCi/g was detected above BV at location 15-613260 in soil from 0–0.5 ft bgs. Uranium-234 activities decreased in the drainage downgradient of AOC 15-008(f); however, uranium-234 was detected above the sediment BV at 3.61 pCi/g at location 15-613263 at the bottom of the drainage. Uranium-234 was also detected above the soil BV at 2.65 pCi/g at location 15-613316 at the bottom of the drainage below adjacent I-J Firing Site [AOC 36-004(e)] and the projectile test area [AOC C-36-006(e)].

Uranium-235/236 was detected above the soil and sediment BV (0.2 pCi/g) in five samples at five locations. Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample. The maximum activity of 5.5 pCi/g was detected above BV at location 15-613260 in soil from 0–0.5 ft bgs. Uranium-235/236 activities decreased in the drainage downgradient of AOC 15-008(f); however, uranium-235/236 was detected above the sediment BV at 0.241 pCi/g at location 15-613262 at the bottom of the drainage. Uranium-235/236 was also detected above the soil BV at 0.336 pCi/g at location 15-613316 at the bottom of the drainage below adjacent I-J Firing Site [AOC 36-004(e)] and the projectile test area [AOC C-36-006(e)].

Uranium-238 was detected above the soil and sediment BV (2.29 pCi/g) in 10 samples at seven locations. Uranium-238 was detected above the tuff BV (1.93 pCi/g) in one sample. The maximum activity of 143 pCi/g was detected above BV at location 15-613260 in soil from 0–0.5 ft bgs. Uranium-238 activities decreased in the drainage downgradient of AOC 15-008(f); uranium-238 was detected above the sediment BV at 4.93 pCi/g at location 15-613263 and above the soil BV at 7.11 pCi/g at

location 15-613262 at the bottom of the drainages downgradient of the site. Uranium-238 was also detected above the soil BV at 12 pCi/g at location 15-613316 at the bottom of the drainage below adjacent I-J Firing Site [AOC 36-004(e)] and the projectile test area [AOC C-36-006(e)].

Uranium-234, uranium-235/236, and uranium-238 were detected above soil and/or sediment BVs/FVs in samples collected from locations at the bottom of the drainages downgradient of the AOC 15-008(f) and adjacent sites AOCs 36-004(e) and C-36-006 and have likely migrated into Potrillo Canyon. Uranium-234 was detected at 10.4 pCi/g, uranium-235/236 was detected at 0.65 pCi/g, and uranium-238 was detected at 13.9 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-2); however, activities of all three uranium isotopes decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2; none of three uranium isotopes were detected in sediment samples from Reach PO-3 (LANL 2010, 111507, p. 63).

Summary of Contaminant Distribution

Concentrations of detected inorganic chemicals and organic chemicals decreased in the drainages downgradient of AOC 15-008(f) or were below EQLs. Uranium-234, uranium-235/236, and uranium-238 were each detected above soil and/or sediment BVs/FVs in samples collected from the bottom of the drainages downgradient of the site and have likely migrated into Potrillo Canyon. Isotopic uranium activities decreased in downgradient reaches, and none of three uranium isotopes were detected in sediment samples from Potrillo Canyon Reach PO-3.

The migration of potential contaminants from AOC 15-008(f) is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

6.11.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for AOC 15-008(f).

6.11.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 15-008(f) is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for AOC 15-008(f).

6.12 SWMU 15-009(e), Septic Tank

6.12.1 Site Description and Operational History

SWMU 15-009(e) is a decommissioned 1500-gal. septic tank (structure 15-0072) at E-F Firing Site [SWMU 15-004(f)] at TA-15 (Figure 6.12-1). The septic tank was constructed in 1947 and received sanitary waste from the E-F Firing Site control building (15-0027), located approximately 175 ft northeast of the tank. The drainline goes around structure 15-0463, which is a transportable used for storage. The septic tank is constructed of 4- to 6-in. reinforced concrete and is 5 ft long × 9 ft deep × 7 ft wide (LANL 1993, 020946, pp. 7-21, 10-20). The septic tank was used until 1981 when E-F Firing Site last operated. Discharges from the septic tank flowed through a vitrified clay pipe to an outfall located approximately 30 ft from the tank at the edge of Potrillo Canyon (LANL 1997, 074091, p. 1).

6.12.2 Relationship to Other SWMUs and AOCs

SWMU 15-009(e) is located southeast of AOC C-15-004. SWMU 15-009(e) is not associated with any SWMUs or AOCs.

6.12.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 15-009(e), two samples of the septic tank contents were collected and submitted for analysis of radionuclides, TAL metals, VOCs, and SVOCs (LANL 1995, 050294, pp. 4-23–4-57). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs.

Based on the results of the Phase I RFI, a VCA was conducted at SWMU 15-009(e) in 1997 to remove the septic tank contents, pressure-wash the interior of the septic tank, collect concrete-chip samples from the interior of the tank to demonstrate the adequacy of the corrective action, and collect a rinsate sample for waste characterization purposes (LANL 1997, 074091, p. 15). Twelve soil samples were collected beneath the septic tank inlet and outlet, next to and below the septic tank, and from the outfall area and drainage channel downgradient of the outfall (LANL 1997, 074091, pp. 1–3). The samples were submitted for analysis of HE and TAL metals; a subset of the samples was also analyzed for VOCs and SVOCs. The tank and drainlines were filled and plugged with expandable concrete and left in place.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.12.4.4. Table 6.12-1 presents the samples collected and analyses requested at SWMU 15-009(e).

6.12.4 Site Contamination

6.12.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- The investigation work plan required six samples to be collected from two depths (0–1 ft and 3–4 ft below structures) at three locations: next to the tank inlet, next to the tank outlet, and on the east side of the tank at SWMU 15-009(e). All six samples were inadvertently collected from 0–1 ft and 3–4 ft bgs, not below the structures; therefore, the sample results are not presented in this report (see deviations in Appendix B).
- The investigation work plan required four samples to be collected from two depths at two locations along the tank inlet drainline at SWMU 15-009(e). All six samples were inadvertently collected from 0–1 ft and 3–4 ft bgs, not below the drainline; therefore, the sample results are not presented in this report (see deviations in Appendix B).
- Six samples were collected from three locations within the drain field outfall: 0–1 ft and 2.5–3 ft, 0–0.5 ft and 0.5–1 ft, and 0–1 ft and 2–2.5 ft bgs, respectively (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium. One of the six samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 15-009(e) are shown in Figure 6.12-1. Table 6.12-1 presents the samples collected and analyses requested for SWMU 15-009(e). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.12.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-009(e), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.12.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-009(e) consisted of results from 18 samples (15 soil and 3 tuff) from 10 locations.

Inorganic Chemicals

Eighteen samples (15 soil and 3 tuff) were analyzed for TAL metals. Six samples (three soil and three tuff) were also analyzed for cyanide, nitrate, and perchlorate. Table 6.12-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.12-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eighteen samples (15 soil and 3 tuff) were analyzed for explosive compounds. Twelve samples (nine soil and three tuff) were analyzed for VOCs and SVOCs, and one soil sample was analyzed for PCBs and dioxins/furans. Table 6.12-3 presents the detected organic chemicals. Figure 6.12-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Six samples (three soil and three tuff) were analyzed for isotopic uranium. Table 6.12-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.12-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.12.4.4 Nature and Extent of Contamination

Because the septic tank and drainline were not located and samples were not collected from underlying soil, the nature and extent of contamination at SWMU 15-009(e) are not defined. The information presented below describes the nature and extent of contamination based on samples collected to date, which were collected in the drain field outfall area. This information will be used to guide sampling in the Phase II investigation, and additional samples will be collected as described in the Phase II work plan. Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and extent are defined. The results will be presented in the Phase II investigation report.

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in two samples at two locations. The maximum concentration of 8.6 mg/kg was detected above BV at location 15-02510 from 0–0.5 ft bgs. Antimony also had DLs (7.1 mg/kg to 7.6 mg/kg) above the soil BV in four samples at three locations, and DLs (0.51 mg/kg to 0.53 mg/kg) above the tuff BV (0.5 mg/kg) in three samples at three locations. Antimony concentrations decreased with depth and decreased downgradient.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 0.83 mg/kg was detected above BV at location 15-02512 from 0–0.5 ft bgs. Cadmium also had DLs (0.62 mg/kg to 0.66 mg/kg) above the soil BV in five samples at three locations. Cadmium concentrations decreased with depth and decreased downgradient. Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 6200 mg/kg at location 15-02513 from 3–4 ft bgs. Calcium concentrations decreased with depth at decreased downgradient. Chromium was detected above the tuff BV (7.14 mg/kg) in three samples at three locations. The maximum concentration of 13 mg/kg was detected above BV at location 15-613423 from 2–2.5 ft bgs. Chromium concentrations were equal to or below the maximum tuff background concentration (13 mg/kg) (Figure H-25, Appendix H).

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 15.6 mg/kg at location 15-02512 from 0–0.5 ft bgs. Copper concentrations decreased with depth and decreased downgradient.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.53 mg/kg) above the soil BV in three samples at three locations, and DLs (0.51 mg/kg to 0.53 mg/kg) above the tuff BV in three samples at three locations.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at two locations. The maximum concentration of 135 mg/kg was detected above BV at location 15-02515 in a single sample collected from 3–3.5 ft bgs. Lead concentrations decreased with depth at nearby sampling location 15-02513 at 6–7 ft bgs and decreased downgradient.

Nickel was detected above the tuff BV (6.58 mg/kg) in three samples at three locations. The maximum concentration of 7.3 mg/kg was detected above BV at location 15-613422 from 0.5–1 ft bgs. Nickel concentrations increased with depth but were below the maximum tuff background concentration (7 mg/kg) at locations 15-6131421 and 15-613423 (Figure H-25, Appendix H); increased with depth at location 15-613422; and decreased downgradient. Nitrate was detected in three soil samples at three locations and in three tuff samples at three locations. The maximum concentration of 0.85 mg/kg was detected at location 15-613421 from 0–1 ft bgs. No background data are available for nitrate. Nitrate concentrations are likely naturally occurring at the other locations.

Selenium was detected above the soil BV (1.52 mg/kg) in two samples at two locations and above the tuff BV (0.3 mg/kg) in three samples at three locations. The maximum concentration of 1.9 mg/kg was detected above BV at location 15-613422 from 0–0.5 ft bgs. Selenium concentrations were the same or decreased slightly with depth at locations 15-613422 and 15-613423, increased with depth at location 15-613421, and decreased downgradient. Silver was detected above the soil BV (1 mg/kg) in two samples at two locations. The maximum concentration of 4.1 mg/kg was detected above BV at location 15-02510 from 0–0.5 ft bgs. Silver also had DLs (1.7 mg/kg to 1.9 mg/kg) above the soil BV in four samples at three locations. Silver concentrations decreased with depth and decreased downgradient. Uranium was detected above the soil BV (1.82 mg/kg) in three samples at three locations. The maximum concentration of 18.9 mg/kg was detected above BV at location 15-02516 in a single sample collected

from 2.17–2.67 ft bgs but decreased with depth at location 15-02513. Uranium also had DLs (26.8 mg/kg to 67.8 mg/kg) above the soil BV in six samples from three locations. Uranium concentrations were below the maximum soil background concentration (3.6 mg/kg) in a single sample at location 15-02515 (Figure H-26, Appendix H). Uranium concentrations decreased with depth at location 15-02513 and decreased downgradient. Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 71 mg/kg at location 15-613421 from 0–1 ft bgs. Zinc concentrations decreased with depth and decreased downgradient.

Organic Chemicals

Acetone, benzo(a)anthracene, chrysene, fluoranthene, 4-isopropyltoluene, pyrene, and toluene were detected in one to two samples at one to two locations at concentrations below EQLs. Benzo(a)pyrene, benzo(b)fluoranthene, and benzo(k)fluoranthene were each detected in one sample at one to three locations. The concentrations were below EQLs or decreased with depth and decreased downgradient.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample, and 1,2,3,4,6,7,8-heptachlorodibenzofuran and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one sample at concentrations below EQLs. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in two samples at two locations. The maximum activity of 8.85 pCi/g was detected above BV at location 15-613423 from 0–1 ft bgs. Uranium-234 activities decreased with depth at locations 15-613422 and 15-613423 and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384 (see Plate 9). Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in three samples at two locations. The maximum activity of 0.488 pCi/g was detected above BV at location 15-613423 from 0–1 ft bgs. Uranium-235/236 activities decreased with depth at locations 15-613421, 15-613422, and 15-613423, and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384 (see Plate 9).

Uranium-238 was detected above the soil BV (2.29 pCi/g) in three samples at three locations. The maximum activity of 16.1 pCi/g was detected above BV at location 15-613423 from 0–0 ft bgs. Uranium-238 activities decreased with depth at locations 15-613421, 15-613422, and 15-613423 and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384 (see Plate 9).

Summary of Nature and Extent

The vertical extent of nickel and selenium is not defined at the drain field outfall at SWMU 15-009(e). The lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides are not defined below the structures and drainline at SWMU 15-009(e) because samples were inadvertently collected from 0–1 and 3–4 ft bgs instead of 0–1 and 3–4 ft below the structures and drainline (see deviations in Appendix B). In addition, the vertical extent of nickel and selenium is not defined at the drain field outfall at SWMU 15-009(e).

6.12.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 15-009(e) because sampling is not complete and extent is not defined for the site.

6.12.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 15-009(e) because sampling is not complete and extent is not defined for the site.

6.13 SWMU 15-010(a), Septic Tank

6.13.1 Site Description and Operational History

SWMU 15-010(a) is the location of a former decommissioned septic tank (structure 15-0080) located east of former buildings 15-0001 and 15-0023 at R-Site at TA-15 (Figure 6.13-1). The septic tank was constructed of reinforced concrete and measured approximately 5 ft long × 3 ft wide × 4 ft deep with a 900-gal. capacity (LANL 1996, 054977, p. 5-79). The septic tank was constructed in 1944 and was connected to a laboratory and shop (former building 15-0001) that were removed in 1962. The septic tank was later connected to relocated laboratory storage building 15-0023 (LANL 1996, 054977, p. 5-79). A 1965 memorandum (Michel 1965, 005292) states the septic tank was reactivated after 1961 to provide sanitary facilities to former building 15-0007, which housed a photography laboratory (AOC C-15-006). Engineering records show that building 15-0007 was destroyed in 1962, and no engineering drawings document the connection of the septic tank to building 15-0007 (LANL 1983, 094948). The septic tank was surveyed in 1965 and found to be free of HE and radioactivity (LANL 1996, 054977, p. 5-84). The septic tank was filled with sand and left in place (LANL 1996, 054977, p. 5-84). During the 2010 investigation, the SWMU 15-010(a) septic tank was not located. Areas of disturbed soil-tuff were evident in the area before the test trenches were excavated to locate the tank. The test trenches confirmed that the septic tank had been removed between 1995 and 2010. Subsequent discussions with knowledgeable site personnel also confirmed the removal of the septic tank.

6.13.2 Relationship to Other SWMUs and AOCs

SWMU 15-010(a) is located east of AOC C-15-005, northwest of SWMU 15-007(a), and south of the northernmost burn pit at SWMU 15-002.

6.13.3 Summary of Previous Investigations

A Phase I RFI was conducted at SWMU 15-010(a) from June 1995 to March 1996 (LANL 1996, 054977, pp. 5-82–5-84). Originally, the RFI was to have included soil sampling at the location of the SWMU 15-010(a) septic tank. However, because the septic tank was found to be in place, the RFI was modified to characterize the septic tank contents. During the RFI, the top of the septic tank was found to be damaged, and the tank had been backfilled with sand. Two sand samples were collected from two depths at one location within the septic tank. The samples were field screened for radioactivity, inorganic chemicals, and HE and submitted for analysis of radionuclides, TAL metals, VOCs, SVOCs, and HE (LANL 1996, 054977, pp. 5-79–5-80). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs.

Because mercury concentrations were detected in the sand samples, the Phase I RFI report recommended a Phase II RFI to better characterize SWMU 15-010(a). During the 1997 Phase II RFI, four subsurface samples were collected from four locations at depth intervals ranging from 8–9.5 ft bgs (LANL 1997, 058499, pp. 17–20) and submitted for analysis of HE, TAL metals, and SVOCs.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.13.4.4. Table 6.13-1 presents the samples collected and analyses requested at SWMU 15-010(a).

6.13.4 Site Contamination

6.13.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds (TNT and RDX); and metals (barium, copper, lead and uranium). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was not removed as proposed in the approved work plan because the tank was not located and is assumed to have been removed previously (see deviations in Appendix B). Additionally, the inlet and outlet lines to the former septic tank were not located and are assumed to have been removed previously (see deviations in Appendix B).
- Six samples were collected from three locations associated with the assumed former septic tank from 4–5 ft and 7–8 ft bgs (see deviations in Appendix B).
- Three samples were collected from one location south of the former septic tank location from 4–5 ft, 7–8 ft, and 9–9.5 ft bgs (see deviations in Appendix B).
- Two samples were collected from one location associated with the assumed former septic tank outlet from 4–5 ft and 6–7 ft bgs (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium. One of the 11 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 15-010(a) are shown in Figure 6.13-1. Table 6.13-1 presents the samples collected and analyses requested for SWMU 15-010(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.13.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 15-010(a), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2.

One soil sample collected at location 15-613429 from 7–8 ft bgs at SWMU 15-010(a) exceeded the screening threshold for lead. Therefore, an additional sample was collected from 9–9.5 ft bgs and submitted for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium analyses. The metals-screening results that guided additional sampling are presented in Table 3.2-2.

6.13.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 15-010(a) consisted of results from 15 samples (10 soil and 5 tuff) from nine locations.

Inorganic Chemicals

Fifteen samples (10 soil and 5 tuff) were analyzed for TAL metals. Eleven samples (10 soil and 1 tuff) were analyzed for cyanide, nitrite and perchlorate. Table 6.13-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Fifteen samples (10 soil and 5 tuff) were analyzed for explosive compounds and SVOCs. Eleven samples (10 soil and 1 tuff) were analyzed for VOCs. One soil sample was also analyzed for dioxins/furans and PCBs. Table 6.13-3 presents the detected organic chemicals. Plate 3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eleven samples (10 soil and 1 tuff) were analyzed for isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at SWMU 15-010(a).

6.13.4.4 Nature and Extent of Contamination

Because the septic tank, inlet, and outlet were not located and samples were not collected from underlying soils and tuff, the nature and extent of contamination at SWMU 15-010(a) are not defined. The information presented below describes the nature and extent of contamination based on samples collected to date. This information will be used to guide sampling in the Phase II investigation, and additional samples will be collected as described in the Phase II work plan. Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and extent are defined. The results will be presented in the Phase II investigation report.

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 0.97 mg/kg at location 15-613430 from 4–5 ft bgs. Antimony also had DLs (0.52 mg/kg to 6.7 mg/kg) above the tuff BV (0.5 mg/kg) in five samples at five locations. Antimony concentrations decreased with depth and decreased to the south and downgradient at location 15-613429. Barium was detected above the soil BV (295 mg/kg) in one sample and above the tuff BV (46 mg/kg) in five samples at five locations. The maximum concentration of 824 mg/kg was detected above BV at location 15-613431 from 7–8 ft bgs. Single samples were collected at locations 15-02520, 15-02521, 15-02522, and 15-02523, and no deeper samples were collected at nearby locations. Barium concentrations increased with depth at location 15-613431 and decreased to the south and downgradient at location 15-613429. Calcium was detected above the tuff BV (2200 mg/kg) in three samples at three locations. The maximum concentration of 4070 mg/kg was detected above BV at location 15-02523 in a single sample from 8.5–9 ft bgs. Calcium concentrations decreased to the south and downgradient at location 15-613429. A single sample was

collected at locations 15-02521 and 15-02522, and no deeper samples were collected at nearby locations. Chromium was detected above the tuff BV (7.14 mg/kg) in four samples at four locations. The maximum concentration of 18 mg/kg was detected in a single sample at location 15-02523 from 8.5–9 ft bgs. Chromium concentrations were below the maximum tuff background concentration (13 mg/kg) in single samples collected at locations 15-02520, 15-02521, and 15-02522 (Figure H-27, Appendix H). Chromium concentrations decreased to the south and downgradient at location 15-613429. Cobalt was detected above the tuff BV (3.14 mg/kg) in four samples at four locations. The maximum concentration of 5.5 mg/kg was detected above BV at location 15-02521 in a single sample from 8–8.5 ft bgs. Single samples were collected at locations 15-02520, 15-02522, and 15-02523, and no deeper samples were collected at nearby locations. Cobalt concentrations decreased to the south and downgradient at location 15-613429. Copper was detected above the soil BV (14.7 mg/kg) in one sample and was detected above the tuff BV (4.66 mg/kg) in four samples at four locations. The maximum concentration of 15.4 mg/kg was detected above BV at location 15-613430 from 4–5 ft bgs. Single samples were collected at locations 15-02520, 15-02521, 15-02522, and 15-02523, and no deeper samples were collected at nearby locations. Copper concentrations decreased with depth at location 15-613430 and decreased to the south and downgradient at location 15-613429. Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.54 mg/kg) above the soil BV in nine samples at five locations and had a DL above the tuff BV (0.5 mg/kg) in one sample.

Lead was detected above the soil BV (22.3 mg/kg) in three samples at three locations and above the tuff BV (11.2 mg/kg) in four samples at four locations. The maximum concentration of 173 mg/kg was detected above BV at location 15-613429 from 7–8 ft bgs. Lead concentrations decreased with depth at locations 15-613429 and 15-613430 and increased downgradient. Single samples were collected at locations 15-02520, 15-02521, 15-02522, and 15-02523, and no deeper samples were collected at nearby locations.

Mercury was detected above the soil BV (0.1 mg/kg) in 10 samples at five locations and above the tuff BV (0.1 mg/kg) in 4 samples at four locations. The maximum concentration of 11.5 mg/kg was detected above BV at location 15-613430 from 4–5 ft bgs. Single samples were collected at locations 15-02520, 15-02521, 15-02522, and 15-02523, and no deeper samples were collected at nearby locations. Mercury concentrations decreased with depth at locations 15-613427, 15-613428, 15-613429, 15-613430, and 15-613431 and decreased downgradient. Nitrate was detected in 10 soil samples at five locations and in 11 tuff samples. The maximum concentration of 65 mg/kg was detected at location 15-613429 from 7–8 ft bgs. Nitrate concentrations decreased with depth at location 15-613429 and decreased downgradient. No background data are available for nitrate.

Perchlorate was detected in six soil samples at four locations. The maximum concentration of 0.0034 mg/kg was detected at location 15-613429 from 4–5 ft bgs. Perchlorate concentrations decreased with depth at locations 15-613428 and 15-613429, increased with depth but were below the EQL at locations 15-613427 and 15-613430, and decreased downgradient in samples collected from SWMU 15-007(a). Selenium was detected above the soil BV (1.52 mg/kg) in 10 samples at five locations and above the tuff BV (0.3 mg/kg) in 1 sample. The maximum concentration of 4.9 mg/kg was detected above BV at location 15-613429 from 7–8 ft bgs. Selenium also had DLs (0.35 mg/kg to 0.55 mg/kg) above the tuff BV in four samples at four locations. Selenium concentrations decreased with depth at location 15-613429; increased with depth at locations 15-613427, 15-613428, 15-613430, and 15-613431; and increased to the south and downgradient at location 15-613429. Silver was detected above the soil and tuff BV (1 mg/kg) in one soil sample and in two tuff samples at two locations. The maximum concentration of 4.9 mg/kg was detected above BV at location 15-02523 in a single sample from 8.5–9 ft bgs. Silver also had DLs (1.9 mg/kg to 2 mg/kg) above the tuff BV in two samples at two

locations. A single sample was collected at location 15-02521. Silver concentrations increased with depth at location 15-613430 and decreased to the south and downgradient at location 15-613429.

Thallium was detected above the soil BV (0.73 mg/kg) in one sample at a concentration of 0.83 mg/kg at location 15-613429 from 7–8 ft bgs. Thallium concentrations decreased with depth at location 15-613429 and decreased downgradient.

Uranium was detected above the tuff BV (2.4 mg/kg) in four samples at four locations. The maximum concentration of 2.79 mg/kg was detected above BV at location 15-02522 from 8.5–9 ft bgs. Uranium concentrations were below the maximum tuff background concentration (5 mg/kg) in single samples collected at locations 15-02520, 15-02521, 15-02522, and 15-02523 (Figure H-27, Appendix H). Isotopic uranium was not detected in samples collected during the 2010 investigation. Vanadium was detected above the tuff BV (17 mg/kg) in one sample at concentration of 17.4 mg/kg at location 15-02521 in a single sample from 8–8.5 ft bgs. The vanadium concentration at this location was detected below the maximum tuff background concentration (21 mg/kg) (Figure H-28, Appendix H).

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 64.3 mg/kg at location 15-613430 from 4–5 ft bgs. Zinc concentrations decreased with depth and decreased downgradient in samples collected from SWMU 15-007(a). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, and 4-isopropyltoluene were detected in one to seven samples at one to seven locations at concentrations below EQLs.

Diethylphthalate was detected in one sample at a concentration of 1.5 mg/kg from 7–8 ft bgs at location 15-613431. Diethylphthalate concentrations increased with depth at location 15-613431 and decreased downgradient.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample collected at location 15-613427 from 4–5 ft bgs. Hexachlorodibenzofuran[1,2,3,4,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one sample collected at location 15-613427 from 4–5 ft bgs at a concentrations below the EQL. As discussed in section 5.0, the predominant presence of hepta- and octa- congeners at the most contaminated location and the detection of the hexa- congener below the EQL indicate a release has not occurred.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 15-010(a).

Summary of Nature and Extent

The lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides are not defined below the septic tank, inlet, and outlet at SWMU 15-010(a) because they could not be located. In addition, the vertical extent of barium, calcium, chromium, cobalt, copper, diethylphthalate, lead, mercury, selenium, and silver is not defined at SWMU 15-010(a) at several other locations. The lateral extent of lead and selenium are not defined at SWMU 15-010(a) at other locations.

6.13.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 15-010(a) because extent is not defined for the site.

6.13.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 15-010(a) because extent is not defined for the site.

6.14 AOC C-15-004, Former Transformer Station

6.14.1 Site Description and Operational History

AOC C-15-004 is a former transformer station (former structure 15-0056) that was located approximately 30 ft southwest of the former E-F Firing Site control room (building 15-0027) at TA-15 (Figure 6.12-1). Two transformers (18-gal. and 30-gal. capacity) were located on a 5-ft-long wooden platform 10 ft above the ground (LANL 1993, 020946, p. 7-21). Each transformer contained mineral oil with PCBs of unknown concentration. The date of installation is not known, but the transformers were removed from the site in 1989 (Francis 1992, 057736, p. 2). No evidence was found of a release on the wooden platform or on the soil beneath the platform (LANL 1993, 020946, p. 7-21).

6.14.2 Relationship to Other SWMUs and AOCs

AOC C-15-004 is located northwest of SWMU 15-009(e). No SWMUs or AOCs are associated with AOC C-15-004.

6.14.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC C-15-004, one surface sample (0–0.5 ft bgs) was collected from each of two locations beneath the former transformer platform (LANL 1995, 050294, p. 4-25). The samples were field screened for radioactivity and submitted for analysis of PCBs. Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed no PCBs detected in any of the RFI samples.

6.14.4 Site Contamination

6.14.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations beneath the former transformer platform from 0–1 ft and 2–3 ft bgs.
- All samples were analyzed for TAL metals, PCBs, and isotopic uranium. One of the four samples was also analyzed for dioxins/furans. The sampling location for the dioxin/furan analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC C-15-004 are shown in Figures 6.12-1 and 6.7-1. Table 6.14-1 presents the samples collected and analyses requested for AOC C-15-004. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.14.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC C-15-004, a concentration of 0.1 ppm was detected in all four samples. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.14.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision level data at AOC C-15-004 consisted of results from four soil samples collected from two locations.

Inorganic Chemicals

Four soil samples were analyzed for TAL metals. Table 6.14-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.12-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four soil samples were analyzed for PCBs. One of the four samples was also analyzed for dioxins/furans. Table 6.14-3 presents the detected organic chemicals. Figure 6.12-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four soil samples were analyzed for isotopic uranium. Table 6.14-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.12-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.14.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 1 mg/kg at location 15-613295 from 0–1 ft bgs. Antimony concentrations decreased with depth and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384. The lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 2 mg/kg was detected above BV at location 15-613295 from 0–1 ft bgs. Cadmium concentrations decreased with depth and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384. The lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples at two locations. The maximum concentration of 52.6 mg/kg was detected above BV at location 15-613296 from 2–3 ft bgs. Copper concentrations decreased with depth at location 15-613295, increased with depth at location 15-613296, and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384. The lateral extent of copper is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples at two locations. The maximum concentration of 184 mg/kg was detected above BV at location 15-613295 from 0–1 ft bgs. Zinc concentrations decreased with depth and decreased downgradient in samples collected from SWMU 15-004(f) at location 15-613384. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Heptachlorodibenzofuran[1,2,3,4,7,8,9-]; 1,2,3,4,7,8-hexachlorodibenzodioxin; 1,2,3,7,8,9-hexachlorodibenzodioxin; 1,2,3,4,7,8-hexachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzofuran; 2,3,4,6,7,8-hexachlorodibenzofuran; 1,2,3,7,8-pentachlorodibenzodioxin; 2,3,4,7,8-pentachlorodibenzofuran; and 2,3,7,8-tetrachlorodibenzodioxin were detected at one location at concentrations below EQLs. Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,4,7,8-hexachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one sample. Because of the presence of multiple congeners detected above EQLs, additional sampling and analysis for dioxins and furans are warranted at this site.

Radionuclides

Uranium-234 was detected or detected above the soil BV (2.59 pCi/g) in one sample at an activity of 6.08 pCi/g at location 15-613296 from 0–1 ft bgs. Uranium-234 activities decreased with depth and increased downgradient in samples collected from SWMU 15-009(e). The lateral extent of uranium-234 is not defined, but the vertical extent is defined.

Uranium-235/236 was detected or detected above the soil BV (0.2 pCi/g) in one sample at an activity of 0.311 pCi/g at location 15-613296 from 0–1 ft bgs. Uranium-235/236 activities decreased with depth and increased downgradient in samples collected from SWMU 15-009(e). The lateral extent of uranium-235/236 is not defined, but the vertical extent is defined.

Uranium-238 was detected or detected above the soil BV (2.29 pCi/g) in three samples at two locations with a maximum activity of 13.9 pCi/g was detected above BV at location 15-613295 from 0–1 ft bgs. Uranium-238 activities decreased with depth at locations 15-613296 and 15-613295 and increased downgradient in samples collected from SWMU 15-009(e). The lateral extent of uranium-238 is not defined, but the vertical extent is defined.

Summary of Nature and Extent

The vertical extent of copper is not defined at AOC C-15-004. The lateral and vertical extent of organic chemicals are defined at AOC C-15-004. The lateral extent of uranium-234, uranium-235/236, and uranium-238 is not defined at AOC C-15-004.

Additional sampling and analysis for dioxins/furans are warranted at this site.

6.14.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-15-004 because extent is not defined for the site.

6.14.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-15-004 because extent is not defined for the site.

6.15 AOC C-15-005, Potential Soil Contamination from Former Building

6.15.1 Site Description and Operational History

AOC C-15-005 is an area of potential soil contamination associated with the footprint of a former laboratory and shop (former building 15-0001) at TA-15 (Figure 6.15-1). Former building 15-0001 was constructed in 1944 to support experiments performed at Firing Sites C and D (LANL 1993, 020946, p. 9-2). Engineering records document that building 15-0001 was destroyed by burning in 1962 (LANL 2009, 105251). The remaining debris from the demolition of building 15-0001 was disposed of at MDA N [SWMU 15-007(a)] in 1962 (LANL 1993, 020946, p. 9-2). Information about the use of materials in this building is limited, but thorium contamination was discovered in the building and cleaned up (LANL 1993, 020946, p. 9-2).

6.15.2 Relationship to Other SWMUs and AOCs

AOC C-15-005 is located northwest of SWMU 15-007(a) and west of SWMU 15-010(a) and the northernmost SWMU 15-002 burn pit.

6.15.3 Summary of Previous Investigations

During the Phase I RFI conducted at AOC C-15-005 from June 1995 to March 1996, four soil samples were collected from two depths (0–0.5 ft and 1.5–2 ft bgs) at two locations within the building footprint. The samples were field screened for radioactivity, VOCs, and HE. One surface sample and both subsurface samples were submitted for analysis of inorganic chemicals, VOCs, SVOCs, isotopic thorium, and uranium (LANL 1996, 054977, pp. 5-16–5-18). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected VOCs, and isotopic thorium detected above BVs.

6.15.4 Site Contamination

6.15.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of 12 samples were collected from six locations within and next to the footprint of the former building 15-0001 from 0–1 ft and 2–3 ft bgs. Two of the 12 samples were collected from one location beneath the asphalt driveway now located next to former building 15-0001 from 0.5–1.5 ft and 2.5–3.5 ft bgs (0–1 ft and 2–3 ft beneath the asphalt).

- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and isotopic thorium. One of the 12 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC C-15-005 are shown in Figure 6.15-1. Table 6.15-1 presents the samples collected and analyses requested for AOC C-15-005. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.15.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC C-15-005, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.15.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Inorganic Chemicals

Twelve samples (six soil and six tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 6.15-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (six soil and six tuff) were analyzed for VOCs, SVOCs, and explosive compounds, and one tuff sample was analyzed for PCBs and dioxins/furans. Table 6.15-3 presents the detected organic chemicals. Plate 3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (six soil and six tuff) were analyzed for isotopic thorium and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at AOC C-15-005.

6.15.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in three samples at three locations. The maximum concentration of 15,300 mg/kg was detected above BV at location 15-613303 from 2–3 ft bgs. Aluminum concentrations increased with depth at locations 15-613302 and 15-613303 and decreased to the south and downgradient at location 15-613300. The lateral extent of aluminum is defined, but the vertical extent is not defined.

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 2.6 mg/kg at location 15-613301 from 0–1 ft bgs. Antimony concentrations decreased with depth and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of antimony are defined.

Arsenic was detected above the tuff BV (2.79 mg/kg) in two samples at two locations. The maximum concentration of 3.3 mg/kg was detected above BV at location 15-613302 from 2–3 ft bgs. Arsenic concentrations decreased with depth at locations 15-613302 and 15-613303 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1) and to the south; its concentrations decreased downgradient at location 15-613300. The lateral and vertical extent of arsenic are defined.

Barium was detected above the tuff BV (46 mg/kg) in five samples at five locations. The maximum concentration of 129 mg/kg was detected above BV at location 15-613302 from 2–3 ft bgs. Barium concentrations decreased with depth at these locations because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1) and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of barium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in five samples at five locations. The maximum concentration of 4790 mg/kg was detected above BV at location 15-613303 from 2–3 ft bgs. Calcium concentrations decreased with depth at location 15-613302 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth at locations 15-613298, 15-613299, 15-61300, and 15-613303; and decreased to the south and downgradient at location 15-613300. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in three samples at three locations. The maximum concentration of 10.6 mg/kg was detected above BV at location 15-613302 from 2–3 ft bgs. Chromium concentrations decreased with depth at locations 15-613300 and 15-613303 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1); increased with depth but were below the maximum tuff background concentration (13 mg/kg) at location 15-613302 (Figure H-29, Appendix H); and decreased downgradient to the south and downgradient at location 15-613300. The lateral and vertical extent of chromium are defined.

Copper was detected above the tuff BV (4.66 mg/kg) in one sample at a concentration of 5.1 mg/kg at location 15-613302 from 2–3 ft bgs. Copper concentrations decreased with depth at this location because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1) and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg,) but had DLs (0.54 mg/kg to 0.58 mg/kg) above the soil BV in three samples at three locations and had DLs (0.54 mg/kg to 0.58 mg/kg) above the tuff BV in six samples at six locations. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in three samples at three locations and above the tuff BV (11.2 mg/kg) in five samples at five locations. The maximum concentration of 45.4 mg/kg was detected above BV at location 15-613300 from 2–3 ft bgs. Lead concentrations decreased with depth at location 15-613299; increased with depth at locations 15-613300, 15-613301, 15-613302, and 15-613303; and increased to the south and downgradient at location 15-613300. The lateral and vertical extent of lead are not defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in three samples at three locations. The maximum concentration of 2650 mg/kg was detected above BV at location 15-613302 from 2–3 ft bgs.

Magnesium concentrations were below the maximum tuff background concentration (2820 mg/kg) at these locations (Figure H-29, Appendix H) and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of magnesium are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in four samples at four locations. The maximum concentration of 2.97 mg/kg was detected above BV at location 15-613301 from 1–2 ft bgs. Mercury also had a DL (0.121 mg/kg) above the soil BV in one sample. Mercury concentrations decreased with depth at locations 15-613298, 15-613299, 15-613302, and 15-613303 and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of mercury are defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in three samples at three locations. The maximum concentration of 9 mg/kg was detected above BV at location 15-613303 from 2–3 ft bgs. Nickel concentrations decreased with depth at location 15-613300 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1), increased with depth at locations 15-613302 and 15-613303, and decreased to the south and downgradient at location 15-613300. The lateral extent of nickel is defined, but the vertical extent is not defined.

Nitrate was detected in six soil samples at six locations and in four tuff samples at four locations. The maximum concentration of 1.4 mg/kg was detected at location 15-613303 from 2–3 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one soil sample at one location and two tuff samples at two locations. The maximum concentration of 0.023 mg/kg was detected at location 15-613303 from 2–3 ft bgs. Perchlorate concentrations increased with depth at locations 15-613298 and 15-613303 and decreased downgradient. The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was detected above the soil BV (1.52 mg/kg) in two samples at two locations and above the tuff BV (0.3 mg/kg) is six samples at six locations. The maximum concentration of 1.9 mg/kg was detected above BV at locations 15-613298 and 15-613300 from 1–2 ft bgs and 2–3 ft bgs, respectively. Selenium concentrations decreased or were the same with depth at locations 15-613298 and 15-613303; increased with depth at locations 15-613299, 15-613300, 15-613301, and 15-613302; and increased to the south and downgradient at location 15-613300. The lateral and vertical extent of selenium are not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at two locations and above the tuff BV (63.5 mg/kg) in one sample. The maximum concentration of 138 mg/kg was detected above BV at location 15-613302 from 2–3 ft bgs. Zinc concentrations decreased with depth at location 15-613301, increased with depth at location 15-613302, and decreased to the south and downgradient at location 15-613300. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acenaphthene was only detected in one soil sample at a concentration of 0.41 mg/kg at location 15-613300 from 0–1 ft bgs. Acenaphthene concentrations decreased with depth. The lateral and vertical extent of acenaphthene are defined.

Acetone, benzo(b)fluoranthene, benzo(k)fluoranthene, benzyl alcohol, butylbenzylphthalate, chrysene, and di-n-butylphthalate were detected in one to four samples at one to two locations at concentrations below EQLs. The lateral and vertical extent of these organic chemicals are defined.

Anthracene, diethylphthalate, phenanthrene, and pyrene were each detected at location 15-613301 from 0–1 ft bgs. The concentrations decreased with depth and decreased to the south and downgradient at location 15-613303. The lateral and vertical extent of these organic chemicals are defined.

Fluoranthene was detected in three samples at three locations. The maximum concentration of 0.69 mg/kg was detected at location 15-613301 from 0–1 ft bgs. Fluoranthene concentrations decreased with depth at location 15-613301, were below EQL at locations 15-613298 and 15-613303, and decreased to the south and downgradient at location 15-613300. The lateral and vertical extent of fluoranthene are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8-heptachlorodibenzofuran were detected in one sample at concentrations below EQLs, and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin was detected in one sample. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at AOC C-15-005.

Summary of Nature and Extent

The vertical extent of aluminum, calcium, lead, nickel, perchlorate, selenium, and zinc is not defined at AOC C-15-005. The lateral extent of barium, lead, and selenium is not defined at AOC C-15-005. The lateral and vertical extent organic chemicals are defined at AOC C-15-005. Radionuclides were not detected or detected above BVs at AOC C-15-005.

6.15.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-15-005 because extent is not defined for the site.

6.15.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-15-005 because extent is not defined for the site.

6.16 AOC C-15-006, Potential Soil Contamination from Former Building

6.16.1 Site Description and Operational History

AOC C-15-006 is an area of potential soil contamination associated with the footprint of a former control building and darkroom (former building 15-0007) at TA-15 (Figure 6.16-1). Former building 15-0007 was constructed in 1944 to support activities performed at Firing Sites C and D (LANL 1993, 020946, p. 9-2). Engineering records document that building 15-0007 was destroyed by burning in 1962 (LANL 1993, 020946, p. 9-2). Debris from the demolition of building 15-0007 was disposed of at MDA N in 1962 [SWMU 15-007(a)] (LANL 1993, 020946, p. 9-2).

6.16.2 Relationship to Other SWMUs and AOCs

AOC C-15-006 is located north of AOC C-15-005, SWMU 15-010(a), the northernmost SWMU 15-002 burn pit, and SWMU 15-007(a).

6.16.3 Summary of Previous Investigations

During the 1995 Phase I RFI conducted at AOC C-15-006, two soil samples were collected from two depths (0–0.5 ft and 1.5–2 ft bgs) at one location within the footprint of building 15-0007 (LANL 1996, 054977, pp. 5-20–5-22). The samples were field screened for radioactivity, inorganic chemicals, and HE. Only the surface sample was submitted for analysis for TAL metals, SVOCs, isotopic thorium, and uranium (LANL 1996, 054977, pp. 5-20–5-22). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed no inorganic chemicals detected above BVs, no detected VOCs, and no radionuclides detected above BVs.

6.16.4 Site Contamination

6.16.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of 12 samples were collected from six locations within and next to the footprint of the former building 15-0007 from 0–1 ft and 2–3 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and isotopic thorium. One of the 12 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC C-15-006 are shown in Figure 6.16-1. Table 6.16-1 presents the samples collected and analyses requested for AOC C-15-006. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.16.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC C-15-006, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

6.16.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC C-15-006 consisted of results from 12 soil samples from six locations.

Inorganic Chemicals

Twelve soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.16-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve soil samples were analyzed for VOCs, SVOCs, and explosive compounds. One soil sample was also analyzed for PCBs and dioxins/furans. Table 6.16-3 presents the detected organic chemicals. Plate 3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve soil samples were analyzed for isotopic thorium and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at AOC C-15-006.

6.16.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in seven samples at five locations. The maximum concentration of 10 mg/kg was detected above BV at location 15-613307 from 2–3 ft bgs. Antimony concentrations decreased with depth at locations 15-613306 and 15-613310; increased with depth at locations 15-613307, 15-613308, and 15-613309; and increased in the downgradient sample at location 15-613307. The lateral and vertical extent of antimony are not defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 1.2 mg/kg was detected above BV at location 15-613307 from 2–3 ft bgs. Cadmium concentrations increased with depth but were below the maximum soil background concentration (2.6 mg/kg) at locations 15-613308 and 15-613307 (Figure H-30, Appendix H) and increased in the downgradient sample at location 15-613307. The vertical extent of cadmium is defined, but the lateral extent is not defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in two samples at two locations. The maximum concentration of 15.3 mg/kg was detected above BV at location 15-613305 from 2–3 ft bgs. Cobalt concentrations decreased with depth at location 15-613310, increased with depth at location 15-613305, and decreased downgradient at location 15-613307. The lateral extent of cobalt is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 16.2 mg/kg at location 15-613310 from 2–3 ft bgs. Copper concentrations increased with depth at this location and decreased downgradient at location 15-613307. The lateral extent of copper is defined, but the vertical extent is not defined.

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.53 mg/kg to 0.59 mg/kg) above the soil BV in seven samples at four locations. Because cyanide was not detected above BVs, the lateral and vertical extent of cyanide are defined.

Iron was detected above the soil BV (21,500 mg/kg) in one sample at a concentration of 35,800 mg/kg at location 15-613309 from 0–1 ft bgs. Iron concentrations decreased with depth and decreased downgradient at location 15-613307. The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in six samples at four locations. The maximum concentration of 43.6 mg/kg was detected above BV at location 15-613307 from 2–3 ft bgs. Lead concentrations decreased with depth at location 15-613309; increased with depth at locations 15-613307, 15-613308, and 15-613310; and increased downgradient at location 15-613307. The lateral and vertical extent of lead are not defined.

Manganese was detected above the soil BV (671 mg/kg) in two samples at two locations. The maximum concentration of 1120 mg/kg was detected above BV at location 15-613305 from 2–3 ft bgs. Manganese concentrations increased with depth but were below the maximum soil background concentration (1100 mg/kg) at location 15-613308 (Figure H-30, Appendix H); increased with depth at location 15-613305; and decreased downgradient at location 15-613307. The lateral extent of manganese is defined, but the vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in 10 samples at six locations. The maximum concentration of 14.4 mg/kg was detected above BV at location 15-613309 from 0–1 ft bgs. Mercury concentrations decreased with depth at locations 15-613305 and 15-613309; increased with depth at locations 15-613306, 15-613307, 15-613308, and 15-613310; and increased downgradient at location 15-613307. The lateral and vertical extent of mercury are not defined.

Nitrate was detected in 10 soil samples at six locations. The maximum concentration of 4.1 mg/kg was detected at location 15-613308 from 2–3 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in seven soil samples at six locations. The maximum concentration of 0.0044 mg/kg was detected at locations 15-613305 and 15-613310 from 0–1 ft bgs. Perchlorate concentrations were below EQLs at all locations. The lateral and vertical extent of perchlorate are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in five samples at four locations. The maximum concentration of 85.5 mg/kg was detected above BV at location 15-613310 from 0–1 ft bgs. Zinc concentrations decreased with depth at locations 15-613309 and 15-613310; increased with depth but were below the maximum soil background concentration (75.5 mg/kg) at location 15-613308 (Figure H-31, Appendix H); increased with depth at location 15-613308; and increased downgradient at location 15-613307. The lateral and vertical of zinc are not defined.

Organic Chemicals

Acenaphthene, Aroclor-1254, Aroclor-1260, benzoic acid, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, and di-n-butylphthalate were detected in one sample at one location at concentrations below EQLs. The lateral and vertical extent of these organic chemicals are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzodioxin; 1,2,3,7,8,9-hexachlorodibenzodioxin; 1,2,3,4,7,8-hexachlorodibenzofuran; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzofuran; 2,3,4,7,8-pentachlorodibenzofuran; and 2,3,7,8-tetrachlorodibenzofuran were detected in one sample at concentrations below EQLs. Because all the dioxins and furans congeners sampled at the most

contaminated location were detected below the EQLs, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected above EQL, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at AOC C-15-006.

Summary of Nature and Extent

The vertical extent of antimony, cobalt, copper, lead, manganese, mercury, and zinc is not defined at AOC C-15-006; the lateral extent of antimony, cadmium, lead, mercury, and zinc is not defined at AOC C-15-006. Radionuclides were not detected or detected above BVs/FVs at AOC C-15-006. The extent of organic chemicals is defined at AOC C-15-006.

6.16.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-15-006 because extent is not defined for the site.

6.16.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-15-006 because extent is not defined for the site.

7.0 TA-36 BACKGROUND AND FIELD-INVESTIGATION RESULTS

7.1 Background of TA-36

TA-36, also known as Kappa Site, is located in the Potrillo and Fence canyons in a remote area near the eastern boundary of the Laboratory (Plate 1). TA-36 occupies approximately 3.7 mi^2 in the central-south-central portion of the Laboratory and is bounded to the west and northwest by TA-15, to the east by TA-71 and White Rock, and to the south by TA-39 and TA-68. TA-68 and TA-71 are buffer areas and have not been used for Laboratory operations. Potrillo Canyon intersects TA-36 and Fence Canyon parallels the southern boundary of TA-36 (Figure 1.1-1 and Plate 1).

7.1.1 Operational History

TA-36 consists of a series of firing sites that has been used to support explosives experiments from the 1950s to the present. The firing sites and facilities at TA-36 accommodate the shipping, receiving, transporting, and testing of HE. Over 30,000 test shots using an estimated 2200 to 4400 lb of DU have been fired at Kappa Site. Initially, the Kappa Site consisted of group offices; four firing sites named Eenie, Meenie, Minie, and Lower Slobbovia; and a storage magazine. In 1983, the boundary of TA-36 was expanded to incorporate the I-J Firing Site, previously located in TA-15 (LANL 1993, 015313, p. 2-2). Sites investigated at TA-36 include a landfill, a septic system, a surface disposal area, a storage area, the location of a former shot-containment-vessel, a project test area, former burn pits, and an inactive firing site.

7.1.2 Summary of Releases

Potential contaminants at TA-36 may have been released into the environment through drainages downgradient of active firing sites, inactive landfills, inactive surface disposal sites, former firing sites, former septic systems, former storage areas, or former burn pits.

7.1.3 Current Site Usage and Status

Much of TA-36 is undeveloped and has been used since the 1950s to the present time for explosive experiments. The TA is remote, with small office and Laboratory buildings, utilities, paved and unpaved roads, and firing site structures scattered throughout the area. TA-36 is located within the HE area, and access is controlled and restricted to Laboratory badge holders.

7.2 SWMU 36-001, MDA AA

7.2.1 Site Description and Operational History

SWMU 36-001 consists of MDA AA, an inactive landfill located at TA-36 approximately 240 ft southwest of a control bunker (building 36-0120) and 100 ft southwest of the x-ray device building (building 36-0086) (Figure 7.2-1). MDA AA consists of two disposal trenches containing burned debris from test shots conducted at the Lower Slobbovia Firing Site (LANL 1993, 015313, p. 5-1). The debris included wood and sand contaminated with barium, uranium, other inorganic chemicals, plastics, and HE (LANL 1989, 105232). The reported dimensions of the north trench are 80 ft × 40 ft × 8 ft to 13 ft deep, and the reported dimensions of the south trench are 120 ft × 20 ft to 30 ft × 3 ft to 12 ft deep (LANL 1996, 054733, p. 5-3). The debris was transported by truck from the Lower Slobbovia Firing Site, placed in the trenches, and burned. Once a trench was filled, it was covered with approximately 4 ft of soil. The disposal trenches were originally constructed in the mid-1960s; the site was closed in 1989 (LANL 1993, 015313, pp. 5-1–5-9).

7.2.2 Relationship to Other SWMUs and AOCs

SWMU 36-001 is located southwest of SWMU 36-004(d) (Lower Slobbovia Firing Site) and southeast of the SWMU 36-004(d) (Skunk Works Firing Site and burn pits).

7.2.3 Summary of Previous Investigations

Phase I RFI activities were conducted at SWMU 36-001 from 1993 to 1996 (LANL 1996, 054733, pp. 5-1–5-9). Initial RFI activities consisted of geophysical surveys using EM, magnetometer/gradiometer, and GPR techniques to define the trenches. Geophysical survey results showed the presence of buried debris but did not delineate the boundaries of discrete disposal trenches. As a result, an exploratory drilling program was conducted to define the extent of buried materials. Approximately 88 boreholes were drilled and ash and/or debris were found at 21 borehole locations, which helped delineate the two disposal trenches. Once the trenches had been delineated, samples were collected from borehole locations with elevated field-screening results. Five boreholes were advanced into the north trench, and four boreholes were advanced into the south trench. Samples were collected at three depth intervals in each borehole. Two of the depth intervals were in the ash/debris zone, and one was approximately 2 ft below the bottom of each trench. In addition, samples of fill/cover material were collected at three of the borehole locations, field screened for organic vapors, radioactivity, and HE and submitted for analysis of TAL metals, isotopic uranium, VOCs, SVOCs, and HE (LANL 1996, 054733, pp. 5-1–5-9). The data collected from seven of the nine sampling locations during the Phase I RFI are screening-level data and

are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected organic chemicals, and uranium isotopes detected above BVs.

Decision-level analytical data collected from two of the nine RFI sampling locations (36-03127 and 36-03131) during previous investigations are presented and evaluated in section 7.2.4.3. Table 7.2-1 presents the samples collected and analyses requested at SWMU 36-001.

In addition to the Phase I RFI, interim action activities were conducted in 1996 to implement erosion-control measures around SWMU 36-001 (LANL 1996, 054449, pp. 1–7). During the interim action, erosion gullies were stabilized near SWMU 36-001 to prevent encroachment onto the site and erosion of the soil cover over the trenches.

7.2.4 Site Contamination

The approved investigation work plan for Potrillo and Fence Canyons Aggregate Area called for the excavation of the disposal trenches and removal and disposal of waste. These activities were initiated during the 2010 investigation but were suspended shortly thereafter because of potential health and safety concerns. Specifically, higher than expected radiation levels and the potential presence of beryllium were encountered during the initial stages of waste removal at SWMU 36-001. The Laboratory notified NMED of these conditions and proposed halting waste removal activities and conducting additional investigations to collect data needed to address potential health and safety concerns (LANL 2010, 111304). NMED agreed with this approach and indicated the Laboratory should conduct this additional characterization and use the data to develop a plan for future actions at SWMU 36-001 (NMED 2010, 111464). To implement this approach, 22 characterization samples were collected from seven locations where 2010 geophysical data indicated the presence of buried metal debris (Figure 7.2-2 and Appendix E). The samples were collected to determine the levels of beryllium and radioactivity present in the buried waste.

7.2.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- Remediation activities were not completed in accordance with the approved work plan because unanticipated levels of radioactivity and potentially beryllium-contaminated metal debris were encountered during the excavation of test trenches (see deviations in Appendix B).
- A total of 15 characterization samples were collected from five locations within the anticipated landfill boundaries from 0–1.5 ft, 5–6.5 ft, and 10–11.5 ft bgs (see deviations in Appendix B).
- Three characterization samples were collected from one location within a test pit from 2–4 ft, 5–6.5 ft, and 10–11.5 ft bgs (see deviations in Appendix B).
- Four characterization samples were collected from one location from 0–1.5 ft, 5–6.5 ft, 10–11.5 ft, and 13.5–15 ft bgs based on elevated field-screening results (see section 7.2.4.2). All seven alternate locations were identified based on geophysical survey results (Figure 7.2-2, deviations in Appendix B, and geophysical survey results in Appendix E).
- All samples were field screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds (TNT and RDX); and metals (barium, copper, lead and uranium). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- All samples were analyzed for cyanide, nitrate, perchlorate, TCLP metals, TAL metals, VOCs, SVOCs, explosive compounds, dioxins/furans, PCBs, americium-241, isotopic plutonium, isotopic thorium, isotopic uranium, strontium-90, total uranium, tritium, and gamma-emitting radionuclides.

Sampling locations with decision-level data for SWMU 36-001 are shown in Figure 7.2-1. Table 7.2-1 presents the samples collected and analyses requested for SWMU 36-001. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.2.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 36-001, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. No screening results for explosive compounds exceeded industrial SSLs. The field-screening results are presented in Table 3.2-2.

One soil sample collected at location 36-613727 from 10–11.5 ft bgs exceeded the metals-screening thresholds for copper and uranium. A deeper sample from 13.5–15 ft bgs was collected at this location and analyzed for cyanide, nitrate, perchlorate, TCLP metals, TAL metals, VOCs, SVOCs, explosive compounds, dioxins/furans, PCBs, americium-241, isotopic plutonium, isotopic thorium, isotopic uranium, strontium-90, total uranium, tritium, and gamma-emitting radionuclides. The metals-screening results that guided the additional sampling are presented in Table 3.2-2.

7.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for SWMU 36-001 consisted of results from 26 soil samples collected from nine locations.

Inorganic Chemicals

Twenty-six soil samples were analyzed for TAL metals. Twenty-two soil samples were also analyzed for TCLP metals, cyanide, nitrate, and perchlorate. Table 7.2-2 presents the inorganic chemicals detected or detected above BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs.

Organic Chemicals

Twenty-six soil samples were analyzed for VOCs, SVOCs, and explosive compounds. Twenty-two soil samples were also analyzed for dioxins/furans and PCBs. Table 7.2-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals.

Radionuclides

Twenty-six soil samples were analyzed for isotopic uranium. Twenty-two soil samples were also analyzed for americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic thorium, isotopic uranium, strontium-90, and tritium. Table 7.2-4 presents the radionuclides detected or detected above BVs/FVs. Plate 12 shows the spatial distribution of radionuclides detected or detected above BVs/FVs.

7.2.4.4 Spatial Distribution of Contaminants

The samples from within the landfill were collected to characterize levels of contamination at the site, including beryllium and radioactivity, and to determine if an updated site SSHASP was required to complete corrective actions. This sampling was not performed to determine lateral and vertical extent of contamination. The general spatial distribution of contaminants is presented below.

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in four samples at three locations. The maximum concentration of 22.6 mg/kg was detected above BV at location 36-613725 from 5–6.5 ft bgs. Antimony also had DLs (0.85 mg/kg to 5.7 mg/kg) above the soil BV in six samples at four locations. Antimony concentrations decreased with depth at these locations.

Barium was detected above the soil BV (295 mg/kg) in one sample at a concentration of 622 mg/kg at location 36-613725 from 5–6.5 ft bgs. Barium concentrations decreased with depth at this location.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a maximum concentration of 0.42 mg/kg at location 36-613724 from 5–6.5 ft bgs. Cadmium also had DLs (0.56 mg/kg to 0.57 mg/kg) above the soil BV in two samples at one location. Cadmium concentrations decreased with depth at this location.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a maximum concentration of 31 mg/kg at location 36-613725 from 5–6.5 ft bgs. Chromium concentrations decreased with depth at this location.

Copper was detected above the soil BV (14.7 mg/kg) in nine samples at six locations. The maximum concentration of 2340 mg/kg was detected above BV at location 36-613727 from 10–11.5 ft bgs. Copper concentrations decreased with depth at these locations.

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.59 mg/kg) above the soil BV in 17 samples at seven locations.

Iron was detected above the soil BV (21,500 mg/kg) in one sample at a maximum concentration of 27,100 mg/kg at location 36-613725 from 5–6.5 ft bgs. Iron concentrations decreased with depth at this location.

Lead was detected above the soil BV (22.3 mg/kg) in four samples at three locations. The maximum concentration of 668 mg/kg was detected above BV at location 36-613725 from 5–6.5 ft bgs. Lead concentrations decreased with depth at these locations.

Mercury was not detected above the soil BV (0.1 mg/kg) but had DLs (0.266 mg/kg to 0.433 mg/kg) above the soil BV in 18 samples.

Nickel was detected above the soil BV (15.4 mg/kg) in two samples at two locations. The maximum concentration of 132 mg/kg was detected above BV at location 36-613727 from 5–6.5 ft bgs. Nickel concentrations decreased with depth at these locations.

Nitrate was detected in 22 soil samples at seven locations. The maximum concentration of 20 mg/kg was detected at location 36-613724 from 5–6.5 ft bgs. No background data are available for nitrate. The detected concentrations of nitrate at the other locations likely reflect naturally occurring levels.

Perchlorate was detected in one soil sample at a concentration of 0.0035 mg/kg at location 36-613722 from 5–6.5 ft bgs. Perchlorate concentrations decreased with depth at this location.

Silver was detected above the soil BV (1 mg/kg) in one sample at a concentration of 4.4 mg/kg at location 36-613725 from 5–6.5 ft bgs. Silver concentrations decreased with depth at this location.

Sodium was detected above the soil BV (915 mg/kg) in one sample at a maximum concentration of 1450 mg/kg was detected above BV at location 36-613725 from 5–6.5 ft bgs. Sodium concentrations decreased with depth at this location.

Thallium was detected above BV (0.73 mg/kg) in one sample at a maximum concentration of 0.89 mg/kg at location 36-03131 from 5.5–7.58 ft bgs. Thallium concentrations decreased with depth at this location.

Uranium was detected above the soil BV (1.82 mg/kg) in 13 samples at five locations. The maximum concentration of 274 mg/kg was detected above BV at location 36-613725 from 5–6.5 ft bgs. Uranium concentrations decreased with depth at these locations.

Zinc was detected above the soil BV (48.8 mg/kg) in eight samples at five locations. The maximum concentration of 397 mg/kg was detected above BV at location 36-613725 from 5–6.5 ft bgs. Zinc concentrations decreased with depth at these locations.

Organic Chemicals

Acetone; benzyl alcohol; bis(2-ethylhexyl)phthalate; di-n-butylphthalate; 3,5-dinitroaniline; 1,2,3,4,7,8-hexachlorodibenzodioxin; methylene chloride; 2-methylphenol; 4-methylphenol; and trichlorofluoromethane were detected in one to five samples at one to four locations at concentrations below the EQLs.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,4,7,8,9-heptachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in 6 to 21 samples at five to seven locations. The maximum concentrations were detected at location 36-613727 from 5–6.5 ft bgs. These organic chemical concentrations decreased with depth at these locations.

Hexachlorodibenzodioxin[1,2,3,7,8,9-]; 1,2,3,4,7,8-hexachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzofuran; 2,3,4,6,7,8-hexachlorodibenzofuran; 1,2,3,7,8,9-hexachlorodibenzofuran; 1,2,3,7,8-pentachlorodibenzodioxin; 1,2,3,7,8-pentachlorodibenzofuran; 2,3,4,7,8-pentachlorodibenzofuran; 2,3,7,8-tetrachlorodibenzodioxin; and 2,3,7,8-tetrachlorodibenzofuran were detected in four to eight samples at four to five locations. The maximum concentrations were detected at location 36-613725 from 5–6.5 ft bgs. These organic chemical concentrations decreased with depth at these locations.

Phenol was detected in one soil sample at a concentration of 0.64 mg/kg at location 36-613727 from 0–1.5 ft bgs. Phenol concentrations decreased with depth at this location.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in three samples at three locations. The maximum activity of 61.3 pCi/g was detected above BV at location 36-613727 from 5–6.5 ft bgs. Uranium-234 activities decreased with depth at all locations.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in three samples at three locations. The maximum activity of 6.7 pCi/g was detected above BV at location 36-613727 from 5–6.5 ft bgs. Uranium-235/236 activities decreased with depth at all locations.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in eight sample at five locations. The maximum activity of 464 pCi/g was detected above BV at location 36-613727 from 5–6.5 ft bgs. Uranium-238 activities decreased with depth at all locations.

Summary of Contaminant Distribution

The concentrations of detected inorganic chemicals, organic chemicals, and radionuclides decreased with depth at all locations at SWMU 36-001. No inorganic or organic chemicals were detected above industrial SSLs. Beryllium was not detected above the soil BV in any samples collected at SWMU 36-001. The only radionuclide detected above industrial SALs was uranium-238 at location 36-613727 from 5–6.5 ft bgs (Table 7.2-4 and Plate 12).

Based on the results of the characterization sampling conducted during this investigation, the remediation of SWMU 36-001 will be conducted in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677) and approved health and safety documents.

7.2.5 Summary of Human Health Risk Screening

The purpose of sampling within the landfill was to evaluate the levels of contaminants, including beryllium and radioactivity, and the general spatial distribution of contaminants for the purpose of evaluating the proposed corrective actions at the site and to determine if an updated SSHASP is required to complete corrective actions. Therefore, a human health risk assessment was not performed for SWMU 36-001.

7.2.6 Summary of Ecological Risk Screening

The purpose of sampling within the landfill was to evaluate the levels of contaminants, including beryllium, radioactivity, and the general spatial distribution of contaminants for the purpose of evaluating the proposed corrective actions at the site and to determine if an updated SSHASP is required for completion of corrective actions. Therefore, an ecological risk assessment was not performed for SWMU 36-001.

7.3 SWMU 36-003(b), Septic System, I-J Firing Site

7.3.1 Site Description and Operational History

SWMU 36-003(b) is a decommissioned septic system located at the west end of TA-36 (Figure 7.3-1). The septic system served building 36-0055, the control bunker for the I-J Firing Site, and consists of a septic tank (structure 36-0061) and its associated drainlines and outfall. The septic tank sits near the edge of Mesita del Potrillo, approximately 100 ft southwest of building 36-0055, (LANL 1993, 015313, p. 5-24). The control bunker housed the electronics and instrumentation used in the operation of the I-J Firing Site [AOC 36-004(e)] and also contained a toilet, sink, and water fountain, all of which were connected to the septic tank via a 4-in.-diameter clay-tile pipe (LASL 1949, 105276). The septic tank is constructed of reinforced concrete and measures 7 ft long × 3.5 ft wide × 5.73 ft deep with a capacity of 420 gal. The tank has a buried overflow pipe that previously discharged near the north rim of Potrillo Canyon. The overflow pipe was capped in 1989. After the overflow pipe was capped, the septic tank continued to be used and its contents were periodically removed and taken to a sanitary wastewater treatment plant for treatment and disposal (LANL 1993, 015313, p. 5-24). The septic system was taken out of service in the early 1990s.

7.3.2 Relationship to Other SWMUs and AOCs

SWMU 36-003(b) served the control building (36-0055) for the I-J Firing Site and is located northwest of AOC C-36-006(e) and east-southeast of AOC 15-008(f).

7.3.3 Summary of Previous Investigations

The contents of the SWMU 36-003(b) septic tank were sampled in 1981; analytical data confirmed HE was not present (LANL 1993, 015313, p. 5-27). During the 1994 Phase I RFI conducted at SWMU 36-003(b), two samples of the liquid were collected from one location within the tank, and four sludge samples were collected from three locations within the tank (LANL 1995, 053985, pp. 5-4–5-12). In addition, five surface samples (0–0.5 ft bgs) were collected from four locations in the drainage channel downgradient of the outfall. The samples were field screened for organic vapors, radioactivity, and HE and submitted for analysis of TAL metals, HE, VOCs, and SVOCs (LANL 1995, 053985, p. 1-15). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs and detected HE.

The 1996 VCA implemented at SWMU 36-003(b) included removing the septic tank contents, pressure washing the tank, and filling the tank with expanding cement. The tank contents were disposed of as low-level radioactive waste at Area G at TA-54 and at the TA-50 Radioactive Liquid Waste Treatment Facility. No confirmation samples were collected (LANL 1996, 055072, pp. 1–4).

7.3.4 Site Contamination

7.3.4.1 Soil, Rock, and Sediment Sampling

Because the septic tank contents had been removed and the tank pressure-washed and filled with expandable concrete, the tank was left in place.

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- The approved investigation work plan required six samples to be collected from two depth intervals (0–1 ft and 3–4 ft below structures) at three locations: next to the tank inlet, next to the tank outlet, and on the south side of the tank at SWMU 36-003(b). All six samples were inadvertently collected from 0–1 ft and 3–4 ft bgs and not below the structures; therefore, the sample results are not included in this report (see deviations in Appendix B).
- The approved investigation work plan required four samples to be collected from two depth intervals at two locations along the tank inlet drainline at SWMU 36-003(b). All four samples were inadvertently collected from 0–1 ft and 3–4 ft bgs and not below the drainline; therefore, the sample results are not included in this report (see deviations in Appendix B).
- Six samples were collected from three locations at and below the outfall from 0–1 ft and 3–4 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium. One of the six samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 36-003(b) are shown in Figure 7.3-1. Table 7.3-1 presents the samples collected and analyses requested for SWMU 36-003(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.3.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 36-003(b), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.3.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 36-003(b) consisted of results from six samples (four soil and two tuff) collected from three locations below the outfall.

Inorganic Chemicals

Six samples (four soil and two tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 7.3-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.3-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Six samples (four soil and two tuff) were analyzed for VOCs, SVOCs, and explosive compounds. One soil sample was analyzed for PCBs and dioxins/furans. Table 7.3-3 presents the detected organic chemicals. Figure 7.3-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Six samples (four soil and two tuff) were analyzed for isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at SWMU 36-003(b).

7.3.4.4 Nature and Extent of Contamination

Because samples were not collected from the soils underlying the former structures, the nature and extent of contamination at SWMU 36-003(b) are not defined. The information presented below describes the nature and extent of contamination based on samples collected to date, which were collected at and downgradient of the outfall. This information will be used to guide sampling in the Phase II investigation, and additional samples will be collected as described in the Phase II work plan. Data from the Phase II investigation will be evaluated with data from the Phase I investigation to determine if nature and extent are defined. The results will be presented in the Phase II investigation report.

Inorganic Chemicals

Copper was detected the soil above BV (14.7 mg/kg) in one sample at a concentration of 15.2 mg/kg at location 15-613464 from 0–1 ft bgs. Copper concentrations decreased with depth at this location and decreased downgradient.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.51 mg/kg to 0.54 mg/kg) above the soil BV in four samples at three locations and a DL (0.51 mg/kg) above the tuff BV in one sample.

Nitrate was detected in four soil samples at three locations and in one tuff sample. The maximum concentration of 6.8 mg/kg was detected at location 15-613465 from 3–4 ft bgs. No background data are available for nitrate. The detected concentrations of nitrate reflect naturally occurring levels. Selenium was detected above the soil BV (1.52 mg/kg) in one sample, and above the tuff BV (0.3 mg/kg) in one sample. The maximum concentration of 1.3 mg/kg was detected above BV at locations 15-613464 and 15-613466 from 3–4 ft bgs. Selenium concentrations increased with depth at location 15-613464, decreased with depth at location 15-613466, and decreased downgradient. Selenium concentrations are essentially the same across the site.

Organic Chemicals

Fluoranthene, phenanthrene, and pyrene were detected in one sample at location 15-613465 from 0–1 ft bgs at concentrations below EQLs. Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample. Heptachlorodibenzofuran[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one sample at concentrations below EQLs. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred.

No PCBs were detected at and below the outfall.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at and below the outfall at SWMU 36-003(b).

Summary of Nature and Extent

The lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides are not defined below the structures and drainline at SWMU 36-003(b) because samples were inadvertently collected from 0–1 and 3–4 ft bgs instead of 0–1 and 3–4 ft below the structures and drainline. However, the lateral and vertical extent of radionuclides and inorganic chemicals are defined at and below the outfall at SWMU 36-003(b).

7.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 36-003(b) because sampling is not complete and extent is not defined for the site.

7.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 36-003(b) because sampling is not complete and extent is not defined for the site.

7.4 AOC 36-004(a), Eenie Firing Site

7.4.1 Site Description and Operational History

AOC 36-004(a) is the active Eenie Firing Site located at TA-36 on Mesita del Potrillo on the rim of Potrillo Canyon (Figure 7.4-1). AOC 36-004(a) is deferred for investigation per Table IV-2 of the Consent Order. AOC 36-004(a) consists of the impact area, a control bunker (building 36-0003), and a make-up building (36-0004) that contains a storage area. Construction of the Eenie Firing Site began in 1949 and was completed in 1951 (LANL 1992, 014987, p. 5-7). Materials used in experimental shots include lead oxide, mercury, copper, nickel, brass, DU, and nitroglycerine. Other activities conducted at the site include shoulder-mounted projectiles fired into targets in the southern portion of the firing site (Kelkar 1992, 012470).

7.4.2 Relationship to Other SWMUs and AOCs

AOC 36-004(a) is located directly south of SWMU 36-006; debris from AOC 36-004(a) was disposed of at SWMU 36-006. Together with SWMU 36-006, AOC 36-004(a) comprises Consolidated Unit 36-006-99 (Table 1.1-1).

7.4.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 36-004(a).

7.4.4 Site Contamination

Investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation proposed sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). All but one of the downgradient drainage sampling locations are associated with SWMU 36-006 (section 7.5), located directly north and downgradient of AOC 36-004(a). The single sampling location (15-613265) associated with AOC 36-004(a) is located in the drainage northwest and downgradient of the site. All other stormwater runoff from AOC 36-004(a) flows to SWMU 36-006 (section 7.5). The sampling activities at AOC 36-004(a) are discussed in the following sections.

7.4.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- Two samples were collected from one location in the drainage northwest and downgradient of the site from two depth intervals: 0–1 ft and 2–3 ft bgs.

- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, isotopic uranium, and gamma-emitting radionuclides. One of the two samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC 36-004(a) are shown on Figure 7.4-1. Table 7.4-1 presents the samples collected and analyses requested for AOC 36-004(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.4.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 36-004(a), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.4.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for AOC 36-004(a) consisted of results from two soil samples collected from one location in the drainage northwest and downgradient of the site.

Inorganic Chemicals

Two soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 7.4-2 presents the inorganic chemicals detected or detected above BVs. Figure 7.4-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Two soil samples were analyzed for explosive compounds, and one of the soil samples was also analyzed for dioxins/furans and PCBs. Table 7.4-3 presents the detected organic chemicals. Figure 7.4-3 shows the spatial distribution of detected organic chemicals. Because the investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Two soil samples were analyzed for isotopic uranium and gamma-emitting radionuclides. Table 7.4-4 presents the radionuclides detected or detected above BVs/FVs. Figure 7.4-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and radionuclide COPCs have not been identified.

7.4.4.4 Spatial Distribution of Contaminants

The site is an active firing site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed to determine whether contamination is migrating from the site. Contaminant distributions were evaluated primarily to determine what

contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected primarily in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 23 mg/kg at location 15-613265 from 0–1 ft bgs and has likely migrated off-site. Copper concentrations decreased downgradient in samples collected at SWMU 36-006 at location 15-613514, and it was not detected above BVs at downgradient locations 36-03146 and 36-03149 at SWMU 36-006 (section 7.5).

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.54 mg/kg) above the soil BV in two samples at location 15-613265. Cyanide was not detected in sediment in any of the downgradient Potrillo Canyon reaches (LANL 2010, 111507).

Nitrate was detected in two samples at location 15-613265, with a maximum concentration of 2.3 mg/kg from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Selenium was detected above the soil BV (0.3 mg/kg) in one sample at a concentration of 1.9 mg/kg at location 15-613265 from 2–3 ft bgs. Selenium concentrations decreased downgradient in samples collected at SWMU 36-006 and were not detected above BV at downgradient locations 36-03146 and 36-03149 at SWMU 36-006 (section 7.5). Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches. Although these averages are affected by the high frequency of nondetects and elevated DLs, the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Organic Chemicals

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample, and 1,2,3,4,6,7,8-heptachlorodibenzofuran and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in one sample at concentrations below EQLs. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

HMX was detected in one sample at location 15-613265 from 0–1 ft bgs at a concentration below EQL and was not detected at SWMU 36-006.

TATB was detected in both samples at location 15-613265; the maximum concentration of 0.9 mg/kg was detected from 0–1 ft bgs. TATB concentrations decreased downgradient in samples collected at SWMU 36-006, and it was not detected at downgradient locations 15-613514, 36-03146, and 36-03149 (section 7.5).

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Uranium-238 was detected above the soil BV (0.3 mg/kg) in one sample at a concentration of 3.03 pCi/g at location 15-613265 from 0–1 ft bgs. Uranium-238 concentrations decreased downgradient in samples collected at SWMU 36-006 and was not detected above BVs/FVs at downgradient locations 15-613514, 36-03146, and 36-03149 (section 7.5).

Summary of Contaminant Distribution

Concentrations of inorganic chemicals and organic chemicals and radionuclide activities detected at the single sampling location downgradient of AOC 36-004(a) decreased in downgradient samples at SWMU 36-006 and were not detected or not detected above BVs in samples collected at the bottom of the drainage at SWMU 36-006. The migration of potential contaminants from AOC 36-004(a) is limited to the drainage downgradient of the site for all constituents and does not extend beyond Potrillo Canyon Reach PO-4.

7.4.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for AOC 36-004(a).

7.4.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 36-004(a) is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for AOC 36-004(a).

7.5 SWMU 36-006, Surface Disposal Area

7.5.1 Site Description and Operational History

SWMU 36-006 consists of an inactive surface disposal area located at TA-36 on the southern slope of Potrillo Canyon, approximately 600 ft north of the Eenie Firing Site [AOC 36-004(a)] at TA-36 (Figure 7.4-1). SWMU 36-006 was used to dispose of cables, metal, concrete, and other similar debris from the TA-36 firing sites (LANL 1993, 015313, p. 5-63). The majority of the debris covers an area approximately 75 ft wide that extends approximately 100 ft down the south canyon slope. The remainder of the debris was scattered laterally 300 ft along the south canyon slope. This debris was dumped into the canyon from trucks. SWMU 36-006 was used from 1955 to 1970. All remaining debris was removed from the SWMU 36-006 surface disposal area during the 2010 investigation.

7.5.2 Relationship to Other SWMUs and AOCs

SWMU 36-006 is located directly north of AOC 36-004(a); debris from AOC 36-004(a) was disposed of at SWMU 36-006. Together with AOC 36-004(a), SWMU 36-006 comprises Consolidated Unit 36-006-99 (Table 1.1-1).

7.5.3 Summary of Previous Investigations

During the 1995 Phase I RFI conducted at SWMU 36-006, surface (0–0.5 ft bgs) and subsurface samples (1.5 ft–2 ft bgs) were collected from 19 locations around the disposal area and field screened for inorganic chemicals, radioactivity, organic vapors, and HE to bias sampling locations (LANL 1996, 054733, pp. 5-39–5-43). Field-screening results showed primarily background levels, although some elevated lead and uranium concentrations were noted. Based on these results, four locations were selected for sampling. Surface samples (0–0.33 ft bgs) were collected from a location upgradient of the debris area and in the first sediment catchments downgradient of the debris area. In addition, one surface sample (0–0.33 ft bgs) and one subsurface sample (1.33–1.5 ft bgs) were collected from each of two locations at the base of the debris area. All six samples were submitted for analysis of TAL metals, HE, VOCs, and SVOCs (LANL 1996, 054733, pp. 5-39–5-43).

All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.5.4.4. Table 7.5-1 presents the samples collected and analyses requested at SWMU 36-006.

7.5.4 Site Contamination

7.5.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- Following removal of surface debris, samples were collected at locations beneath where debris was removed and screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; explosive compounds (TNT and RDX); and metals (barium, copper, lead, and uranium). Field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1.
- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2 and Appendix B, B-3.0-1.
- A total of 12 samples were collected from six locations beneath the debris removal area from 0–1 ft and 2–3 ft bgs.
- A total of 10 samples were collected from five locations next to the debris removal area boundaries from 0–1 ft and 2–3 ft bgs.
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium. Two of the 22 sample (1 from beneath the debris removal and 1 next to the debris removal boundary) were also analyzed for dioxins/furans and PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 36-006 are shown in Figure 7.4-1. Table 7.5-1 presents the samples collected and analyses requested for SWMU 36-006. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.5.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 36-006, a maximum concentration of 65 ppm was detected at location 15-613518 from 2–3 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. The field-screening results are presented in Table 3.2-2 and Appendix B, Table B-3.0-1. No changes to sampling or other activities occurred because of the field-screening results.

7.5.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 36-006 consisted of results from 28 samples (27 soil and 1 tuff) collected from 15 locations.

Inorganic Chemicals

Twenty-eight samples (27 soil and 1 tuff) were analyzed for TAL metals. Twenty-two samples (21 soil and 1 tuff) were analyzed for cyanide, nitrate, and perchlorate. Table 7.5-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.4-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-eight samples (27 soil and 1 tuff) were analyzed for VOCs, SVOCs, and explosive compounds. Two soils samples were also analyzed for PCBs and dioxins/furans. Table 7.5-3 presents the detected organic chemicals. Figure 7.4-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-two samples (21 soil and 1 tuff) were analyzed for isotopic uranium. Table 7.5-4 presents the radionuclides detected or detected above BVs/FVs. Figure 7.4-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.5.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 1.6 mg/kg at location 15-613523 from 0–1 ft bgs. Antimony also had DLs (10 mg/kg to 11 mg/kg) above the soil BV in six samples at four locations. Antimony concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of antimony are defined.

Barium was detected above the soil BV (295 mg/kg) in one sample at a concentration of 380 mg/kg at location 36-03145 from 1.33–2 ft bgs. The barium concentration increased with depth but was below the maximum soil background concentration (410 mg/kg) at this location (Figure H-32, Appendix H) and decreased downgradient. The lateral and vertical extent of barium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 1.5 mg/kg at location 36-03145 from 0–0.33 ft bgs. Cadmium also had DLs (0.52 mg/kg to 0.56 mg/kg) above the soil BV in five samples. Cadmium concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in five samples at four locations. The maximum concentration of 15,000 mg/kg was detected above BV at location 36-03145 in a sample collected from 0–0.33 ft bgs. Calcium concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of calcium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 410 mg/kg at location 36-03145 from 0–0.33 ft bgs. Chromium concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in eight samples at six locations. The maximum concentration of 3140 mg/kg was detected above BV at location 15-613523 from 0–1 ft bgs. Copper concentrations decreased with depth at locations 15-613517, 15-613521, 15-613522, 15-613523, and 15-613624; were essentially the same at depth at location 36-03145; and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.55 mg/kg) above the soil BV in 20 samples at 11 locations and above the tuff BV in 1 sample. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in five samples at four locations and above the tuff BV (11.2 mg/kg) in one sample. The maximum concentration of 200 mg/kg was detected above BV at location 36-03145 from 0–0.33 ft bgs. Lead concentrations decreased with depth at locations 15-613522, 15-613523, 15-613524, and 36-03145 and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in four samples at four locations. The maximum concentration of 1.48 mg/kg was detected above BV at location 15-613522 from 0–1 ft bgs. Mercury also had DLs (0.11 mg/kg) above the soil BV in four samples at three locations. Mercury concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample at a concentration of 200 mg/kg at location 36-03145 from 0–0.33 ft bgs. Nickel concentrations decreased with depth and downgradient. The lateral and vertical extent of nickel are defined.

Nitrate was detected in 21 soil samples at 11 locations and in 1 tuff sample. The maximum concentration of 3.9 mg/kg was detected at location 15-613517 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in 11 samples at eight locations and above the tuff BV (0.3 mg/kg) in 1 sample. The maximum concentration of 2.5 mg/kg was detected above BV at location 15-613515 from 2–3 ft bgs. Selenium concentrations decreased or were the same with depth at locations 15-613514, 15-613517, 15-613521, and 15-613524; increased with depth at locations 15-613515, 15-613516, 15-613522, and 15-613523; and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Silver was not detected above the soil BV (1 mg/kg) but had DLs (2.1 mg/kg to 2.3 mg/kg) above the soil BV in six samples at four locations. Because silver was not detected above BV, the lateral and vertical extent of silver are defined.

Thallium was not detected above the soil BV (0.73 mg/kg) but had DLs (1.3 mg/kg to 1.4 mg/kg) above the soil BV in six samples at four locations. Because thallium was not detected above BV, the lateral and vertical extent of thallium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in six samples at five locations. The maximum concentration of 168 mg/kg was detected above BV at location 15-613523 from 0–1 ft bgs. Zinc

concentrations decreased with depth at locations 15-613517, 15-613522, 15-613523, and 15-613524; increased with depth at location 36-03145; and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent of zinc is not defined.

Organic Chemicals

Acenaphthene; anthracene; benzo(a)anthracene; benzo(b)fluoranthene; benzo(g,h,i)perylene; benzo(a)pyrene; benzo(k)fluoranthene; chrysene; dibenzofuran; fluoranthene; fluorene; indeno(1,2,3-cd); 2-methylnaphthalene; naphthalene; phenanthrene; and pyrene were detected in one to four samples at one to three locations. The maximum concentrations were detected at location 15-613517 from 0–1 ft bgs. The concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Acetone, benzoic acid, dibenz(a,h)anthracene, 4-isopropyltoluene, methylene chloride, and trichlorofluoromethane were detected in one to six samples at one to four locations at concentrations below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Amino-2,6-dinitrotoluene[4-]; 2-amino-4,6-dinitrotoluene; 3,5-dinitroaniline; RDX; 1,3,5-trinitrobenzene; and 2,4,6-trinitrotoluene were detected in one sample at location 15-613523 from 0–1 ft bgs. Concentrations of these organic chemicals decreased with depth and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were detected in two samples at two locations, and 1,2,3,4,6,7,8-heptachlorodibenzofuran was detected in one sample at concentrations below the EQL. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

TATB was detected in one soil sample at a concentration of 2.7 mg/kg at location 15-613522 from 0–1 ft bgs. TATB concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of TATB are defined.

Radionuclides

Uranium-238 was detected above the soil BV (2.29 pCi/g) in three samples at three locations. The maximum activity of 5.26 pCi/g was detected above BV at location 15-613523 from 0–1 ft bgs. Uranium-238 activities decreased with depth at locations 15-613521, 15-613522, and 15-613523 and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of selenium and zinc is not defined at SWMU 36-006. The extent of organic chemicals and radionuclides is defined at SWMU 36-006.

7.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 36-006 because extent is not defined for the site.

7.5.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 36-006 because extent is not defined for the site.

7.6 AOC 36-004(b), Meenie Firing Site

7.6.1 Site Description and Operational History

AOC 36-004(b) is the Meenie Firing Site located at TA-36 in a flat area at the head of Fence Canyon (Figure 7.6-1 and Plate 1). AOC 36-004(b) is deferred for investigation per Table IV-2 of the Consent Order. This firing site consists of the firing point, a control bunker (building 36-0006), and a magazine and make-up building (36-0005). Construction of the Meenie Firing Site began in 1949 and was completed in 1950 (LANL 1993, 020946, p. 5-37). The site has been used extensively for gun firing, with shots fired into a cliff north of the firing area and into an embankment south of the firing area. Shots fired at this site involved up to 300 lb of HE, and at least one shot involved detonating 60 gal. of nitromethane in a sealed aluminum container. Lead bricks were often used as part of shots until 1971 and were sometimes pulverized during detonation (Stauffer 1992, 105416).

7.6.2 Relationship to Other SWMUs and AOCs

AOC 36-004(b) is located southeast of Eenie Firing Site [AOC 36-004(a)] and northwest of Minie Firing Site [AOC 36-004(c)]. AOC 36-004(b) is not associated with any other SWMUs or AOCs.

7.6.3 Summary of Previous Investigations

During the 1994 RFI conducted at AOC 36-004(b), field activities included investigating off-site migration of potential contaminants via major drainage channels (ICF Kaiser Engineers 1996, 054713, pp. 107–119). Eight samples were collected from identified sediment catchment areas with substantial accumulations of fine particles. Samples were submitted for analysis of TAL metals, radionuclides, VOCs, and SVOCs. Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs and radionuclides detected or detected above FVs.

7.6.4 Site Contamination

Investigation of AOC 36-004(b) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections.

7.6.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.

- Ten samples were collected from five locations in sediment catchment areas in the drainage downgradient of the site toward Fence Canyon. Samples were collected from two depth intervals (0–1 ft bgs and 1–2 or 2–3 ft bgs) at each location (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, explosive compounds, VOCs, SVOCs, isotopic uranium, and gamma-emitting radionuclides. One of the 10 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC 36-004(b) are shown in Figure 7.6-1. Table 7.6-1 presents the samples collected and analyses requested for AOC 36-004(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.6.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 36-004(b), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.6.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for AOC 36-004(b) consisted of results from 10 sediment samples collected from five locations in sediment catchment areas in the drainage downgradient of the site.

Inorganic Chemicals

Ten sediment samples were analyzed for TAL metals, perchlorate, cyanide, and nitrate. Table 7.6-2 presents the inorganic chemicals detected or detected above BVs. Figure 7.6-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the investigation of AOC 36-004(b) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Ten sediment samples were analyzed for VOCs, SVOCs, and explosive compounds. One sediment sample was also analyzed for dioxins/furans and PCBs. Table 7.6-3 presents the detected organic chemicals. Figure 7.6-3 shows the spatial distribution of detected organic chemicals. Because the investigation of AOC 36-004(b) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Ten sediment samples were analyzed for isotopic uranium, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at AOC 36-004(b).

7.6.4.4 Spatial Distribution of Contaminants

The site is an active firing site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed not to determine the nature and extent but to

determine whether contamination is migrating from the site. Contaminant distributions were evaluated primarily to determine what contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

Barium was detected above the sediment BV (127 mg/kg) in one sample at a concentration of 184 mg/kg at location 15-613270 from 1–2 ft bgs. Barium concentrations decreased downgradient.

Nitrate was detected in 10 sediment samples at five locations, with a maximum concentration of 0.98 mg/kg detected at location 15-613266 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Perchlorate was detected in one sample below the EQL at a concentration of 0.0029 mg/kg at location 15-613266 from 0–1 ft bgs. Perchlorate concentrations decreased downgradient.

Selenium was detected above the sediment BV (0.3 mg/kg) in 10 samples from five locations. The maximum concentration of 1.5 mg/kg was detected above BV at location 15-613266 from 0–1 ft bgs. Selenium concentrations decreased downgradient from this location. Selenium concentrations decreased in the drainage downgradient of AOC 36-004(b); however, selenium was detected above the sediment BV at 1.1 mg/kg at location 15-613267 at the bottom of the drainage. Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches. Although these averages are affected by the high frequency of nondetects and elevated DLs, the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Organic Chemicals

Acetone was detected in two samples at one location. The maximum concentration was detected at location 15-613368 from 1–2 ft bgs. Acetone concentrations decreased downgradient.

Aroclor-1254 and Aroclor-1260 were each detected at concentrations below EQLs in one sample at location 15-613266 at a concentration of 0.013 mg/kg and 0.011 mg/kg, respectively. Concentrations of both Aroclors decreased in sediments in downgradient Fence Canyon reaches (Reaches F-1, FS-1, F-2, and F-3) (LANL 2010, 111507, p. 16).

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate chrysene, fluoranthene, 4-isopropyltoluene, phenanthrene, pyrene, and toluene were detected in one to five samples at one to four locations below the EQLs.

Diethylphthalate was detected at a concentration of 0.58 mg/kg in one sample at location 15-613266 from 0–1 ft bgs. Diethylphthalate concentrations decreased downgradient.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]; 1,2,3,4,6,7,8-heptachlorodibenzofuran; 1,2,3,6,7,8-hexachlorodibenzodioxin; 1,2,3,7,8,9-hexachlorodibenzodioxin; 1,2,3,4,6,7,8,9-octachlorodibenzodioxin; and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were each detected in one sample. Hexachlorodibenzofuran[1,2,3,6,7,8-]; 2,3,4,6,7,8-hexachlorodibenzofuran; and 1,2,3,7,8-pentachlorodibenzofuran were detected in one sample at concentrations below the EQLs. Because of the

presence of multiple congeners detected above EQL, additional sampling and analysis for dioxins and furans in Fence Canyon are warranted.

Because no PCBs were detected above EQLs, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

No radionuclides were detected or detected above BVs/FVs in sediment samples from the drainage downgradient of AOC 36-004(b).

Summary of Contaminant Distribution

Concentrations of detected inorganic chemicals and organic chemicals decreased in the drainage downgradient of AOC 36-004(b) and were not detected or not detected above BVs in samples collected from the bottom of the drainage. Radionuclides were not detected above BVs/FVs. Aroclor-1254 and Aroclor-1260 were each detected below EQLs in one sample at the bottom of the drainage downgradient of the site. Concentrations of both Aroclors decreased in sediments in downgradient Fence Canyon Reaches F-1, FS-1, F-2 and were not detected in Reach F-3 (LANL 2010, 111507, p. 16). Because of the presence of multiple congeners detected above EQLs, additional sampling and analysis for dioxins and furans in Fence Canyon are warranted.

7.6.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 36-004(b) is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for AOC 36-004(b).

7.6.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC 36-004(b) is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for AOC 36-004(b).

7.7 AOC 36-004(c), Minie Firing Site

7.7.1 Site Description and Operational History

AOC 36-004(c) is the Minie Firing Site located at TA-36 near the head of Fence Canyon, approximately 800 ft southeast of the Meenie Firing Site [AOC 36-004(b)] (Figure 7.7-1). AOC 36-004(c) is an active RCRA-regulated OD site and is also used to conduct experiments involving explosives. This firing site consists of the firing point, a control bunker (building 36-0008), a make-up building (36-0007), a firing platform (no structure number), and an x-ray house (no structure number). Construction of the Minie Firing Site began in 1949 and was completed in 1950 (LANL 1993, 020946, p. 5-37). The site has been extensively used to conduct armor-piercing experiments. In these experiments, penetrator jets are directed at targets on the canyon wall to the west of the site. Metal plates are placed behind the targets to stop the penetrators (Kelkar 1992, 012469). AOC 36-004(c) has also been used for OD of scrap HE. Emergency detonation of leaking gas cylinders has been performed, but very infrequently (LANL 1990, 007513, p. 109).

7.7.2 Relationship to Other SWMUs and AOCs

AOC 36-004(c) is located southwest of SWMU 36-005, south-southeast of Eenie Firing Site [AOC 36-004(a)], and south of Meenie Firing Site [AOC 36-004(b)].

7.7.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC 36-004(c), field activities included investigating potential off-site migration of contaminants via major drainage channels (ICF Kaiser Engineers 1996, 054713, pp. 107–119). Sediment catchment areas with substantial accumulations of fine particles were identified, and eight samples were collected (ICF Kaiser Engineers 1996, 054713, pp. 107–119) and submitted for analysis of TAL metals, radionuclides, VOCs, and SVOCs. Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals above detected BVs and radionuclides detected or detected above BVs/FVs.

7.7.4 Site Contamination

Investigation of AOC 36-004(c) was not proposed in the approved investigation work plan because the site is an active RCRA-regulated OD site (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections.

7.7.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- A total of 14 samples were collected from seven locations in sediment catchment areas in the drainage downgradient of the site toward Fence Canyon. Samples were collected from two depth intervals (0–0.25 ft, 0–0.5 ft, or 0–1 ft bgs and 0.25–0.5 ft, 0.5–1 ft, 1–2 ft, or 2–3 ft bgs) (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and gamma-emitting radionuclides. One of the 14 samples was also analyzed for dioxins/furans and PCBs. The sampling location for the dioxin/furan and PCB analyses was selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC 36-004(c) are shown in Figure 7.7-1. Table 7.7-1 presents the samples collected and analyses requested for AOC 36-004(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.7.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 36-004(c), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.7.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for AOC 36-004(c) consisted of results from 14 soil and sediment samples collected from seven locations in sediment catchment areas in the drainage downgradient of the site.

Inorganic Chemicals

Fourteen samples (4 soil and 10 sediment) were analyzed for TAL metals, cyanide, perchlorate, and nitrate. Table 7.7-2 presents the inorganic chemicals detected or detected above BVs. Figure 7.7-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because AOC 36-004(c) is an active firing site, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Fourteen samples (4 soil and 10 sediment) were analyzed for VOCs, SVOCs, and explosive compounds. One soil sample was also analyzed for dioxins/furans and PCBs. Table 7.7-3 presents the detected organic chemicals. Figure 7.7-3 shows the spatial distribution of detected organic chemicals. Because AOC 36-004(c) is an active firing site, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Fourteen samples (4 soil and 10 sediment) were analyzed for isotopic uranium and gamma-emitting radionuclides. Table 7.7-4 presents the radionuclides detected or detected above BVs/FVs. Figure 7.7-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of AOC 36-004(c) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and radionuclide COPCs have not been identified.

7.7.4.4 Spatial Distribution of Contaminants

The site is an active RCRA-regulated OD site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed not to determine the nature and extent but to determine whether off-site migration is occurring. Contaminant distributions were evaluated primarily to determine what contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

Barium was detected above the sediment BV (127 mg/kg) in one sample at a concentration of 214 mg/kg at location 15-613280 from 0–0.25 ft bgs. Barium concentrations decreased downgradient.

Calcium was detected above the sediment BV (4420 mg/kg) in one sample at a concentration of 9590 mg/kg at location 15-613279 from 0–0.25 ft bgs. Calcium concentrations decreased downgradient.

Cobalt was detected above the sediment BV (4.73 mg/kg) in one sample at a concentration of 4.9 mg/kg at location 15-613280 from 0–0.25 ft bgs. Cobalt concentrations decreased downgradient.

Copper was detected above the sediment BV (0.3 mg/kg) in two samples from one location and above the soil BV (14.7 mg/kg) in three samples from two locations. The maximum concentration of 31.2 mg/kg was detected above BV at location 15-613280 from 0–0.25 ft bgs. Copper concentrations decreased downgradient.

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.53 mg/kg to 0.54 mg/kg) in four soil samples at two locations. Cyanide was not detected above BV in samples from the seven downgradient sampling locations.

Lead was detected above the sediment BV (19.7 mg/kg) in one sample at a concentration of 26.6 mg/kg at location 15-613280 from 0–0.25 ft bgs. Lead concentrations decreased downgradient.

Nitrate was detected in 4 soil samples at two locations, and 10 sediment samples at five locations. The maximum concentration of 4.1 mg/kg was detected at location 15-613285 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Perchlorate was detected in two soil samples at location 15-613283, with a maximum concentration of 0.012 mg/kg from 2–3 ft bgs. Perchlorate concentrations decreased downgradient.

Selenium was detected above the sediment BV (0.3 mg/kg) in 10 samples from five locations. The maximum concentration of 2.1 mg/kg was detected above BV at location 15-613281 from 2–3 ft bgs. Sampling location 15-613281 is at bottom of the drainage below the site. Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches, although these averages are affected by the high frequency of nondetects and elevated DLs, and the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Organic Chemicals

Amino-2,6-dinitrotoluene[4-]; 2-amino-4,6-dinitrotoluene; and 2,6-di-nitrotoluene were each detected in one sample at location 16-613283 from 0–1 ft bgs at concentrations below the EQL.

Benzoic acid was detected in one sediment sample at location 15-613281 from 0–1 ft bgs at a concentration below the EQL. Benzoic acid was not detected in downgradient Fence Canyon Reaches F-1, F-2, or F-3 (LANL 2010, 111507).

Bis(2-ethylhexyl)phthalate was detected in seven samples at six locations. The maximum concentration of 0.68 mg/kg was detected at location 15-613283 from 0–1 ft bgs. Bis(2-ethylhexyl)phthalate concentrations were below the EQL in the other six samples and decreased downgradient.

Di-n-butylphthalate was detected six samples at five locations. The maximum concentration of 0.86 mg/kg was detected at location 15-613283 from 0–1 ft bgs. Di-n-butylphthalate concentrations were below EQLs in the other five samples and decreased downgradient.

Di-n-nitrotoluene[2,4-] was detected in two samples at two locations. The maximum concentration of 1.4 mg/kg was detected at location 15-613283 from 0–1 ft bgs. The 2,4-di-n-nitrotoluene concentrations were below the EQL in the other sample and decreased downgradient.

Heptachlorodibenzofuran[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzofuran were each detected in one sample at concentrations below the EQL. Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were each detected in one sample. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

HMX was detected at a concentration of 0.25 mg/kg in one sample at location 15-613283 from 0–1 ft bgs. HMX concentrations decreased downgradient.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

TATB was detected in seven samples at four locations. The maximum concentration of 8.3 mg/kg was detected at location 15-613283 from 0–1 ft bgs and was below the EQL in one sample. TATB concentrations decreased downgradient.

Radionuclides

Cesium-137 was detected at depths where the soil FV (1.65 pCi/g) does not apply in one sample at location 15-213285 from 2–3 ft bgs. Cesium-137 concentrations decreased downgradient from this location, and it was not detected above BV/FV in samples from the six sampling locations downgradient of location 15-213285 (locations 15-613283, 15-613280, 15-613281, 15-613282, 15-613283, and 15-513284) and is not migrating off-site.

Uranium-238 was detected above the sediment BV (2.29 pCi/g) in one sample at location 15-613280 from 0–0.25 ft bgs. Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at location 15-613285 from 0–1 ft bgs. Uranium-238 concentrations decreased downgradient, and it was not detected above BVs/FVs in samples from three sampling locations at the bottom of the drainage (locations 15-613281, 15-613282, and 15-513284) and is not migrating off-site.

Summary of Contaminant Distribution

Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainage downgradient of AOC 36-004(c). Benzoic acid was detected below the EQL in one sample at the bottom of the drainage below AOC 36-004(c) but was not detected in downgradient Fence Canyon Reaches F-1, F-2, or F-3 (LANL 2010, 111507). Cesium-137 and uranium-238 were detected or detected above BVs/FVs in one and two samples, respectively, near the top of the drainage but were not detected above BVs/FVs in samples from the bottom of the drainage below AOC 36-004(c).

The migration of potential contaminants from AOC 36-004(c) is limited to the drainage downgradient of the site for all constituents and does not extend beyond Fence Canyon Reach F-3.

7.7.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. AOC 36-004(c) is an active firing site; therefore, a human health risk assessment was not performed for AOC 36-004(c).

7.7.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. AOC 36-004(c) is an active firing site; therefore, an ecological risk assessment was not performed for AOC 36-004(c).

7.8 SWMU 36-004(d), Skunk Works Firing Site, Lower Slobbovia Firing Site, and Burn Pits

7.8.1 Site Description and Operational History

SWMU 36-004(d) consists of the active Lower Slobbovia Firing Site and the inactive Skunk Works Firing Site, located in Potrillo Canyon, and three former burn pits located on the mesa top above Potrillo Canyon at TA-36 (Figure 7.8-1). SWMU 36-004(d) is deferred for investigation per Table IV-2 of the Consent Order.

The Lower Slobbovia Firing Site consists of two active firing points and a control building (36-0012). One of the firing points (structure 36-0013) was constructed in 1950 and is located on top of an approximately 200-ft-diameter sand and dirt pad. The control building (36-0012) was constructed into the side of the pad (LANL 1993, 020946, p. 5-38). The second firing point consisted of a wooden tower (structure 36-0120), constructed in 1986 at the northwest end of a 1000-ft-long sled track for conducting drop tests (Kelkar 1992, 012471). Shots fired at the Lower Slobbovia Firing Site primarily involved HE (LANL 1990, 007513, p. 109). Less than 2% of the shots involved significant amounts of metal (e.g., DU, lead, copper, aluminum, and steel) (Kelkar 1992, 012471). The largest shot fired at Lower Slobbovia used 5000 to 6000 lb of HE (Kelkar 1992, 012469). In addition, underground tests, buried to approximately 100 ft, were conducted at this site (Kelkar 1992, 012469).

The Skunk Works Firing Site, located approximately 0.5 mi northwest of the Lower Slobbovia Firing Site, was used to conduct small-explosives experiments during the 1950s (Kelkar 1992, 012471). These experiments involved gas (acetylene and oxygen), liquid (tetranitromethane), and solid explosives. Beryllium and radioactive materials were not used at the site (LANL 1996, 054733, pp. 5-21–5-28). Structures at the Skunk Works Firing Site included a 5-ft × 5.5-ft × 5-ft belowgrade structure that previously served as a battery storage room and two buildings (36-0044 and 36-0045) that were moved to the site from TA-15. All the structures have been removed. The Skunk Works firing pad was located next to building 36-0045. A shallow depression, located approximately 100 ft farther up the canyon, was also used as a firing pad (LANL 1996, 054733, pp. 5-21–5-28).

The burn pits were used for burning and disposal of test debris before MDA AA (SWMU 36-001) was established in the mid-1960s (LANL 1993, 020946, p. 5-39). These pits are located on Mesita del Potrillo approximately 4000 ft west of the Lower Slobbovia control building (36-0012). The largest pit is a bermed enclosure located north of Potrillo Road and is approximately 40 ft in diameter. Two smaller areas are located south of Potrillo Road (LANL 1996, 054733, p. 5-29–5-31). Debris was transported by truck from TA-36 firing sites to the pits, placed in the pits, and burned. The debris consisted of wood, nails, other metal fragments, plastics, and sand contaminated with barium, uranium, and HE (LANL 1996, 054733, pp. 5-29–5-36).

7.8.2 Relationship to Other SWMUs and AOCs

SWMU 36-001 is located directly south of the SWMU 36-004(d) Lower Slobbovia Firing Site and SWMU 36-005 is located west of the SWMU 36-004(d) Skunk Works Firing Site and burn pits.

7.8.3 Summary of Previous Investigations

Previous environmental investigations at SWMU 36-004(d) included sampling performed during the 1988 DOE environmental survey. This effort involved collecting five composite surface samples from the Lower Slobbovia Firing Site and analyzing them for inorganic chemicals and radionuclides. The results indicated elevated levels of copper, lead, uranium, and zinc (DOE 1992, 030081, pp. 55–56).

A Phase I RFI investigation was conducted from 1994 to 1996 at the Skunk Works Firing Site and burn pits (LANL 1996, 054733, pp. 5-27–5-28, 5-35–5-36). Phase I RFI activities at the Skunk Works Firing Site included a radiological survey of the site and field screening for inorganic chemicals, organic vapors, and HE. Based on field-screening results, a surface (0–0.5 ft bgs) and a subsurface soil sample (1.5–2 ft bgs) were collected at three locations, including the former firing pad next to building 36-0045, the depression to the northwest of building 36-0045, and the former battery storage room. A surface sample (0–0.5 ft bgs) was also collected from the drainage channel receiving surface runoff from the site. The samples were field screened for radioactivity, organic vapors, and HE and submitted for analysis of TAL metals, isotopic uranium, HE, VOCs, and SVOCs (LANL 1996, 054733, pp. 5-21–5-28). Data from the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected VOCs and SVOCs, and radionuclides detected above BVs.

Phase I RFI activities at the burn pits included radiological and geophysical surveys to determine the pit locations; however, the survey results were inconclusive, and additional historical research was conducted to determine the locations of the burn pits. The pits were discovered along Potrillo Road. Ash was found within the bermed area of the north pit (LANL 1996, 054733, pp. 5-30–5-33). Subsurface soil samples were collected at three locations within the north pit. Samples were collected from one depth (3.33 ft–4.17 ft bgs) at one location; two depths (0.33 ft–1.08 ft and 3.17 ft–3.67 ft bgs) from one location; and three depths (2 ft–2.58 ft, 4.42 ft–5.08 ft, and 5.58 ft–6.33 ft bgs) at one location at the north pit. Subsurface samples were also collected from two depths at each of two locations at the two south pit areas from depth ranging from 0.5–1.08 ft and 2–2.75 ft bgs. The samples were field screened for radioactivity, organic vapors, and HE and submitted for analysis of TAL metals, isotopic uranium, HE, VOCs, SVOCs, and gamma-emitting radionuclides (LANL 1996, 054733, pp. 5-21–5-28). All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.8.4.4. Table 7.8-1 presents the samples collected and analyses requested at SWMU 36-004(d).

7.8.4 Site Contamination

Investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan did propose sampling in sediment catchment areas in the drainage downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections.

7.8.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field-screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.

- A total of 12 samples were collected from six locations in sediment catchments in the drainages downgradient of the burn pits. Samples were collected from two depth intervals (0–0.25 ft or 0–1 ft bgs and 0.25–0.5 ft, 1–2 ft, or 2–3 ft bgs) at each location (see deviations in Appendix B).
- Six samples were collected from three locations in sediment catchments in the drainage downgradient of the Skunk Works Firing Site from two depth intervals (0–1 ft and 2–3 ft bgs) at each location.
- All samples were analyzed for cyanide, nitrate, perchlorate, VOCs, SVOCs, TAL metals, explosive compounds, isotopic uranium, and gamma-emitting radionuclides. Two of the 18 samples (1 downgradient from the burn pits and 1 downgradient from the Skunks Works Firing Site) were also analyzed for dioxins/furans and PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 36-004(d) are shown on Figure 7.8-1. Table 7.8-1 presents the samples collected and analyses requested for SWMU 36-004(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.8.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 36-004(d), a maximum concentration of 1.8 ppm was detected at location 15-613499 from 2–3 ft bgs. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.8.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for SWMU 36-004(d) consisted of results from 18 sediment samples collected in 2010 from nine locations in sediment catchment areas in the drainages downgradient of the site and 9 soil samples and 1 tuff sample collected in 1996 from five locations within the burn pits.

Inorganic Chemicals

Eighteen sediment samples were analyzed for TAL metals, cyanide, perchlorate, and nitrate, and nine soil samples and one tuff sample were also analyzed for TAL metals. Table 7.8-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.8-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Eighteen sediment samples were analyzed for VOCs, SVOCs, and explosive compounds. One sediment sample was also analyzed for dioxins/furans and PCBs. Nine soil samples and one tuff sample were also analyzed for VOCs, SVOCs, and HE. Table 7.8-3 presents the detected organic chemicals. Figure 7.8-3 shows the spatial distribution of detected organic chemicals. Because the investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and organic COPCs have not been identified.

Radionuclides

Eighteen sediment samples, nine soil samples, and one tuff sample were analyzed for isotopic uranium and gamma-emitting radionuclides. Table 7.8-4 presents the radionuclides detected or detected above BVs/FVs. Figure 7.8-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and radionuclide COPCs have not been identified.

7.8.4.4 Spatial Distribution of Contaminants

The site is an active firing site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed not to determine the nature and extent but to determine whether contamination is migrating from the site. Contaminant distributions were evaluated primarily to determine what contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

DLs for antimony, cadmium, mercury, selenium, silver, and thallium were above soil BVs in one to six samples at one to three sampling locations within the former burn pits. Antimony, cadmium, mercury, selenium, silver, and thallium were not detected in samples collected in sediment catchments in the drainages downgradient of the site.

Aluminum, barium, calcium, cobalt, and nickel were each detected above tuff BVs in one sample at location 36-03177 from 5.58–6.33 ft bgs. Calcium was detected above the sediment BV (4420 mg/kg) in one sample at a concentration of 4450 mg/kg at location 15-613503 from 0–1 ft bgs. Nickel was detected above the soil BV (15.4 mg/kg) in one sample at a concentration of 17 mg/kg at location 36-03179 from 3.33–4.17 ft bgs. Concentrations of aluminum, barium, calcium, cobalt, and nickel decreased downgradient.

Lead was detected above the sediment BV (19.7 mg/kg) in one sample at a concentration of 21.6 mg/kg at location 15-613496 from 0–1 ft bgs. Lead concentrations decreased downgradient.

Nitrate was detected in 18 sediment samples at nine locations, with a maximum concentration of 11 mg/kg at location 15-613499 from 0–1 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels.

Perchlorate was detected in two sediment samples at two locations in the drainage below the former burn pits above Fence Canyon, with a maximum concentration of 0.0029 mg/kg detected at location 15-613503 from 1–2 ft bgs. Perchlorate was detected at 0.0023 mg/kg at location 15-613504 at the bottom of the drainage and may have migrated off-site. Perchlorate was not detected in sediment in downgradient Fence Canyon Reach F-2 and was detected in Fence Canyon Reach F-3 at a maximum concentration of 0.00113 mg/kg.

Selenium was detected above the sediment BV (0.3 mg/kg) in 18 samples at nine locations. The maximum concentration of 1.7 mg/kg was detected above BV at location 15-613502 from 0–0.25 ft bgs. Selenium concentrations remained essentially unchanged in the drainages downgradient of AOC 36-004(b), and it was detected above the sediment BV at 0.75 mg/kg at location 15-613504, at 1 mg/kg at location 15-613499, and at 1.3 mg/kg at location 15-613498 at the bottom of the drainages below the former AOC 36-004(d) burn pits and Skunk Works Firing Site. Selenium has a high frequency

(90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches, although these averages are affected by the high frequency of nondetects and elevated DLs, and the spatial pattern of selenium does not indicate a release (LANL 2010, 111507).

Organic Chemicals

Acetone was detected in two samples at two locations at concentrations below EQL.

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 were each detected in one sample at location 15-613504 from 0–1 ft bgs. Chrysene was also detected in the sample collected from 1–2 ft bgs at location 15-613504 at a concentration below the EQL. Detected concentrations of these polycyclic aromatic hydrocarbons (PAHs) were at or below the EQLs, with the exception of benzo(a)anthracene, chrysene, phenanthrene, and pyrene. These PAHs may be migrating off-site as sampling location 15-613504 is at the bottom of the drainage below the former SWMU 36-004(d) burn pits. However, concentrations of all PAHs decreased downgradient in Fence Canyon Reach F-2 and were not detected in sediment in Fence Canyon Reach F-3 (LANL 2010, 111507).

Bis(2-ethylhexyl)phthalate was detected in four samples at four locations. The maximum concentration (0.098 mg/kg) was detected at location 36-03175 from 0.5–1.08 ft bgs and was below the EQL in all four samples.

Butanone[2-]; tert-butylbenzene; 1,2-dibromo-3-chloropropane; 2-hexanone; methylene chloride; naphthalene; and tetrachloroethene were each detected in one sample at or below the EQL.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] was detected in one sample at location 15-613497 (former Skunk Works Firing Site) from 0–1 ft bgs and in one sample at location 15-613502 (former burn pit) from 0–0.25 ft bgs at concentrations below the EQL. Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-] was detected in one sample at location 15-613497 (former Skunk Works Firing Site) from 0–1 ft bgs and in one sample below the EQL at location 15-613502 (former burn pit) from 0–0.25 ft bgs. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Isopropyltoluene[4-] was detected in four samples at two locations. The maximum concentration (0.031 mg/kg) was detected at location 36-03175 from 0.5–1.08 ft bgs and was below the EQL in the sample from 1–2 ft bgs at location 15-613503. Concentrations of 4-isopropyltoluene decreased downgradient, and it was not detected in samples from locations at the bottom of drainages downgradient of the site.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Toluene was detected in four samples at three locations. The maximum concentration (0.0033 mg/kg) was detected at location 15-613503 from 0–1 ft bgs and was below the EQL in the sample from 1–2 ft bgs at location 15-613503 and in the sample at location 36-03175. Concentrations of toluene decreased downgradient, and it was not detected in samples from locations at the bottom of drainages downgradient of the site.

Trimethylbenzene[1,2,4-] was detected in two samples at location 15-613503. The maximum concentration (0.0012 mg/kg) was detected in the sample from 0–1 ft bgs and was below the EQL in both samples.

Radionuclides

Cesium-137 was detected in three subsurface soil samples and two subsurface sediment samples at four locations (Table G-2). The maximum concentration (0.24 pCi/g) was detected at location 36-03175 from 0.5–1.08 ft bgs. Cesium-137 concentrations decreased downgradient in the drainage from location 15-613503 to location 15-613504. A single radionuclide sample result in Fence Canyon was above the sediment BV: cesium-137 at 1.04 pCi/g in Reach F-3 compared with the BV of 0.9 pCi/g but below the maximum result from the background sediment data set of 1.28 pCi/g (LANL 2010, 111507).

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at location 36-03177 from 2–2.58 ft bgs. Uranium-238 was not detected above BV/FV in any samples in the drainages downgradient of location 36-03177 and is not migrating off-site.

Summary of Contaminant Distribution

Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainages downgradient of SWMU 36-004(d). Perchlorate was detected at two locations in the drainage below the former burn pits above Fence Canyon and may have migrated off-site. Perchlorate was not detected in sediment in downgradient Fence Canyon Reach F-2. Concentrations of 4-isopropyltoluene and toluene decreased downgradient, and neither contaminant was detected in samples from locations at the bottom of drainages downgradient of the site. Cesium-137 activities decreased in the drainage downgradient of the SWMU 36-004(d) burn pits; however, cesium-137 was detected above the sediment BV at the bottom of the drainage and has likely migrated off-site. A single radionuclide sample result in Fence Canyon was detected above sediment BV: cesium-137 was detected at 1.04 pCi/g in Reach F-3, but its activity was below the maximum result from the background sediment data set of 1.28 pCi/g (LANL 2010, 111507). Uranium-238 was not detected above BV/FV in any samples at the bottom of the drainage and is not migrating off-site.

The migration of potential contaminants from SWMU 36-004(d) is limited to the drainages below SWMU 36-004(d) for most constituents and does not extend beyond Potrillo Canyon Reach PO-4 or Fence Canyon Reach F-3.

7.8.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for SWMU 36-004(d).

7.8.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of SWMU 36-004(d) is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for SWMU 36-004(d).

7.9 AOC 36-004(e), I-J Firing Site

7.9.1 Site Description and Operational History

AOC 36-004(e) is the I-J Firing Site located at the west end of TA-36 on Mesita del Potrillo along the north rim of Potrillo Canyon (Figure 6.11-1 and Plate 1). AOC 36-004(e) is deferred for investigation per Table IV-2 of the Consent Order. The I-J Firing Site consists of two firing points (I and J) and the control building (36-0055). The site was constructed in 1948 and was located in TA-15 until 1981 when the boundary of TA-36 was expanded to encompass the portion of TA-15 that contained the I-J Firing Site. Shots at I-J Firing Site used up to 500 lb of HE and involved a variety of solid and liquid explosives and inorganic chemicals (LANL 1993, 020946, p. 5-40). According to former employees, significant amounts of DU were used at I-J Firing Site in addition to small quantities of mercury and cadmium (Kelkar 1992, 009043). Some shots were fired into iron, copper, or lead targets. Other metals used in shots included aluminum, antimony, various steels, lithium-magnesium alloys, and lithium hydride (Kelkar 1992, 012468). In addition, hydrocarbons, argon, benzene, small amounts of mercury, cadmium, and beryllium were used in shots (Kelkar 1992, 009043; Kelkar 1992, 012468).

All shots involving radioactive materials at the I-J Firing Site were conducted in fully enclosed containment vessels. These vessels were removed from the I-J Firing Site for use at TA-15, although one was later returned to the I-J Firing Site (LANL 1993, 020946, p. 5-40). The returned vessel was identified in the 1990 SWMU report as AOC C-36-001 (LANL 1990, 007513) and was subsequently removed from the site in 1994 and disposed of at MDA G at TA-54 (LANL 1996, 053779, p. 3). Other firing-site activities conducted at I-J Firing Site included tests in which DU projectiles were fired into an embankment. This projectile test area was designated as AOC C-36-006(e) (LANL 1993, 020946, pp. 5-39–5-40).

7.9.2 Relationship to Other SWMUs and AOCs

AOC 36-004(e) is located to the east of AOC 15-008(f) and north of AOC C-36-006(e).

7.9.3 Summary of Previous Investigations

Previous investigations conducted at I-J Firing Site consist of a surface radiological survey conducted in 1991 that identified areas of elevated radioactivity at the time of the survey. Numerous pieces of DU and oxidized DU were present around the site. Based on the presence of visible pieces of DU, an interim action plan was prepared in 1997 that called for removing visible pieces of DU from the firing site and surrounding area and emplacing stormwater controls (LANL 1997, 062453, p. 3-5). However, the plan was not implemented. No previous investigations have been conducted at AOC 36-004(e).

7.9.4 Site Contamination

Investigation of AOC 36-004(e) is deferred per Table IV-2 of the Consent Order and was not proposed in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved investigation work plan proposed sampling in sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following section.

7.9.4.1 Soil, Rock, and Sediment Sampling

No sampling was proposed for AOC 36-004(e) in the approved investigation work plan; data from the samples collected in drainages downgradient of AOCs 15-008(f) and C-36-006(e) were used to determine

if contaminants are migrating off-site. Sampling activities are described in section 6.11.4 for AOC 15-008(f) and in section 7.12.4 for AOC C-36-006(e).

7.10 SWMU 36-005, Storage Area

7.10.1 Site Description and Operational History

SWMU 36-005 is an inactive storage area (known as the "Boneyard") located at TA-36 near the head of Fence Canyon between the Meenie and Minie Firing Sites [AOCs 36-004(b) and 36-004(c), respectively] (Figure 7.10-1 and Plate 1). This approximately 260 ft × 300 ft storage area is an undeveloped area, largely covered with grass and ponderosa pine. From the 1950s to the late 1970s, the Boneyard was used as a parking lot for trailers and a storage area for large nonwaste items. From the late 1970s to the late 1980s, the site was used to store large waste items exposed to explosives tests (Kelkar 1992, 012470), including metal drums, cans, cylinders, and scrap metals such as lead sheets, copper, uranium-contaminated steel, and iron (LANL 1993, 020946, p. 5-53).

In the late 1980s, a major cleanup was conducted at the site. Cans labeled isopentane, uranium-contaminated iron and steel, drums, and cylinders were removed during this cleanup effort (LANL 1993, 020946, p. 5-53).

7.10.2 Relationship to Other SWMUs and AOCs

SWMU 36-005 is located near the head of Fence Canyon between the Meenie and Minie Firing Sites [AOCs 36-004(b) and 36-004(c), respectively].

7.10.3 Summary of Previous Investigations

Previous environmental investigations at SWMU 36-005 include a radiological survey and sampling performed by the DOE environmental survey in 1988. This effort involved collecting six grab samples from four locations showing elevated radiation levels and six grab samples from locations showing visible staining or debris (LANL 1993, 015313, pp. 5-55–5-56).

The Phase I RFI conducted at SWMU 36-005 in 1994 included land, geomorphic, and radiological surveys (LANL 1995, 053985, pp. 4-12–4-13). The radiological survey identified no areas of elevated radiation. Thirty-one surface soil samples (0–0.5 ft bgs) were collected from 27 locations. Nine of these locations were within the current active storage area; nine were in the drainage channel downgradient of the site; and nine were from random locations, including three locations outside the Boneyard. The samples were field screened for VOCs, radioactivity, and HE and submitted for analysis of TAL metals, isotopic uranium, and VOCs. Data collected during the Phase I RFI are screening-level data and are presented in Appendix B of the HIR (LANL 2009, 105251). Screening-level data showed inorganic chemicals detected above BVs, detected organic chemicals, and uranium-235 detected above the BV.

Based on Phase I RFI results, a Phase II RFI was conducted in 1997 involving the collection of subsurface samples at locations where the maximum concentrations of organic chemicals were detected in Phase I RFI samples. Four subsurface soil samples were collected from three locations from depths ranging from 1–3.3 ft bgs. The samples were submitted for analysis of VOCs. All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.10.4.4. Table 7.10-1 presents the samples collected and analyses requested at SWMU 36-005.

7.10.4 Site Contamination

During the 2010 implementation of the approved work plan, cultural resource issues were raised by Laboratory archaeologists, causing work activities to be suspended. The Laboratory was aware of cultural resources located at SWMU 36-005; however, additional archaeological sites were discovered during a site visit by Laboratory archaeologists (English 2010, 111797). It was determined that full clearance by the State Historical Preservation Office to collect samples (and remove debris) may not be possible, and the review process to reach this determination would extend beyond due date of the investigation report. An alternate sampling approach was proposed that included three transects across the slope downgradient of the site. This alternative sampling approach was successfully implemented (see section 7.10.4-1 and deviations in Appendix B).

7.10.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field-screened for organic vapors; gross-alpha, -beta, and -gamma radioactivity; and explosive compounds (TNT and RDX). Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations in the drainage downgradient of the site from two depth intervals (0–0.5 ft and 0.5–1 ft bgs at location 36-03022 and 0–1 ft and 1–2 ft bgs at location 36-03020) at each location (see deviations in Appendix B).
- Three samples were collected from location 36-03051 from 0–1 ft, 2–3 ft, and 4–5 ft bgs (see deviations in Appendix B).
- A total of 21 samples were collected from seven alternate locations from 0–1 ft, 2–3 ft, and 4–5 ft bgs (see deviations in Appendix B).
- All samples were analyzed for cyanide, nitrate, perchlorate, TAL metals, VOCs, SVOCs, explosive compounds, and isotopic uranium. One of the 28 samples was also analyzed for dioxins/furans and 3 of the 28 samples were also analyzed for PCBs. The sampling locations for the dioxin/furan and PCB analyses were selected based on their proximity to the potential contaminant source.

Sampling locations with decision-level data for SWMU 36-005 are shown in Figure 7.10-1. Table 7.10-1 presents the samples collected and analyses requested for SWMU 36-005. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.10.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 36-005, no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.10.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 36-005 consisted of results from 28 samples (19 soil and 9 tuff) collected from 10 locations.

Inorganic Chemicals

Twenty-eight samples (19 soil and 9 tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 7.10-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.10-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-eight samples (19 soil and 9 tuff) were analyzed for explosive compounds, VOCs, and SVOCs. Three samples (one soil and two tuff) were also analyzed for PCBs, and the same soil sample was also analyzed for dioxins/furans. Table 7.10-3 presents the detected organic chemicals. Figure 7.10-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-eight samples (19 soil and 9 tuff) were analyzed for isotopic uranium. Radionuclides were not detected or detected above BVs/FVs at AOC 36-004(b).

7.10.4.4 Nature and Extent of Contamination

Reaches F-1, FS-1, and F-2 in Fence Canyon and AOC 36-004(c) are located downgradient of SWMU 36-005 (Plate 1); therefore, the SWMU 36-005 data will be supplemented as necessary by data presented in the Potrillo and Fence canyons investigation report (LANL 2010, 111507) and AOC 36-004(c) sediment sampling results (see section 7.7).

Inorganic Chemicals

Antimony was not detected above BVs but had a DL (0.54 mg/kg) above the tuff BV (0.5 mg/kg) in one sample. Because antimony was not detected above the tuff BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 257 mg/kg at location 15-613509 from 2–3 ft bgs. Barium concentrations decreased with depth and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral and vertical extent of barium are defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in one sample at a concentration of 1.4 mg/kg at location 15-613509 from 2–3 ft bgs. Beryllium concentrations decreased with depth and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral and vertical extent of beryllium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in two samples at one location. The maximum concentration of 5840 mg/kg was detected above BV at location 15-613513 from 4–5 ft bgs. Calcium concentrations increased with depth at this location and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in four samples at four locations. The maximum concentration of 27.2 mg/kg was detected above BV at location 15-613508 from 4–5 ft bgs. Chromium

concentrations decreased with depth at locations 15-613507 and 15-613510 because the concentrations in the shallower samples were below the soil BV but above the concentrations in the deeper tuff samples (see section 5.0 and Appendix G, Table G-1), increased with depth at locations 15-613508 and 15-613509, and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral extent of chromium is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 17.7 mg/kg at location 15-613512 from 0–1 ft bgs. Copper concentrations decreased with depth and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.59 mg/kg) above the soil BV in 18 samples at nine locations and had DLs (0.5 mg/kg to 0.54 mg/kg) above the tuff BV in 8 samples at five locations. Because cyanide was not detected above the soil or tuff BV, the lateral and vertical extent of cyanide are defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in two samples at two locations. The maximum concentration of 12.4 mg/kg was detected above BV at location 15-613508 from 4–5 ft bgs. Nickel concentrations increased with depth at locations 15-613508 and 15-613509 and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral extent of nickel is defined, but the vertical extent is not defined.

Nitrate was detected in 18 soil samples at 10 locations and in 7 tuff samples at 5 locations. The maximum concentration of 16.4 mg/kg was detected at location 15-613509 from 0–1 ft bgs. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples at two locations and in two tuff samples at two locations. The maximum concentration of 0.0048 mg/kg was detected at location 15-613512 from 0–1 ft bgs. Perchlorate concentrations decreased with depth at location 15-613512; increased with depth but were below the EQL at locations 15-613507, 15-613511, and 15-613513; and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in five samples at five locations and above the tuff BV (0.3 mg/kg) in nine samples at six locations. The maximum concentration of 3.2 mg/kg was detected above BV at location 15-613513 from 4–5 ft bgs. Selenium concentrations decreased with depth at locations 15-613507, 15-613508, 15-613509, 15-613510, and 36-03051; increased with depth at locations 15-613511, 15-613512, and 15-613513; and decreased downgradient. Selenium has a high frequency (90%) of nondetects in the Potrillo and Fence canyons investigations data set, and DLs for these samples are above the BV, making it difficult to evaluate the sources, concentrations, and distribution of selenium. Average selenium concentrations in fine facies sediment are above the BV in all reaches, although these averages are affected by the high frequency of nondetects and elevated DLs, and the spatial pattern of selenium does not indicate a release (LANL 2010, 111507). The lateral extent of selenium is defined, but the vertical extent is not defined.

Organic Chemicals

Acetone was detected in four samples at two locations. The maximum concentration of 0.31 mg/kg was detected at location 36-03051 from 0–1 ft bgs. Acetone concentrations decreased with depth at location 36-03051, increased with depth at location 36-03022, and decreased downgradient in sediment

samples collected at AOC 36-004(c). The lateral extent of acetone is defined, but the vertical extent is not defined.

Benzoic acid, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, di-n-butylphthalate, and pentachlorophenol were detected in one to five sample at one to four locations at concentrations below the EQL. The lateral and vertical extent of these organic chemicals are defined.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were detected in one sample at concentrations below the EQL. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Methylene chloride was detected in 16 samples at nine locations. The maximum concentration of 0.0063 mg/kg was detected at location 36-03022 from 0–0.5 ft bgs. Methylene chloride concentrations decreased with depth at location 36-03022; were below EQL at locations 15-613507, 15-613508, 15-613509, 15-613510, 15-613511, and 15-613512; increased with depth at location 36-03020; and decreased downgradient in sediment samples collected at AOC 36-004(c). The lateral extent of methylene chloride is defined, but the vertical extent is not defined.

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 36-005.

Summary of Nature and Extent

The vertical extent of acetone, calcium, chromium, methylene chloride, nickel, and selenium is not defined at SWMU 36-005. The extent of radionuclides is defined at SWMU 36-005.

7.10.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 36-005 because extent is not defined for the site.

7.10.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 36-005 because extent is not defined for the site.

7.11 AOC C-36-001, Former Containment Vessel

7.11.1 Site Description and Operational History

AOC C-36-001 is a former containment vessel that provided secondary containment for explosives tests at TA-36 (Figure 7.11-1). The containment vessel was manufactured in 1970 and located at the PHERMEX test facility at TA-15. The containment vessel was later relocated to the I-J Firing Site and placed south of building 36-0055 where it remained until 1983 when it was removed. The containment vessel consisted of a 19.5-ton steel sphere that was 12 ft in diameter. An explosive device was placed and detonated in a primary containment vessel which, in turn, was placed inside the AOC C-36-001

containment vessel. The explosion gases were vented through a filtration system that captured particulates and did not allow release of the test material (LANL 1993, 020946, p. 5-40). No specific location(s) exists for this site; the location is identified only as the general area south of building 36-0055 (LANL 1996, 053779).

7.11.2 Relationship to Other SWMUs and AOCs

AOC C-36-001 was generally located south of AOC 36-004(e), southeast of AOC 15-008(f), and north of SWMU 36-003(b) and AOC C-36-006(e).

7.11.3 Summary of Previous Investigations

In 1994, a VCA was implemented at AOC C-36-001 that involved decontamination and disposal of the vessel. The vessel was taken from TA-36 to building 15-0233 for initial decontamination and was subsequently taken to the decontamination facility at TA-50 for further decontamination. It was then returned to TA-15 pending acceptance for disposal at TA-54, Area G. In October 1994, the containment vessel was disposed of at MDA G at TA-54 (LANL 1996, 053779, p. 3). No confirmation samples were collected during the VCA.

7.11.4 Site Contamination

The previous location(s) of the former containment vessel used at PHERMEX and the I-J Firing Site are not known. Therefore, characterization of any releases from AOC C-36-001 will be accomplished by investigations at the PHERMEX and I-J Firing Site (LANL 2009, 106657.8; NMED 2009, 106677). Investigation of both of these firing sites is deferred per Table IV-2 of the Consent Order. To determine if contaminants are migrating from either firing site, samples were collected from sediment catchments in the drainages downgradient of PHERMEX [SWMUs 15-003 and 15-006(a)] and I-J Firing Site (AOC 36-004(a)] (sections 6.4.4 and 7.3.4, respectively).

7.11.4.1 Soil, Rock, and Sediment Sampling

No sampling was proposed for AOC C-36-001 in the approved investigation work plan; data from the samples collected in drainages downgradient of SWMU 15-003 and AOC C-36-006(e) were used to determine if contaminants are migrating off-site. Sampling activities and data are described in section 6.4.4 for SWMU 15-003 and in section 7.12.4 for AOC C-36-006(e).

7.12 AOC C-36-006(e), Projectile Test Area

7.12.1 Site Description and Operational History

AOC C-36-006(e) is a former projectile test area located within the southern portion of the I-J Firing Site [AOC 36-004(e)] along the north rim of Potrillo Canyon (Figure 6.11-1). AOC C-36-006(e) was formerly used for testing DU projectiles as part of I-J Firing Site activities (LANL 1993, 020946, pp. 5-39–5-40). Projectiles were fired from a 120-mm gun into a nearby embankment. Although some projectiles were recovered after an experiment was completed, much of the projectile material remains on-site (LANL 1990, 007512, p. 72).

Originally, the I-J Firing Site was located within the boundary of TA-15. In 1981, the boundary of TA-36 was expanded to include portions of TA-15. As part of this expansion, the area where I-J Firing Site was located was transferred to TA-36. However, the 1990 SWMU report (LANL 1990, 007514, p. 262) is

inconsistent in addressing the SWMUs and AOCs affected by the transfer. Although the SWMU report addresses the I-J Firing Site as AOC 36-004(e), it addresses the nearby projectile test area (which was also part of the 1981 transfer to TA-36) as AOC 15-006(e). AOC 15-006(e) was renamed AOC C-36-006(e) in the OU 1086 work plan because the projectile test area was within the boundaries of TA-36 when the work plan was written (LANL 1993, 020946, pp. 5-39–5-40).

7.12.2 Relationship to Other SWMUs and AOCs

AOC C-36-006(e) is located within AOC 36-004(e) (I-J Firing Site), southeast of AOC 15-008(f), and south of SWMU 36-003(b).

7.12.3 Summary of Previous Investigations

Previous investigations conducted at I-J Firing Site, which encompasses AOC C-36-006(e), consisted of a surface radiological survey conducted in 1991 that identified areas of elevated radioactivity at the time of the survey. Numerous pieces of DU and oxidized DU were present around the site. Based on the presence of visible pieces of DU, an interim action plan was prepared in 1997 that called for removing visible pieces of DU from the firing site and surrounding area and installing stormwater controls (LANL 1997, 062453, p. 3). However, the plan was not implemented. No previous investigations have been conducted at AOC C-36-006(e).

7.12.4 Site Contamination

AOC C-36-006(e) is encompassed by the I-J Firing Site, which is deferred per Table IV-2 of the Consent Order. No characterization sampling was proposed for AOC C-36-006(e) in the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Although investigation to determine the nature and extent of contamination was not proposed, the approved work plan proposed sampling in sediment catchment areas in the drainages downgradient of the site to determine if contaminants are migrating from the site (LANL 2009, 106657.8; NMED 2009, 106677). These sampling activities are discussed in the following sections. The data from these sampling locations also addresses potential migration from AOCs 36-004(e) (section 7.9.4) and 15-008(f) (section 6.12.4).

7.12.4.1 Soil, Rock, and Sediment Sampling

The following activities were completed during the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded in the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations in sediment catchments in the drainages downgradient of the site. Samples were collected from two depth intervals (0–0.25 ft, 0–0.5 ft, or 0–1 ft bgs and 0.25–0.5 ft, 0.5–1 ft, or 2–3 ft bgs) at each location (see deviations in Appendix B).
- All samples were analyzed for TAL metals, VOCs, SVOCs, explosive compounds, isotopic uranium, and gamma-emitting radionuclides. Nine samples were analyzed for cyanide and perchlorate. One of the 10 samples was also analyzed for dioxins/furans and PCBs (see deviations in Appendix B). The sampling location for the dioxin/furan and PCB analyses were selected based on its proximity to the potential contaminant source.

Sampling locations with decision-level data for AOC C-36-006(e) are shown on Figure 6.11-1. Table 7.12-1 presents the samples collected and analyses requested for AOC C-36-006(e). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.12.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC C-36-006(e), no organic vapors were detected. No radiological-screening results exceeded twice the maximum site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.12.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data for AOC C-36-006(e) consisted of results from 10 soil and sediment samples collected in 2010 from five locations in sediment catchment areas in the drainages downgradient of the site.

Inorganic Chemicals

Ten samples (eight soil and two sediment) were analyzed for TAL metals. Nine samples (seven soil and two sediment) were analyzed for cyanide and perchlorate. Table 7.12-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.11-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the investigation of AOC C-36-006(e) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Organic Chemicals

Ten samples (eight soil and two sediment) were analyzed for VOCs, SVOCs, explosive compounds. One soil sample was also analyzed for dioxins/furans and PCBs. Table 7.12-3 presents the detected organic chemicals. Figure 6.11-3 shows the spatial distribution of detected organic chemicals. Because the investigation of AOC C-36-006(e) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

Radionuclides

Ten samples (eight soil and two sediment) were analyzed for isotopic uranium and gamma-emitting radionuclides. Table 7.12-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.11-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the investigation of AOC C-36-006(e) is deferred per Table IV-2 of the Consent Order, the extent of contamination was not evaluated and inorganic COPCs have not been identified.

7.12.4.4 Spatial Distribution of Contaminants

The site is located within an active firing site. Because the distribution of contamination is affected by continuing operations, limited characterization sampling was performed not to determine the nature and extent but to determine whether off-site migration is occurring. Contaminant distributions were evaluated primarily to determine what contaminants are being dispersed, whether they are migrating off-site, and the general spatial distribution. Because samples were collected in sediment catchment areas where vertical mixing may occur, vertical distribution is not considered.

Inorganic Chemicals

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.52 mg/kg to 0.55 mg/kg) above the soil BV in five samples at four locations. Cyanide was not detected above BV in sediment in downgradient canyon reaches (LANL 2010, 111507).

Mercury was not detected above the soil BV (0.1 mg/kg) but had a DL (0.151 mg/kg) above the soil BV in one sample at location 15-613312. Mercury concentrations decreased downgradient.

Perchlorate was detected in two soil samples at two locations and in one sediment sample. The maximum concentration of 0.0031 mg/kg was detected at location 15-613313 from 0–1 ft bgs. Perchlorate concentrations were below the EQL at all locations and decreased in the drainage downgradient of the site; it was not detected in samples from locations at the bottom of the drainage and is therefore not migrating off-site.

Selenium was detected above the sediment BV (0.3 mg/kg) in two samples at one location. The maximum concentration of 1.3 mg/kg was detected above BV at location 15-613315 from 0–0.5 ft bgs. Selenium concentrations decreased in the drainage downgradient of the site, and it was not detected in samples from locations at the bottom of the drainage and is therefore not migrating off-site.

Organic Chemicals

Acetone was detected in six samples at four locations. The maximum concentration of 0.029 mg/kg was detected at location 15-613313 from 2–3 ft bgs. Acetone concentrations in the other five samples from downgradient locations were below EQL.

Benzoic acid, bis(2-ethylhexyl)phthalate, 4-isopropyltoluene, and toluene were each detected in one to four samples at one to two locations at concentrations below the EQL.

Heptachlorodibenzodioxin[1,2,3,4,6,7,8-] and 1,2,3,4,6,7,8,9-octachlorodibenzodioxin were each detected in one sample, and 1,2,3,4,6,7,8-heptachlorodibenzofuran was detected in one sample at a concentration below the EQL. As discussed in section 5.0, the presence of only hepta- and octa- congeners indicates a release has not occurred. Therefore, no additional sampling and analysis for dioxins and furans are warranted at this site.

Methylene chloride was detected in eight samples at five locations. The maximum concentration of 0.036 mg/kg was detected at location 15-613314 from 0.25–0.5 ft bgs. Methylene chloride concentrations decreased downgradient. Methylene chloride was detected in two samples from the two locations (locations 15-613315 and 15-613316) at the bottom of the drainage. However, methylene chloride was not detected in sediment in any of the downgradient Potrillo Canyon reaches (LANL 2010, 111507).

Because no PCBs were detected, no additional sampling and analysis for PCBs are warranted at this site.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at location 15-613316 from 0–0.5 ft bgs at an activity of 2.65 pCi/g. Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in one sample at location 15-613316 from 0–0.5 ft bgs at an activity of 0.336 pCi/g. Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at location 15-613316 from 0–0.5 ft bgs at an activity of 12 pCi/g. Sampling location 15-613316 is at the bottom of the drainage downgradient of

AOC C-36-006(e); therefore, all three uranium isotopes are likely migrating off-site. Uranium-234, uranium-235/236, and/or uranium-238 were also detected upgradient in samples at locations 15-613261 and 15-613263 at the bottom of the drainage below AOC 15-008(f) (section 6.11.4).

Uranium-234 was detected at 10.4 pCi/g, uranium-235/236 was detected at 0.65 pCi/g, and uranium-238 was detected at 13.9 pCi/g in sediment in the nearest downgradient reach in Potrillo Canyon (Reach PO-2); however, activities of all three uranium isotopes decreased in Reach PO-3 from upgradient Potrillo Canyon Reach PO-2 (LANL 2010, 111507).

Summary of Contaminant Distribution

Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainages downgradient of the site and were not detected or not detected above BVs in samples collected from the bottom of the drainage below the site. Uranium-234, uranium-235/236, and uranium-238 were each detected above soil and/or sediment BVs/FVs in samples collected from the bottom of the drainages downgradient of the site and have likely migrated into Potrillo Canyon. Isotopic uranium activities decreased in downgradient reaches, and these uranium isotopes were not detected in sediment samples from Potrillo Canyon Reach PO-3 (LANL 2010, 111507, p. 63).

The migration of potential contaminants from AOC C-36-006(e) is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

7.12.5 Summary of Human Health Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC C-36-006(e) is deferred per Table IV-2 of the Consent Order. Therefore, a human health risk assessment was not performed for AOC C-36-006(e).

7.12.6 Summary of Ecological Risk Screening

The purpose of sampling the drainage downgradient of the site was to determine whether contaminants are migrating from the site. The investigation of AOC C-36-006(e) is deferred per Table IV-2 of the Consent Order. Therefore, an ecological risk assessment was not performed for AOC C-36-006(e).

8.0 CONCLUSIONS

8.1 Nature and Extent of Contamination

Of the 27 sites addressed during the 2010 Potrillo and Fence Canyons Aggregate Area investigation, the nature and extent of contamination have not been determined for the 14 sites investigated. One site is a duplicate of another site and was not investigated. Complete investigations were not conducted at 10 of the sites that are deferred per Table IV-2 of the Consent Order, are delayed because they are located within one of the deferred sites, or are delayed because of ongoing OD activities at the site. Sampling was conducted at these sites only to determine if contaminants are migrating off-site. At one additional site, sampling was conducted for planning remediation activities, and excavation and removal activities were suspended at one other site because of health and safety concerns.

Summaries of the nature and extent of contamination and remaining characterization and/or remediation requirements for the sites at TA-15 and TA-36 are presented below.

8.1.1 TA-15

Eleven sites at TA-15 were investigated to determine the nature and extent of contamination. Additional sampling is needed to define the extent of contamination for one or more inorganic chemical, organic chemical, or radionuclide at the following 11 sites:

- SWMU 15-002—vertical extent of beryllium, calcium, chromium, copper, lead, magnesium, nickel and selenium; lateral extent of selenium.
- SWMU 15-007(a)—vertical extent of acetone, calcium, lead, mercury and selenium.
- SWMUs 15-004(b) and 15-004(c)—vertical extent of aluminum, arsenic, barium, calcium, chromium, copper, lead, magnesium, nickel, RDX, and thallium.
- SWMU 15-008(a)—vertical extent of aluminum, barium, calcium, chromium, lead, mercury, nickel, selenium, silver, uranium-234, uranium-235/236, and uranium-238.
- AOC 15-005(b)—vertical extent of barium, calcium, and cobalt; lateral extent of aluminum, arsenic, barium, calcium, chromium, cobalt, lead, manganese, nickel, perchlorate, and selenium.
- SWMU 15-009(e)—vertical extent of nickel and selenium at the drain field outfall; lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides below the structures and drainline.
- SWMU 15-010(a)—vertical extent of barium, calcium, chromium, cobalt, copper, diethylphthalate, lead, mercury, selenium, and silver; lateral extent of lead and selenium; lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides below the structures and drainline.
- AOC C-15-004—vertical extent of copper; lateral extent of uranium-234, uranium-235/236, and uranium-238. Additional sampling and analysis for dioxins and furans.
- AOC C-15-005—vertical extent of aluminum, calcium, lead, nickel, perchlorate, selenium and zinc; lateral extent of barium, lead, and selenium.
- AOC C-15-006—vertical extent of antimony, cobalt, copper, lead, manganese, mercury, and zinc; lateral extent of antimony, cadmium, lead, mercury, and zinc.

Sampling at one additional site, SWMU 15-004(f), was conducted for planning remediation activities rather than determining the nature and extent of contamination. Inorganic chemicals and radionuclides are present above background in surface and near-surface soil and tuff at grid sampling locations throughout the site and within the earthen mounds. FIDLER survey results where count rates were greater than 160,000 cpm or greater than 8 times estimated background levels were measured in the area between the earthen mounds and the area directly east of the earthen mounds (Figures 6.7-2 and 6.7-3 and Appendix D). The count rates generally decreased to background levels within 200 ft radially from the two earthen mounds area.

Similarly, the most elevated results of the inorganic chemical and radionuclide data from the 2010 and previous investigations were between the two earthen mounds near Firing Point E. Concentrations and activities decreased in samples collected from the top and back (to the northeast and southeast) of the mounds and in samples collected outside of the mound area. Inorganic chemical and radionuclide data were compared with industrial SSLs/SALs. Copper was detected above the industrial SSL in one sample; uranium-238 was detected above the industrial SAL in three samples at two locations.

The concentrations of detected organic chemicals and most inorganic chemicals and the activities of radionuclides decreased downgradient of SWMU 15-004(f). Copper, uranium-234, and uranium-238 were

detected above the sediment BV and BVs/FVs at a sampling location at the head of Potrillo Canyon, indicating these contaminants have likely migrated into Potrillo Canyon. Downcanyon extent of copper and the two uranium isotopes in Potrillo Canyon has been defined downgradient in Potrillo Canyon Reach PO-3 (LANL 2010, 111507). The migration of potential contaminants from SWMU 15-004(f) is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

The following three sites at TA-15 are deferred per Table IV-2 of the Consent Order; samples were collected from downgradient drainages to determine if contaminants are migrating off-site.

- SWMUs 15-003 and 15-006(a): Concentrations of the most detected inorganic chemicals and radionuclide activities decreased in the drainage downgradient of SWMUs 15-003 and 15-006(a) and were not detected or not detected above BVs in samples collected from the bottom of the drainage below both sites. Cobalt and uranium-238 were each detected above the sediment BV at the bottom of the drainage downgradient of SWMUs 15-003 and 15-006(a) and have likely migrated off-site. The concentration of cobalt decreased in downgradient reaches in Potrillo Canyon. Uranium-238 activities in the drainage below both sites were slightly above BV, but the extent of uranium-238 has been defined downgradient in Potrillo Canyon Reach PO-3 (LANL 2010, 111507, p. 63).Organic chemicals were not detected in samples at the bottom of the drainage. The migration of potential contaminants from SWMU 15-003 and 15-006(a) is limited to the drainages downgradient of the sites for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.
- AOC 15-008(f): Concentrations of detected inorganic chemicals and organic chemicals decreased in the drainages downgradient of AOC 15-008(f) and were not detected or not detected above BVs in samples collected from the bottom of the drainage below the site. Uranium-234, uranium-235/236, and uranium-238 were each detected above soil and/or sediment BVs/FVs in samples collected from the bottom of the drainages downgradient of the site and have likely migrated into Potrillo Canyon. Isotopic uranium activities decreased in downgradient reaches, and none of three uranium isotopes were detected in sediment samples from Potrillo Canyon Reach PO-3. The migration of potential contaminants from AOC 15-008(f) is limited to the drainage downgradient of the site for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

The following site at TA-15 is a duplicate of a site at TA-36:

- AOC 15-006(e) is duplicate of AOC C-36-006(e) (see section 8.1.2).

8.1.2 TA-36

Three sites at TA-36 were investigated to determine the nature and extent of contamination. Additional sampling is needed to define the extent of contamination for one or more inorganic chemical, organic chemical, or radionuclides at the following three sites:

- SWMU 36-003(b)—lateral and vertical extent of inorganic chemicals, organic chemicals, and radionuclides are not defined below the structures and drainline.
- SWMU 36-005—vertical extent of acetone, calcium, chromium, methylene chloride, nickel, and selenium.
- SWMU 36-006—vertical extent of selenium and zinc.

The following sites at TA-36 are deferred per Table IV-2 of the Consent Order or are delayed for investigation; samples were collected from downgradient drainages to determine if contaminants are migrating off-site.

- AOC 36-004(a)—deferred per Table IV-2 of the Consent Order. Concentrations of inorganic chemicals and organic chemicals and radionuclide activities detected at the single sampling location downgradient of AOC 36-004(a) decreased in downgradient samples at SWMU 36-006 and were not detected or not detected above BVs and BVs/FVs in samples collected at the bottom of the drainage at SWMU 36-006 and therefore have not migrated off-site.
- AOC 36-004(b)—deferred per Table IV-2 of the Consent Order. Concentrations of detected inorganic chemicals and organic chemicals decreased in the drainage downgradient of AOC 36-004(b) and were not detected or not detected above BVs in samples collected from the bottom of the drainage. Radionuclides were not detected above BVs/FVs. Aroclor-1254 and Aroclor-1260 were each detected below EQLs in one sample at the bottom of the drainage downgradient of the site. Concentrations of both Aroclors decreased in sediments in downgradient Fence Canyon Reaches F-1, FS-1, and F-2 and were not detected in Reach F-3 (LANL 2010, 111507, p. 16). Because of the presence of multiple congeners detected above EQLs, additional sampling and analysis for dioxins and furans in Fence Canyon are warranted.
- AOC 36-004(c)—delayed active RCRA-regulated OD site (interim status). Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainage downgradient of AOC 36-004(c). Benzoic acid was detected below the EQL in one sample at the bottom of the drainage below AOC 36-004(c) but was not detected in downgradient Fence Canyon Reaches F-1, F-2, or F-3 (LANL 2010, 111507). Cesium-137 and uranium-238 were detected or detected above BVs/FVs in one and two samples, respectively, near the top of the drainage but were not detected above BVs/FVs in samples from the bottom of the drainage below AOC 36-004(c) and therefore are not migrating off-site.
- SWMU 36-004(d)—deferred per Table IV-2 of the Consent Order. Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainages downgradient of SWMU 36-004(d). Perchlorate was detected at two locations in the drainage below the former burn pits above Fence Canyon and may have migrated off-site. Perchlorate was not detected in sediment in downgradient Fence Canyon Reach F-2. Concentrations of 4-isopropyltoluene and toluene decreased downgradient, and neither contaminant was detected in samples from locations at the bottom of drainages downgradient of the site. Cesium-137 activities decreased in the drainage downgradient of the SWMU 36-004(d) burn pits; however, cesium-137 was detected above the sediment BV at the bottom of the drainage and has likely migrated off-site. A single radionuclide sample result in Fence Canyon was detected above sediment BV: cesium-137 was detected at 1.04 pCi/g in Reach F-3, but the activity was below the maximum result from the background sediment data set of 1.28 pCi/g (LANL 2010, 111507). Uranium-238 was not detected above BV/FV in any samples at the bottom of the drainage and is not migrating off-site. The migration of potential contaminants from SWMU 36-004(d) is limited to the drainages below SWMU 36-004(d) for most constituents and does not extend beyond Potrillo Canyon Reach PO-4 or Fence Canyon Reach F-3.
- AOC 36-004(e)—deferred per Table IV-2 of the Consent Order. No sampling was proposed for AOC 36-004(e) in the approved work plan because downgradient drainage data from samples collected at AOCs 15-008(f) and C-36-006(e) were used to evaluate potential contamination migration for all three sites.

- AOC C-36-001—deferred per Table IV-2 of the Consent Order. Previous location(s) of the former containment vessel used at PHERMEX and at the I-J Firing Site are not known. Characterization of any releases from AOC C-36-001 will be accomplished by the future PHERMEX and I-J Firing Site investigations (LANL 2009, 106657.8; NMED 2009, 106677). No sampling was proposed for AOC C-36-001 in the approved work plan because downgradient drainage data from samples collected at SWMUs 15-003 and15-006(a) and AOC C-36-006(e) were used to evaluate potential contaminant migration for all three sites.

- AOC C-36-006(e)—delayed; encompassed by the I-J Firing Site, which is deferred per Table IV-2 of the Consent Order. Characterization of any releases from AOC C-36-006(e) will be accomplished by the future I-J Firing Site investigation (LANL 2009, 106657.8; NMED 2009, 106677). Concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased in the drainages downgradient of the site and were not detected or not detected above BVs and BVs/FVs in samples collected from the bottom of the drainage below the site. Uranium-234, uranium-235/236, and uranium-238 were each detected above soil and/or sediment BVs/FVs in samples collected from the bottom of the drainages downgradient of the site and have likely migrated into Potrillo Canyon. Isotopic uranium activities decreased in downgradient reaches, and these uranium isotopes were not detected in sediment samples from Potrillo Canyon Reach PO-3. The migration of potential contaminants from AOC C-36-006(e) is limited to the downgradient drainage for most constituents and does not extend beyond Potrillo Canyon Reach PO-4.

Based on the elevated radioactivity detected during exploratory trenching and the associated health and safety issues, field activities were halted at the following site at TA-36 during the Potrillo and Fence Canyons Aggregate Area investigation.

- Because of higher than expected radiation levels and the potential presence of beryllium detected during the initial stages of waste removal at SWMU 36-001, the Laboratory suspended excavation and removal activities. Samples were collected from within the landfill trenches to characterize levels of beryllium and radioactivity to determine if an updated SSHASP is required for completion of corrective actions. The concentrations of detected inorganic chemicals and organic chemicals and radionuclide activities decreased with depth at all locations at SWMU 36-001. Beryllium was not detected above the soil BV, and uranium-238 was detected above the industrial SAL at one location. No other chemicals or radionuclides were detected above industrial SSLs or SALs. The dioxin and furan data for SWMU 36-001 consist of both the hepta- and octa- congeners and the tetra-, penta-, and hexa- congeners. The presence of the penta- and tetra- congeners indicates that a release associated with site activities has occurred, which is consistent with the history of burning at the site.

8.2 Summary of Risk-Screening Assessments

Nature and extent of contamination are not defined for any of the sites sampled during the Potrillo and Fence Canyons Aggregate Area investigation; therefore, no human health or ecological risk screening assessments were conducted.

9.0 RECOMMENDATIONS

The determination of site status is based on the results of risk-screening assessments and the nature and extent evaluation. Depending upon the decision scenario used, the sites are recommended as corrective

actions complete with or without controls or for additional activities. The current and reasonably foreseeable future land use for the Potrillo and Fence Canyon Aggregate Area is industrial.

9.1 Additional Field Characterization and Remediation Activities

9.1.1 Additional Field Characterization Activities

The extent of contamination has not been defined for 14 sites investigated in the Potrillo and Fence Canyons Aggregate Area. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- SWMUs 15-002, 15-004(b), 15-004(c), 15-007(a), 15-008(a), 15-009(e), 15-010(a), 36-003(b), 36-005, and 36-006 and AOCs C-15-004, C-15-005, 15-005(b), and C-15-006

A Phase II investigation work plan will be developed specifying sampling locations, numbers of samples, and analytical suites required to define the extent of contamination for these sites. Upon completion of the proposed Phase II sampling, the data collected will be used to confirm the extent of contamination has been defined and to complete human health and ecological risk screening assessments for these sites. The results will be presented in a Phase II investigation report for the Potrillo and Fence Canyons Aggregate Area.

9.1.2 Additional Field Characterization and Remediation Activities

Two sites require remediation and characterization/confirmation sampling in the Potrillo and Fence Canyons Aggregate Area:

- SWMU 15-004(f), E-F Firing Site

Additional samples will be collected for laboratory analysis to verify the distribution of potential contamination indicated by the FIDLER survey. Based on the results of this sampling, potential corrective actions will be identified and evaluated. A Phase II investigation work plan will be developed describing additional characterization sampling locations, numbers of samples, and analytical suites for SWMU 15-004(f).

- SWMU 36-001, MDA AA

Based on results from characterization samples collected within the waste disposal trenches at SWMU 36-001, the Laboratory recommends implementing the remediation approach proposed in the approved investigation work plan using geophysical survey results to guide waste removal.

Upon completion of the proposed remediation and confirmation sampling at both sites, the data will be used to confirm the extent of contamination has been defined and to complete human health and ecological risk screening assessments for these sites. The results will be presented in a Phase II investigation report for the Potrillo and Fence Canyons Aggregate Area.

9.2 Recommendations for Deferred/Delayed Characterization

Ten sites are recommended for deferred/delayed characterization and investigation; seven of the sites are deferred per Table IV-2 of the Consent Order, two sites are located within a deferred site and are therefore delayed, and one site is delayed because of active OD site operations:

- SWMU 15-003, PHERMEX Steel Firing Pad
- SWMU 15-006(a), PHERMEX Firing Site
- AOC 15-008(f), Sand Mounds at I-J Firing Site
- AOC C-36-001, Former Containment Vessel
- AOC 36-004(a), Eenie Firing Site
- AOC 36-004(b), Meenie Firing Site
- AOC 36-004(c), Minie Firing Site
- SWMU 36-004(d), Skunk Works Firing Site, Lower Slobbovia Firing Site, and Burn Pits
- AOC 36-004(e), I-J Firing Site
- AOC C-36-006(e), Projectile Test Area

9.3 Recommendations for Corrective Actions Complete

AOC 15-006(e) is a duplicate of AOC C-36-006(e); the site was renamed because it is located at TA-36 within the I-J Firing Site. Therefore, the Laboratory recommends no further investigation or remediation activities are warranted at this site and will request a certification of completion.

9.4 Schedule for Recommended Activities

A Phase II investigation work plan will be developed and submitted to NMED 6-mo after this investigation report is approved. The Phase II work plan will provide details and a schedule for implementing sampling and remediation activities and submitting a Phase II investigation report.

10.0 REFERENCES AND MAP DATA SOURCES

10.1 References

The following list includes all documents cited in this report. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This inform 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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10.2 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/Type	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; as published 29 November 2010.
Paved parking	Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
Dirt roads	Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
Drainages	WQH Drainage Arcs; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
Canyon reaches for Potrillo and Fence Canyons	Investigation Report for Potrillo and Fence Canyons, Plates 1 and 2; Los Alamos National Laboratory, Environment and Remediation Support Services, LA-UR-10-8316, 15 December 2010.

Legend Item/Type	Data Source
LANL structures	Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
LANL fence lines	Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
LANL communications lines	Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
LANL electric lines	Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
LANL gas lines	Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
LANL sewer lines	Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section as published 29 November 2010.
LANL water lines	Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; as published 29 November 2010.
Other LANL / drain lines in PFAA area	Two drain lines digitized from Figures 4.1-22 and -26 from the Integrated Work Plan for Potrillo and Fence Canyons Aggregate Area; LANL ERID 2009-0318; July 2009.
Former LANL PFAA area structures	Former PFAA structures, WES GIS Team project folder 09-0039; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group Geographic Information Systems, unpublished
PFAA area LANL PRS boundaries	Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, 2010-1E, published 9 December 2010.
PFAA area sample locations	TPMC field survey data, now found in: Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, to be included in a post October 2010 publication of the data.
PFAA area field-screening locations for SWMUs 15-004(b,c,f)	TPMC field survey data, plan locations contained in the Integrated Work Plan for Potrillo and Fence Canyons Aggregate Area, Rev. 1; LANL ERID 2009-0318; July 2009; final screening locations unpublished.
MDA N [SWMU 15-007(a)] excavation perimeter	TPMC field survey data, GPS survey conducted post-excavation December 2010, unpublished.
LANL historical sample locations	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 4 October 2010
LANL surface water monitoring site locations	Surface Water Monitoring Environmental Surveillance at Los Alamos During 2008 On-site and Perimeter Monitoring Locations; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, September 2009, as published 2 April, 2010.
MDA N [SWMU 15-007(a)] and MDA AA (SWMU 36-001) geophysical survey results	Geophysical Investigations at SWMU 36-001 (MDA AA) and SWMU 15-007(a) (MDA N) Los Alamos National Laboratory Los Alamos, New Mexico; Figures 1, 5, and 8, Sunbelt Geophysics, Socorro, New Mexico, November 2010.

Legend Item/Type	Data Source
SWMU 15-004(f) radiological survey and contours	GPS-Based Radiological Survey of SWMUs 15-004(f), 15-007(a), and 36-001 at the Los Alamos National Laboratory; Figure A1, Environmental Restoration Group, Inc., Albuquerque, New Mexico, December 2010. TPMC digital contouring of survey radiological count data, March 2011, unpublished
Contours	Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

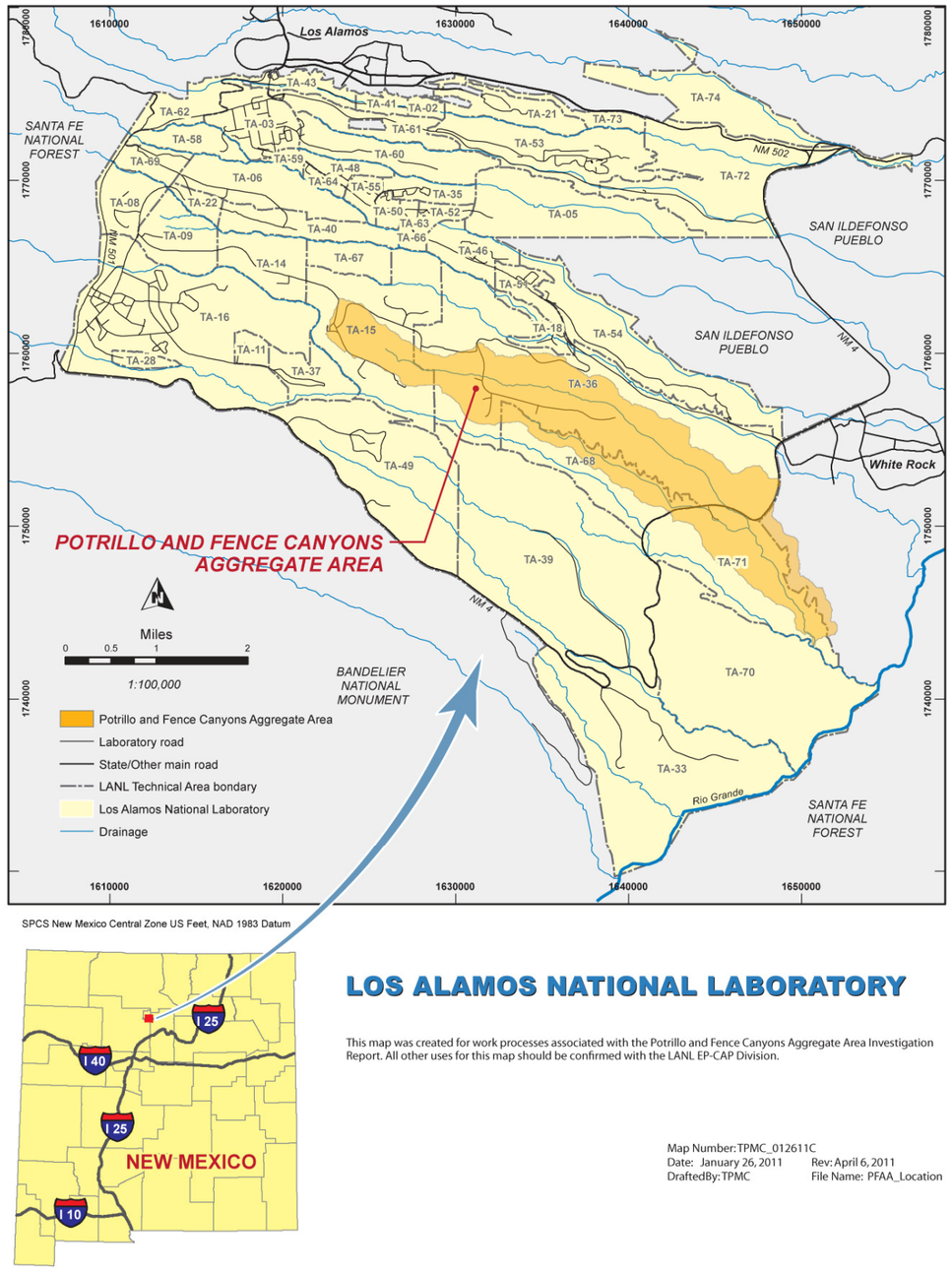


Figure 1.1-1 Location of Potrillo and Fence Canyons Aggregate Area with respect to Laboratory technical areas

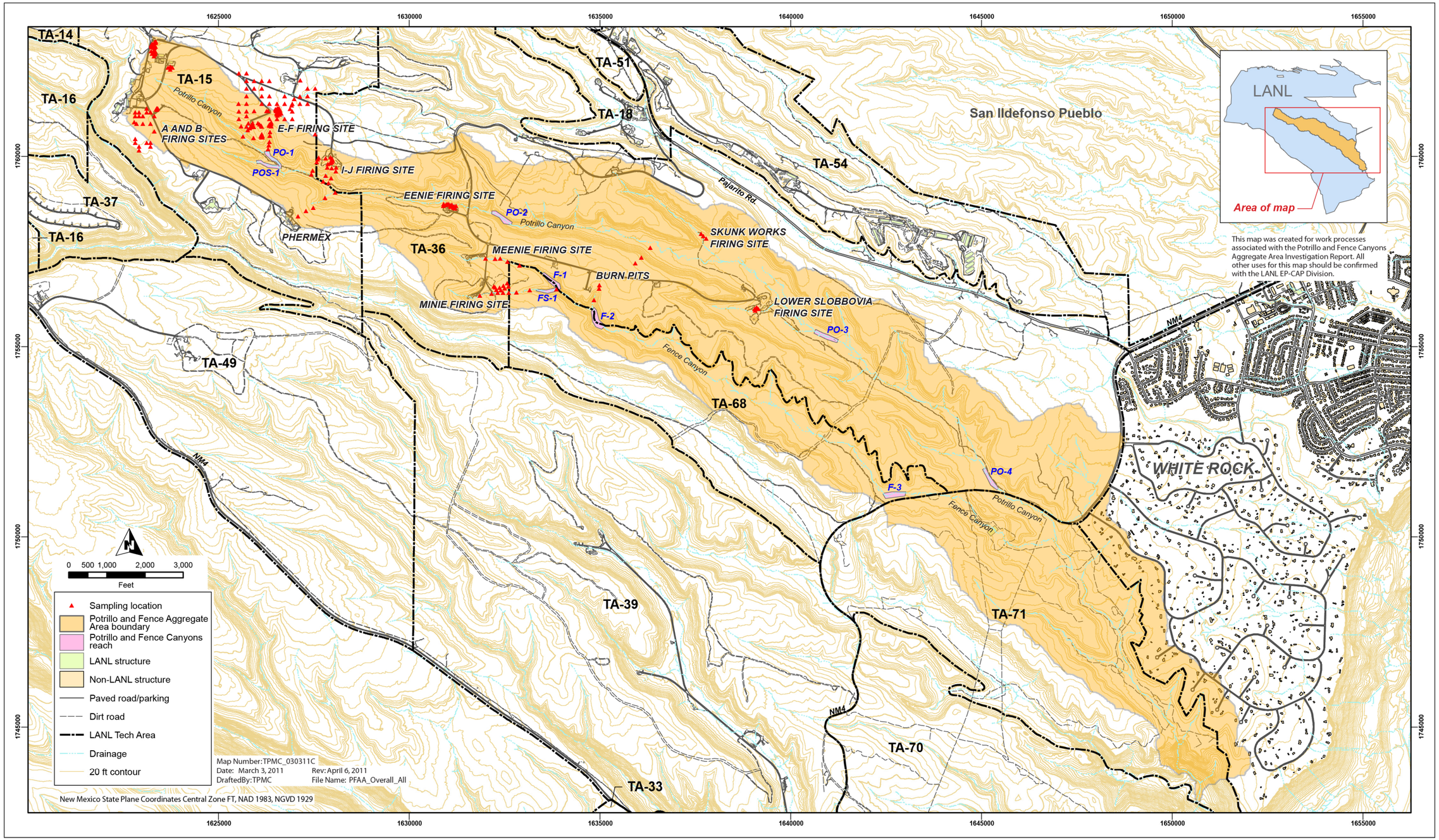


Figure 1.1-2 Location of Potrillo and Fence Canyons Aggregate Area and its surrounding landholdings

Bandelier Tuff	Tshirege Member (Qbt)	Qbt 4	Ash-Flow Units
		Qbt 3	
		Qbt 2	
		Qbt 1v	
		Qbt 1g	
		Tsankawi Pumice Bed	
Cerro Toledo Interval (Qct)		Volcaniclastic Sediments and Ash-Falls	
Bandelier Tuff	Otowi Member (Qbo)	Ash-Flow Units	
		Guaje Pumice Bed (Qbog)	
Puye Formation (Tp)	Fanglomerate	Fanglomerate Facies includes sand, gravel, conglomerate, and tuffaceous sediments	
	Basalt and Andesite	Cerros del Rio Basalts intercalated within the Puye Formation, includes up to four interlayered basaltic flows. Andesites of the Tschicoma Formation present in western part of plateau	
	Fanglomerate	Fanglomerate Facies includes sand, gravel, conglomerate, and tuffaceous sediments; includes “Old Alluvium”	
	Axial facies deposits of the ancestral Rio Grande	Totavi Lentil	
Santa Fe Group	Coarse Sediments	Coarse-Grained Upper Facies (formerly called the “Chaquehui Formation” by Purtymun 1995, 045344)	
	Basalt		
	Coarse Sediments		
	Basalt		
	Coarse Sediments		
	Basalt		
	Coarse Sediments		
	Arkosic clastic sedimentary deposits	Undivided Santa Fe Group (includes Chamita[?] and Tesuque Formations)	

Source: Adapted from (LANL 1999, 064617).

Figure 2.2-1 Generalized stratigraphy of bedrock geologic units of the Pajarito Plateau

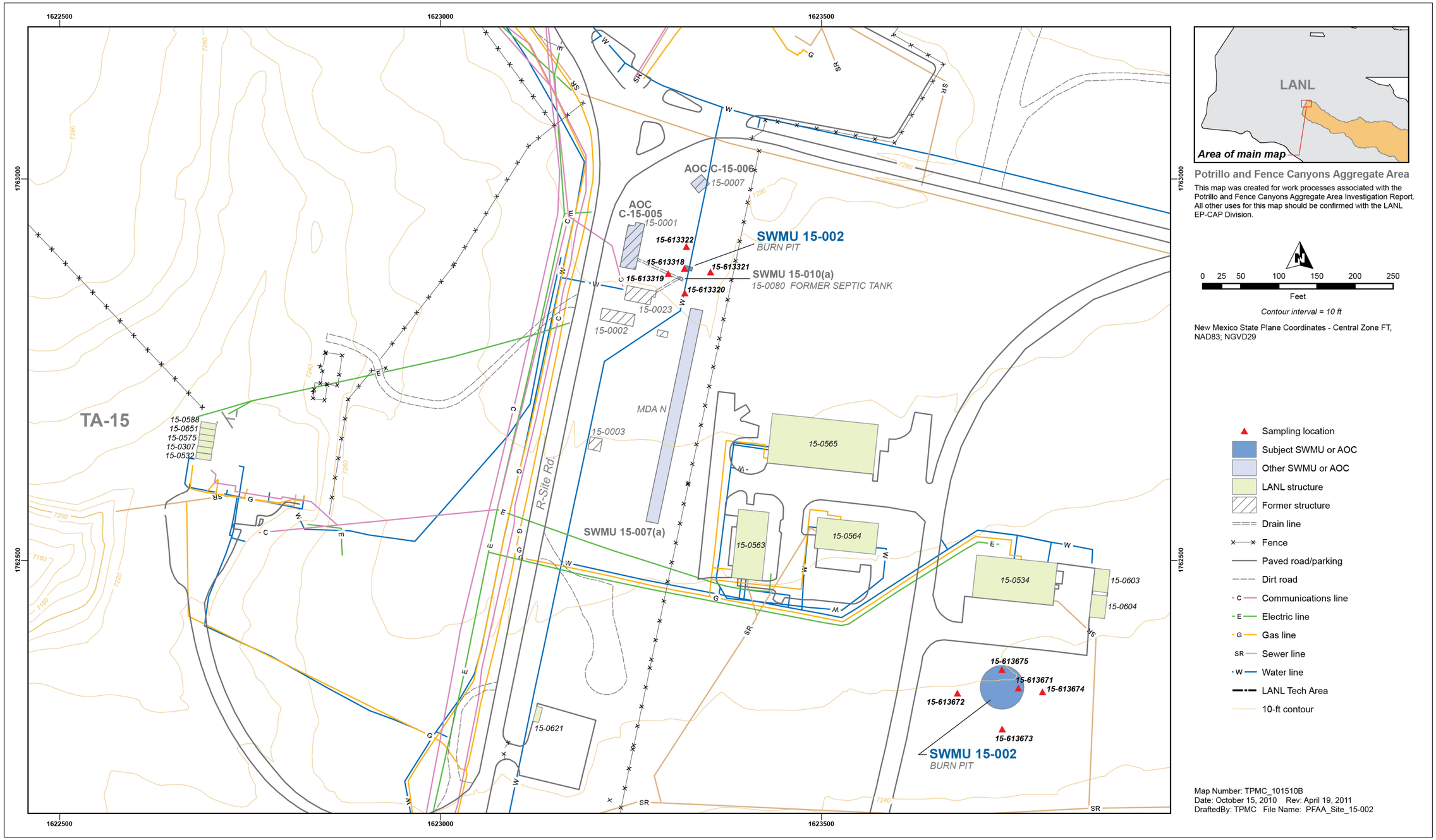


Figure 6.2-1 Site map of SWMU 15-002

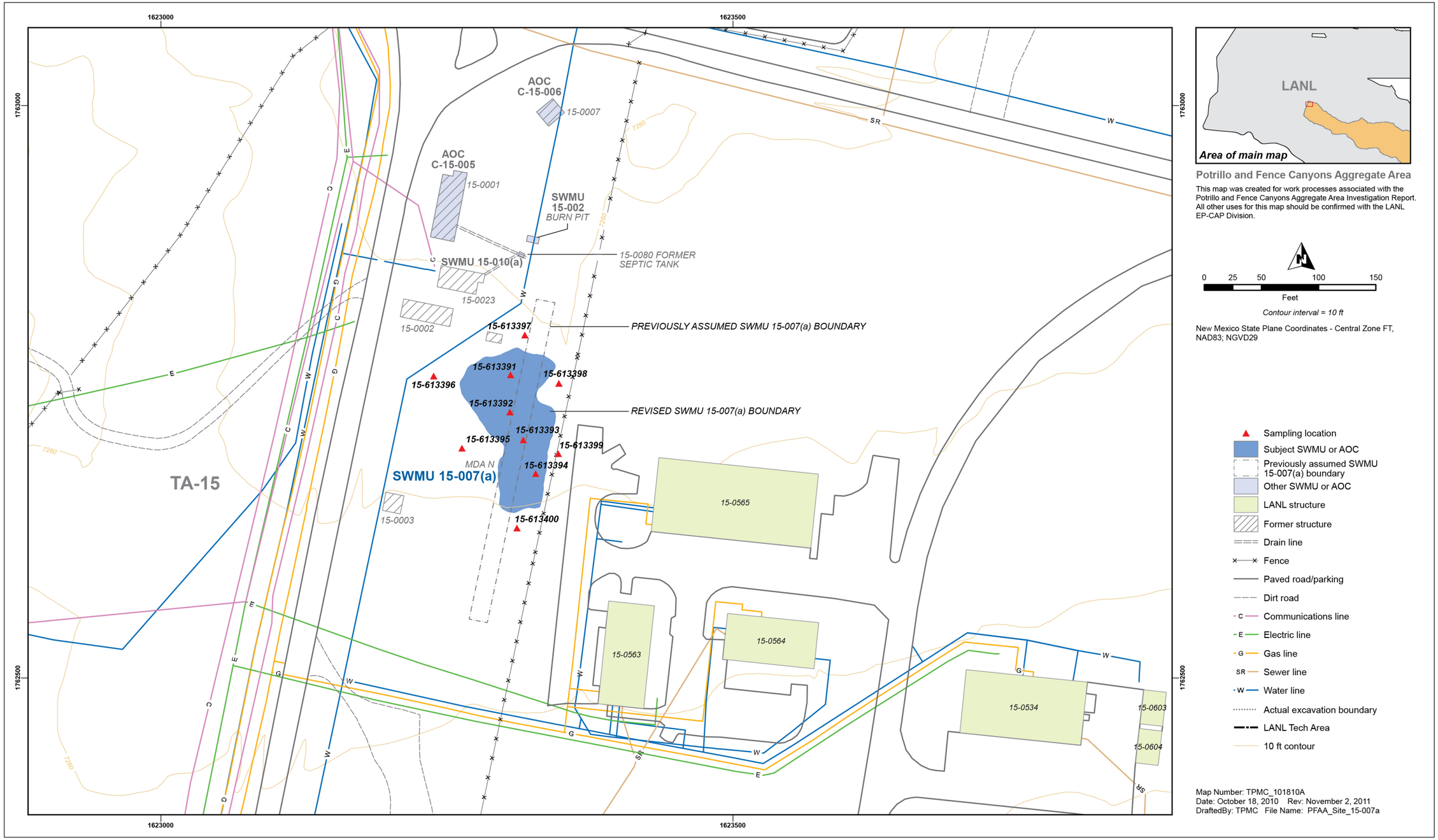


Figure 6.3-1 Site map of SWMU 15-007(a)

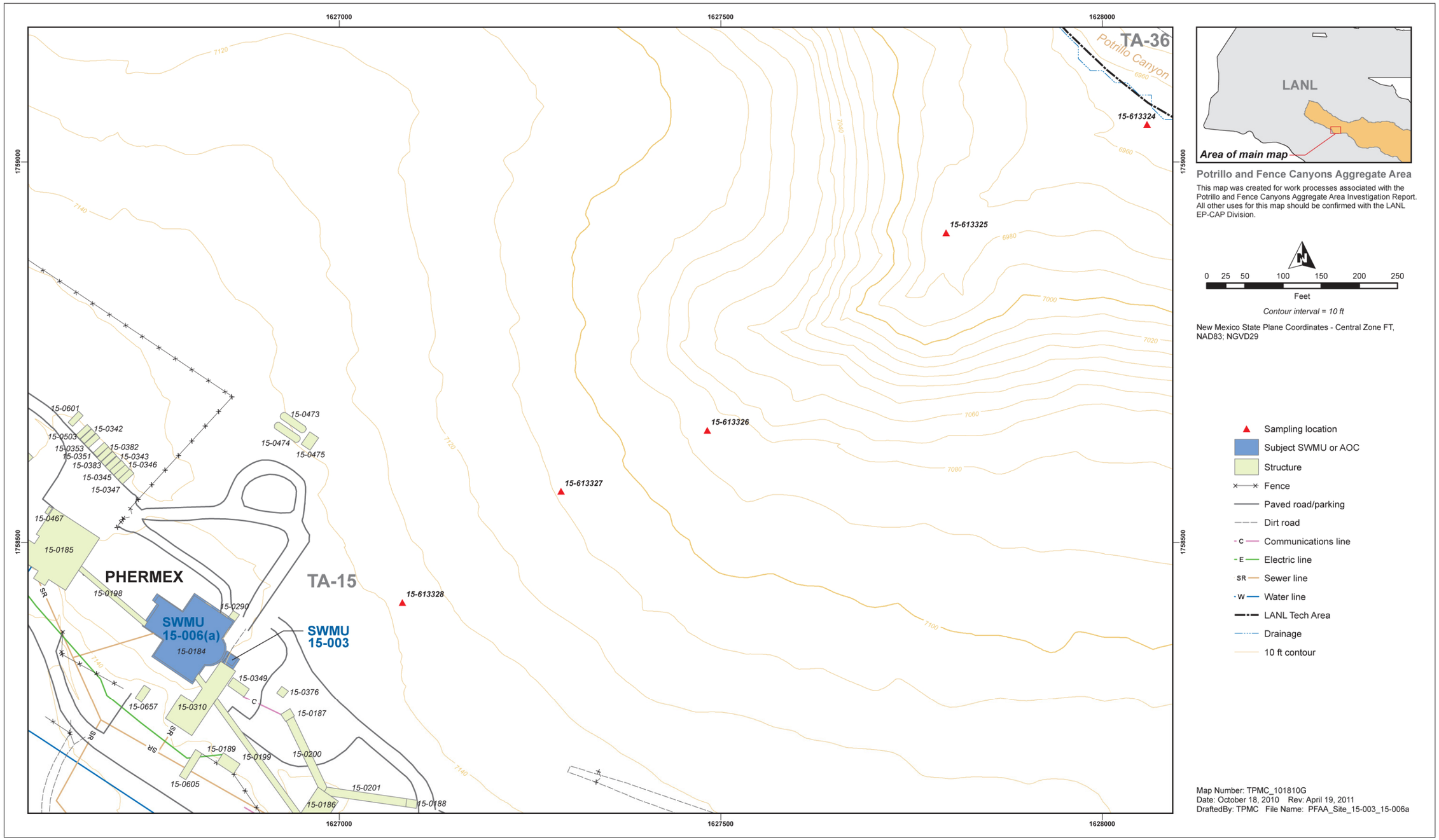


Figure 6.4-1 Site map of SWMUs 15-003 and 15-006(a)

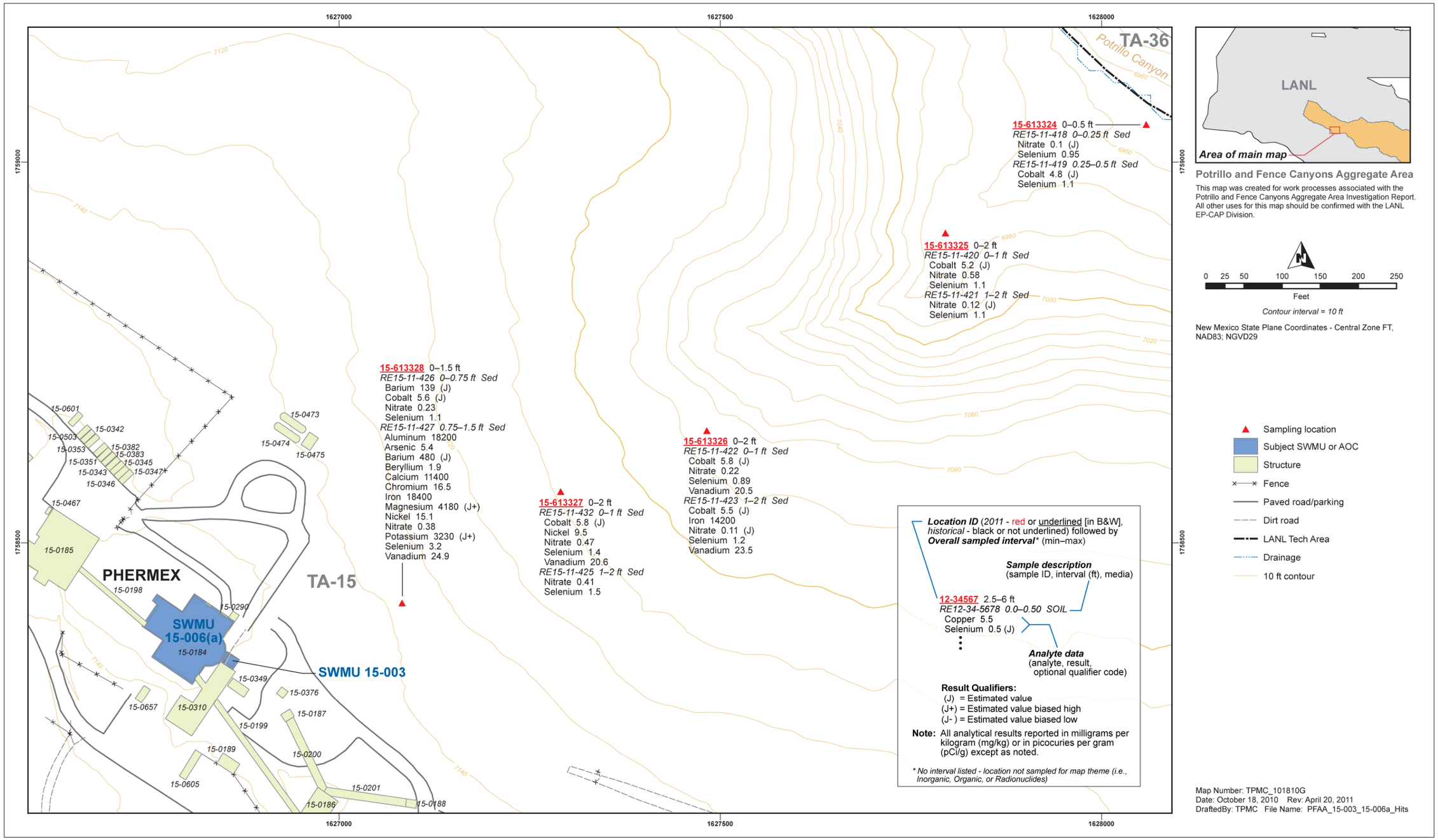


Figure 6.4-2 Inorganic chemicals above BVs at SWMUs 15-003 and 15-006(a)

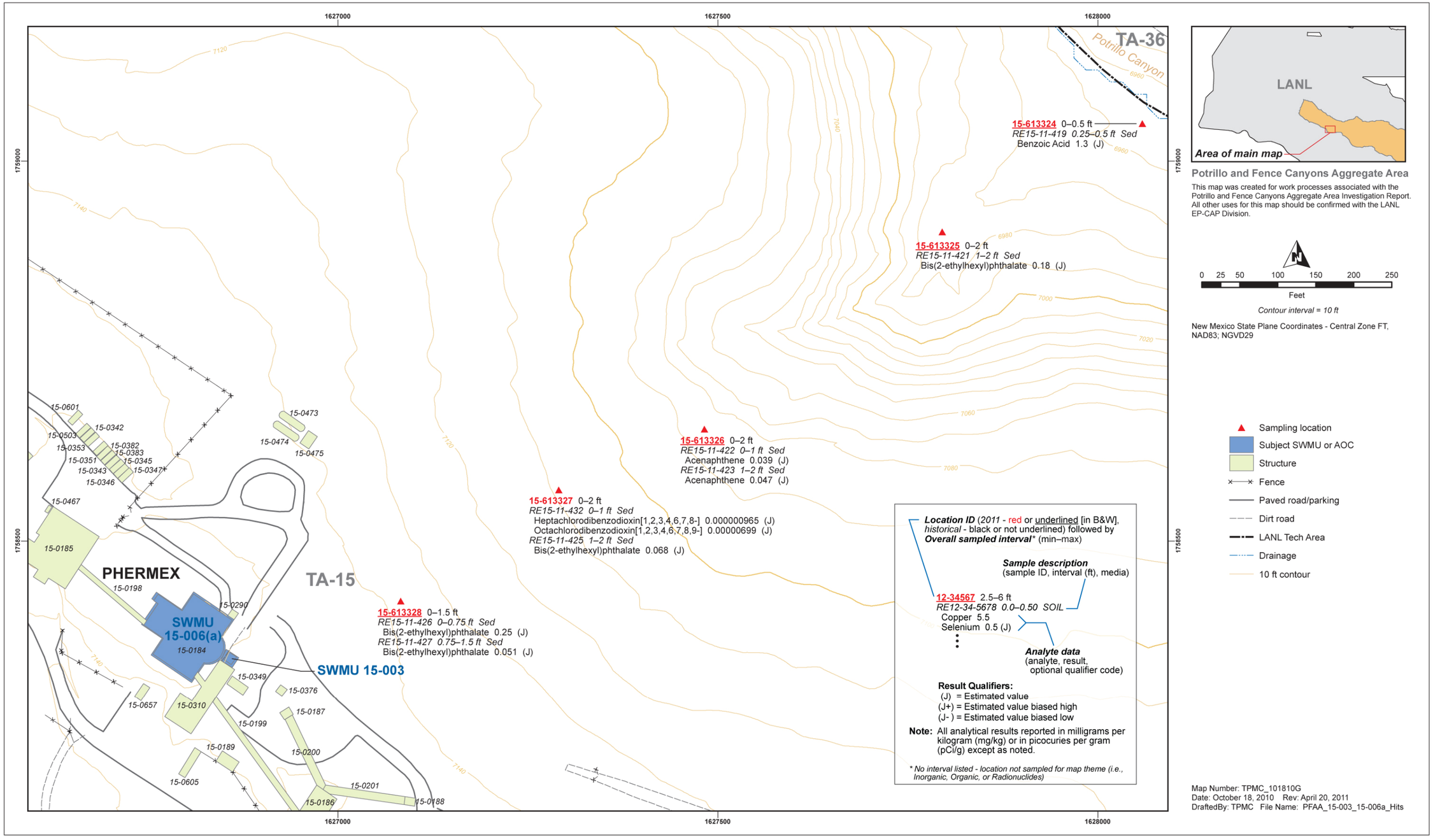


Figure 6.4-3 Organic chemicals detected at SWMUs 15-003 and 15-006(a)

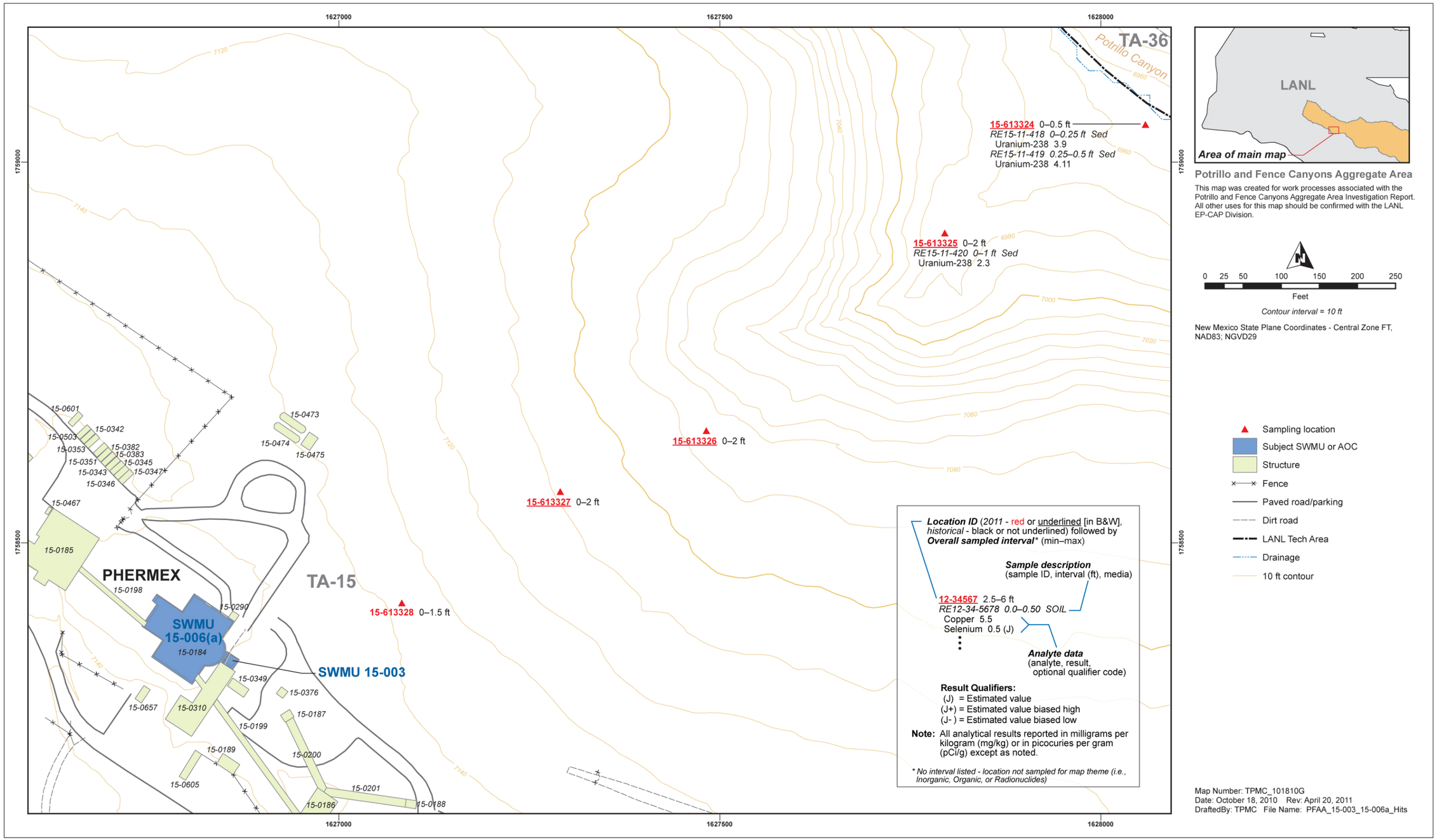


Figure 6.4-4 Radionuclides detected or detected above BVs/FVs at SWMUs 15-003 and 15-006(a)

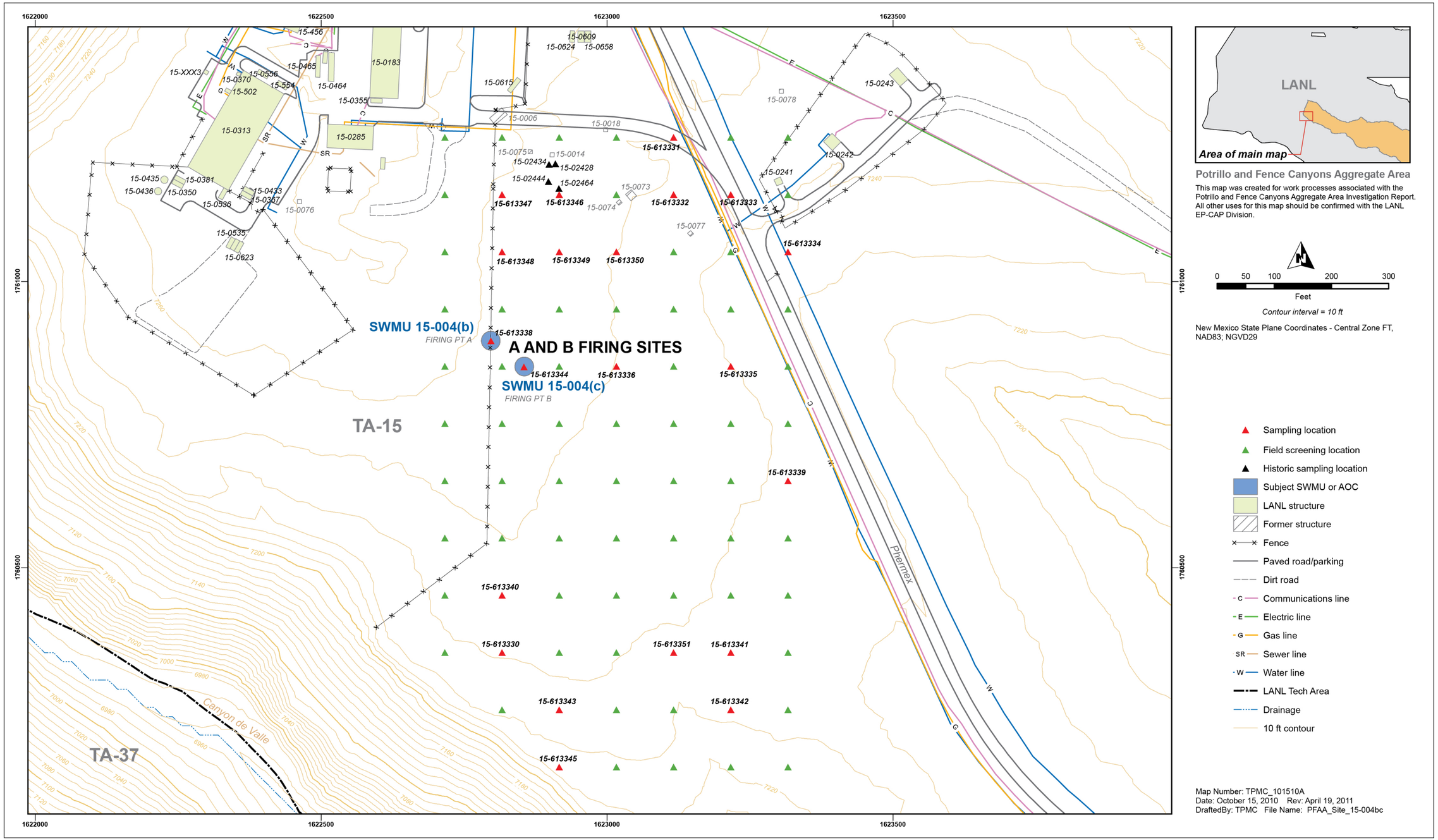


Figure 6.6-1 Site map of SWMUs 15-004(b) and 15-004(c)

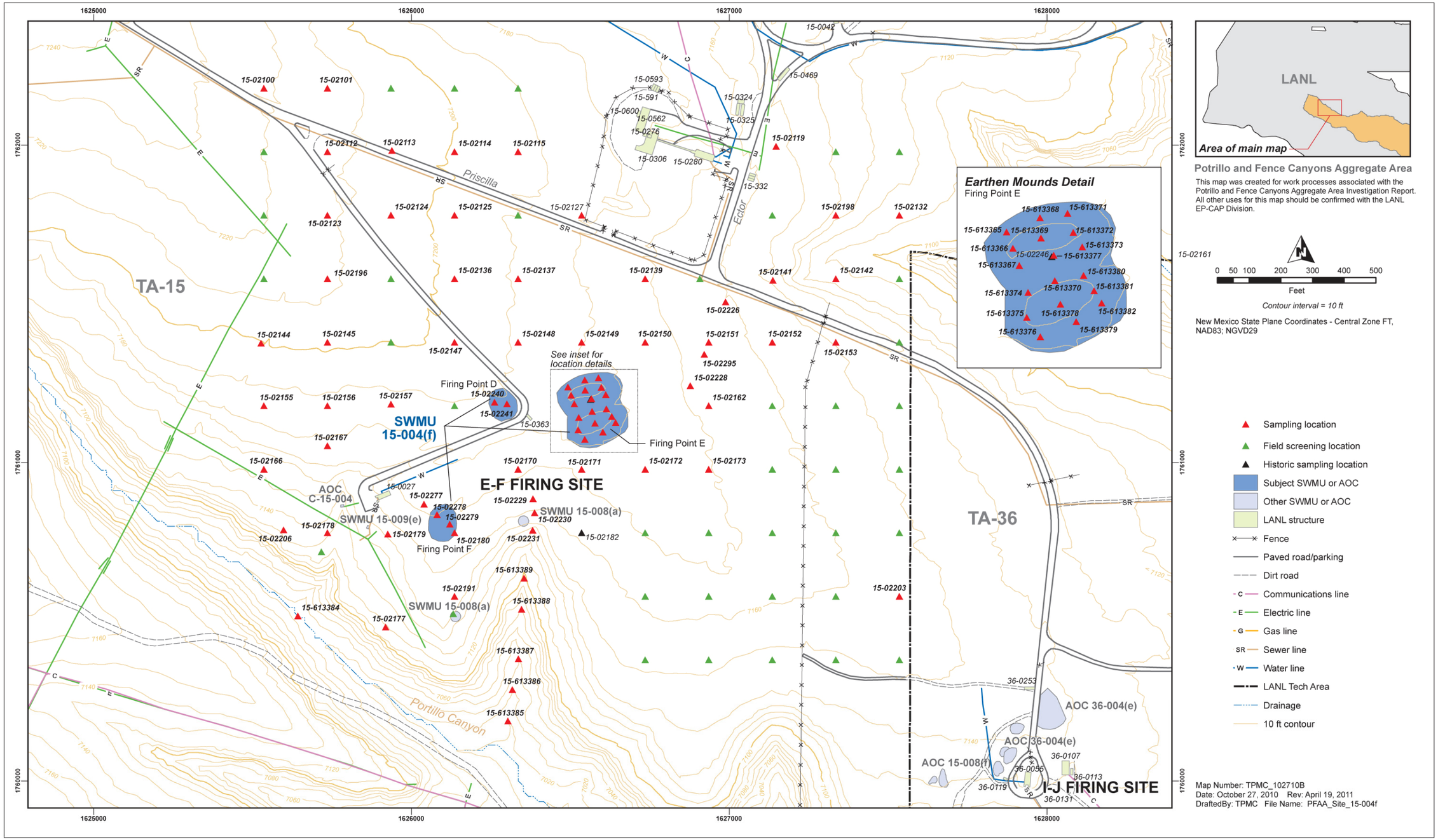


Figure 6.7-1 Site map of SWMU 15-004(f)

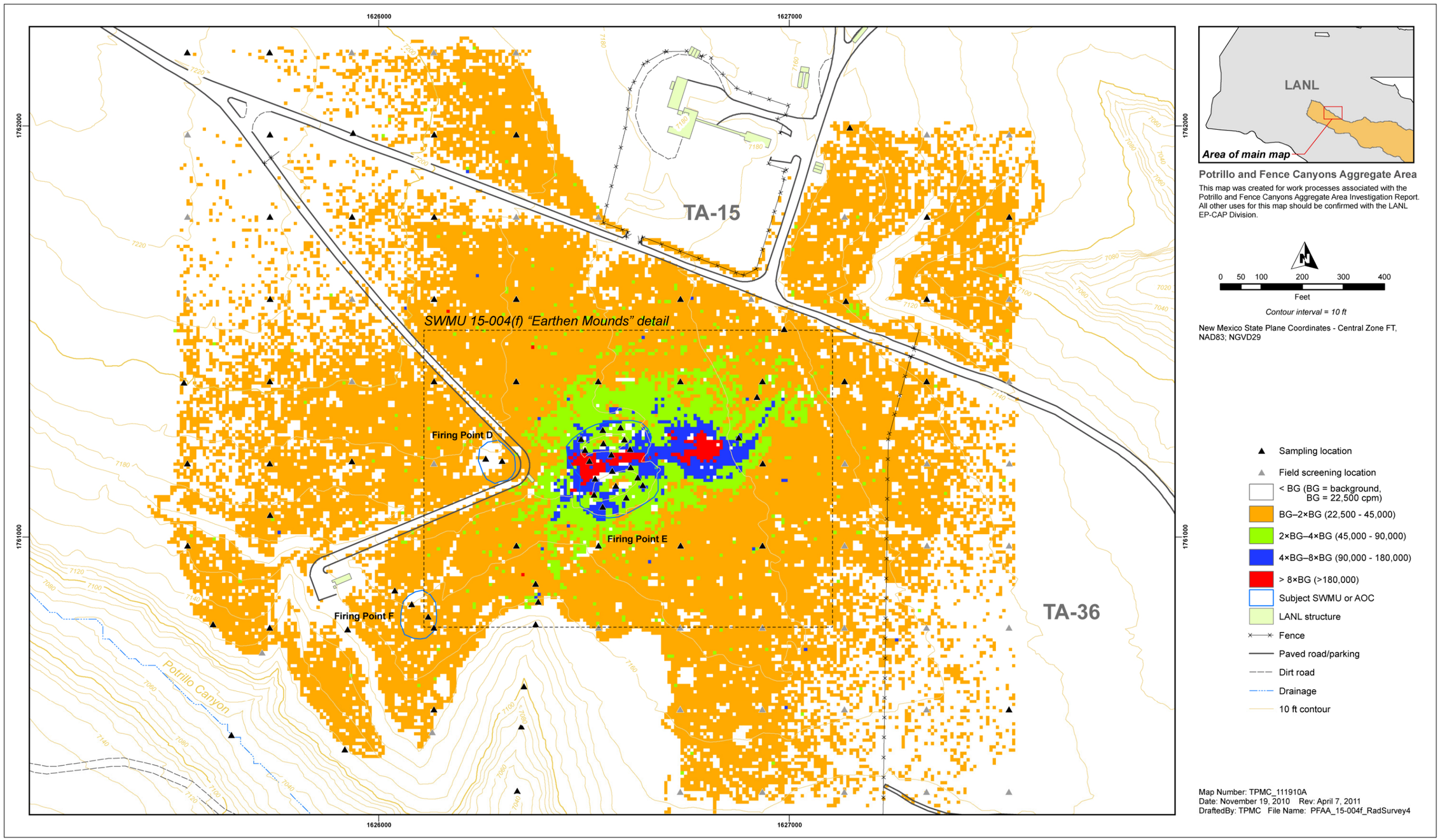


Figure 6.7-2 Radiological survey data for SWMU 15-004(f)

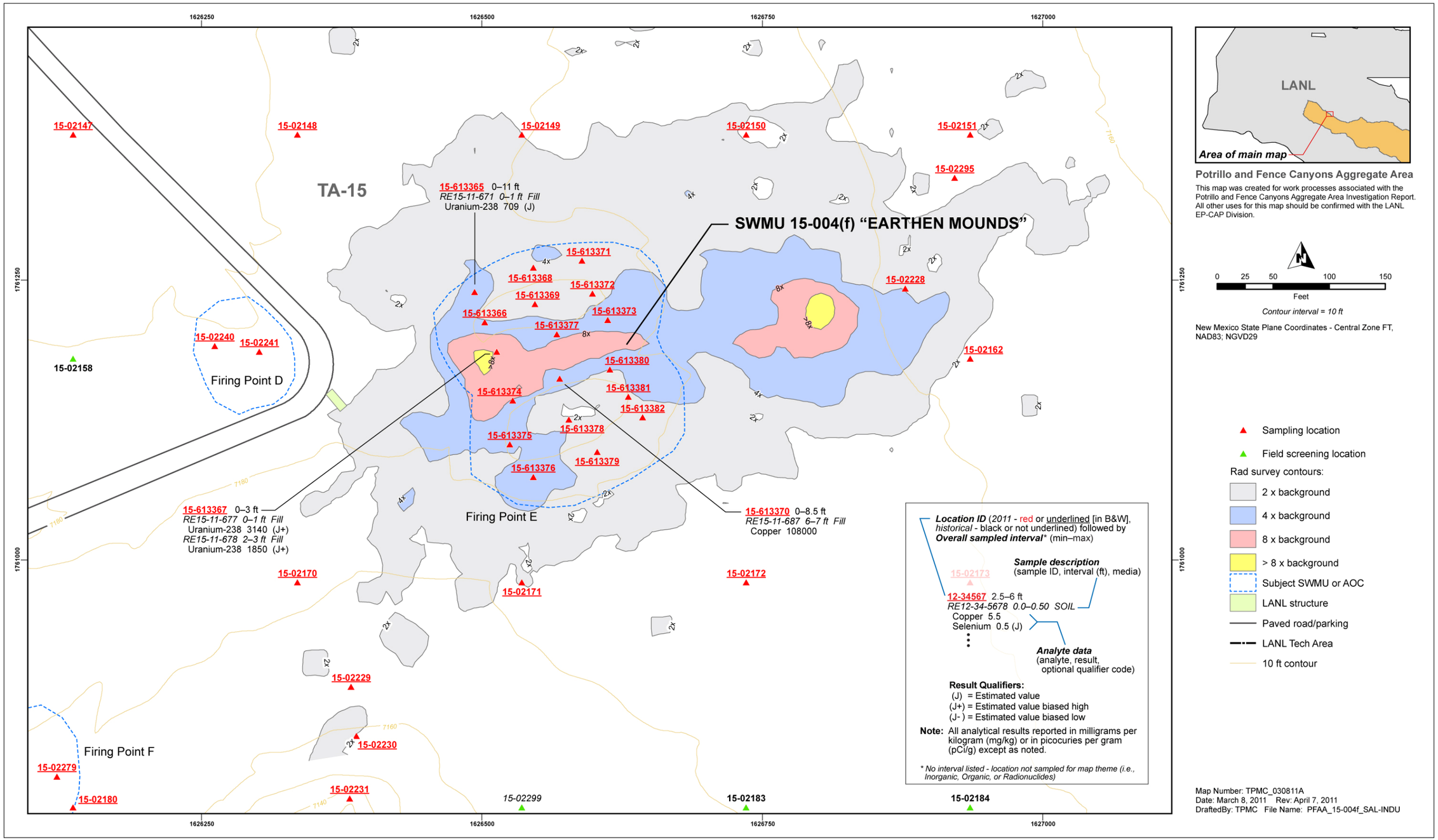


Figure 6.7-3 Comparison of radiological survey data for SWMU 15-004(f) with inorganic chemical and radionuclide results greater than industrial SSLs or SALs

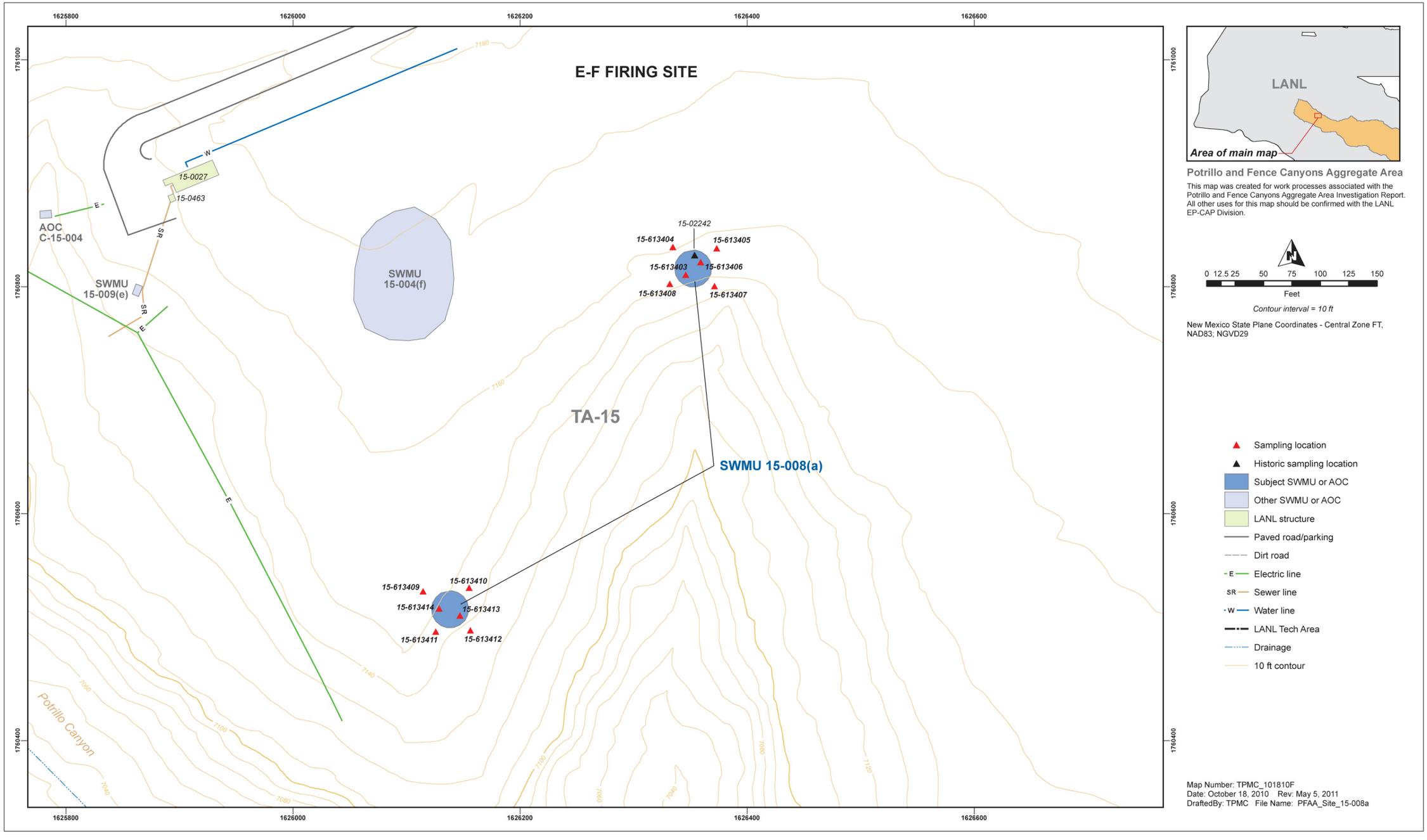


Figure 6.8-1 Site map of SWMU 15-008(a)

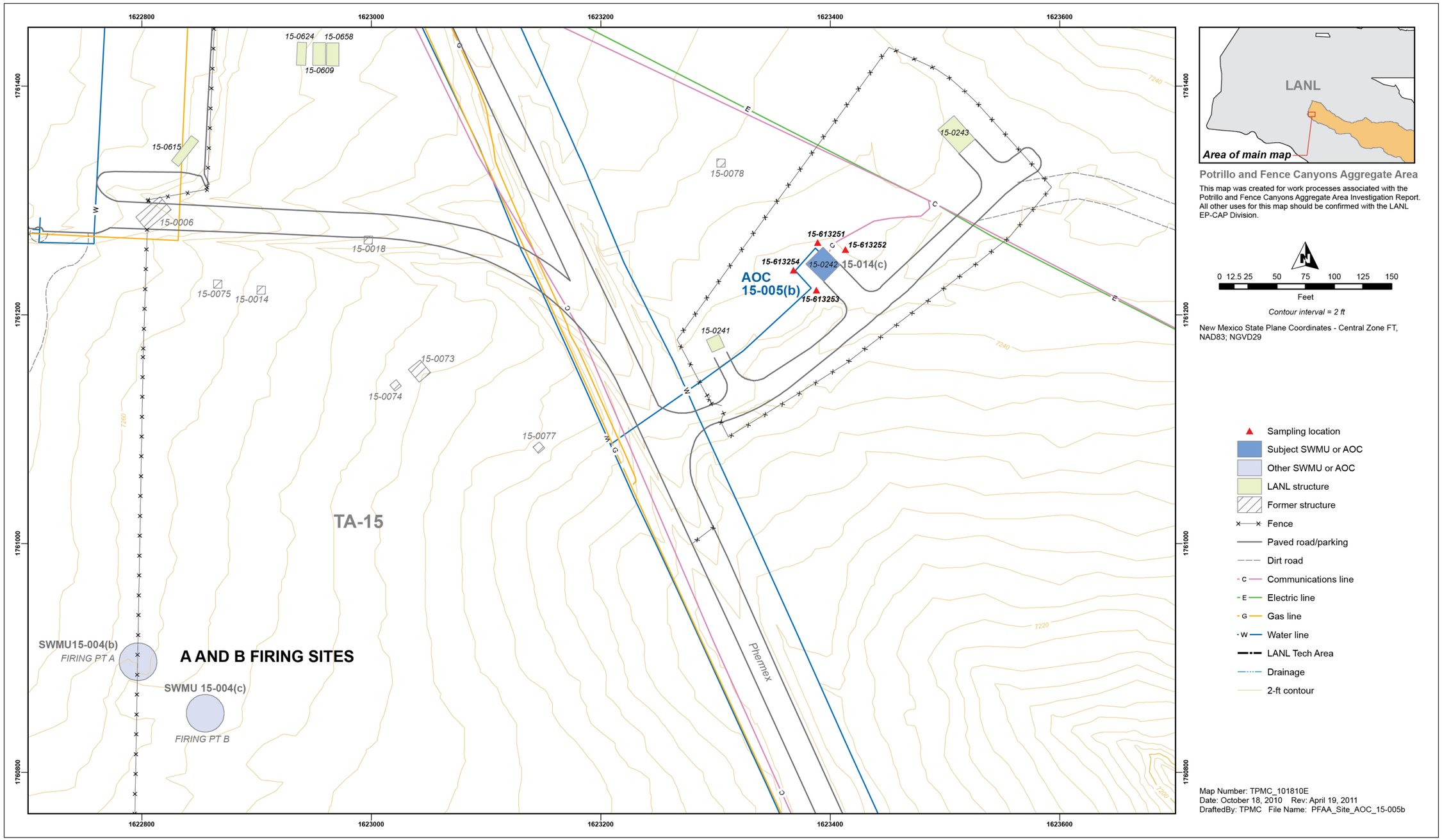


Figure 6.9-1 Site map of AOC 15-005(b)

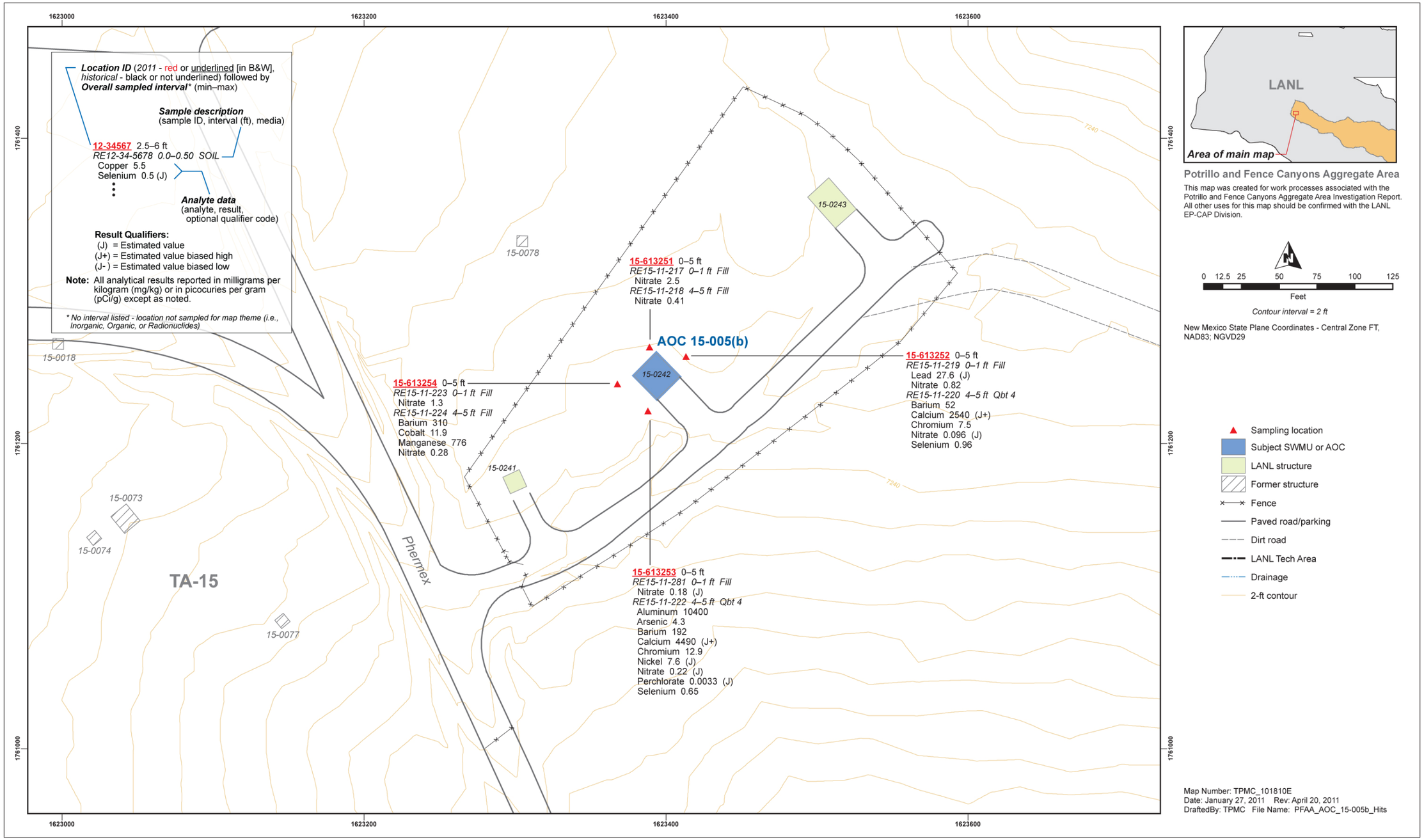


Figure 6.9-2 Inorganic chemicals above BVs at AOC 15-005(b)

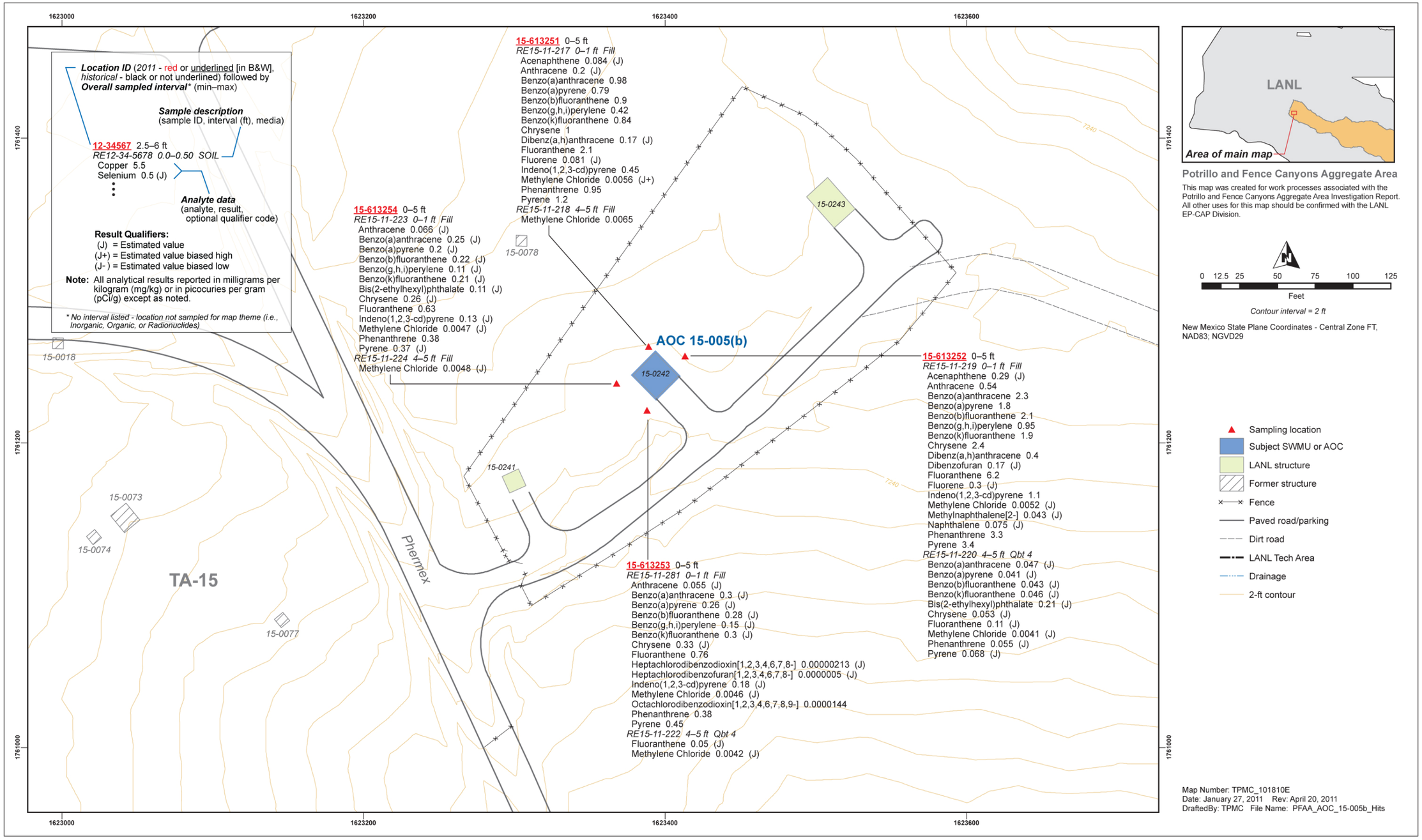


Figure 6.9-3 Organic chemicals detected at AOC 15-005(b)

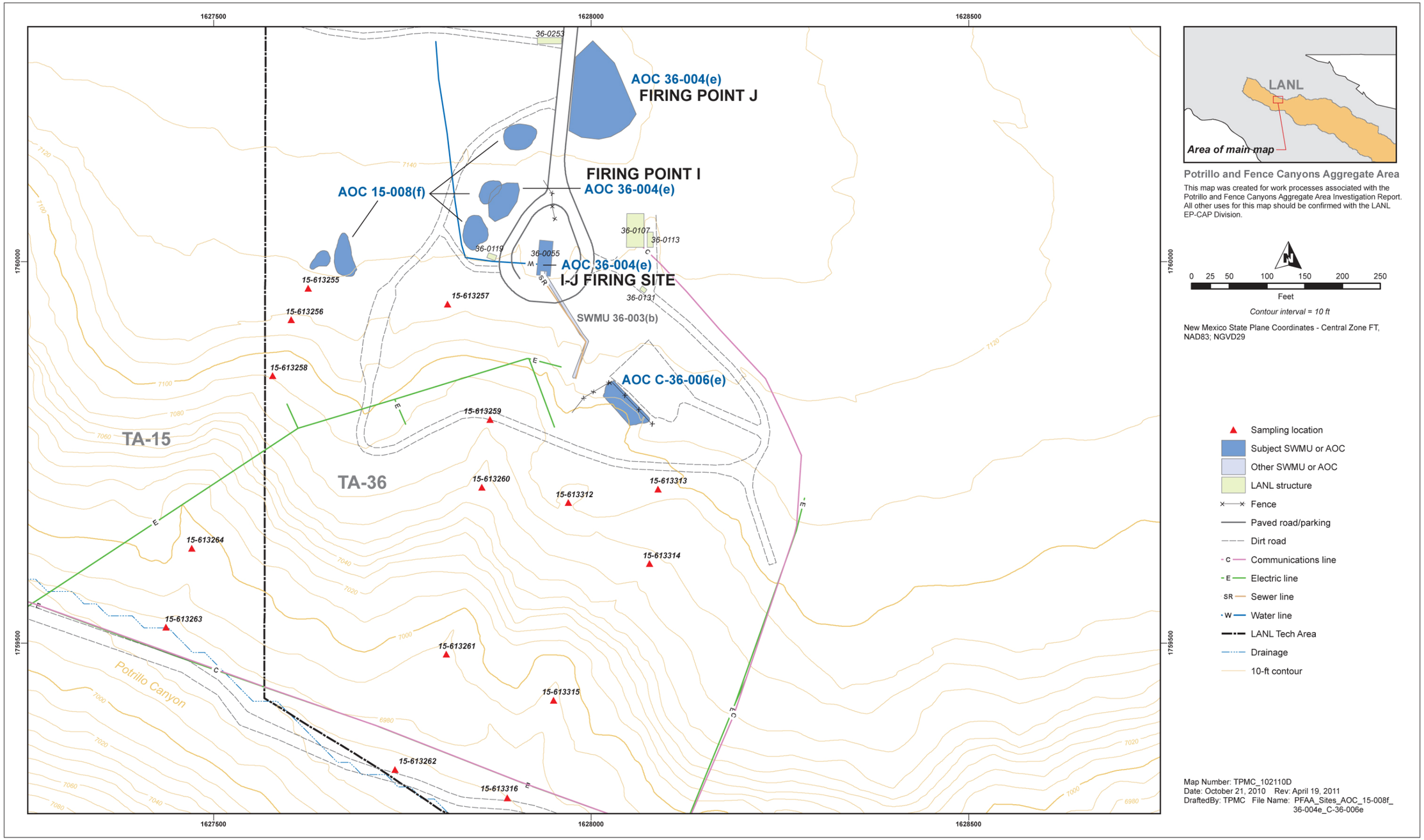


Figure 6.11-1 Site map of AOCs 15-008(f), 36-004(e), and C-36-006(e)

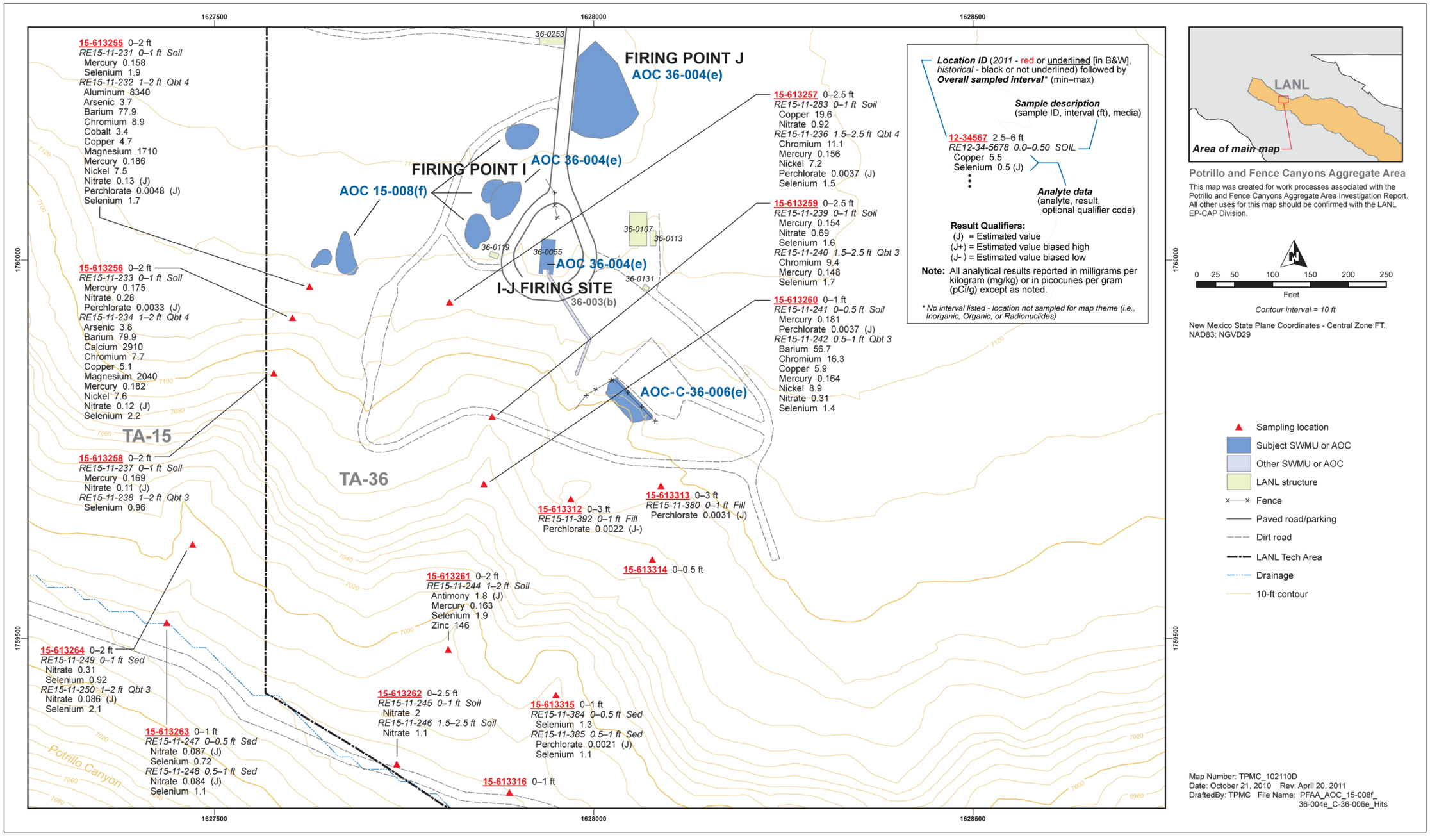


Figure 6.11-2 Inorganic chemicals above BVs at AOCs 15-008(f), 36-004(e), and C-36-006(e)

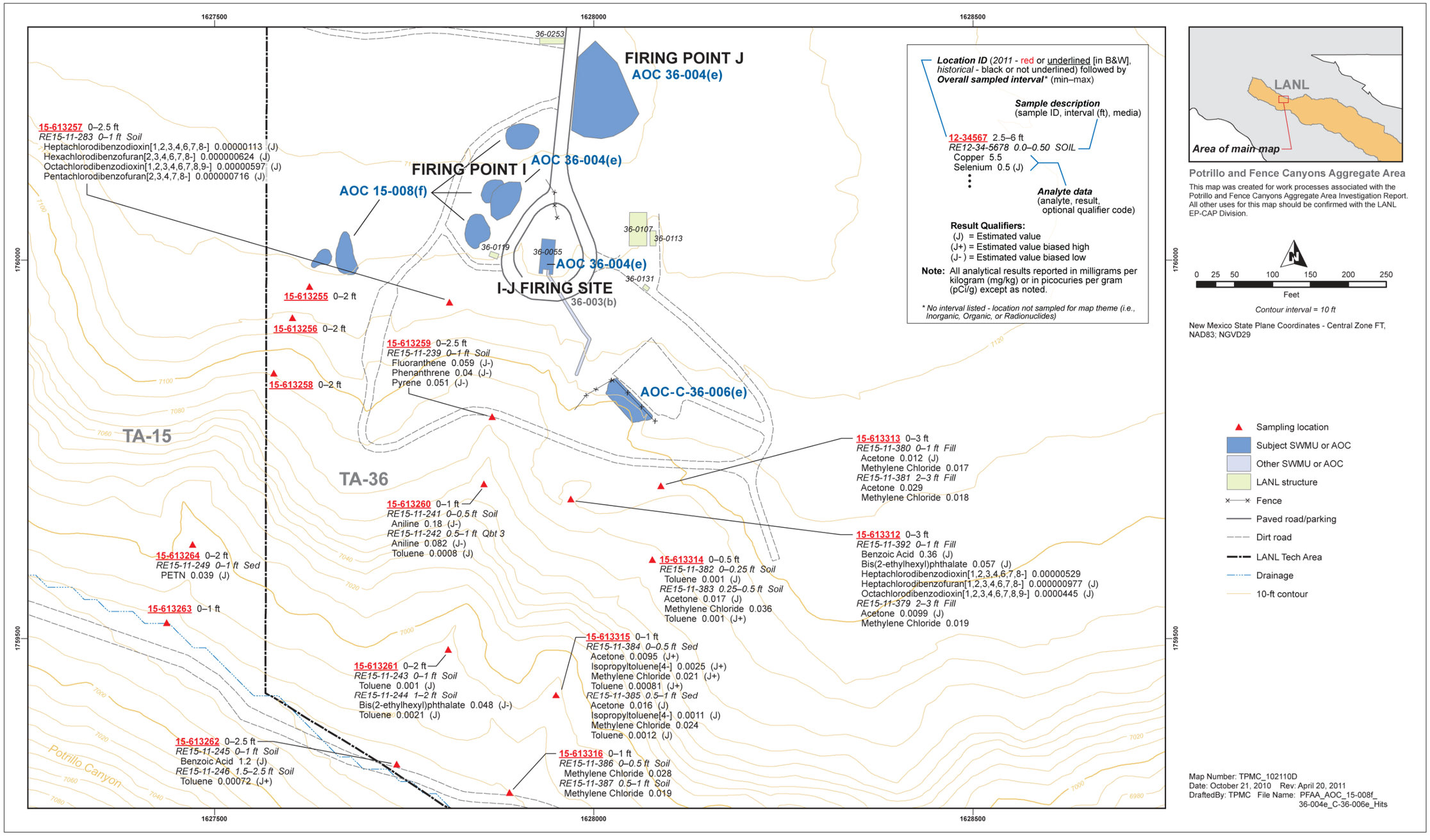


Figure 6.11-3 Organic chemicals detected at AOCs 15-008(f), 36-004(e), and C-36-006(e)

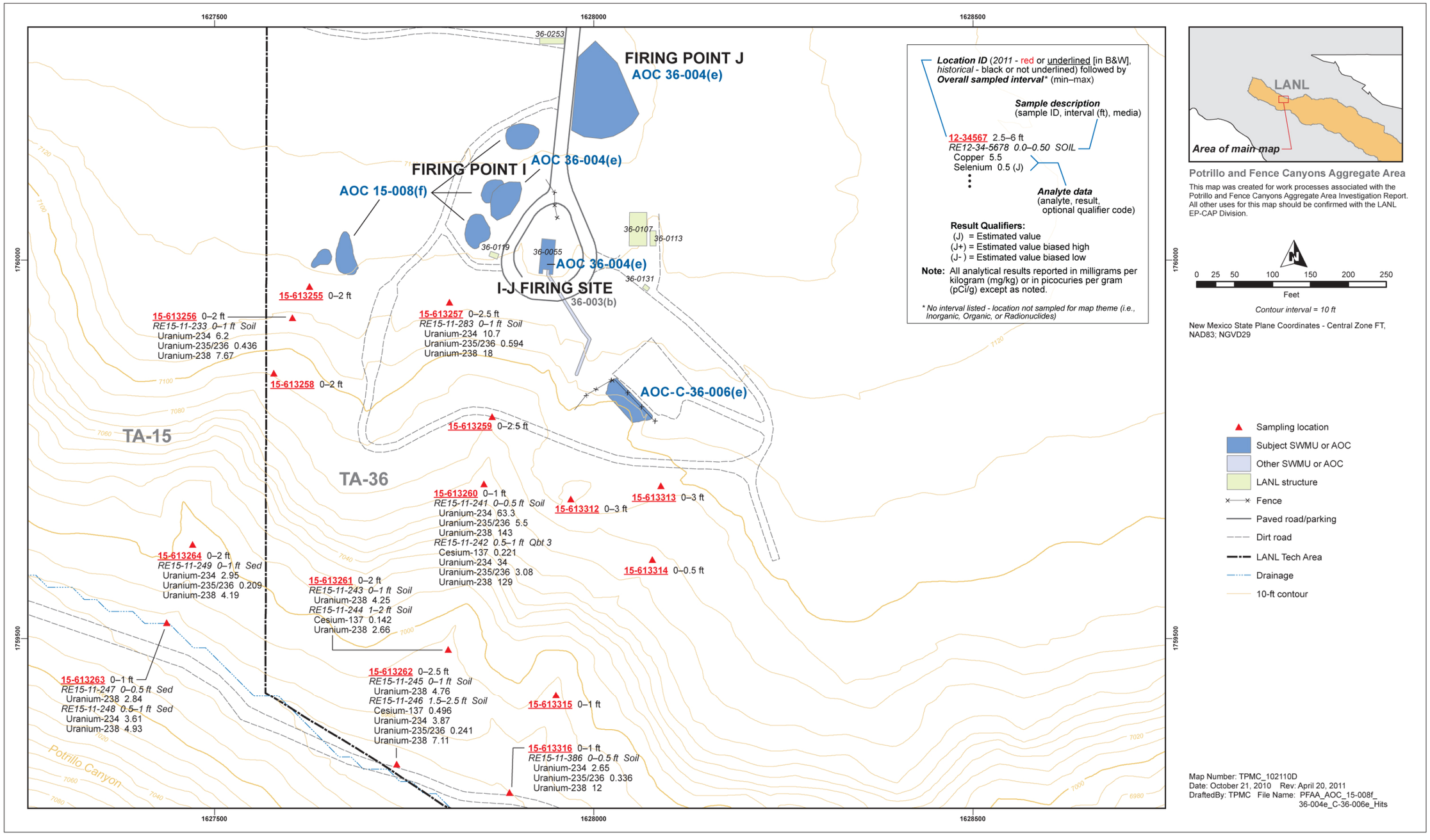


Figure 6.11-4 Radionuclides detected or detected above BVs/FVs at AOCs 15-008(f), 36-004(e), and C-36-006(e)

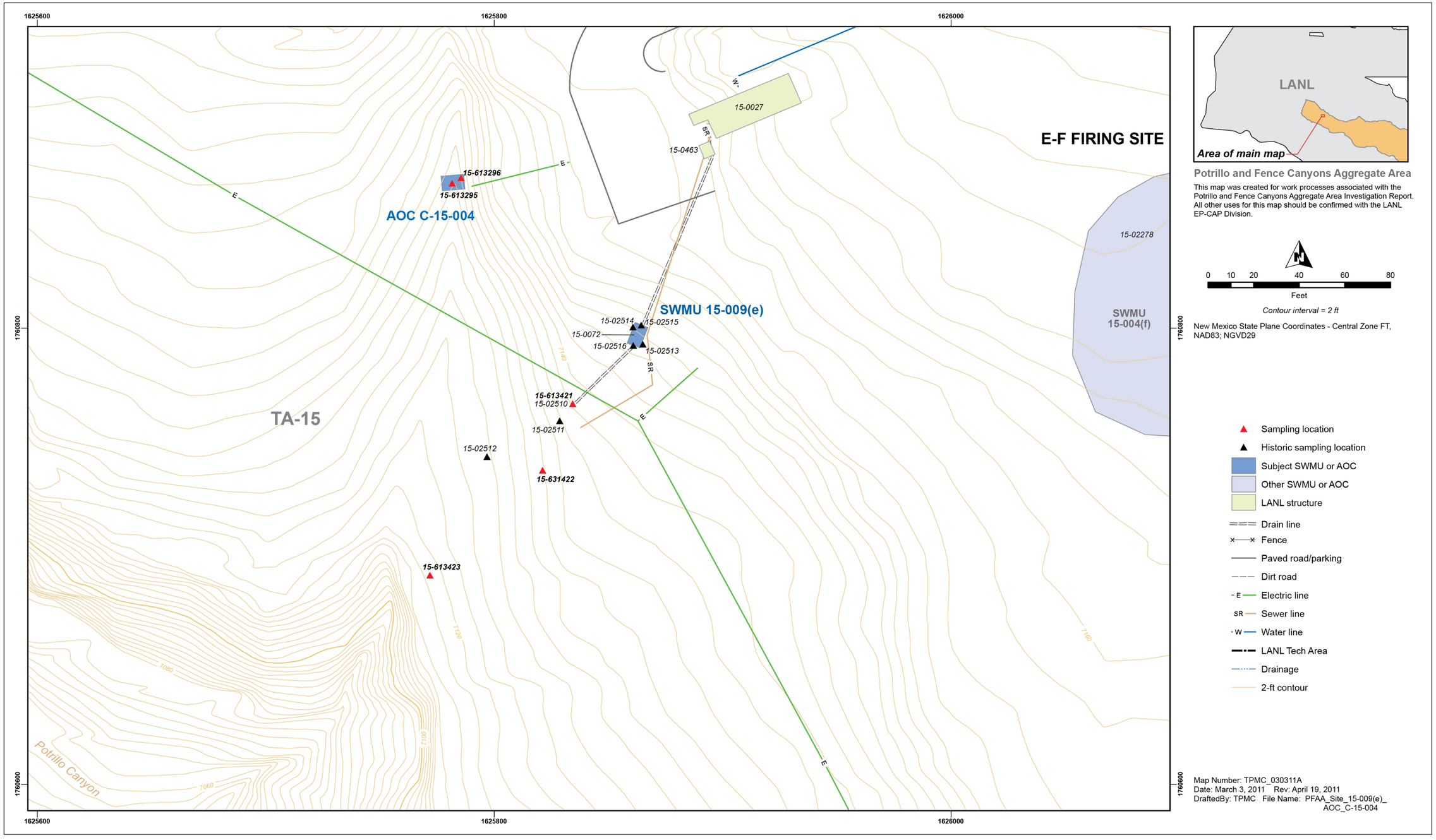


Figure 6.12-1 Site map of SWMU 15-009(e) and AOC C-15-004

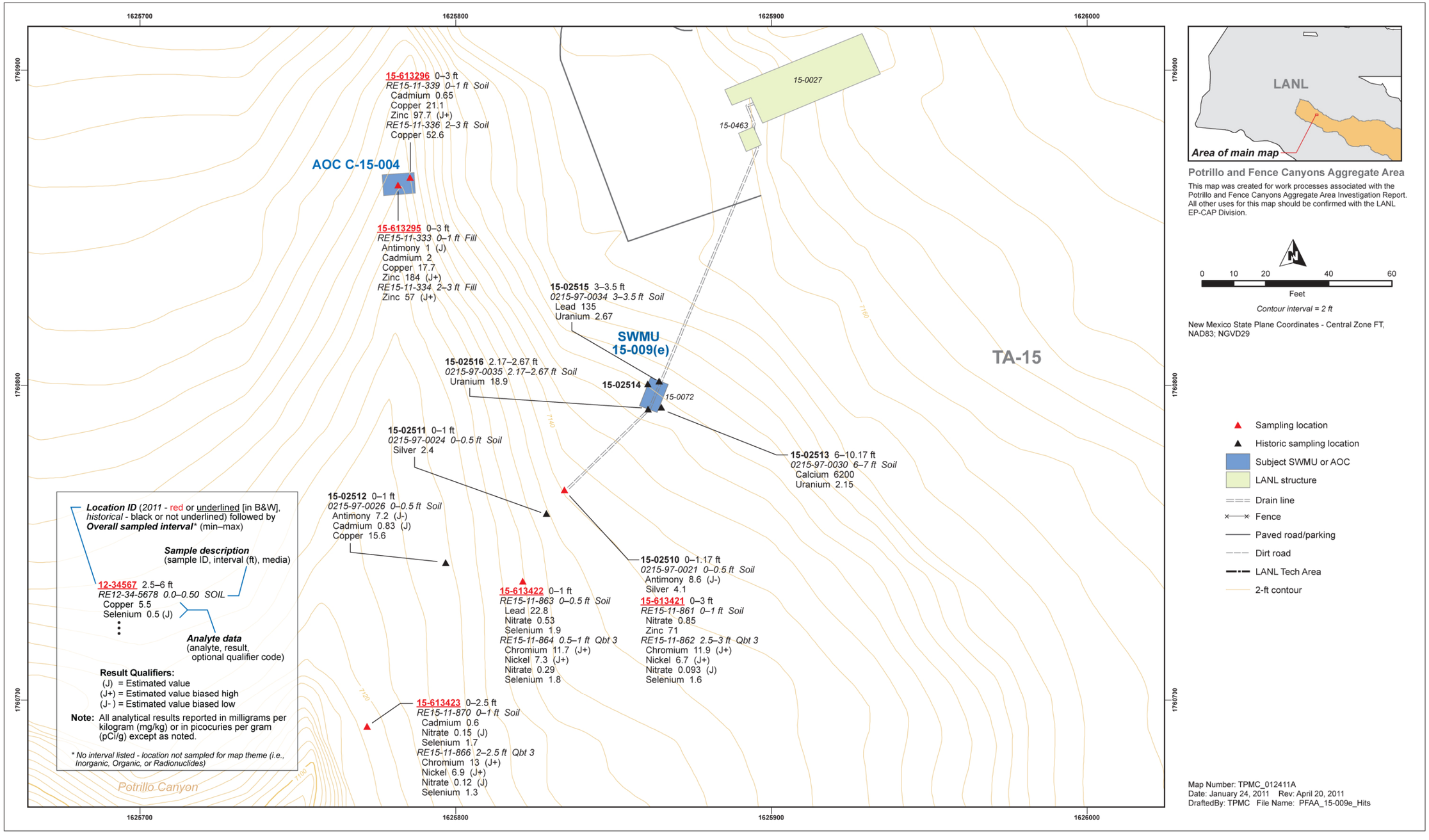


Figure 6.12-2 Inorganic chemicals above BVs at SWMU 15-009(e) and AOC C-15-004

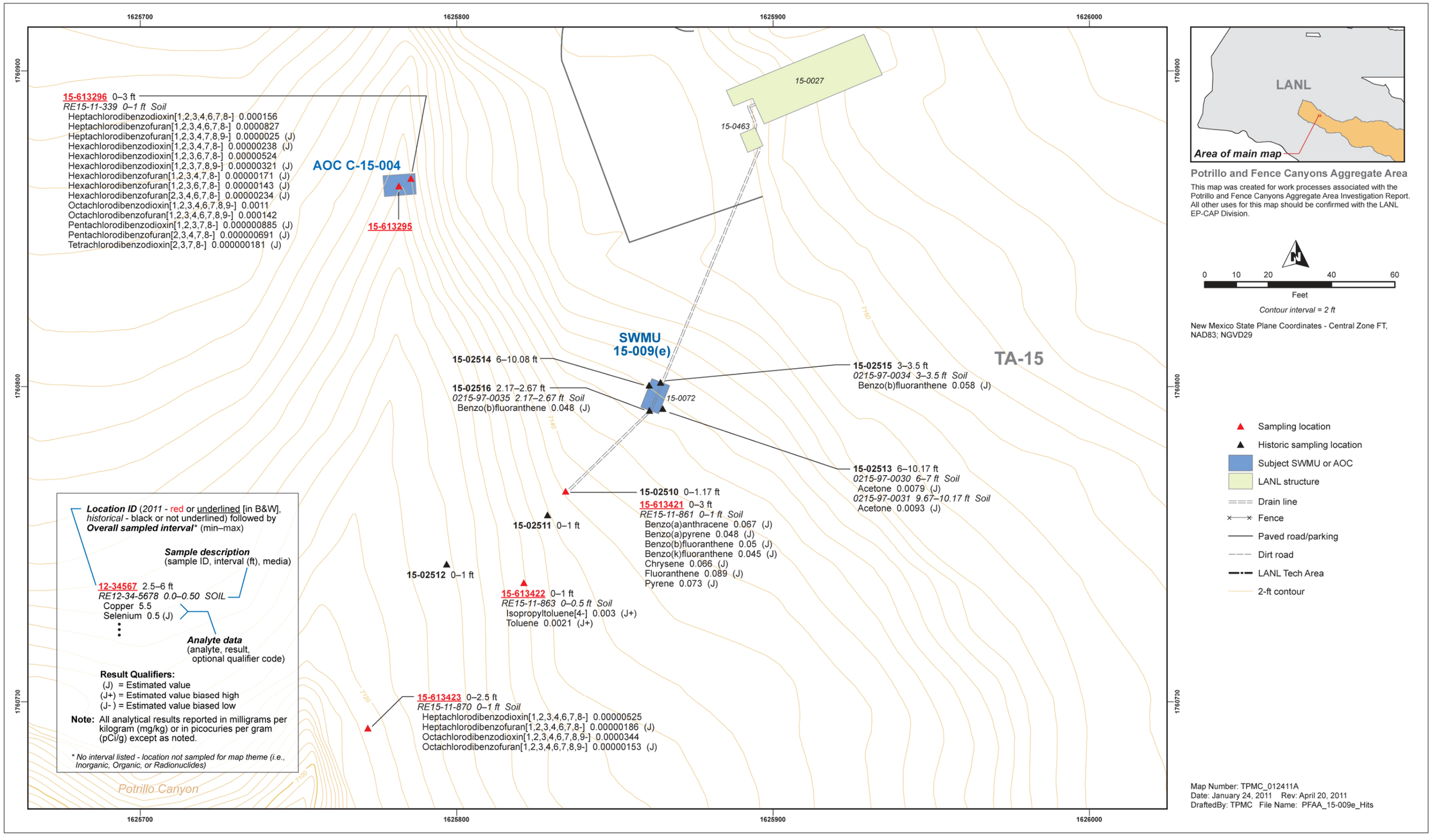


Figure 6.12-3 Organic chemicals detected at SWMU 15-009(e) and AOC C-15-004

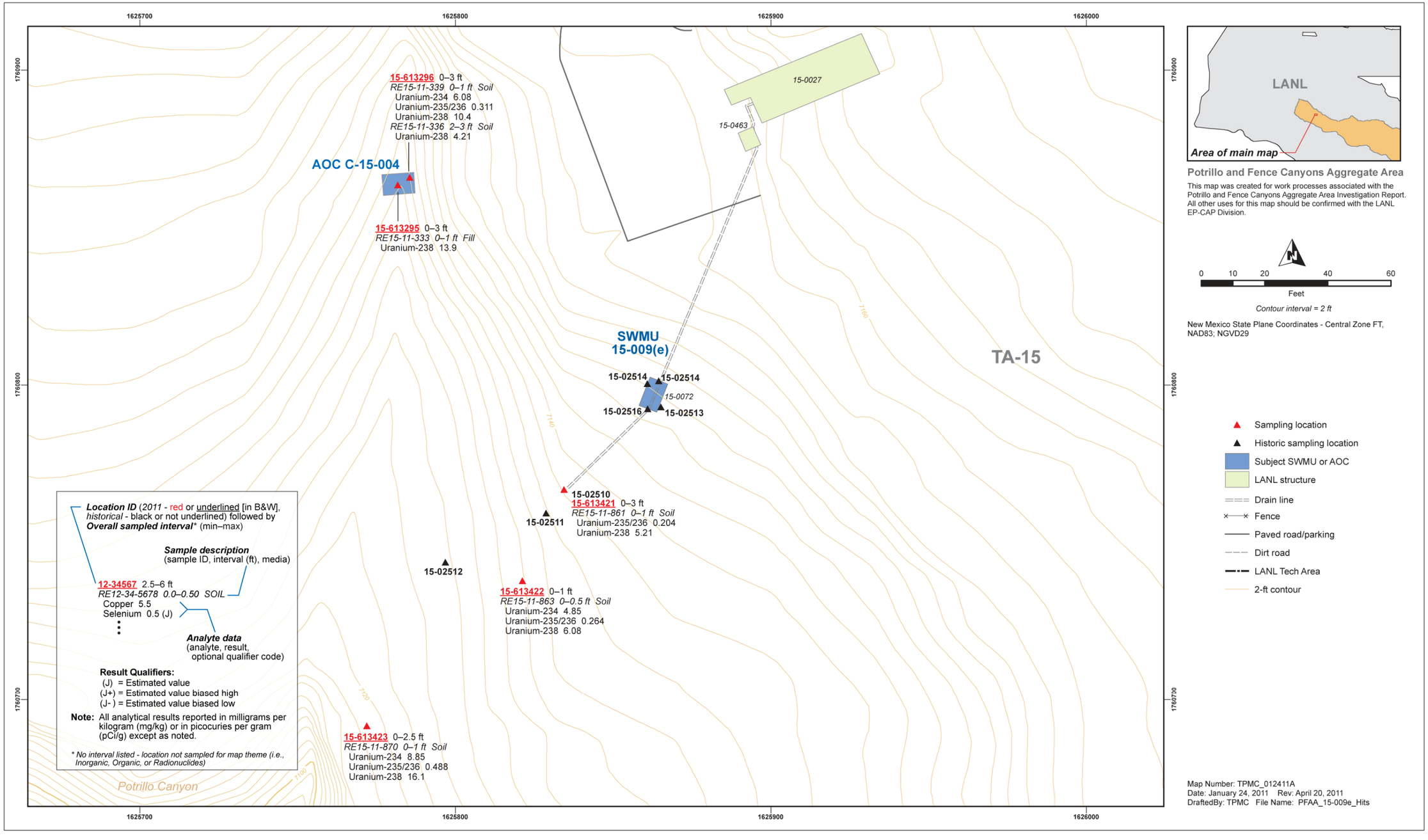


Figure 6.12-4 Radionuclides detected or detected above BVs/FVs at SWMU 15-009(e) and AOC C-15-004

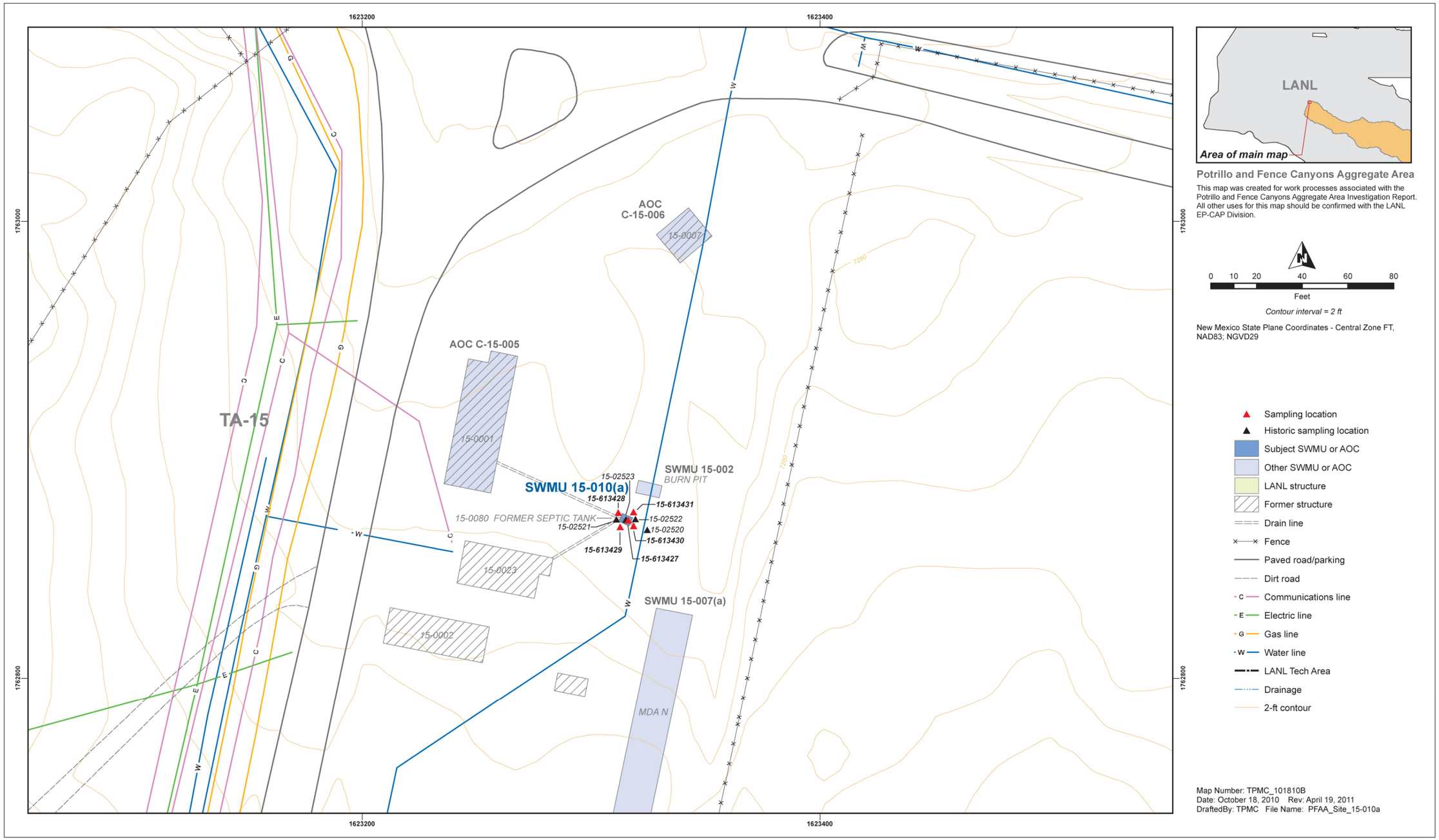


Figure 6.13-1 Site map of SWMU 15-010(a)

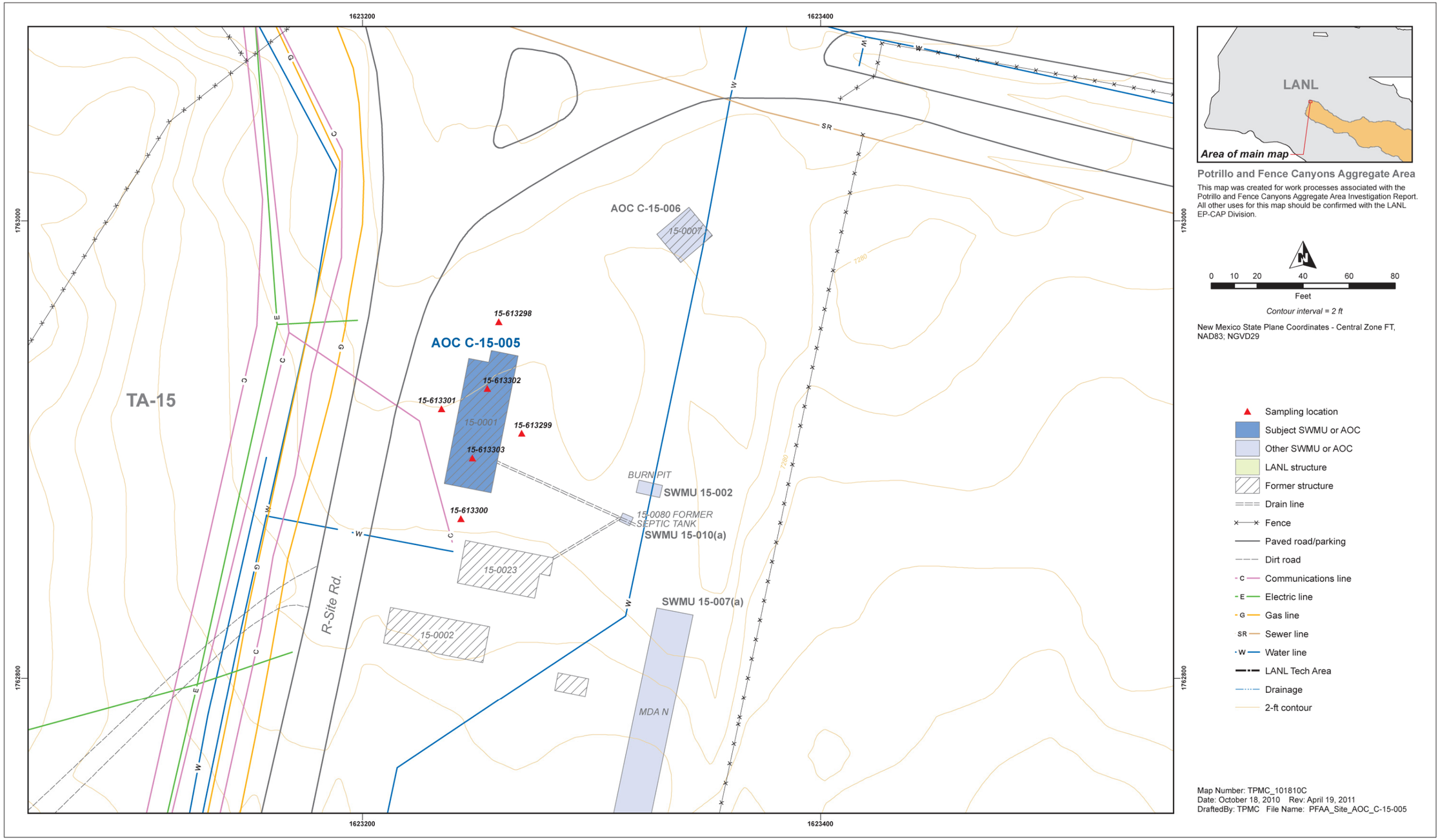


Figure 6.15-1 Site map of AOC C-15-005

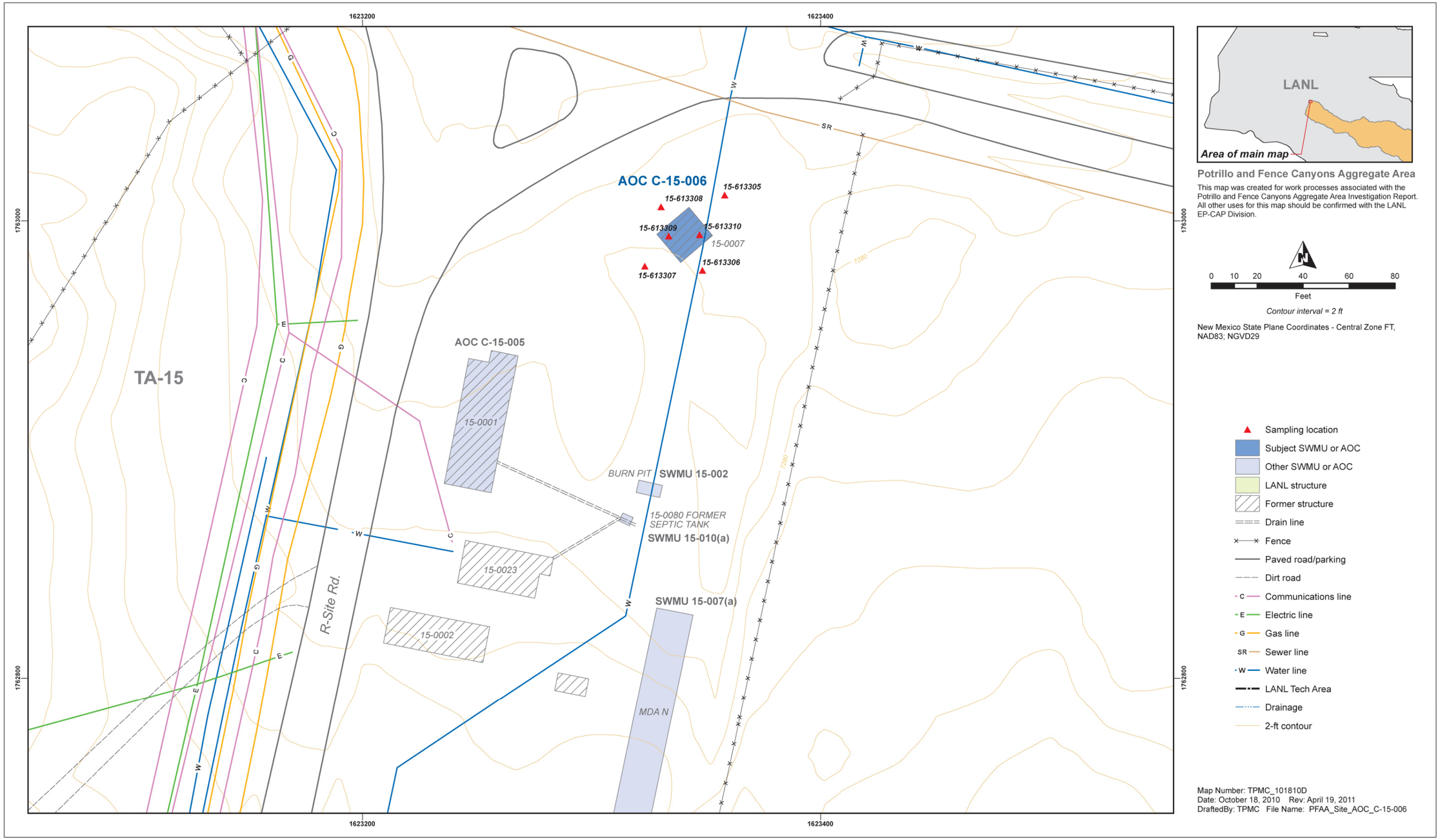


Figure 6.16-1 Site map of AOC C-15-006

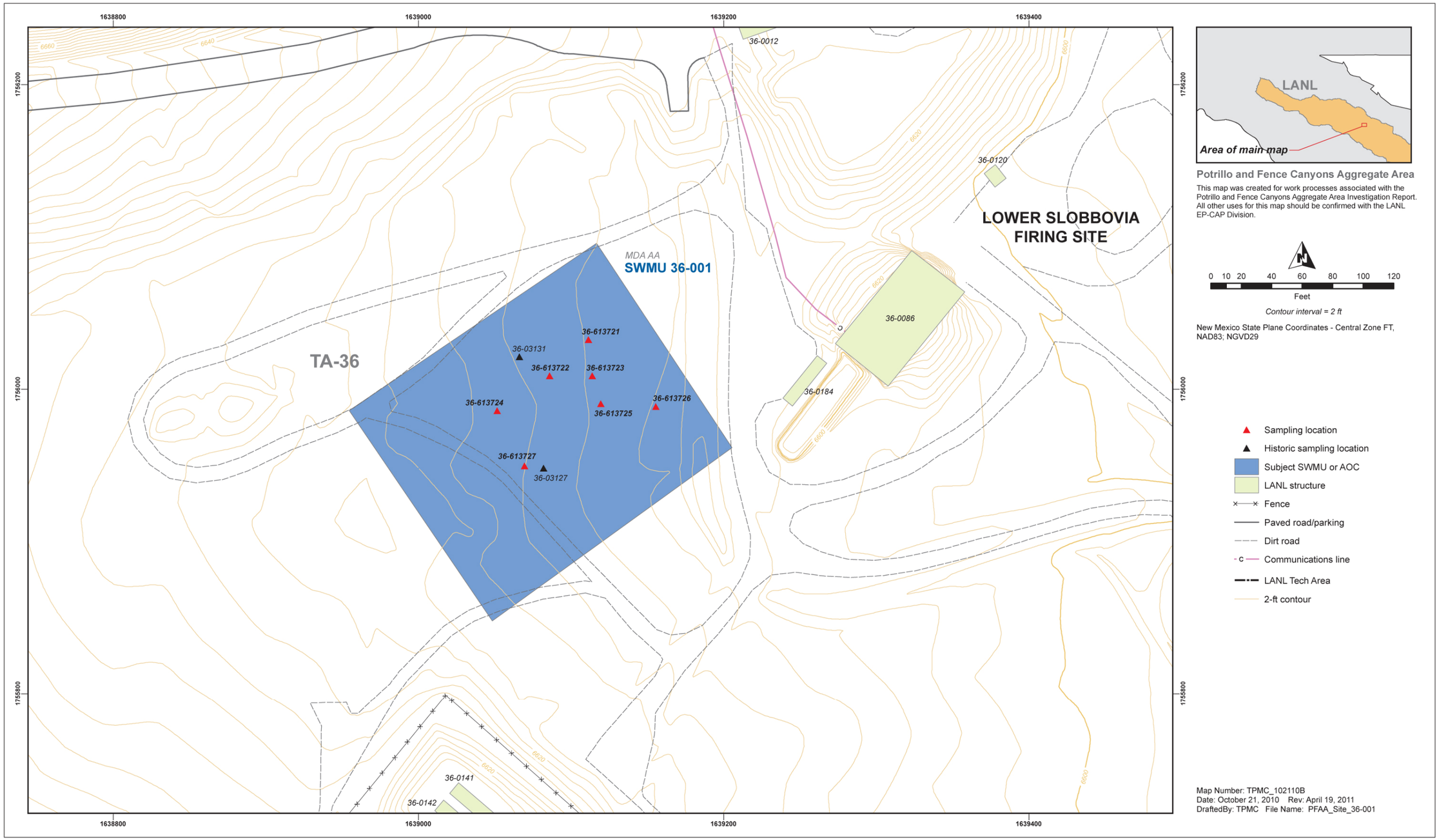


Figure 7.2-1 Site map of SWMU 36-001

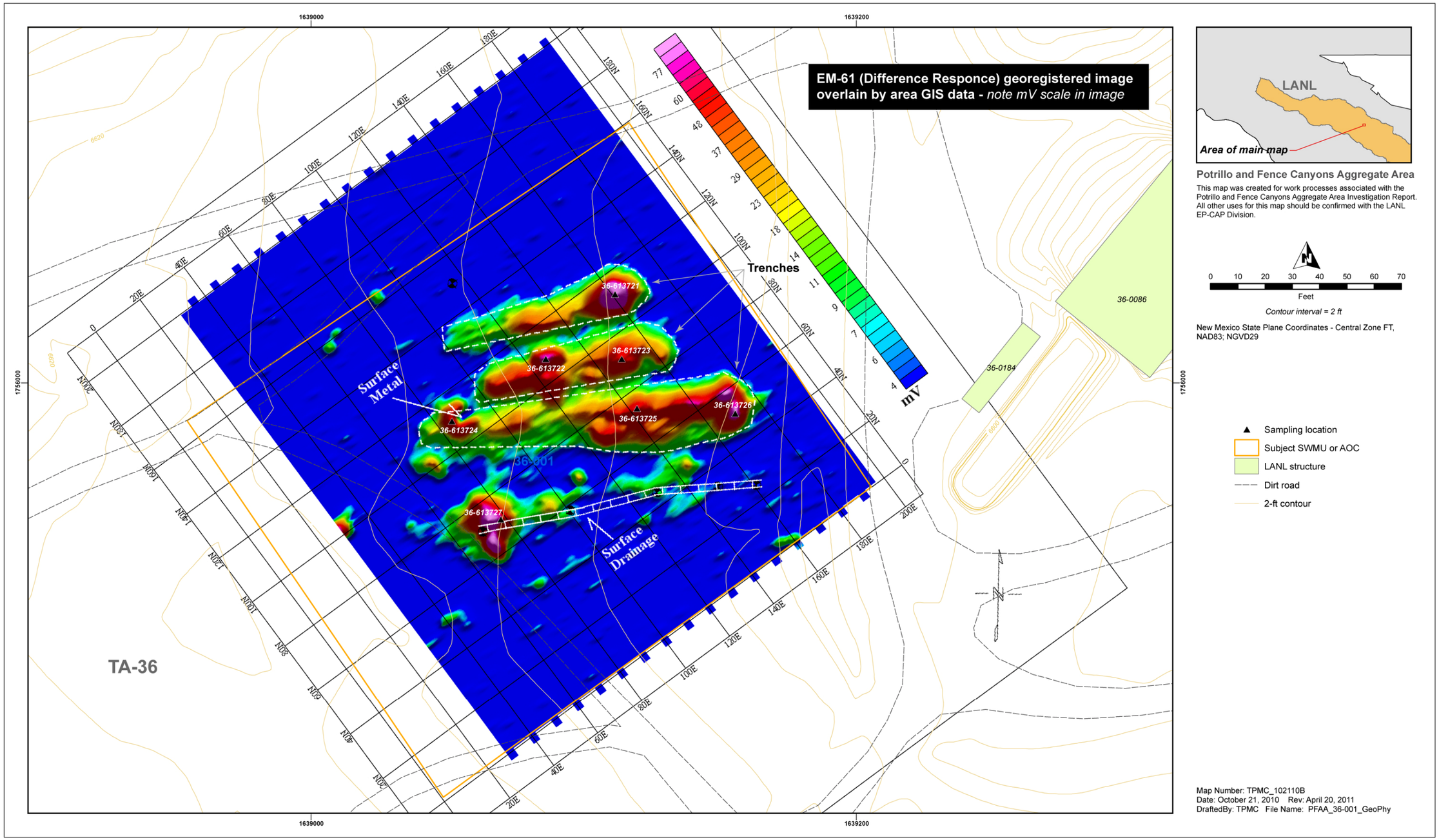


Figure 7.2-2 Geophysical survey of SWMU 36-001

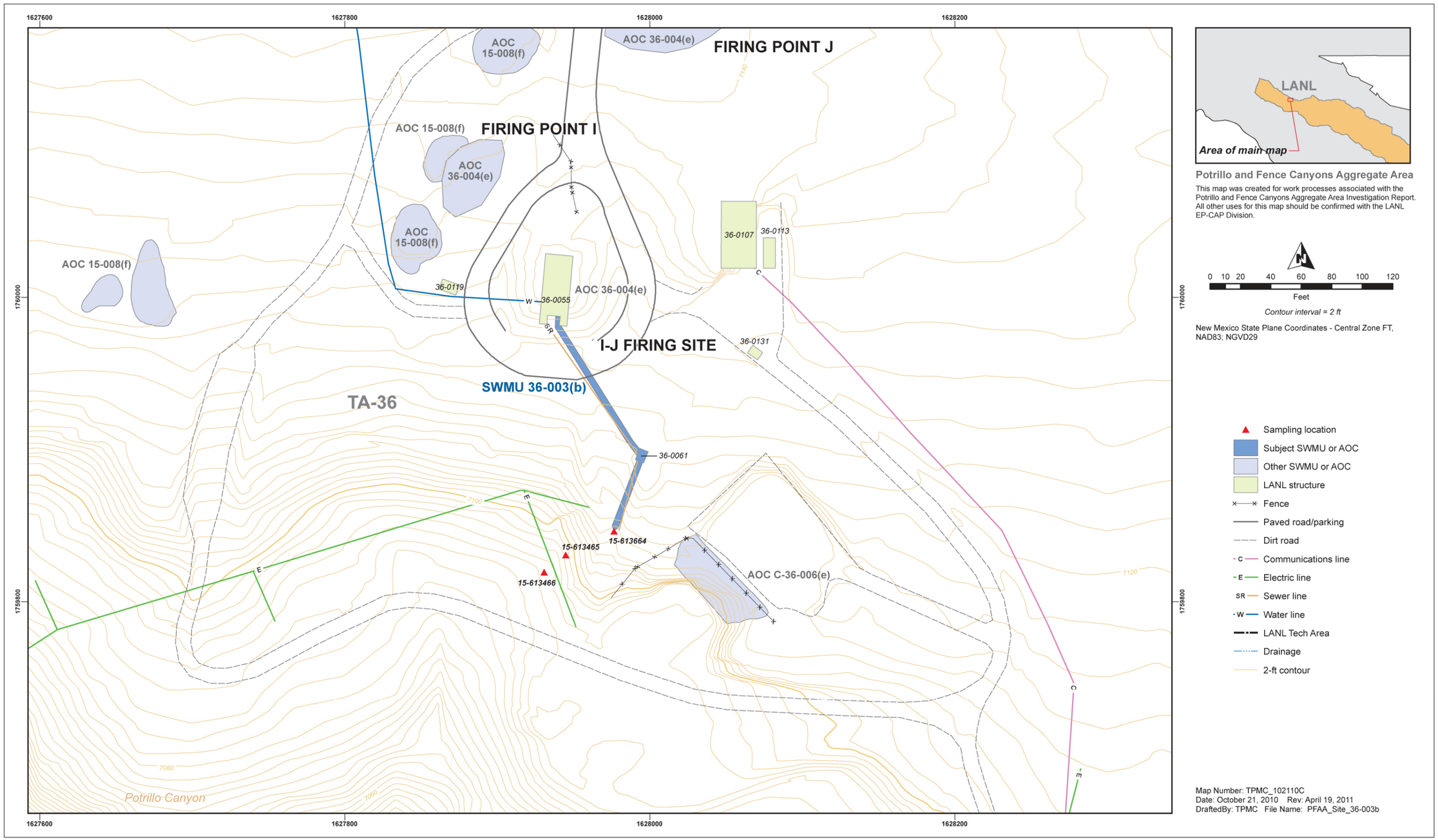


Figure 7.3-1 Site map of SWMU 36-003(b)

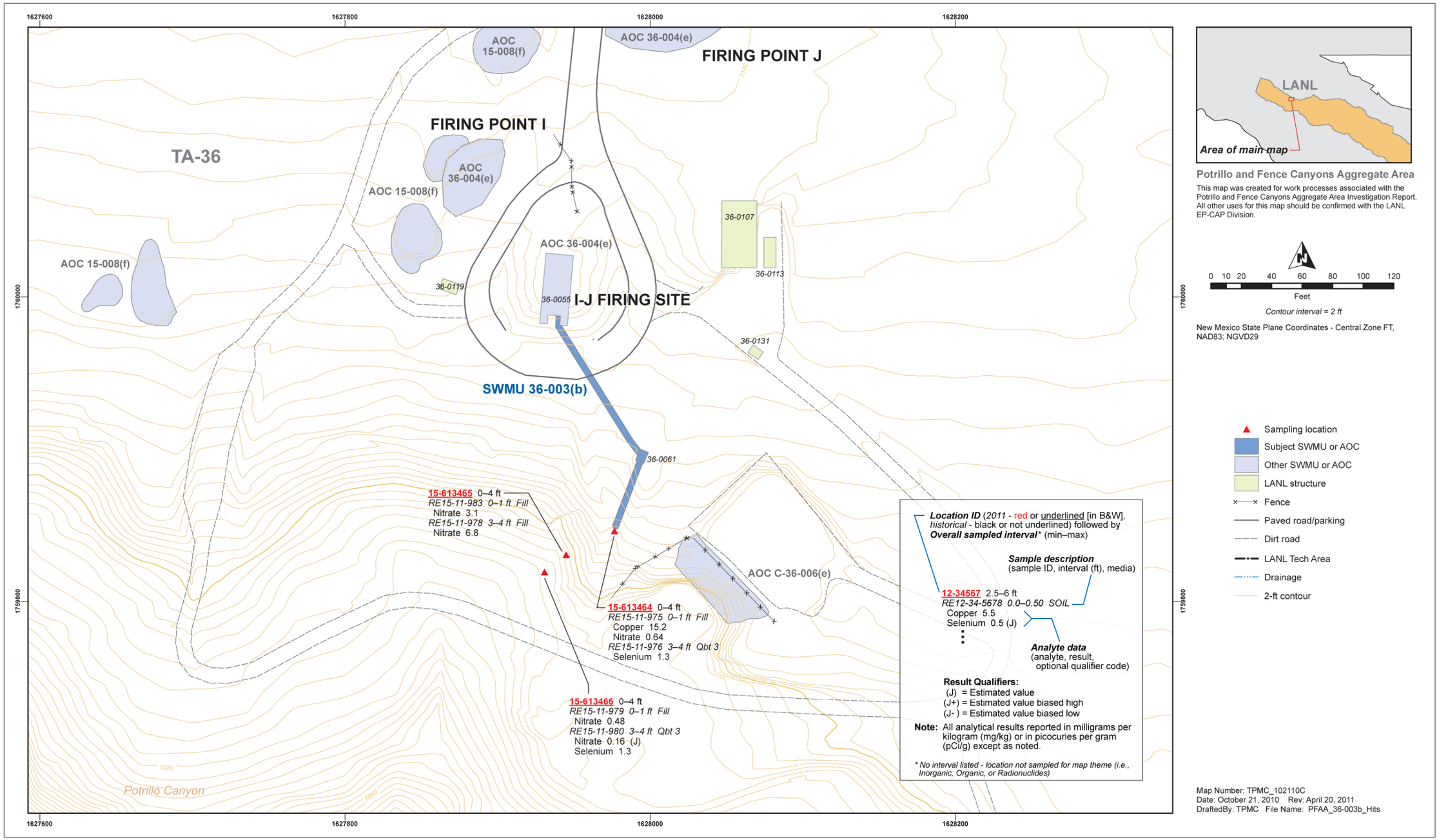


Figure 7.3-2 Inorganic chemicals above BVs at SWMU 36-003(b)

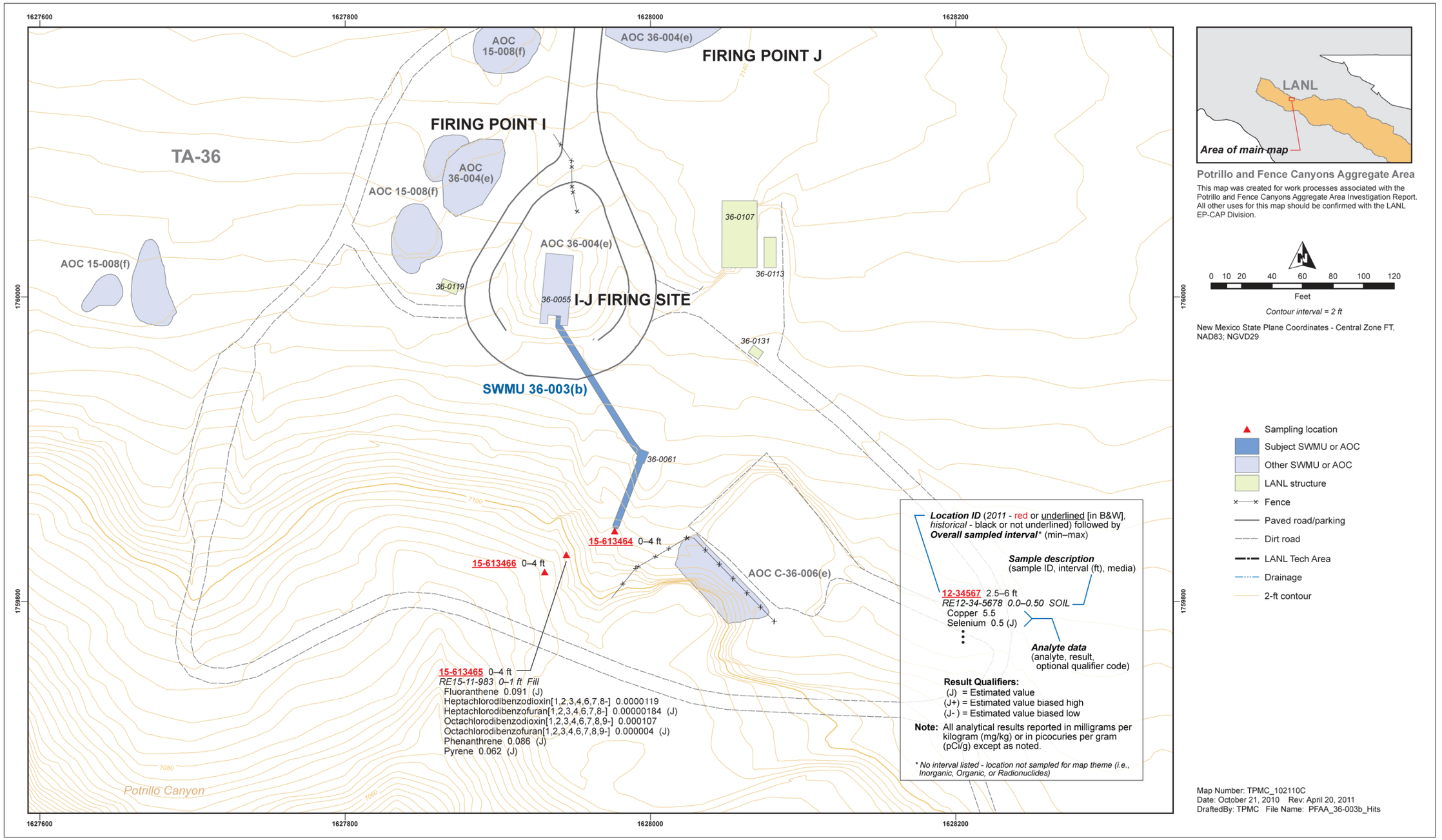


Figure 7.3-3 Organic chemicals detected at SWMU 36-003(b)

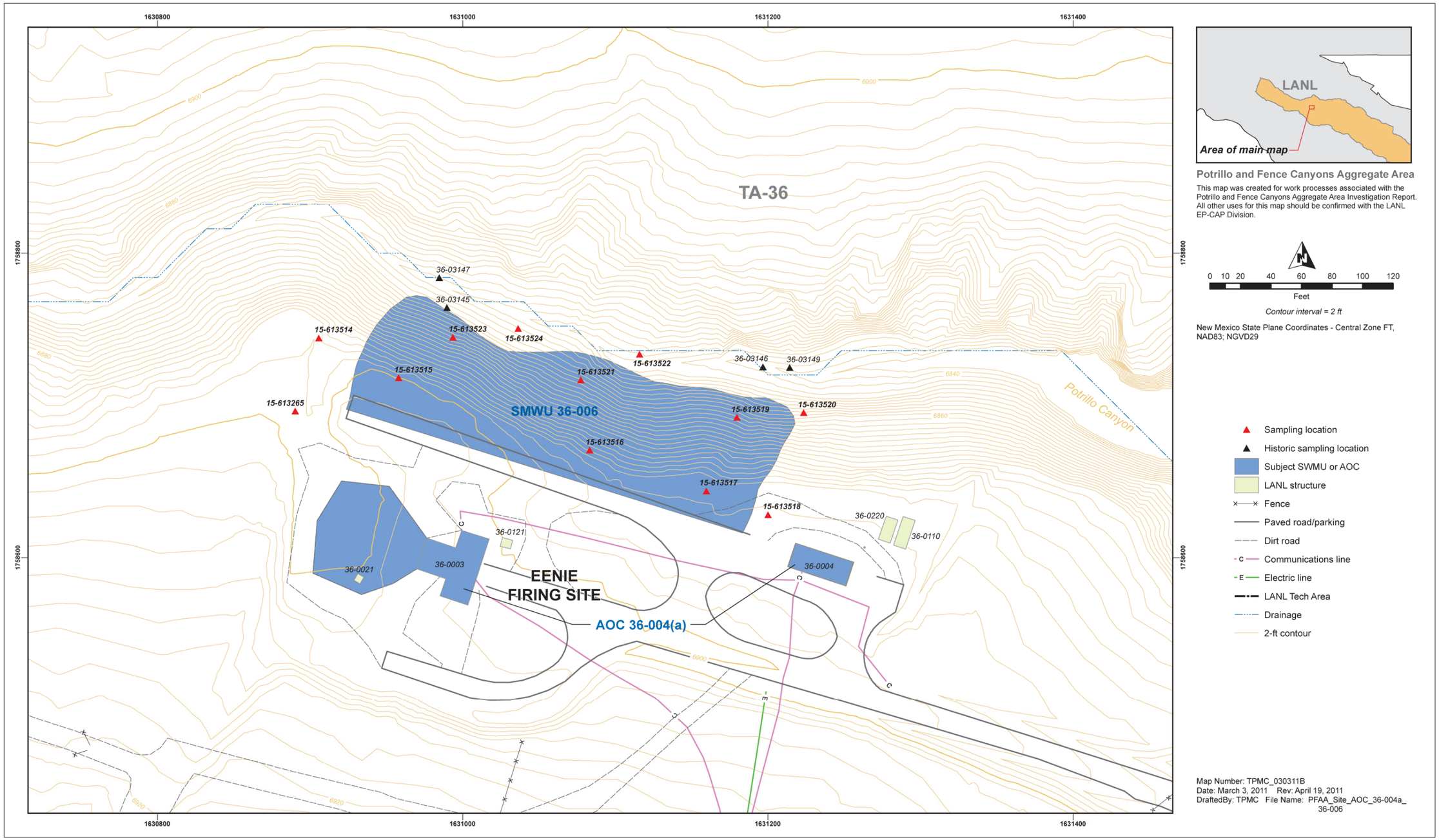


Figure 7.4-1 Site map of AOC 36-004(a) and SWMU 36-006

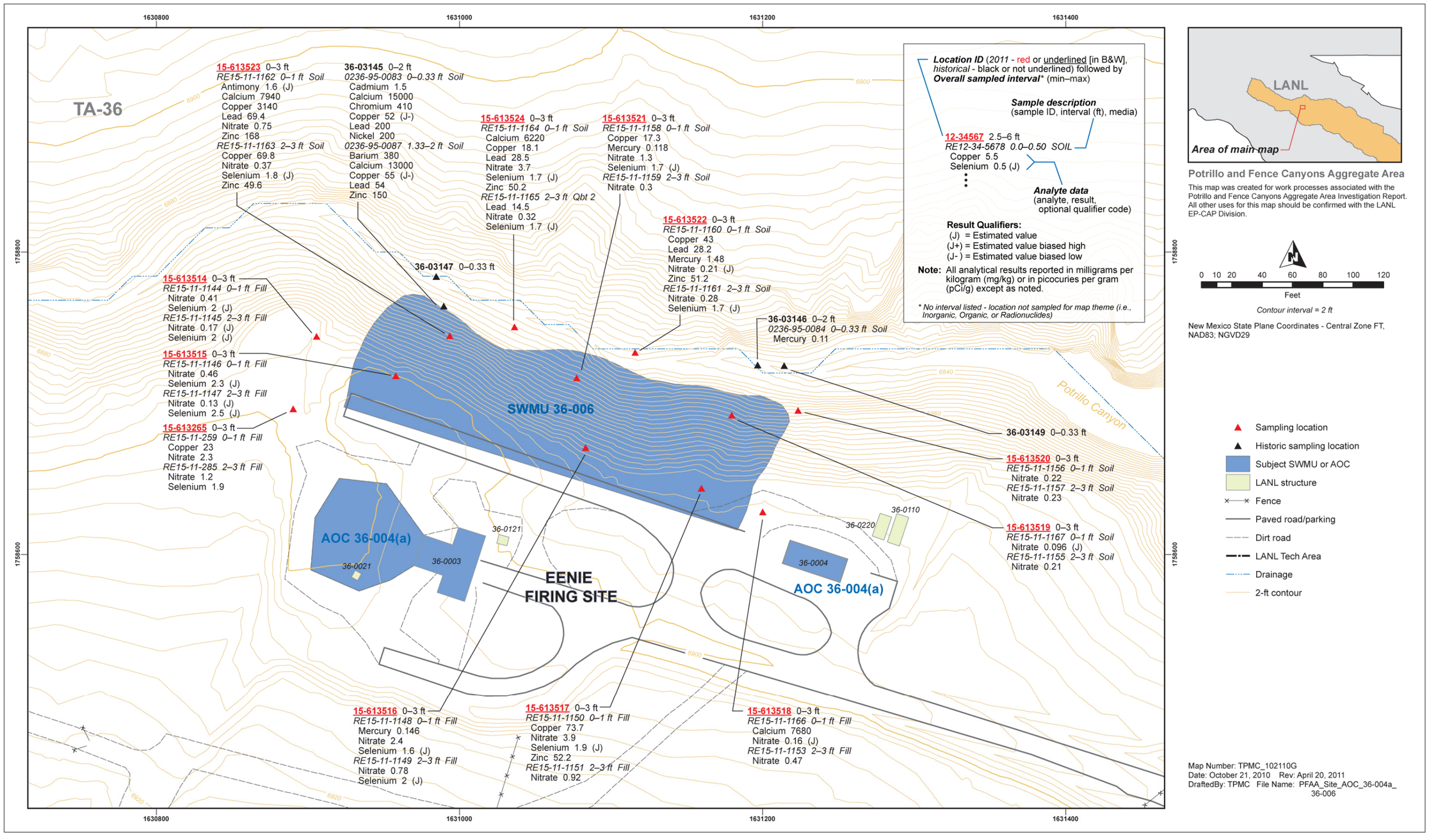


Figure 7.4-2 Inorganic chemicals above BVs at AOC 36-004(a) and SWMU 36-006

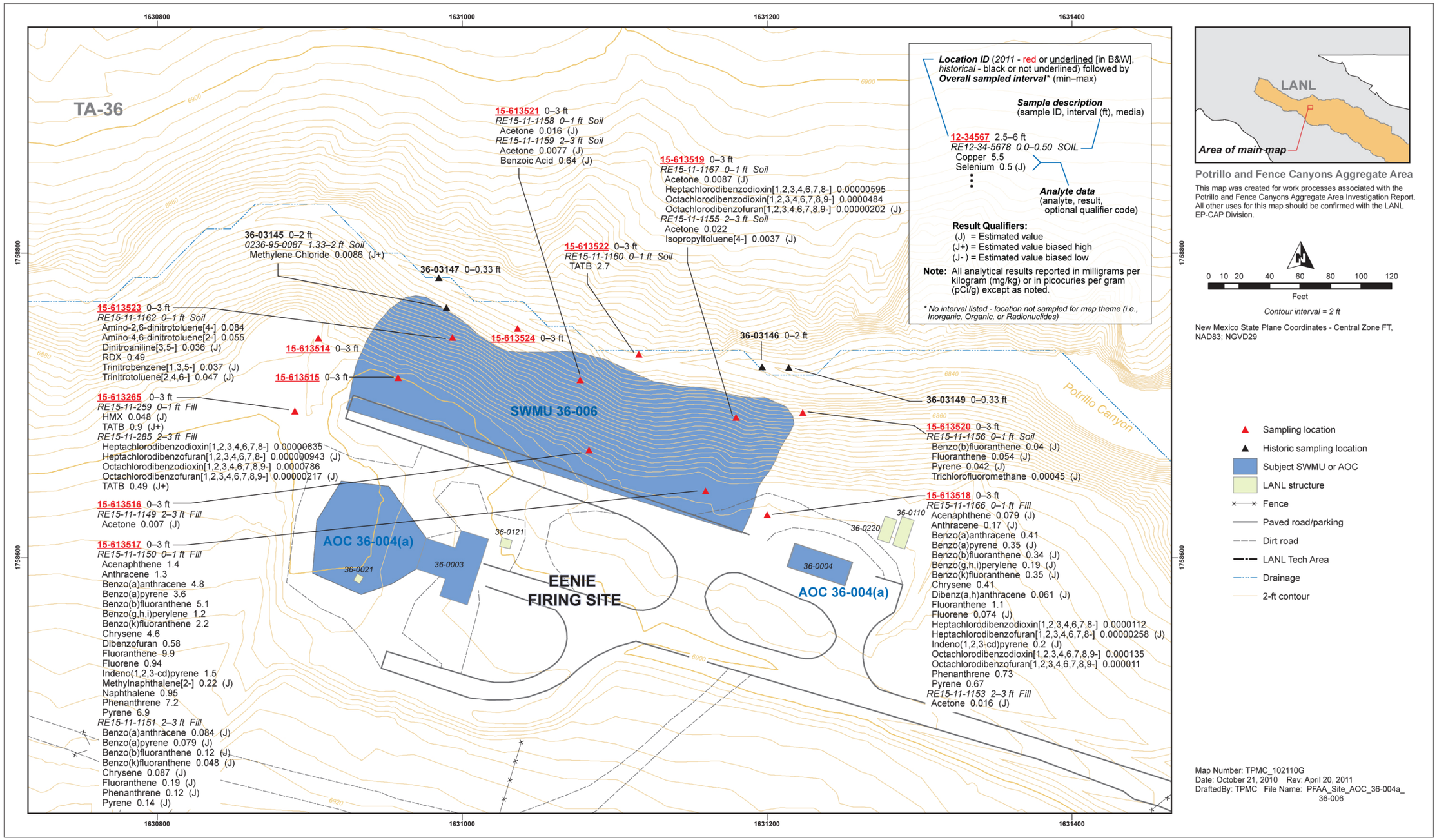


Figure 7.4-3 Organic chemicals detected at AOC 36-004(a) and SWMU 36-006

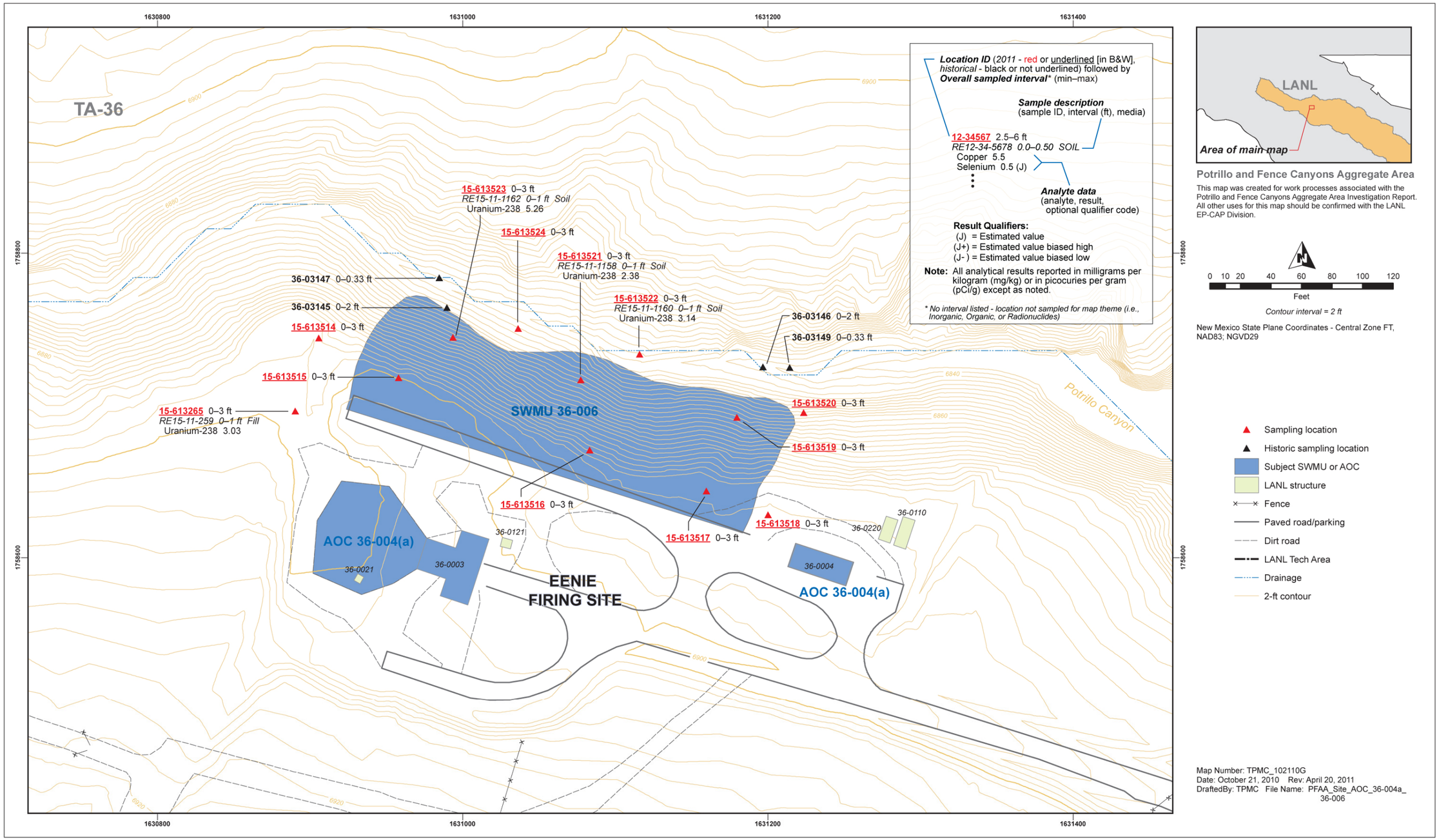


Figure 7.4-4 Radionuclides detected or detected above BVs/FVs at AOC 36-004(a) and SWMU 36-006

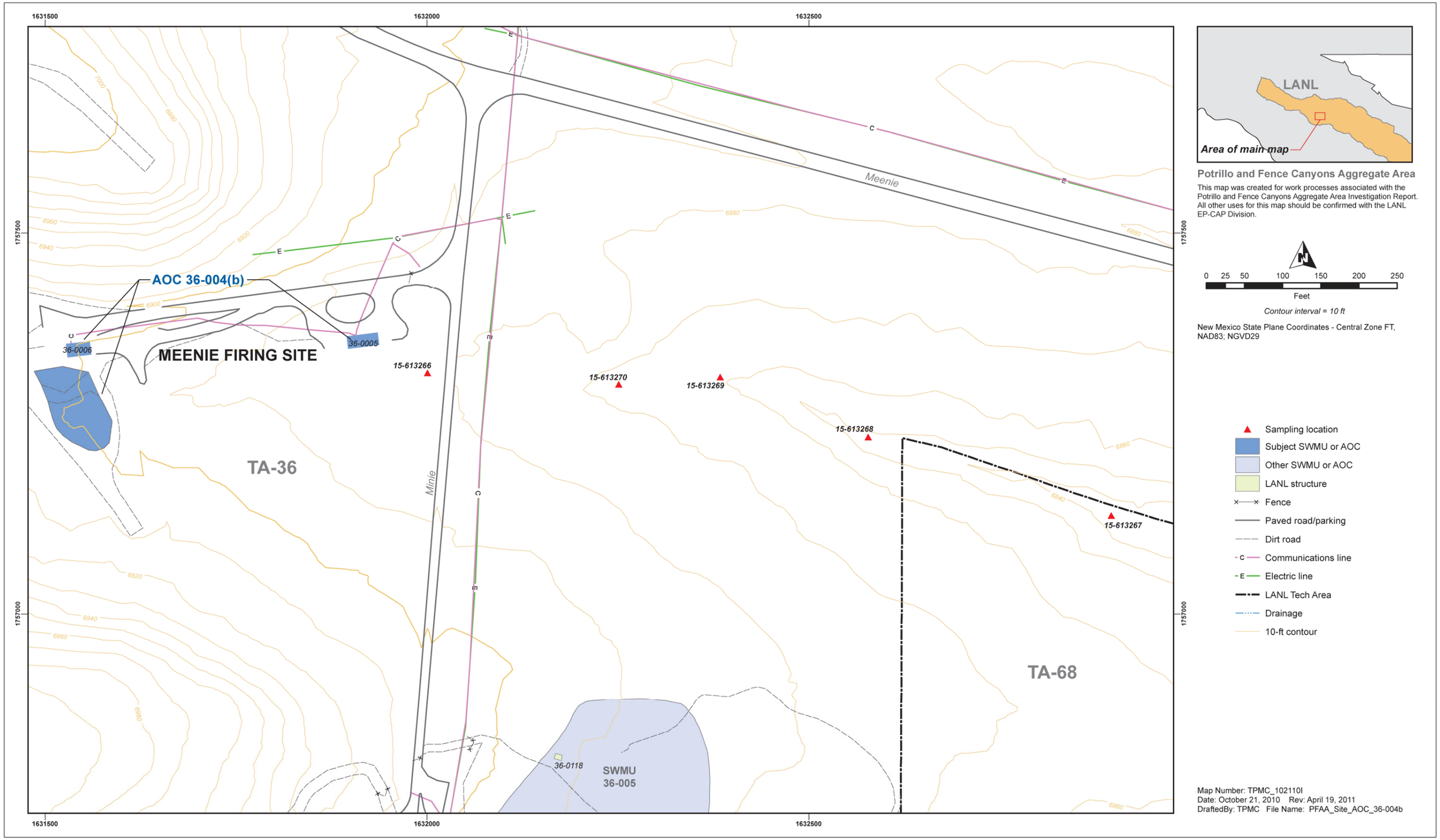


Figure 7.6-1 Site map of AOC 36-004(b)

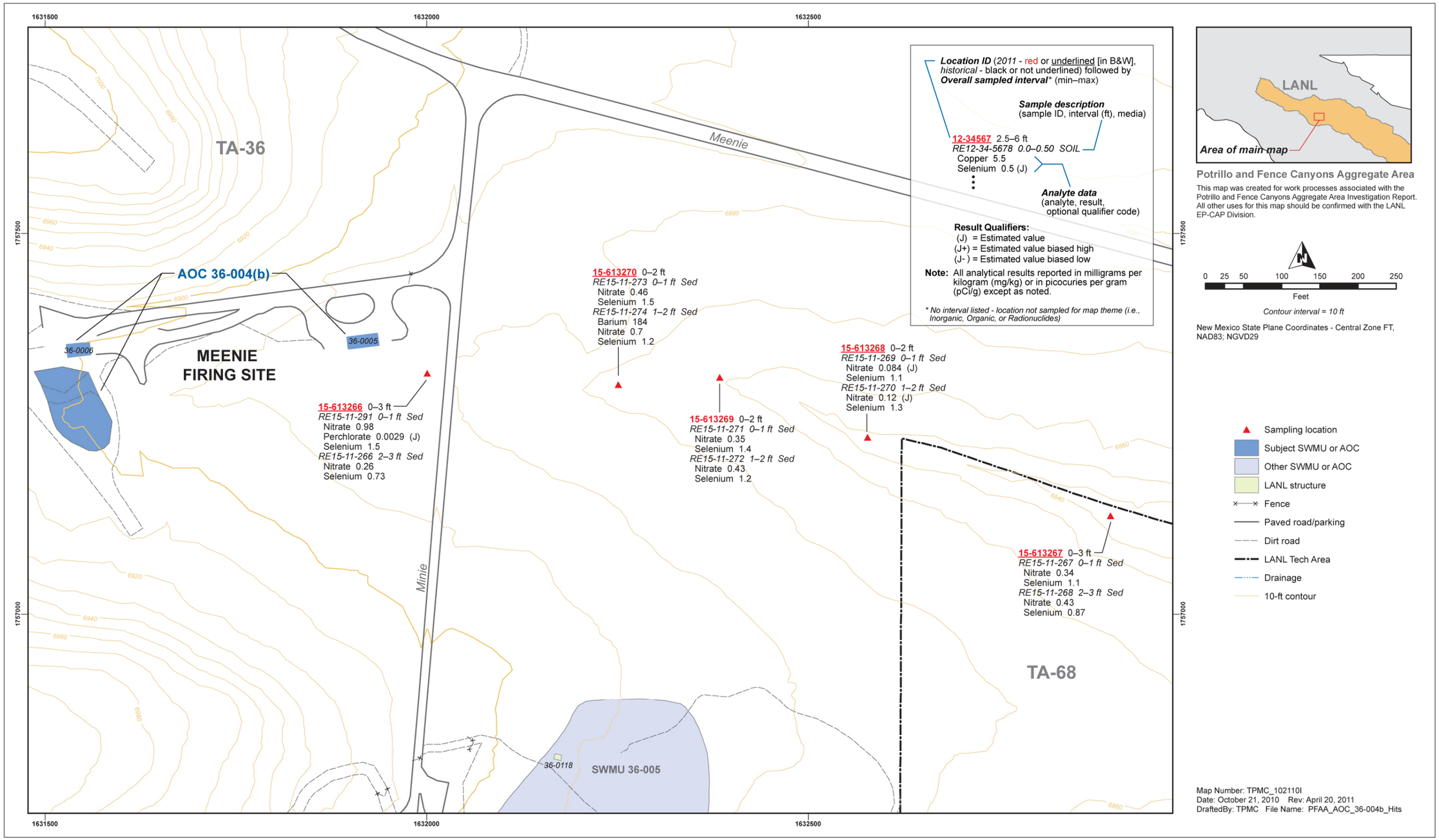


Figure 7.6-2 Inorganic chemicals above BVs at AOC 36-004(b)

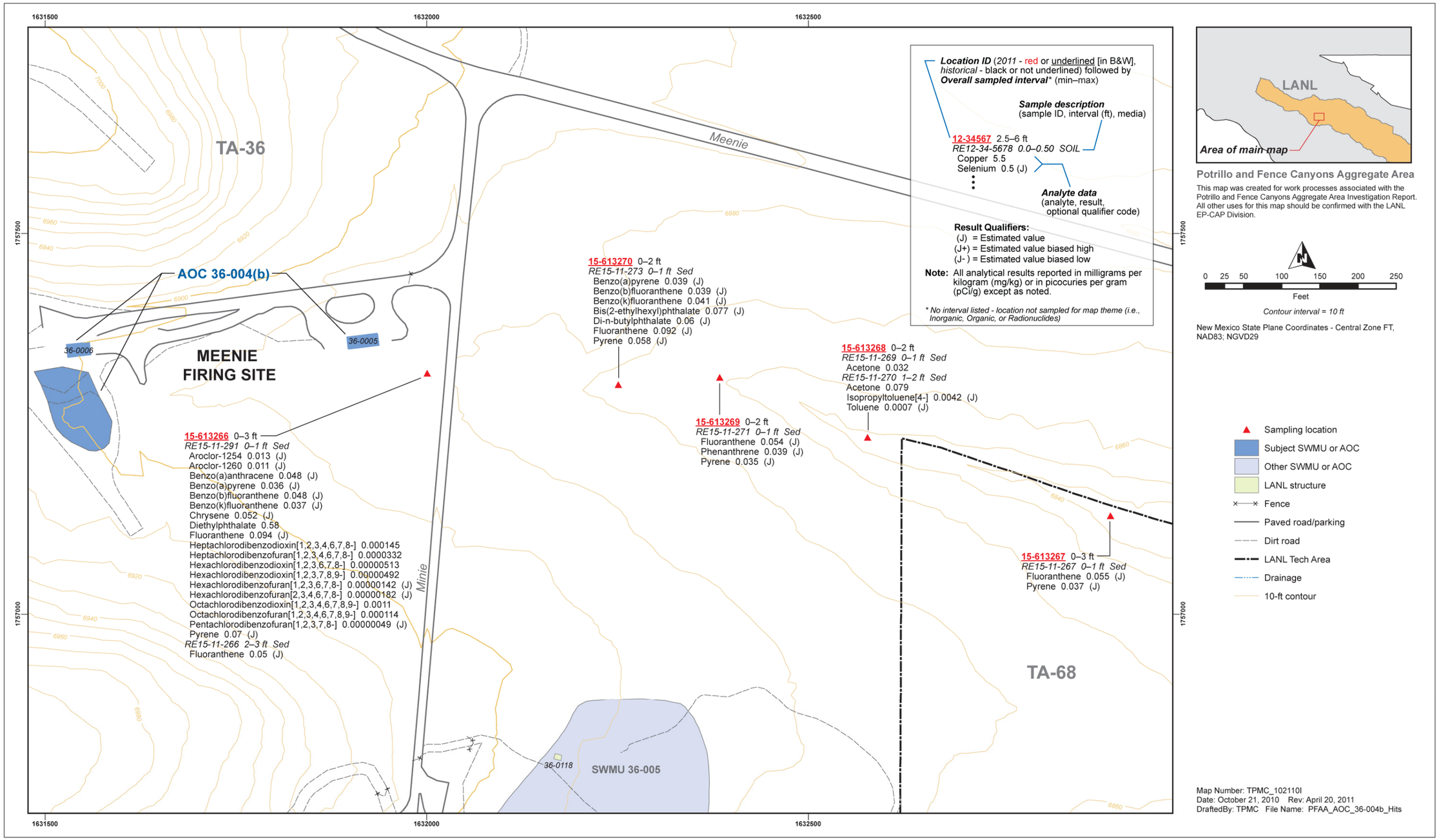


Figure 7.6-3 Organic chemicals detected at AOC 36-004(b)

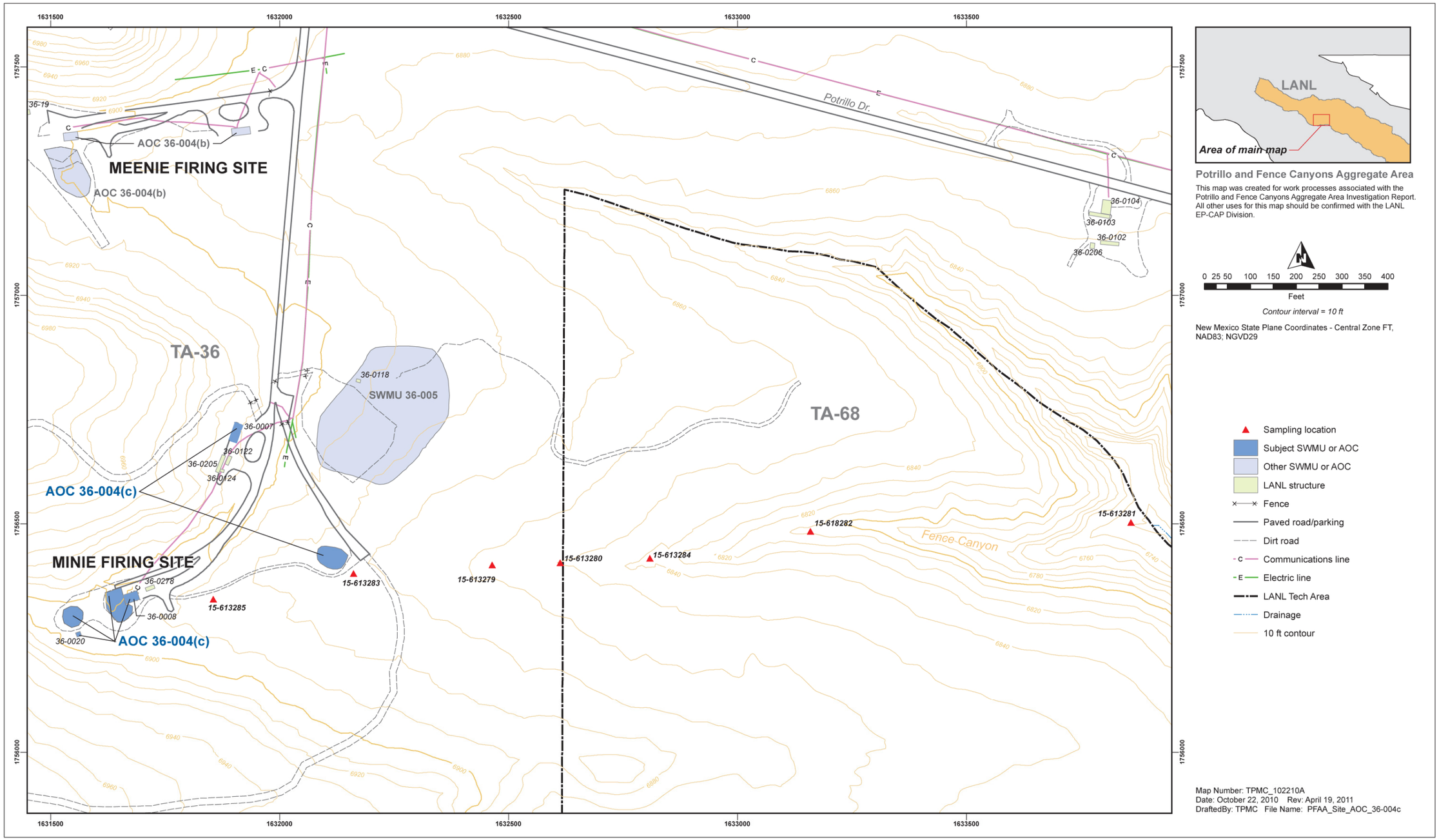


Figure 7.7-1 Site map of AOC 36-004(c)

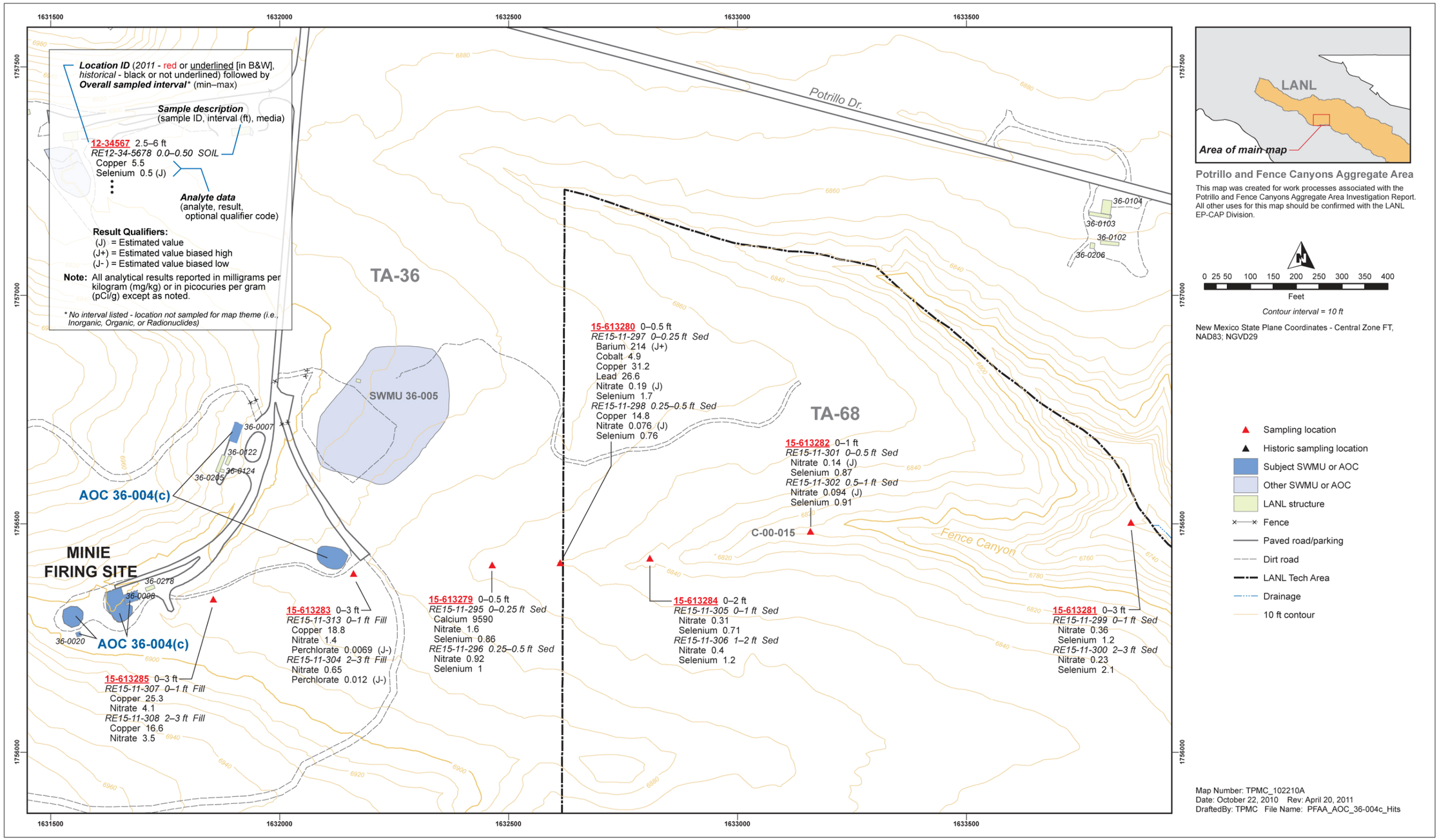


Figure 7.7-2 Inorganic chemicals above BVs at AOC 36-004(c)

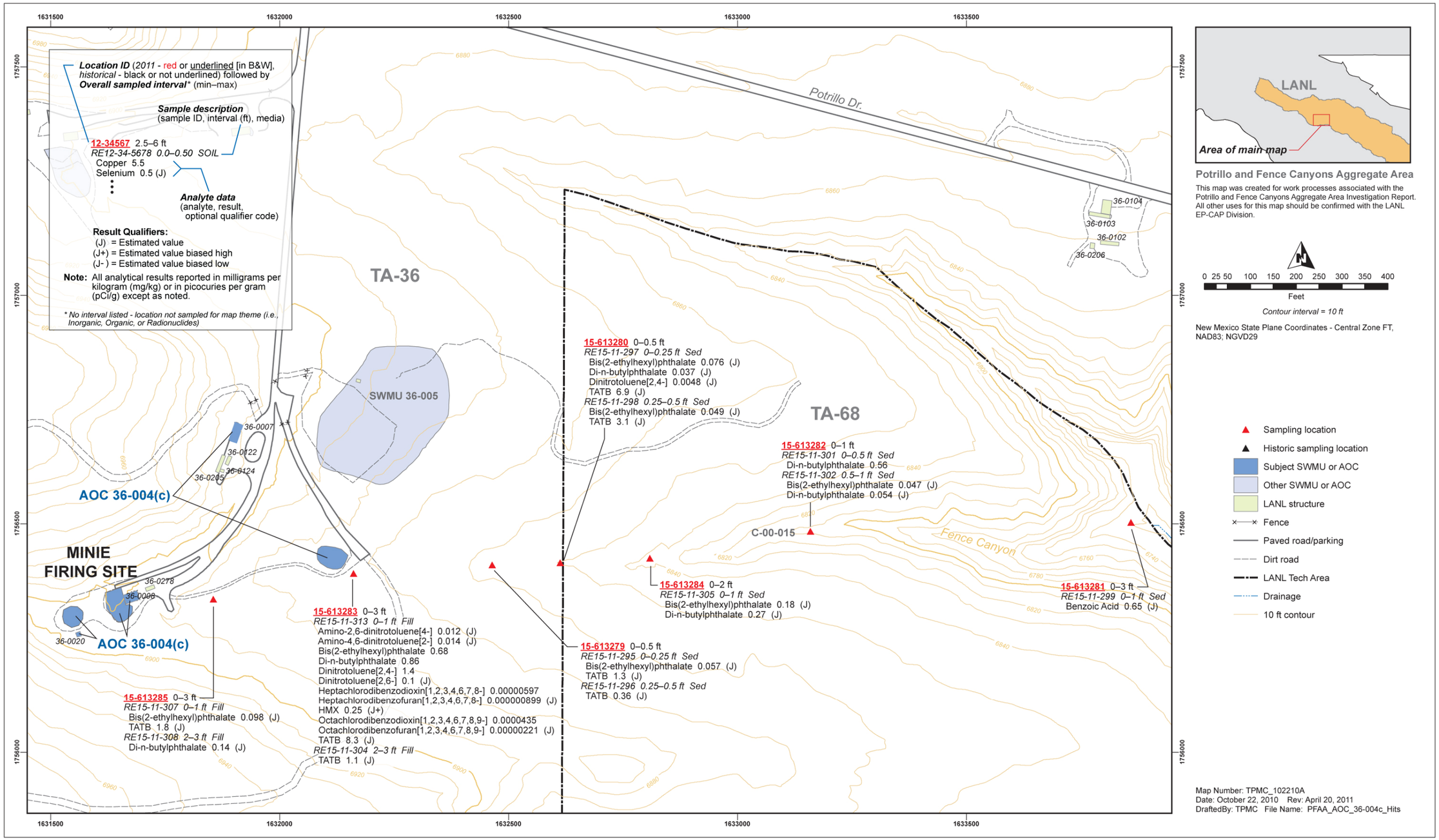


Figure 7.7-3 Organic chemicals detected at AOC 36-004(c)

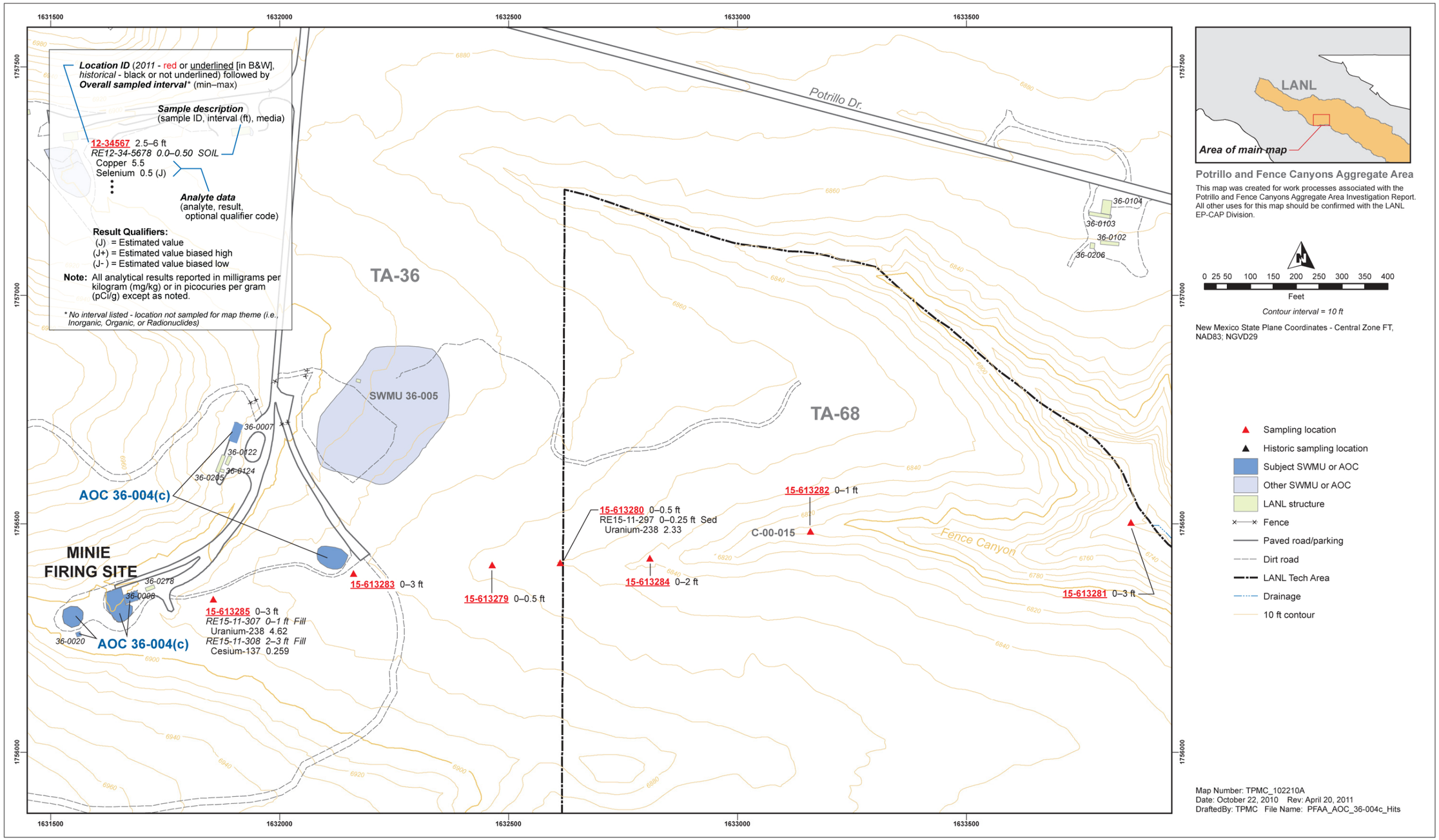


Figure 7.7-4 Radionuclides detected or detected above BVs/FVs at AOC 36-004(c)

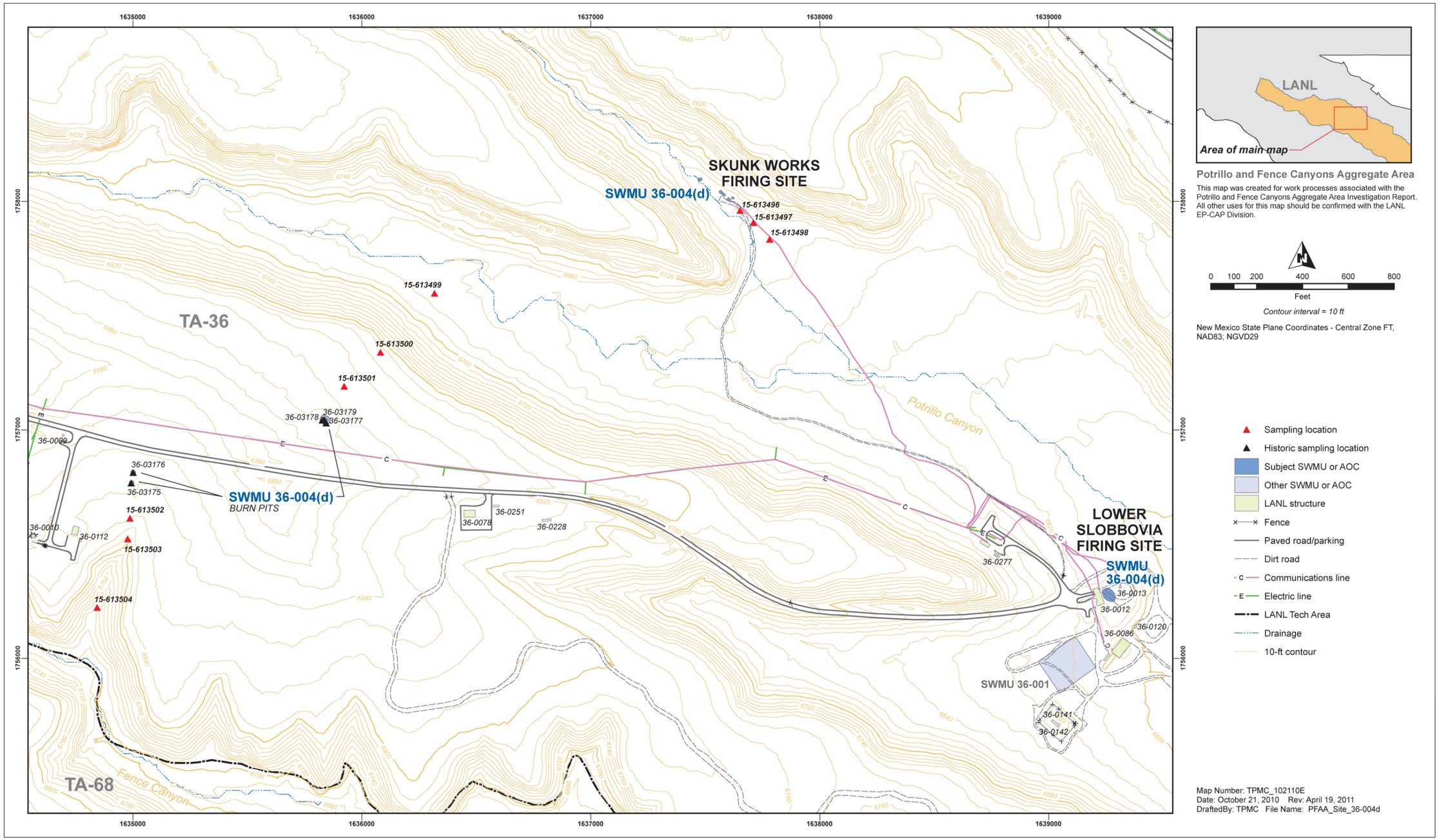


Figure 7.8-1 Site map of SWMU 36-004(d)

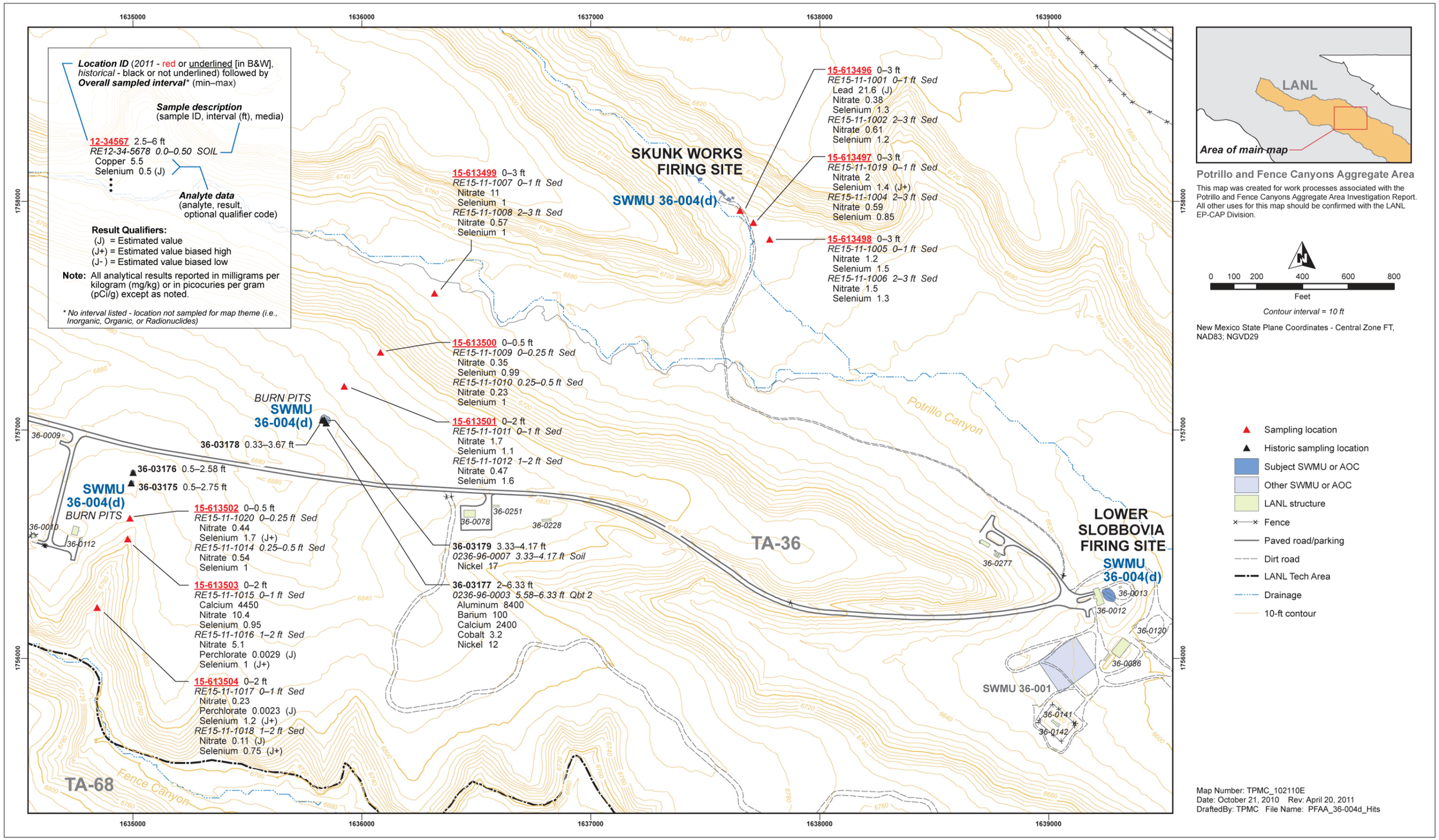


Figure 7.8-2 Inorganic chemicals above BVs at SWMU 36-004(d)

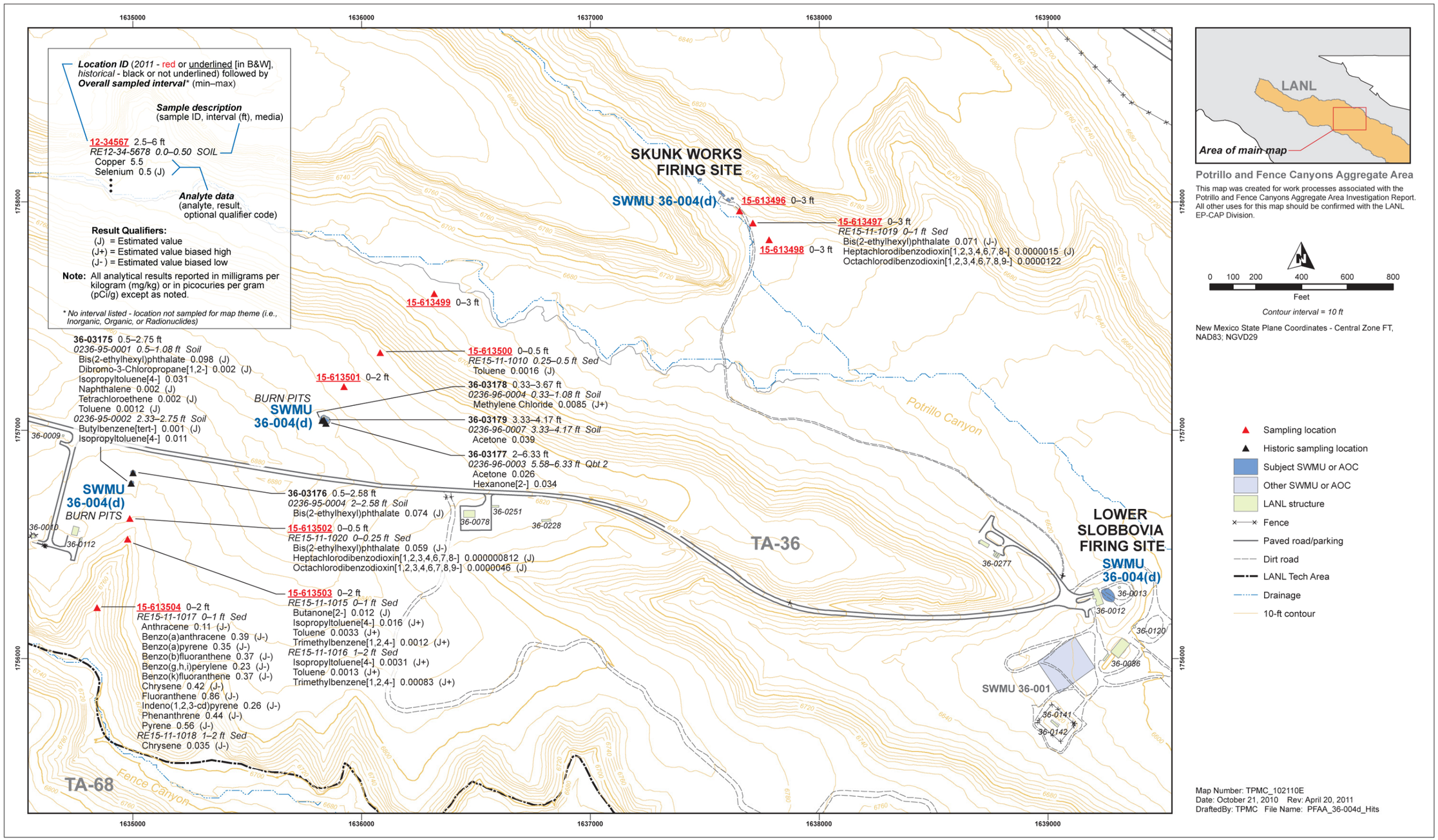


Figure 7.8-3 Organic chemicals detected at SWMU 36-004(d)

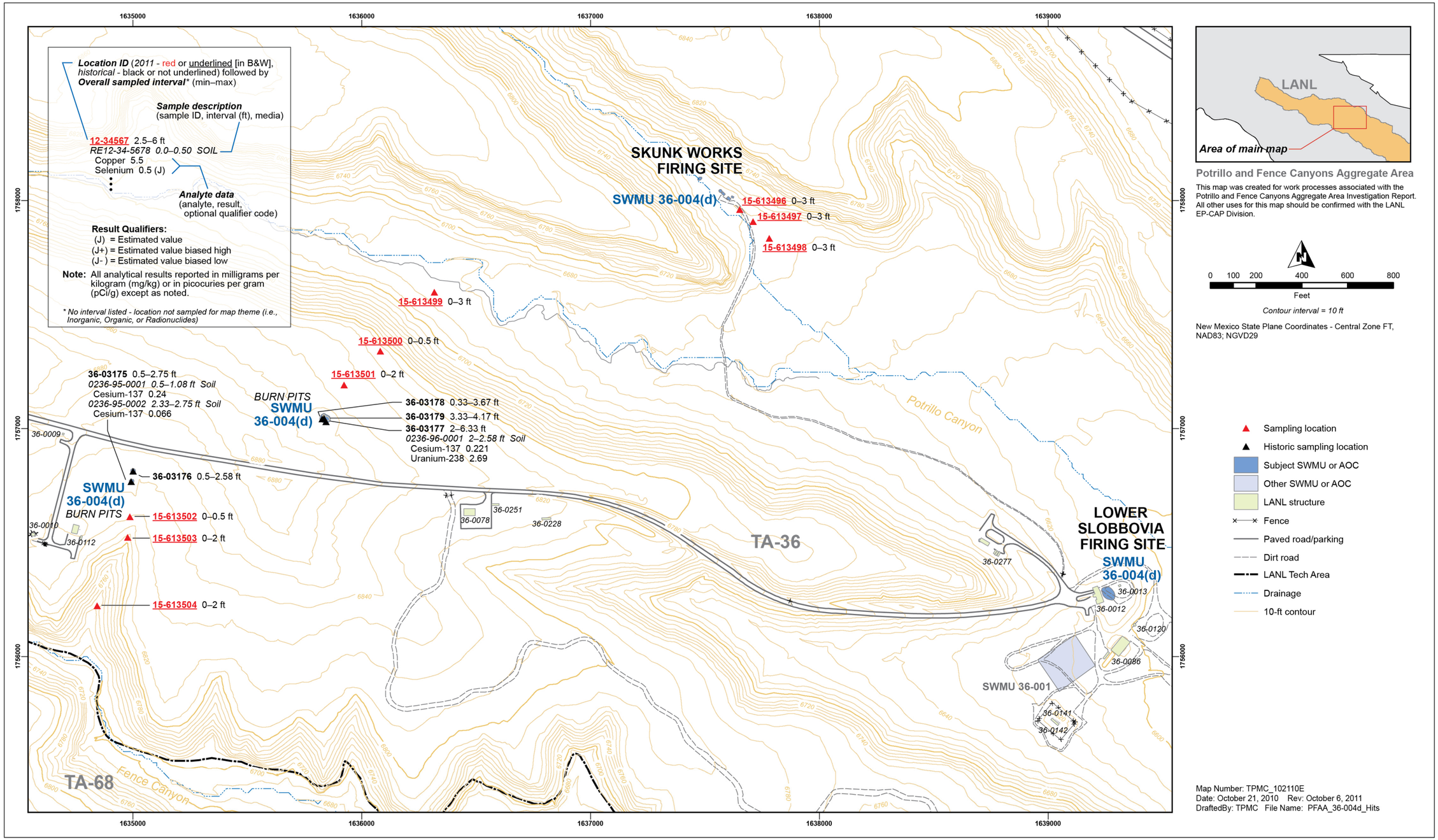


Figure 7.8-4 Radionuclides detected or detected above BVs/FVs at SWMU 36-004(d)

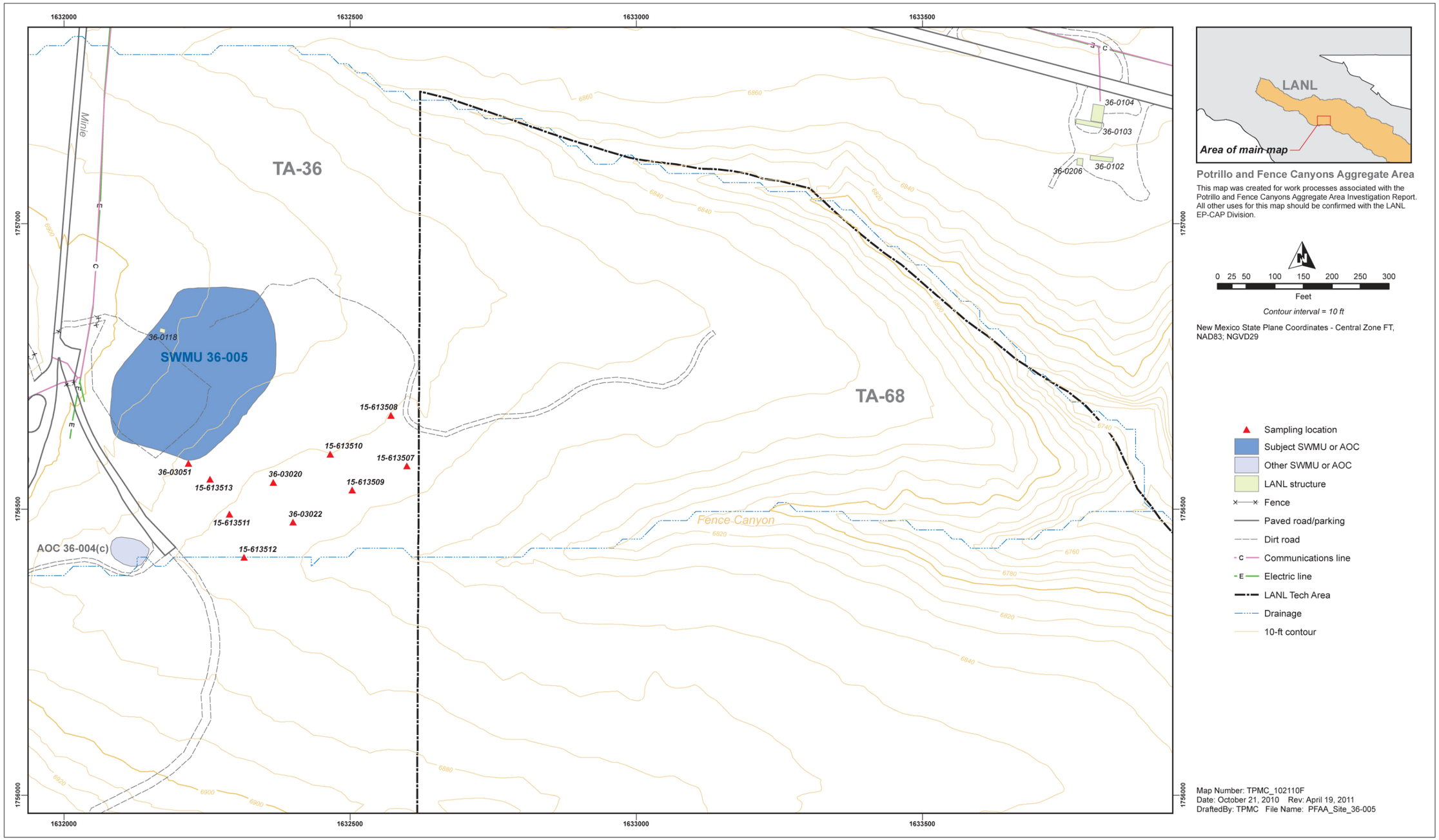


Figure 7.10-1 Site map of SWMU 36-005

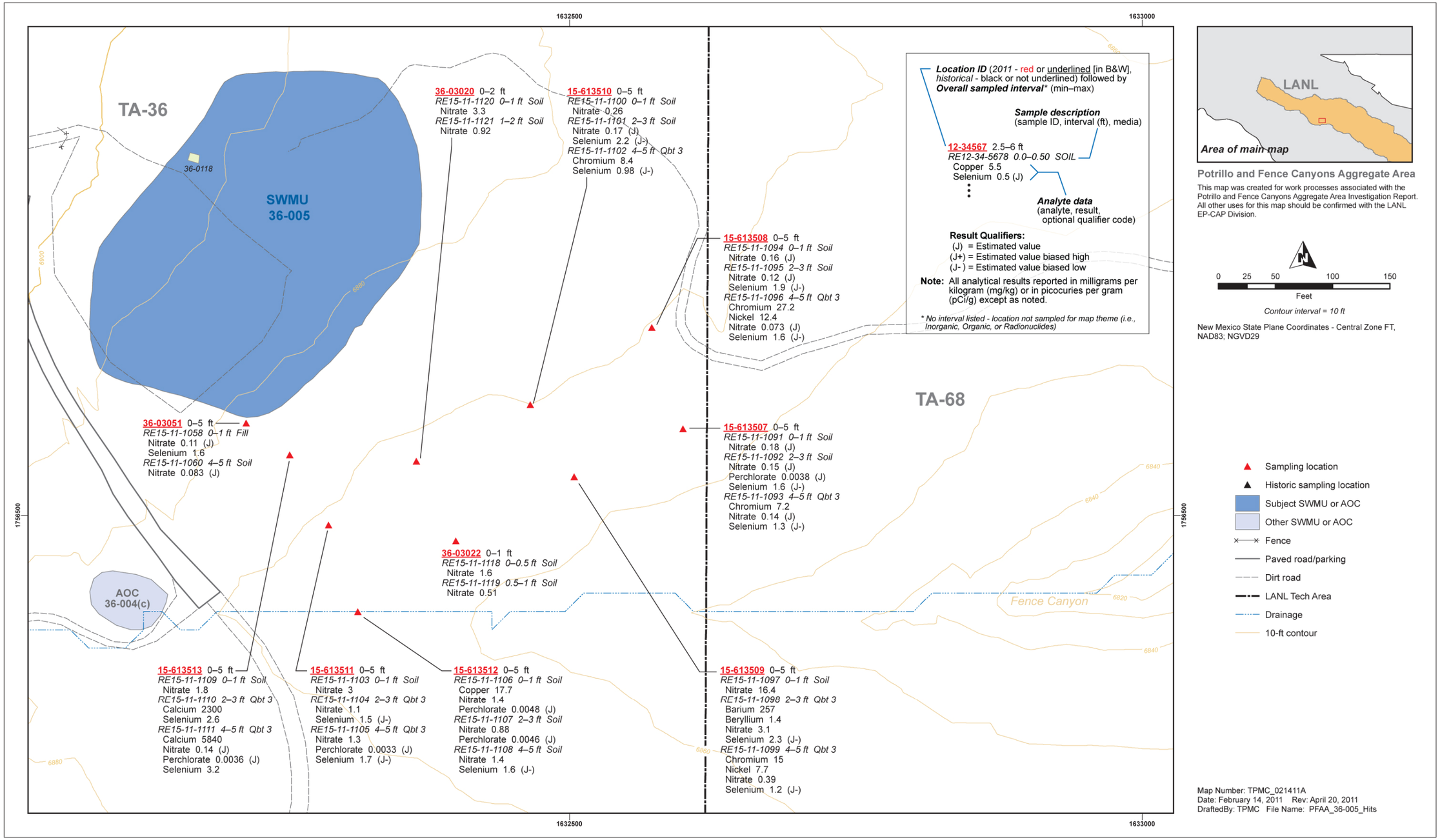


Figure 7.10-2 Inorganic chemicals above BVs at SWMU 36-005

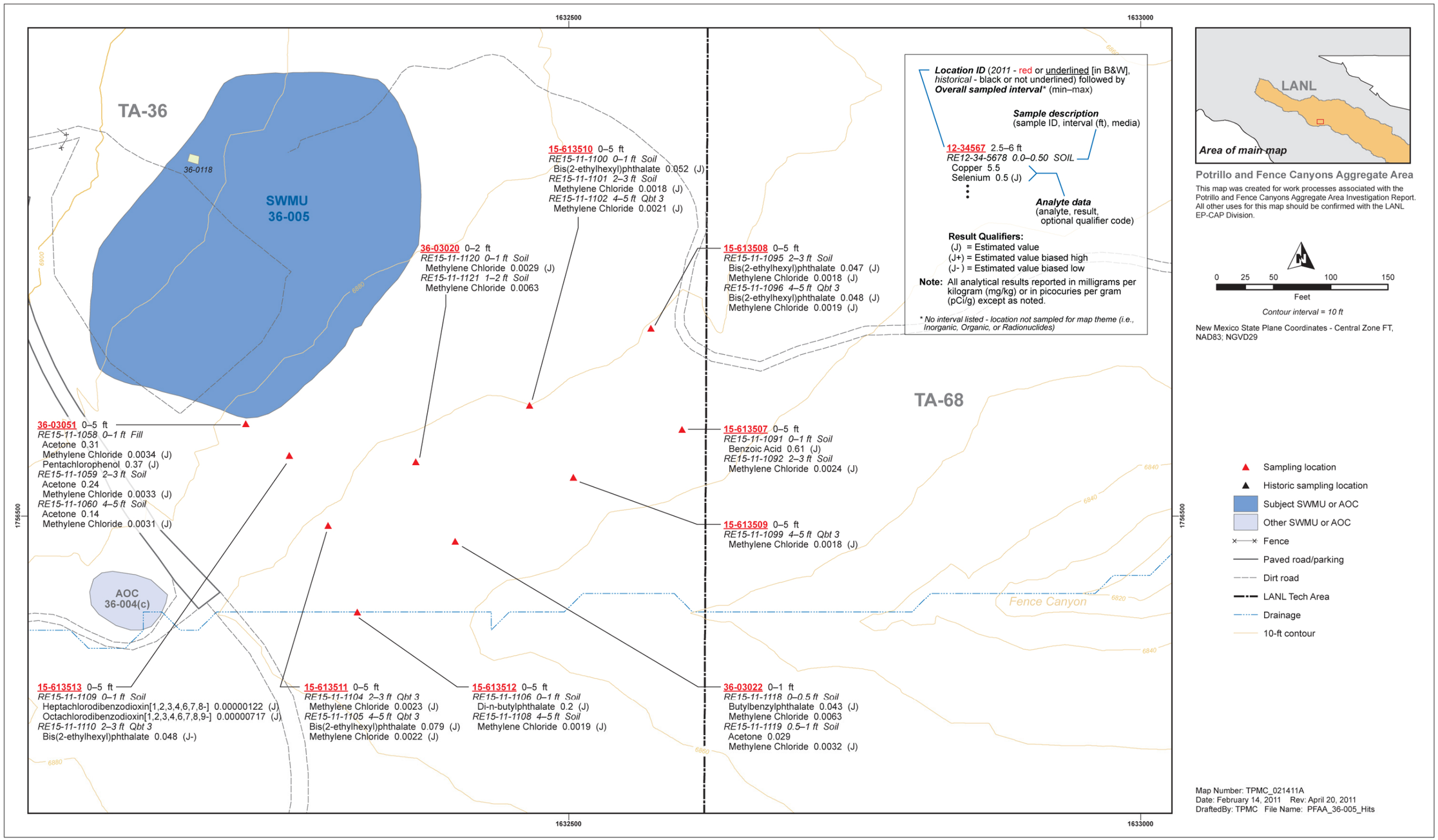


Figure 7.10-3 Organic chemicals detected at SWMU 36-005

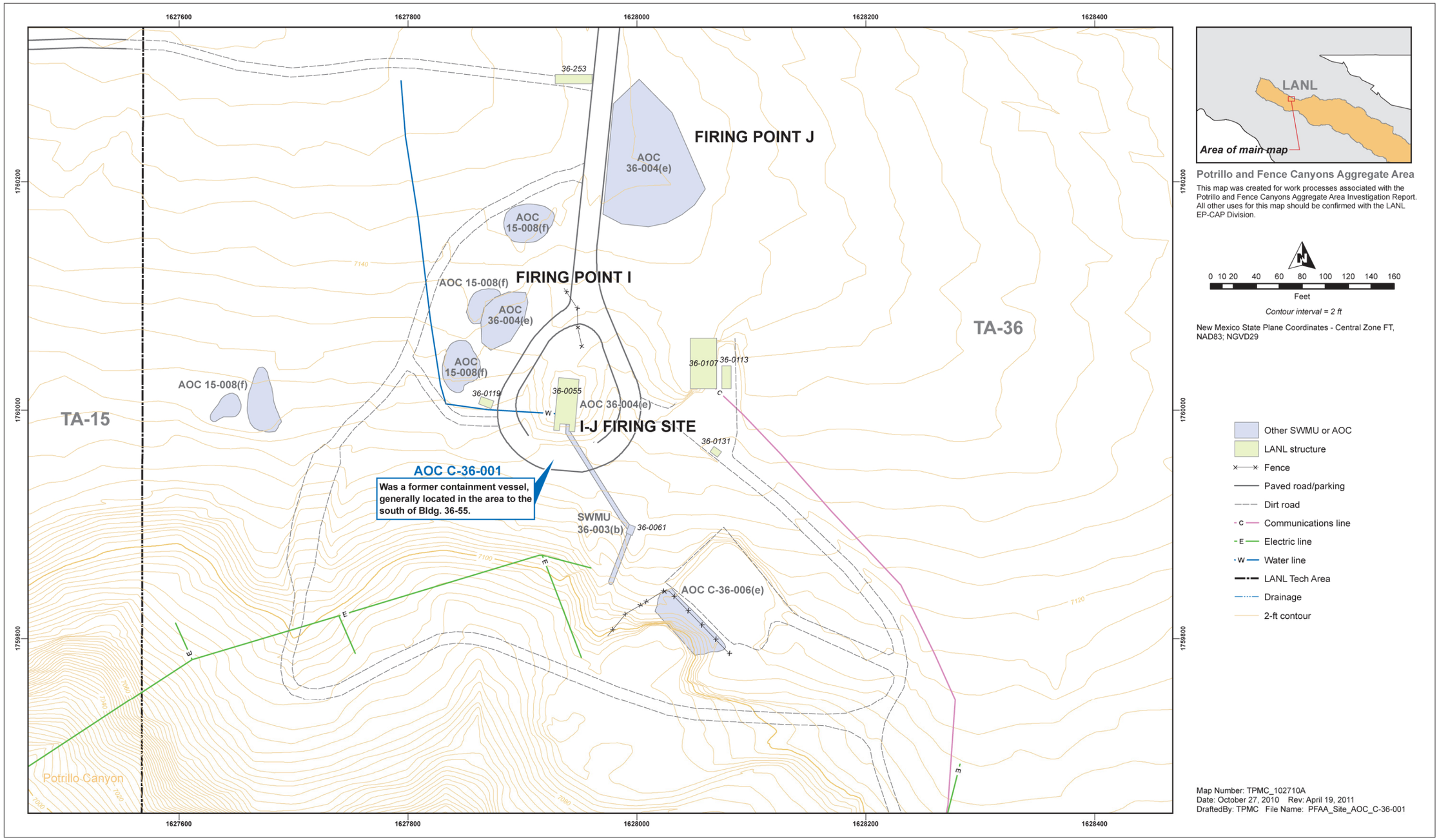


Figure 7.11-1 Site map of AOC C-36-001

Table 1.1-1
Sites under Investigation in Potrillo and Fence Canyons Aggregate Area

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
TA-15				
15-002-00	SWMU 15-002	Former Burn Pits	1995,1996 RFIs	Sampled
	SWMU 15-007(a)	MDA N	1995,1996 RFIs	Remediated and sampled
15-003-00	SWMU 15-003	PHERMEX Steel Firing Pad	Deferred per Table IV-2 of the Consent Order	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site
	SWMU 15-006(a)	PHERMEX Firing Site	Deferred per Table IV-2 of the Consent Order	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site
15-004(b)-99	SWMU 15-004(b)	Firing Site A	1995 RFI, 1996 VCA	Sampled
	SWMU 15-004(c)	Firing Site B	1995 RFI, 1996 VCA	Sampled
15-004(f)-99	SWMU 15-004(f)	E-F Firing Site	1994 RFI, 2001 environmental pilot treatment study	Sampled to plan remediation activities
	SWMU 15-008(a)	Two Surface Disposal Areas at E-F Firing Site	1994 RFI	Remediated and sampled
	AOC 15-005(b)	Storage Area	1995 RFI	Sampled
	AOC 15-006(e)	Projectile Test Area, Duplicate of AOC C-36-006(e)	Duplicate of AOC C-36-006(e)	See AOC C-36-006(e)
	AOC 15-008(f)	Sand Mounds at I-J Firing Site (TA-36)	Deferred per Table IV-2 of the Consent Order	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site
	SWMU 15-009(e)	Septic Tank	1994 RFI, 1997 VCA	Sampled
	SWMU 15-010(a)	Septic Tank	1995, 1997 RFIs	Sampled
	AOC C-15-004	Former Transformer Station	1994 RFI	Sampled
	AOC C-15-005	Potential Soil Contamination from Former Building	1995–1996 RFI	Sampled
	AOC C-15-006	Potential Soil Contamination from Former Building	1995 RFI	Sampled

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
TA-36				
	SWMU 36-001	MDA AA	1993–1996 RFI	Sampled for health and safety and waste characterization purposes
	SWMU 36-003(b)	Septic System, I-J Firing Site	1994 RFI, 1996 VCA	Sampled
36-006-99	AOC 36-004(a)	Eenie Firing Site	Deferred per Table IV-2 of the Consent Order	Samples collected from drainage downgradient of the site to determine if contaminants are migrating from the site
	SWMU 36-006	Surface Disposal Area	1995 RFI	Remediated and sampled
	AOC 36-004(b)	Meenie Firing Site	1994 RFI; deferred per Table IV-2 of the Consent Order	Samples collected from drainage downgradient of the site to determine if contaminants are migrating from the site
	AOC 36-004(c)	Minie Firing Site	1994 RFI; active RCRA-regulated OD site	Samples collected from drainage downgradient of the site to determine if contaminants are migrating from the site
	SWMU 36-004(d)	Skunk Works Firing Site, Lower Slobbovia Firing Site, and Burn Pits	1994–1996 RFIs; deferred per Table IV-2 of the Consent Order	Samples collected from drainages downgradient of the sites to determine if contaminants are migrating from the sites
	AOC 36-004(e)	I-J Firing Site	Deferred per Table IV-2 of the Consent Order	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site
	SWMU 36-005	Storage Area	1994, 1997 RFIs	Archaeological site; samples collected around site boundary and from drainage downgradient of the site to determine if contaminants are migrating from the site
	AOC C-36-001	Former Containment Vessel	1994 VCA	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site
	AOC C-36-006(e)	Projectile Test Area	No previous investigation	Samples collected from drainages downgradient of the site to determine if contaminants are migrating from the site

Note: Shading denotes consolidated unit.

Table 3.2-1
Surveyed Coordinates for Locations Sampled

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
TA-15			
SWMU 15-002	15-613318	1623320.602	1762882.752
SWMU 15-002	15-613319	1623299.493	1762876.315
SWMU 15-002	15-613320	1623321.107	1762850.772
SWMU 15-002	15-613321	1623354.510	1762878.280
SWMU 15-002	15-613322	1623323.072	1762911.684
SWMU 15-002	15-613671	1623758.697	1762332.822
SWMU 15-002	15-613672	1623678.721	1762326.140
SWMU 15-002	15-613673	1623737.668	1762278.982
SWMU 15-002	15-613674	1623790.721	1762328.105
SWMU 15-002	15-613675	1623737.130	1762357.171
SWMUs 15-003 and 15-006(a)	15-613324	1628058.724	1759049.425
SWMUs 15-003 and 15-006(a)	15-613325	1627795.079	1758907.112
SWMUs 15-003 and 15-006(a)	15-613326	1627482.172	1758647.572
SWMUs 15-003 and 15-006(a)	15-613327	1627290.596	1758567.293
SWMUs 15-003 and 15-006(a)	15-613328	1627082.599	1758421.330
SWMUs 15-004(b) and 15-004(c)	15-613330	1622816.889	1760352.355
SWMUs 15-004(b) and 15-004(c)	15-613331	1623116.889	1761252.355
SWMUs 15-004(b) and 15-004(c)	15-613332	1623116.889	1761152.355
SWMUs 15-004(b) and 15-004(c)	15-613333	1623216.889	1761152.355
SWMUs 15-004(b) and 15-004(c)	15-613334	1623316.889	1761052.355
SWMUs 15-004(b) and 15-004(c)	15-613335	1623216.889	1760852.355
SWMUs 15-004(b) and 15-004(c)	15-613336	1623016.889	1760852.355
SWMUs 15-004(b) and 15-004(c)	15-613338	1622796.969	1760896.507
SWMUs 15-004(b) and 15-004(c)	15-613339	1623316.889	1760652.355
SWMUs 15-004(b) and 15-004(c)	15-613340	1622816.889	1760452.355
SWMUs 15-004(b) and 15-004(c)	15-613341	1623216.889	1760352.355
SWMUs 15-004(b) and 15-004(c)	15-613342	1623216.889	1760252.355
SWMUs 15-004(b) and 15-004(c)	15-613343	1622916.889	1760252.355
SWMUs 15-004(b) and 15-004(c)	15-613344	1622855.059	1760851.382
SWMUs 15-004(b) and 15-004(c)	15-613345	1622916.889	1760152.355
SWMUs 15-004(b) and 15-004(c)	15-613346	1622916.889	1761152.355
SWMUs 15-004(b) and 15-004(c)	15-613347	1622816.889	1761152.355
SWMUs 15-004(b) and 15-004(c)	15-613348	1622816.889	1761052.355
SWMUs 15-004(b) and 15-004(c)	15-613349	1622916.889	1761052.355
SWMUs 15-004(b) and 15-004(c)	15-613350	1623016.889	1761052.355
SWMUs 15-004(b) and 15-004(c)	15-613351	1623116.889	1760352.355
SWMU 15-004(f)	15-02100	1625535.567	1762180.046

Table 3.2-1 (continued)

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 15-004(f)	15-02101	1625735.566	1762180.052
SWMU 15-004(f)	15-02112	1625735.561	1761980.051
SWMU 15-004(f)	15-02113	1625938.513	1761983.942
SWMU 15-004(f)	15-02114	1626135.557	1761980.051
SWMU 15-004(f)	15-02115	1626335.565	1761980.049
SWMU 15-004(f)	15-02119	1627147.610	1761997.251
SWMU 15-004(f)	15-02123	1625735.561	1761780.051
SWMU 15-004(f)	15-02124	1625935.559	1761780.053
SWMU 15-004(f)	15-02125	1626135.559	1761780.053
SWMU 15-004(f)	15-02132	1627535.565	1761780.049
SWMU 15-004(f)	15-02136	1626135.565	1761580.049
SWMU 15-004(f)	15-02137	1626335.565	1761580.049
SWMU 15-004(f)	15-02139	1626735.565	1761580.049
SWMU 15-004(f)	15-02141	1627138.315	1761575.286
SWMU 15-004(f)	15-02142	1627335.565	1761580.049
SWMU 15-004(f)	15-02144	1625527.108	1761376.971
SWMU 15-004(f)	15-02145	1625735.561	1761380.055
SWMU 15-004(f)	15-02147	1626135.557	1761380.055
SWMU 15-004(f)	15-02148	1626335.565	1761380.049
SWMU 15-004(f)	15-02149	1626535.565	1761380.049
SWMU 15-004(f)	15-02150	1626735.565	1761380.049
SWMU 15-004(f)	15-02151	1626935.565	1761380.049
SWMU 15-004(f)	15-02152	1627135.565	1761380.049
SWMU 15-004(f)	15-02153	1627335.565	1761380.049
SWMU 15-004(f)	15-02155	1625535.565	1761180.049
SWMU 15-004(f)	15-02156	1625735.565	1761180.049
SWMU 15-004(f)	15-02157	1625935.565	1761185.049
SWMU 15-004(f)	15-02162	1626935.565	1761180.049
SWMU 15-004(f)	15-02166	1625535.565	1760980.049
SWMU 15-004(f)	15-02167	1625735.565	1761054.049
SWMU 15-004(f)	15-02170	1626335.565	1760980.049
SWMU 15-004(f)	15-02171	1626535.565	1760980.049
SWMU 15-004(f)	15-02172	1626735.565	1760980.049
SWMU 15-004(f)	15-02173	1626935.565	1760980.049
SWMU 15-004(f)	15-02177	1625918.903	1760483.036
SWMU 15-004(f)	15-02178	1625735.565	1760780.049
SWMU 15-004(f)	15-02179	1625925.973	1760775.778
SWMU 15-004(f)	15-02180	1626135.565	1760780.049
SWMU 15-004(f)	15-02191	1626135.565	1760580.049

Table 3.2-1 (continued)

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 15-004(f)	15-02196	1625735.560	1761580.060
SWMU 15-004(f)	15-02198	1627335.570	1761780.050
SWMU 15-004(f)	15-02203	1627535.565	1760580.049
SWMU 15-004(f)	15-02206	1625597.670	1760788.497
SWMU 15-004(f)	15-02226	1626988.684	1761506.462
SWMU 15-004(f)	15-02228	1626877.735	1761242.642
SWMU 15-004(f)	15-02229	1626383.459	1760886.811
SWMU 15-004(f)	15-02230	1626388.066	1760843.172
SWMU 15-004(f)	15-02231	1626382.048	1760788.107
SWMU 15-004(f)	15-02240	1626261.924	1761191.231
SWMU 15-004(f)	15-02241	1626301.421	1761186.267
SWMU 15-004(f)	15-02277	1626039.800	1760870.300
SWMU 15-004(f)	15-02278	1626080.800	1760837.400
SWMU 15-004(f)	15-02279	1626121.000	1760807.300
SWMU 15-004(f)	15-02295	1626921.550	1761341.450
SWMU 15-004(f)	15-613365	1626493.236	1761239.358
SWMU 15-004(f)	15-613366	1626502.487	1761212.578
SWMU 15-004(f)	15-613367	1626513.200	1761186.284
SWMU 15-004(f)	15-613368	1626545.823	1761261.270
SWMU 15-004(f)	15-613369	1626547.284	1761228.646
SWMU 15-004(f)	15-613370	1626569.195	1761161.938
SWMU 15-004(f)	15-613371	1626589.159	1761267.600
SWMU 15-004(f)	15-613372	1626598.410	1761237.898
SWMU 15-004(f)	15-613373	1626612.044	1761214.525
SWMU 15-004(f)	15-613374	1626527.320	1761142.461
SWMU 15-004(f)	15-613375	1626524.886	1761103.508
SWMU 15-004(f)	15-613376	1626545.823	1761074.293
SWMU 15-004(f)	15-613377	1626566.761	1761201.866
SWMU 15-004(f)	15-613378	1626577.473	1761125.419
SWMU 15-004(f)	15-613379	1626602.793	1761096.691
SWMU 15-004(f)	15-613380	1626613.992	1761170.216
SWMU 15-004(f)	15-613381	1626630.547	1761145.870
SWMU 15-004(f)	15-613382	1626643.207	1761127.367
SWMU 15-004(f)	15-613384	1625642.929	1760518.103
SWMU 15-004(f)	15-613385	1626304.126	1760187.503
SWMU 15-004(f)	15-613386	1626318.103	1760286.076
SWMU 15-004(f)	15-613387	1626337.177	1760382.717
SWMU 15-004(f)	15-613388	1626347.350	1760539.122
SWMU 15-004(f)	15-613389	1626355.007	1760637.388

Table 3.2-1 (continued)

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
AOC 15-005(b)	15-613251	1623389.118	1761263.375
AOC 15-005(b)	15-613252	1623413.250	1761257.269
AOC 15-005(b)	15-613253	1623387.955	1761221.508
AOC 15-005(b)	15-613254	1623367.894	1761239.243
SWMU 15-007(a)	15-613391	1623306.007	1762764.838
SWMU 15-007(a)	15-613392	1623305.442	1762732.397
SWMU 15-007(a)	15-613393	1623316.951	1762707.942
SWMU 15-007(a)	15-613394	1623327.785	1762678.486
SWMU 15-007(a)	15-613395	1623263.361	1762700.712
SWMU 15-007(a)	15-613396	1623238.747	1762763.804
SWMU 15-007(a)	15-613397	1623318.255	1762799.610
SWMU 15-007(a)	15-613398	1623348.173	1762757.246
SWMU 15-007(a)	15-613399	1623347.519	1762696.106
SWMU 15-007(a)	15-613400	1623311.576	1762631.065
SWMU 15-008(a)	15-613403	1626334.864	1760822.062
SWMU 15-008(a)	15-613404	1626334.468	1760834.939
SWMU 15-008(a)	15-613405	1626368.198	1760867.165
SWMU 15-008(a)	15-613406	1626368.251	1760852.271
SWMU 15-008(a)	15-613407	1626370.990	1760800.446
SWMU 15-008(a)	15-613408	1626331.424	1760802.475
SWMU 15-008(a)	15-613409	1626114.323	1760531.606
SWMU 15-008(a)	15-613410	1626154.903	1760534.649
SWMU 15-008(a)	15-613411	1626125.482	1760496.099
SWMU 15-008(a)	15-613412	1626155.917	1760497.113
SWMU 15-008(a)	15-613413	1626146.787	1760510.302
SWMU 15-008(a)	15-613414	1626131.808	1760530.641
AOC 15-008(f)	15-613255	1627625.524	1759965.669
AOC 15-008(f)	15-613256	1627602.926	1759924.241
AOC 15-008(f)	15-613257	1627810.069	1759944.955
AOC 15-008(f)	15-613258	1627578.446	1759850.799
AOC 15-008(f)	15-613259	1627866.238	1759793.619
AOC 15-008(f)	15-613260	1627855.346	1759704.933
AOC 15-008(f)	15-613261	1627808.262	1759485.887
AOC 15-008(f)	15-613262	1627740.394	1759334.825
AOC 15-008(f)	15-613263	1627437.212	1759521.254
AOC 15-008(f)	15-613264	1627471.108	1759624.825
SWMU 15-009(e)	15-613421	1625834.533	1760766.940
SWMU 15-009(e)	15-613423	1625772.017	1760691.804
SWMU 15-009(e)	15-631422	1625821.319	1760737.868

Table 3.2-1 (continued)

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 15-010(a)	15-613427	1623316.225	1762869.235
SWMU 15-010(a)	15-613428	1623312.033	1762872.679
SWMU 15-010(a)	15-613429	1623312.794	1762866.397
SWMU 15-010(a)	15-613430	1623318.621	1762866.809
SWMU 15-010(a)	15-613431	1623318.611	1762872.912
AOC C-15-004	15-613295	1625785.587	1760865.945
AOC C-15-004	15-613296	1625781.775	1760863.579
AOC C-15-005	15-613298	1623259.644	1762956.011
AOC C-15-005	15-613299	1623269.641	1762907.178
AOC C-15-005	15-613300	1623243.109	1762869.880
AOC C-15-005	15-613301	1623234.650	1762917.944
AOC C-15-005	15-613302	1623254.645	1762926.788
AOC C-15-005	15-613303	1623248.108	1762896.412
AOC C-15-006	15-613305	1623358.264	1763011.444
AOC C-15-006	15-613306	1623348.487	1762978.448
AOC C-15-006	15-613307	1623323.434	1762980.281
AOC C-15-006	15-613308	1623330.461	1763006.250
AOC C-15-006	15-613309	1623333.822	1762993.418
AOC C-15-006	15-613310	1623347.265	1762994.029
TA-36			
SWMU 36-001	36-613721	1639111.525	1756032.694
SWMU 36-001	36-613722	1639086.103	1756008.873
SWMU 36-001	36-613723	1639113.927	1756008.873
SWMU 36-001	36-613724	1639051.673	1755986.054
SWMU 36-001	36-613725	1639119.531	1755990.658
SWMU 36-001	36-613726	1639155.562	1755988.856
SWMU 36-001	36-613727	1639069.660	1755949.896
SWMU 36-003(b)	15-613465	1627944.971	1759830.739
SWMU 36-003(b)	15-613466	1627930.834	1759819.517
SWMU 36-003(b)	15-613664	1627976.672	1759846.470
AOC 36-004(a)	15-613265	1630890.364	1758696.322
AOC 36-004(b)	15-613266	1632000.854	1757316.779
AOC 36-004(b)	15-613267	1632896.167	1757129.609
AOC 36-004(b)	15-613268	1632577.856	1757232.490
AOC 36-004(b)	15-613269	1632384.489	1757311.201
AOC 36-004(b)	15-613270	1632251.239	1757301.904
AOC 36-004(c)	15-613279	1632464.952	1756410.266
AOC 36-004(c)	15-613280	1632613.468	1756414.914
AOC 36-004(c)	15-613281	1633860.187	1756503.233

Table 3.2-1 (continued)

SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
AOC 36-004(c)	15-613283	1632161.708	1756391.638
AOC 36-004(c)	15-613284	1632809.303	1756424.609
AOC 36-004(c)	15-613285	1631855.628	1756334.957
AOC 36-004(c)	15-618282	1633160.112	1756483.491
SWMU 36-004(d)	15-613496	1637653.139	1757962.275
SWMU 36-004(d)	15-613497	1637710.616	1757908.832
SWMU 36-004(d)	15-613498	1637781.790	1757835.286
SWMU 36-004(d)	15-613499	1636318.534	1757599.348
SWMU 36-004(d)	15-613500	1636082.138	1757341.011
SWMU 36-004(d)	15-613501	1635923.439	1757191.647
SWMU 36-004(d)	15-613502	1634987.842	1756615.096
SWMU 36-004(d)	15-613503	1634978.200	1756523.579
SWMU 36-004(d)	15-613504	1634843.973	1756223.998
SWMU 36-005	15-613507	1632599.153	1756575.965
SWMU 36-005	15-613508	1632571.748	1756664.576
SWMU 36-005	15-613509	1632504.147	1756533.943
SWMU 36-005	15-613510	1632465.780	1756596.976
SWMU 36-005	15-613511	1632289.471	1756491.921
SWMU 36-005	15-613512	1632315.049	1756416.099
SWMU 36-005	15-613513	1632255.670	1756553.127
SWMU 36-005	36-03020	1632366.173	1756547.542
SWMU 36-005	36-03022	1632400.784	1756477.844
SWMU 36-005	36-03051	1632217.527	1756580.877
SWMU 36-006	15-613514	1630905.695	1758744.404
SWMU 36-006	15-613515	1630957.981	1758718.227
SWMU 36-006	15-613516	1631083.286	1758670.780
SWMU 36-006	15-613517	1631159.588	1758644.007
SWMU 36-006	15-613518	1631200.193	1758628.390
SWMU 36-006	15-613519	1631179.667	1758692.198
SWMU 36-006	15-613520	1631223.396	1758695.321
SWMU 36-006	15-613521	1631077.485	1758716.739
SWMU 36-006	15-613522	1631115.859	1758733.695
SWMU 36-006	15-613523	1630993.598	1758744.850
SWMU 36-006	15-613524	1631036.434	1758750.651
AOC C-36-006(e)	15-613312	1627969.996	1759684.736
AOC C-36-006(e)	15-613313	1628088.903	1759702.259
AOC C-36-006(e)	15-613314	1628077.638	1759604.630
AOC C-36-006(e)	15-613315	1627950.376	1759425.662
AOC C-36-006(e)	15-613316	1627889.161	1759297.635

Table 3.2-2
Field-Screening Results for Samples Collected and Submitted for Off-Site Analysis

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
TA-15												
SWMU 15-002	15-613318	0–1	RE15-11-394	0.0	48	2120	ND[a]	1.2	NA[b]	NA	NA	NA
SWMU 15-002	15-613318	3–4	RE15-11-415	0.0	24	2360	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613318	6–7	RE15-11-396	0.0	42	2380	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613319	0–1	RE15-11-397	0.0	66	2090	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613319	3–4	RE15-11-398	0.0	40	2180	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613319	6–7	RE15-11-399	0.0	78	2270	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613320	0–1	RE15-11-400	0.0	60	2080	ND	1.2	NA	NA	NA	NA
SWMU 15-002	15-613320	3–4	RE15-11-401	0.0	48	2450	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613320	6–7	RE15-11-402	0.0	60	2400	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613321	0–1	RE15-11-403	0.0	66	2100	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613321	3–4	RE15-11-404	0.0	44	2660	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613321	6–7	RE15-11-405	0.0	96	2420	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613322	0–1	RE15-11-406	0.0	30	2140	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613322	3–4	RE15-11-407	0.0	54	2390	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613322	6–7	RE15-11-408	0.0	48	2410	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613671	0–1	RE15-11-2706	0.0	28	1930	2.2	1.2	NA	NA	NA	NA
SWMU 15-002	15-613671	3–4	RE15-11-2728	0.0	60	2200	ND	3.2	NA	NA	NA	NA
SWMU 15-002	15-613671	6–7	RE15-11-2708	0.0	96	2090	ND	3.0	NA	NA	NA	NA
SWMU 15-002	15-613672	0–1	RE15-11-2709	0.0	66	2240	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613672	3–4	RE15-11-2710	0.0	36	2380	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613672	6–7	RE15-11-2711	0.0	66	2540	ND	1.5	NA	NA	NA	NA
SWMU 15-002	15-613673	0–1	RE15-11-2712	0.0	54	1979	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613673	3–4	RE15-11-2713	0.0	54	2570	ND	0.8	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-002	15-613673	5–6	RE15-11-2714	0.0	78	2380	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613674	0–1	RE15-11-2715	0.0	66	2170	0.8	ND	NA	NA	NA	NA
SWMU 15-002	15-613674	3–4	RE15-11-2716	0.0	54	2330	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613674	6–7	RE15-11-2717	0.0	78	2410	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613675	0–1	RE15-11-2718	0.0	60	2080	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613675	3–4	RE15-11-2719	0.0	102	2210	ND	ND	NA	NA	NA	NA
SWMU 15-002	15-613675	6–7	RE15-11-2720	0.0	108	2190	ND	5.6	NA	NA	NA	NA
SWMU 15-007(a)	15-613391	4–5	RE15-11-784	0.0	58	2101	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613391	8–9	RE15-11-805	0.0	36	883	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613392	5–6	RE15-11-804	0.0	46	2000	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613392	9–10	RE15-11-786	0.0	58	3620	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613393	5.5–6.5	RE15-11-787	0.0	29	2150	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613393	9.5–10.5	RE15-11-788	0.0	72	3218	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613394	5–6	RE15-11-789	0.0	23	2030	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613394	9–10	RE15-11-790	0.0	87	3264	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613395	2–3	RE15-11-792	0.1	42	2120	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613395	5–6	RE15-11-793	0.0	36	2770	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613396	2–3	RE15-11-794	0.0	24	2490	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613396	5–6	RE15-11-795	0.0	38	2050	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613397	2–3	RE15-11-796	0.0	42	1848	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613397	5–6	RE15-11-797	0.0	48	2440	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613398	2–3	RE15-11-798	0.0	54	2310	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613398	5–6	RE15-11-799	0.0	48	2410	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613399	2–3	RE15-11-806	0.0	60	2230	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613399	5–6	RE15-11-801	0.0	48	2330	NA	NA	NA	NA	NA	NA
SWMU 15-007(a)	15-613400	2–3	RE15-11-802	0.0	66	2270	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-007(a)	15-613400	5–6	RE15-11-803	0.0	30	2200	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613324	0–0.25	RE15-11-418	0.0	60	2520	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613324	0.25–0.5	RE15-11-419	0.0	24	2540	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613325	0–1	RE15-11-420	0.0	48	2660	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613325	1–2	RE15-11-421	0.0	78	2040	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613326	0–1	RE15-11-422	0.0	84	2630	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613326	1–2	RE15-11-423	0.0	72	2450	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613327	0–1	RE15-11-432	0.0	84	2200	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613327	1–2	RE15-11-425	0.0	48	2560	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613328	0–0.75	RE15-11-426	0.0	42	2210	NA	NA	NA	NA	NA	NA
SWMUs 15-003 and 15-006(a)	15-613328	0.75–1.5	RE15-11-427	0.0	24	2040	NA	NA	NA	NA	NA	NA
SWMUs 15-004(b) and 15-004(c)	15-613330	0–1	RE15-11-440	0.2	82	2810	ND	ND	174.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613330	3–4	RE15-11-441	0.2	134	2950	ND	ND	76.0	ND	69.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613331	0–1	RE15-11-442	0.0	76	2710	ND	ND	290.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613331	3–4	RE15-11-443	0.0	87	2470	ND	1.4	ND	ND	ND	ND

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	15-613332	0–1	RE15-11-444	1.3	52	2500	ND	ND	121.0	43.0	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613332	3–4	RE15-11-445	1.2	52	2430	ND	ND	232.0	47.0	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613333	0–1	RE15-11-446	1.3	52	2490	ND	ND	183.0	ND	14.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613333	3–4	RE15-11-447	0.8	17	2690	ND	ND	237.0	41.0	18.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613334	0–1	RE15-11-448	1.4	117	2380	ND	ND	228.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613334	3–4	RE15-11-449	1.4	52	2730	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613335	0–1	RE15-11-450	1.0	70	2590	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613335	3–4	RE15-11-451	0.0	93	2920	ND	ND	244.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613336	0–1	RE15-11-452	0.0	82	2970	ND	ND	256.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613336	3–4	RE15-11-453	0.0	70	2660	ND	ND	210.0	40.0	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613338	0–1	RE15-11-456	0.0	93	2530	ND	ND	184.0	ND	14.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613338	3–4	RE15-11-457	0.0	52	2690	ND	ND	ND	43.0	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613339	0–1	RE15-11-458	0.0	76	2450	ND	ND	229.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613339	3–4	RE15-11-459	0.0	93	2280	ND	ND	234.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613340	0–1	RE15-11-460	0.0	58	2470	ND	1.0	81.0	ND	ND	ND

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	15-613340	3–4	RE15-11-461	0.0	23	2600	ND	1.2	90.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613341	0–1	RE15-11-462	0.0	61	2440	ND	ND	142.0	ND	16.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613341	3–4	RE15-11-463	0.0	27	2370	ND	ND	208.0	39.0	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613342	0–1	RE15-11-469	0.0	22	2320	ND	2.9	188.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613342	3–4	RE15-11-464	0.0	33	2880	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613343	0–1	RE15-11-466	0.0	55	2200	ND	ND	226.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613343	3–4	RE15-11-467	0.0	33	2740	ND	ND	114.0	ND	14.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613344	0–1	RE15-11-468	0.6	64	2540	ND	1.0	218.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613344	3–4	RE15-11-454	0.0	87	2690	ND	2.9	273.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613345	0–1	RE15-11-470	0.0	55	2490	ND	ND	86.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613345	1–2	RE15-11-471	0.0	38	2810	ND	ND	102.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613346	0–1	RE15-11-472	0.0	16	2600	ND	ND	637.0	ND	351.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613346	3–4	RE15-11-473	0.0	10	2300	ND	ND	262.0	ND	78.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613347	0–1	RE15-11-474	0.0	26	2490	ND	1.5	737.0	ND	483.0	22.0
SWMUs 15-004(b) and 15-004(c)	15-613347	3–4	RE15-11-475	0.0	26	2250	ND	ND	268.0	ND	ND	ND

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	15-613348	0–1	RE15-11-476	0.0	21	2430	ND	ND	247.0	ND	31.0	18.0
SWMUs 15-004(b) and 15-004(c)	15-613348	3–4	RE15-11-477	0.0	21	2640	ND	ND	189.0	ND	18.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613349	0–1	RE15-11-478	0.0	26	2270	ND	ND	458.0	ND	819.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613349	3–4	RE15-11-479	0.0	21	2560	ND	ND	206.0	ND	16.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613350	0–1	RE15-11-480	0.0	32	2280	ND	ND	181.0	ND	274.0	18.0
SWMUs 15-004(b) and 15-004(c)	15-613350	3–4	RE15-11-481	0.0	41	2210	ND	ND	325.0	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15-613351	0–1	RE15-11-482	0.0	26	2340	ND	ND	196.0	ND	27.0	ND
SWMUs 15-004(b) and 15-004(c)	15-613351	3–4	RE15-11-483	0.0	32	2690	ND	ND	ND	ND	96.0	ND
SWMU 15-004(f)	15-02100	3–4	RE15-11-543	0.0	58	3010	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02101	3–4	RE15-11-542	0.0	87	4030	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02112	3–4	RE15-11-540	0.0	123	3130	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02113	0–1	RE15-11-576	0.0	43	2690	ND	1.2	154.0	ND	17.0	24.0
SWMU 15-004(f)	15-02113	3–4	RE15-11-577	0.0	21	2610	ND	1.0	ND	ND	15.0	ND
SWMU 15-004(f)	15-02114	3–4	RE15-11-541	0.0	64	4220	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02115	3–4	RE15-11-544	0.0	105	3110	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02119	3–4	RE15-11-555	0.0	16	2680	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02123	3–4	RE15-11-546	0.0	64	3440	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02124	0–1	RE15-11-572	0.0	53	2210	NA	NA	288.0	2.0	ND	20.0
SWMU 15-004(f)	15-02124	3–4	RE15-11-573	0.0	32	2380	NA	NA	323.0	ND	ND	ND
SWMU 15-004(f)	15-02125	3–4	RE15-11-539	0.0	95	3760	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02127	3–4	RE15-11-545	0.0	82	2990	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02132	0–1	RE15-11-592	0.0	56	2860	ND	ND	ND	ND	ND	53.0
SWMU 15-004(f)	15-02132	1–2	RE15-11-593	0.0	76	3060	ND	ND	ND	ND	ND	31.0
SWMU 15-004(f)	15-02136	0–1	RE15-11-568	0.0	32	2670	NA	NA	86.0	ND	ND	22.0
SWMU 15-004(f)	15-02136	3–4	RE15-11-569	0.0	26	2460	NA	NA	ND	ND	ND	ND
SWMU 15-004(f)	15-02137	3–4	RE15-11-538	0.0	121	4560	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02139	3–4	RE15-11-557	0.0	5	2880	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02141	3–3.5	RE15-11-554	0.0	5	2780	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02142	0–1	RE15-11-595	0.0	71	2340	ND	ND	ND	ND	ND	59.0
SWMU 15-004(f)	15-02142	1–2	RE15-11-596	0.0	40	2290	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02144	3–4	RE15-11-550	0.0	82	3560	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02145	0–1	RE15-11-590	0.0	82	2570	ND	ND	97.0	ND	ND	45.0
SWMU 15-004(f)	15-02145	3–4	RE15-11-591	0.0	58	2130	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02147	3–4	RE15-11-548	0.0	41	3930	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02148	0–1	RE15-11-574	0.0	32	2810	ND	ND	184.0	ND	19.0	23.0
SWMU 15-004(f)	15-02148	3–4	RE15-11-575	0.0	46	2260	ND	ND	ND	ND	21.0	ND
SWMU 15-004(f)	15-02149	3–4	RE15-11-529	0.0	134	3310	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02150	0–1	RE15-11-582	0.0	71	1942	ND	ND	354.0	ND	18.0	25.0
SWMU 15-004(f)	15-02150	3–4	RE15-11-583	0.0	51	2030	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02151	3–4	RE15-11-535	0.0	83	4250	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02152	3–4	RE15-11-536	0.0	100	4257	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02153	3–4	RE15-11-558	0.0	21	3670	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02155	3–4	RE15-11-551	0.0	29	3440	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02156	0–1	RE15-11-586	0.0	68	2261	1.1	ND	159.0	ND	17.0	58.0
SWMU 15-004(f)	15-02156	3–4	RE15-11-587	0.0	53	2370	ND	ND	ND	ND	16.0	ND
SWMU 15-004(f)	15-02157	3–4	RE15-11-549	0.0	45	3141	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02162	0–1	RE15-11-580	0.0	81	2290	ND	ND	72.0	ND	ND	31.0
SWMU 15-004(f)	15-02162	3–4	RE15-11-581	0.0	40	2130	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02166	3–3.5	RE15-11-552	0.0	64	3350	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02167	3–3.5	RE15-11-553	0.0	99	3500	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02170	3–4	RE15-11-526	0.0	61	2770	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02171	0–1	RE15-11-578	0.0	102	5190	ND	ND	119.0	ND	ND	29.0
SWMU 15-004(f)	15-02171	1–2	RE15-11-579	0.0	68	2190	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02172	3–4	RE15-11-528	2.5	64	3330	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02173	3–4	RE15-11-532	0.0	49	4410	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02177	3–3.5	RE15-11-560	0.0	32	3720	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02178	3–3.5	RE15-11-559	0.0	37	3560	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02179	3–3.5	RE15-11-561	0.0	37	2900	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02180	3–4	RE15-11-524	0.0	27	2650	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02191	3–4	RE15-11-523	0.0	55	2890	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02196	3–4	RE15-11-547	0.0	35	4050	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02198	3–4	RE15-11-556	0.0	37	3260	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02203	0–1	RE15-11-670	0.0	86	2340	ND	ND	243.0	ND	15.0	23.0
SWMU 15-004(f)	15-02203	3–4	RE15-11-594	0.0	40	1971	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02206	3–3.5	RE15-11-562	0.0	37	3120	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02226	3–4	RE15-11-537	0.0	97	4820	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02228	3–4	RE15-11-533	0.0	55	3840	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02229	0–1	RE15-11-588	0.0	121	4678	ND	ND	77.0	17.0	20.0	80.0
SWMU 15-004(f)	15-02229	1–2	RE15-11-589	0.0	48	2410	ND	ND	ND	ND	21.0	ND
SWMU 15-004(f)	15-02230	0–0.5	RE15-11-597	0.0	92	2870	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02230	0.5–1	RE15-11-598	0.0	111	2700	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02231	3–4	RE15-11-527	67.9	82	3640	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02240	3–4	RE15-11-531	0.0	70	2940	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02241	3–4	RE15-11-530	0.0	52	2740	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02277	3–3.5	RE15-11-565	0.0	32	2760	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02278	3–4	RE15-11-525	0.0	27	2380	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02279	0–1	RE15-11-584	0.0	107	3620	ND	ND	96.0	4.0	ND	30.0
SWMU 15-004(f)	15-02279	3–4	RE15-11-585	0.0	68	2530	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02295	3–4	RE15-11-534	0.0	77	4110	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-02299	3–4	RE15-11-563	0.0	43	2590	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613365	10.5–11	RE15-11-604	0.0	55	4120	NA	NA	ND	ND	ND	ND
SWMU 15-004(f)	15-613365	0–1	RE15-11-671	0.0	98	4760	NA	NA	189.0	200.0	28.0	278.0
SWMU 15-004(f)	15-613365	6–7	RE15-11-672	0.0	106	4680	NA	NA	ND	ND	ND	28.0
SWMU 15-004(f)	15-613365	9–10	RE15-11-673	0.0	106	4860	NA	NA	ND	ND	15.0	17.0
SWMU 15-004(f)	15-613366	0–1	RE15-11-674	0.0	159	4060	NA	NA	229.0	ND	ND	129.0
SWMU 15-004(f)	15-613366	6–7	RE15-11-675	0.0	123	3990	NA	NA	190.0	53.0	ND	33.0
SWMU 15-004(f)	15-613366	9–10	RE15-11-676	0.0	105	4490	NA	NA	323.0	124.0	15.0	69.0
SWMU 15-004(f)	15-613367	0–1	RE15-11-677	0.0	1140	140000	NA	NA	ND	3822.0	206.0	4972.0
SWMU 15-004(f)	15-613367	2–3	RE15-11-678	0.0	648	101900	NA	NA	ND	798.0	120.0	3383.0
SWMU 15-004(f)	15-613368	0–1	RE15-11-680	0.0	149	15570	NA	NA	109.0	331.0	26.0	555.0
SWMU 15-004(f)	15-613368	6–7	RE15-11-681	0.0	0	1924	NA	NA	168.0	50.0	ND	33.0
SWMU 15-004(f)	15-613368	9–10	RE15-11-682	0.0	98	4340	NA	NA	ND	36.0	20.0	ND
SWMU 15-004(f)	15-613369	0–1	RE15-11-683	0.0	105	4130	NA	NA	229.0	ND	ND	47.0
SWMU 15-004(f)	15-613369	6–7	RE15-11-684	0.0	58	3340	NA	NA	228.0	15.0	ND	30.0
SWMU 15-004(f)	15-613369	9–10	RE15-11-685	0.0	152	4460	NA	NA	185.0	18.0	23.0	62.0
SWMU 15-004(f)	15-613369	11–12	RE15-11-600	0.0	38	3010	NA	NA	293.0	36.0	17.0	ND
SWMU 15-004(f)	15-613370	0–1	RE15-11-686	0.0	66	3710	NA	NA	208.0	16.0	17.0	103.0
SWMU 15-004(f)	15-613370	6–7	RE15-11-687	0.0	49	3300	NA	NA	198.0	95.0	ND	78.0

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-613370	8–8.5	RE15-11-688	0.0	266	22000	NA	NA	88.0	493.0	45.0	1085.0
SWMU 15-004(f)	15-613371	0–1	RE15-11-689	0.0	55	4560	NA	NA	121.0	1764.0	125.0	1421.0
SWMU 15-004(f)	15-613371	6–7	RE15-11-690	0.0	16	2280	NA	NA	ND	39.0	ND	78.0
SWMU 15-004(f)	15-613371	9–10	RE15-11-691	0.0	16	2000	NA	NA	ND	ND	ND	ND
SWMU 15-004(f)	15-613372	0–1	RE15-11-692	0.0	123	5790	NA	NA	234.0	21.0	ND	116.0
SWMU 15-004(f)	15-613372	6–7	RE15-11-693	0.0	134	4420	NA	NA	302.0	13.0	ND	45.0
SWMU 15-004(f)	15-613372	9–10	RE15-11-694	0.0	159	4170	NA	NA	356.0	33.0	ND	36.0
SWMU 15-004(f)	15-613372	10.9–11.1	RE15-11-603	0.0	44	5470	NA	NA	261.0	68.0	16.0	107.0
SWMU 15-004(f)	15-613373	0–1	RE15-11-695	0.0	26	5770	NA	NA	128.0	44.0	19.0	260.0
SWMU 15-004(f)	15-613373	6–6.25	RE15-11-696	0.0	43	5100	NA	NA	719.0	117.0	55.0	162.0
SWMU 15-004(f)	15-613374	0–1	RE15-11-698	0.0	110	8810	NA	NA	124.0	34.0	ND	335.0
SWMU 15-004(f)	15-613374	6–7	RE15-11-699	0.0	77	4320	NA	NA	183.0	49.0	ND	58.0
SWMU 15-004(f)	15-613374	8–8.5	RE15-11-700	0.0	210	15570	NA	NA	317.0	1849.0	84.0	864.0
SWMU 15-004(f)	15-613375	0–1	RE15-11-701	0.0	240	8760	NA	NA	155.0	69.0	17.0	406.0
SWMU 15-004(f)	15-613375	6–7	RE15-11-702	0.0	111	3900	NA	NA	197.0	ND	ND	ND
SWMU 15-004(f)	15-613375	9–10	RE15-11-703	0.0	117	4850	NA	NA	228.0	8.0	15.0	47.0
SWMU 15-004(f)	15-613375	11–12	RE15-11-599	0.0	38	3310	NA	NA	352.0	1.0	ND	30.0
SWMU 15-004(f)	15-613376	0–1	RE15-11-704	0.0	257	12900	NA	NA	118.0	237.0	18.0	381.0
SWMU 15-004(f)	15-613376	6–7	RE15-11-705	0.0	181	7770	NA	NA	ND	ND	10.0	128.0
SWMU 15-004(f)	15-613376	8.25–9.25	RE15-11-706	0.0	26	6420	NA	NA	88.0	48.0	ND	307.0
SWMU 15-004(f)	15-613376	10–11	RE15-11-601	0.0	105	4830	NA	NA	99.0	ND	6.0	69.0
SWMU 15-004(f)	15-613377	0–1	RE15-11-707	0.0	72	5380	NA	NA	281.0	76.0	17.0	246.0
SWMU 15-004(f)	15-613377	3–3.5	RE15-11-708	0.0	44	4320	NA	NA	190.0	63.0	ND	104.0
SWMU 15-004(f)	15-613378	0–1	RE15-11-710	0.0	140	4160	NA	NA	262.0	ND	ND	52.0
SWMU 15-004(f)	15-613378	6–7	RE15-11-711	0.0	128	2830	NA	NA	181.0	ND	ND	ND
SWMU 15-004(f)	15-613378	9–10	RE15-11-712	0.0	87	3060	NA	NA	160.0	ND	ND	ND

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-613379	0–1	RE15-11-713	0.0	86	8270	NA	NA	215.0	84.0	36.0	396.0
SWMU 15-004(f)	15-613379	6–7	RE15-11-714	0.0	32	3220	NA	NA	441.0	ND	ND	ND
SWMU 15-004(f)	15-613379	9–10	RE15-11-715	0.0	43	3500	NA	NA	89.0	ND	18.0	ND
SWMU 15-004(f)	15-613380	0–1	RE15-11-716	0.0	75	5080	NA	NA	228.0	50.0	21.0	213.0
SWMU 15-004(f)	15-613380	6–7	RE15-11-717	0.0	16	3500	NA	NA	254.0	60.0	19.0	41.0
SWMU 15-004(f)	15-613380	9–9.5	RE15-11-718	0.0	80	10280	NA	NA	355.0	72.0	50.0	463.0
SWMU 15-004(f)	15-613381	0–1	RE15-11-725	0.0	369	19980	NA	NA	222.0	55.0	21.0	456.0
SWMU 15-004(f)	15-613381	6–7	RE15-11-720	0.0	111	3140	NA	NA	285.0	3.0	14.0	ND
SWMU 15-004(f)	15-613381	9–10	RE15-11-721	0.0	175	7210	NA	NA	312.0	163.0	45.0	154.0
SWMU 15-004(f)	15-613381	11–12	RE15-11-602	0.0	88	3160	NA	NA	257.0	ND	ND	ND
SWMU 15-004(f)	15-613382	0–1	RE15-11-722	0.0	140	15870	NA	NA	324.0	76.0	ND	809.0
SWMU 15-004(f)	15-613382	6–7	RE15-11-723	0.0	91	3030	NA	NA	219.0	ND	ND	ND
SWMU 15-004(f)	15-613382	9–10	RE15-11-724	0.0	70	4040	NA	NA	ND	ND	ND	ND
SWMU 15-004(f)	15-613384	0–0.5	RE15-11-728	0.3	27	2080	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613384	0.5–1	RE15-11-729	0.8	33	2450	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613385	0–1	RE15-11-730	0.9	55	2270	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613385	1–1.5	RE15-11-731	0.6	55	2140	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613386	0–1	RE15-11-732	0.4	38	4300	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613386	1–2	RE15-11-733	2.4	61	5400	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613387	0–1	RE15-11-734	0.7	72	2330	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613387	2–3	RE15-11-735	1.1	88	2110	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613388	0–1	RE15-11-736	0.2	72	2710	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613388	1–1.5	RE15-11-737	3.2	49	2140	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613389	0–0.5	RE15-11-740	0.3	110	7060	NA	NA	NA	NA	NA	NA
SWMU 15-004(f)	15-613389	0.5–1	RE15-11-739	1.6	105	10150	NA	NA	NA	NA	NA	NA
SWMU 15-008(a)	15-613403	0–1	RE15-11-816	0.0	96	2970	ND	ND	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-008(a)	15-613403	1–2	RE15-11-817	0.0	78	3190	ND	1.3	NA	NA	NA	NA
SWMU 15-008(a)	15-613404	0–1	RE15-11-818	0.5	78	3160	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613404	1–2	RE15-11-819	0.0	114	3000	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613405	0–1	RE15-11-820	0.1	126	3830	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613405	1–2	RE15-11-821	0.0	108	5510	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613406	0–1	RE15-11-840	0.0	66	5120	ND	1.7	NA	NA	NA	NA
SWMU 15-008(a)	15-613406	1–2	RE15-11-823	0.0	126	4350	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613407	0–1	RE15-11-824	0.0	2460	16660	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613407	2–3	RE15-11-825	0.0	174	10610	ND	0.8	NA	NA	NA	NA
SWMU 15-008(a)	15-613408	0–1	RE15-11-826	0.0	78	6860	0.7	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613408	1–2	RE15-11-827	0.0	126	4600	ND	1.0	NA	NA	NA	NA
SWMU 15-008(a)	15-613409	0–1	RE15-11-828	0.0	60	3620	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613409	1–2	RE15-11-829	0.0	42	3180	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613410	0–1	RE15-11-830	0.0	60	3010	ND	0.9	NA	NA	NA	NA
SWMU 15-008(a)	15-613410	3–4	RE15-11-831	0.0	48	4180	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613411	0–1	RE15-11-832	0.0	60	2550	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613411	3–4	RE15-11-833	0.0	72	3920	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613412	0–1	RE15-11-834	0.0	78	5600	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613412	3–4	RE15-11-835	0.0	46	4860	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613413	0–1	RE15-11-836	3.0	132	6400	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613413	1–2	RE15-11-837	0.0	42	4580	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613414	0–1	RE15-11-841	0.0	144	5950	ND	ND	NA	NA	NA	NA
SWMU 15-008(a)	15-613414	1–2	RE15-11-839	0.0	77	4520	ND	ND	NA	NA	NA	NA
AOC 15-005(b)	15-613251	0–1	RE15-11-217	0.0	33	2370	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613251	4–5	RE15-11-218	0.0	38	3240	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613252	0–1	RE15-11-219	0.0	77	2380	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
AOC 15-005(b)	15-613252	4–5	RE15-11-220	0.0	38	3630	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613253	0–1	RE15-11-281	0.0	44	2660	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613253	4–5	RE15-11-222	0.0	44	3070	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613254	0–1	RE15-11-223	0.0	49	2810	NA	NA	NA	NA	NA	NA
AOC 15-005(b)	15-613254	4–5	RE15-11-224	1.0	33	2840	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613255	0–1	RE15-11-231	0.0	72	2780	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613255	1–2	RE15-11-232	0.0	94	2260	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613256	0–1	RE15-11-233	0.0	49	3860	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613256	1–2	RE15-11-234	0.0	44	3010	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613257	0–1	RE15-11-283	0.0	27	2860	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613257	1.5–2.5	RE15-11-236	0.0	44	2490	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613258	0–1	RE15-11-237	0.0	33	2650	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613258	1–2	RE15-11-238	0.0	27	2270	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613259	0–1	RE15-11-239	0.0	44	3010	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613259	1.5–2.5	RE15-11-240	0.0	33	2710	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613260	0–0.5	RE15-11-241	0.0	94	6120	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613260	0.5–1	RE15-11-242	0.0	61	4910	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613261	0–1	RE15-11-243	0.0	44	2130	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613261	1–2	RE15-11-244	0.4	61	1912	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613262	0–1	RE15-11-245	0.0	33	2140	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613262	1.5–2.5	RE15-11-246	0.0	38	2210	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613263	0–0.5	RE15-11-247	0.0	43	2110	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613263	0.5–1	RE15-11-248	0.0	49	2390	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613264	0–1	RE15-11-249	0.0	38	2330	NA	NA	NA	NA	NA	NA
AOC 15-008(f)	15-613264	1–2	RE15-11-250	0.0	27	717	NA	NA	NA	NA	NA	NA
SWMU 15-009(e)	15-613421	0–1	RE15-11-861	0.0	61	2110	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-009(e)	15-613421	2.5–3	RE15-11-862	0.0	83	2200	NA	NA	NA	NA	NA	NA
SWMU 15-009(e)	15-613422	0–0.5	RE15-11-863	0.0	49	2450	NA	NA	NA	NA	NA	NA
SWMU 15-009(e)	15-613422	0.5–1	RE15-11-864	0.0	49	2340	NA	NA	NA	NA	NA	NA
SWMU 15-009(e)	15-613423	0–1	RE15-11-870	0.0	16	2770	NA	NA	NA	NA	NA	NA
SWMU 15-009(e)	15-613423	2–2.5	RE15-11-866	0.0	33	2420	NA	NA	NA	NA	NA	NA
SWMU 15-010(a)	15-613427	4–5	RE15-11-902	0.0	30	1548	ND	ND	ND	ND	27.0	ND
SWMU 15-010(a)	15-613427	7–8	RE15-11-883	0.0	54	2480	ND	ND	104.0	ND	14.0	ND
SWMU 15-010(a)	15-613428	4–5	RE15-11-884	0.0	72	2390	ND	ND	25.0	ND	32.0	ND
SWMU 15-010(a)	15-613428	7–8	RE15-11-885	0.0	96	2480	ND	ND	ND	ND	23.0	ND
SWMU 15-010(a)	15-613429	4–5	RE15-11-886	0.0	36	2430	ND	ND	184.0	27.0	ND	ND
SWMU 15-010(a)	15-613429	7–8	RE15-11-887	0.0	36	2010	ND	ND	ND	ND	111.0	ND
SWMU 15-010(a)	15-613429	9–9.5	RE15-11-2947	0.0	33	3960	ND	ND	89.0	ND	71.0	ND
SWMU 15-010(a)	15-613430	4–5	RE15-11-888	0.0	84	2250	ND	ND	168.0	ND	16.0	ND
SWMU 15-010(a)	15-613430	6–7	RE15-11-889	0.0	72	2330	ND	ND	ND	ND	ND	ND
SWMU 15-010(a)	15-613431	4–5	RE15-11-890	0.0	72	2320	ND	ND	261.0	11.0	18.0	ND
SWMU 15-010(a)	15-613431	7–8	RE15-11-891	0.0	90	2560	ND	ND	198.0	ND	ND	ND
AOC C-15-004	15-613295	0–1	RE15-11-333	0.1	61	2220	NA	NA	NA	NA	NA	NA
AOC C-15-004	15-613295	2–3	RE15-11-334	0.1	38	1905	NA	NA	NA	NA	NA	NA
AOC C-15-004	15-613296	2–3	RE15-11-336	0.1	88	2370	NA	NA	NA	NA	NA	NA
AOC C-15-004	15-613296	0–1	RE15-11-339	0.1	49	2420	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613298	0–1	RE15-11-341	0.0	48	2010	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613298	2–3	RE15-11-342	0.0	54	2210	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613299	0.5–1.5	RE15-11-343	0.0	84	2350	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613299	2.5–3.5	RE15-11-344	0.0	48	2440	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613300	0–1	RE15-11-345	0.0	66	2210	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613300	2–3	RE15-11-346	0.0	54	2390	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
AOC C-15-005	15-613301	0–1	RE15-11-347	0.0	42	2450	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613301	2–3	RE15-11-348	0.0	78	2390	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613302	0–1	RE15-11-349	0.0	78	2160	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613302	2–3	RE15-11-350	0.0	102	2440	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613303	0–1	RE15-11-357	0.0	66	2230	NA	NA	NA	NA	NA	NA
AOC C-15-005	15-613303	2–3	RE15-11-352	0.0	102	2520	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613305	0–1	RE15-11-360	0.0	36	1968	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613305	2–3	RE15-11-361	0.0	12	1991	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613306	0–1	RE15-11-362	0.0	48	2200	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613306	2–3	RE15-11-363	0.0	60	2160	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613307	0–1	RE15-11-364	0.0	36	2150	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613307	2–3	RE15-11-365	0.0	60	2015	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613308	0–1	RE15-11-366	0.0	22	2270	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613308	2–3	RE15-11-367	0.0	66	2280	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613309	0–1	RE15-11-368	0.0	30	1962	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613309	2–3	RE15-11-369	0.0	48	1911	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613310	0–1	RE15-11-376	0.0	72	2110	NA	NA	NA	NA	NA	NA
AOC C-15-006	15-613310	2–3	RE15-11-371	0.0	60	2010	NA	NA	NA	NA	NA	NA
TA-36												
SWMU 36-001	36-613721	2–4	RE36-11-2862	0.0	126	7450	ND	ND	ND	4498.0	132.0	682.0
SWMU 36-001	36-613721	5–6.5	RE36-11-2863	0.0	48	3010	ND	ND	ND	47.0	14.0	38.0
SWMU 36-001	36-613721	10–11.5	RE36-11-2864	0.0	60	2630	ND	ND	63.0	ND	19.0	ND
SWMU 36-001	36-613722	0–1.5	RE36-11-2865	0.0	48	2110	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613722	5–6.5	RE36-11-2866	0.0	66	2400	ND	ND	93.0	ND	ND	ND
SWMU 36-001	36-613722	10–11.5	RE36-11-2867	0.0	108	2540	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613723	0–1.5	RE36-11-2868	0.0	102	2280	ND	ND	ND	ND	ND	ND

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 36-001	36-613723	5–6	RE36-11-2869	0.0	108	2170	ND	ND	63.0	397.0	43.0	ND
SWMU 36-001	36-613723	10–11.5	RE36-11-2870	0.0	114	2470	ND	ND	ND	10.0	ND	ND
SWMU 36-001	36-613724	0–1.5	RE36-11-2871	0.0	60	2380	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613724	5–6.5	RE36-11-2872	0.0	72	1397	4.1	2.0	ND	116.0	28.0	ND
SWMU 36-001	36-613724	10–11.5	RE36-11-2873	0.0	33	5700	ND	1.0	173.0	ND	ND	ND
SWMU 36-001	36-613725	0–1	RE36-11-2874	0.0	40	2380	ND	1.3	61.0	ND	ND	ND
SWMU 36-001	36-613725	5–6.5	RE36-11-2875	0.0	46	5450	ND	1.1	ND	ND	ND	ND
SWMU 36-001	36-613725	10–11.5	RE36-11-2876	0.0	46	2850	ND	2.0	ND	ND	ND	ND
SWMU 36-001	36-613726	0–1.5	RE36-11-2877	0.0	46	2550	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613726	5–6.5	RE36-11-2878	0.0	30	2710	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613726	10–11.5	RE36-11-2879	0.0	25	2210	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613727	0–1.5	RE36-11-2880	0.0	56	2680	ND	ND	ND	ND	ND	ND
SWMU 36-001	36-613727	5–6.5	RE36-11-2881	0.0	46	2550	ND	2.0	ND	52.0	ND	63.0
SWMU 36-001	36-613727	10–11.5	RE36-11-2882	0.0	40	2530	ND	ND	ND	55.0	ND	25.0
SWMU 36-001	36-613727	13.5–15	RE36-11-2949	0.0	33	5740	ND	ND	104.0	28.0	13.0	ND
SWMU 36-003(b)	15-613464	0–1	RE15-11-975	0.0	41	1707	NA	NA	NA	NA	NA	NA
SWMU 36-003(b)	15-613464	3–4	RE15-11-976	0.0	47	1964	NA	NA	NA	NA	NA	NA
SWMU 36-003(b)	15-613465	0–1	RE15-11-983	0.0	41	1905	NA	NA	NA	NA	NA	NA
SWMU 36-003(b)	15-613465	3–4	RE15-11-978	0.0	43	2000	NA	NA	NA	NA	NA	NA
SWMU 36-003(b)	15-613466	0–1	RE15-11-979	0.0	65	2190	NA	NA	NA	NA	NA	NA
SWMU 36-003(b)	15-613466	3–4	RE15-11-980	0.0	59	1776	NA	NA	NA	NA	NA	NA
AOC 36-004(a)	15-613265	0–1	RE15-11-259	0.0	44	3120	NA	NA	NA	NA	NA	NA
AOC 36-004(a)	15-613265	2–3	RE15-11-285	0.0	44	2880	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613514	0–1	RE15-11-1144	0.0	49	2840	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613514	2–3	RE15-11-1145	0.0	72	2970	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613515	0–1	RE15-11-1146	0.0	88	3260	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 36-006	15-613515	2–3	RE15-11-1147	0.0	61	3040	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613516	0–1	RE15-11-1148	0.0	127	2670	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613516	2–3	RE15-11-1149	0.0	55	3230	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613517	0–1	RE15-11-1150	0.0	55	3040	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613517	2–3	RE15-11-1151	0.0	122	3060	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613518	0–1	RE15-11-1166	0.0	72	2660	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613518	2–3	RE15-11-1153	65.0	27	3150	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613519	0–1	RE15-11-1167	0.0	66	2790	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613519	2–3	RE15-11-1155	0.0	27	2570	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613520	0–1	RE15-11-1156	0.1	61	2610	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613520	2–3	RE15-11-1157	0.0	72	2940	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613521	0–1	RE15-11-1158	0.0	72	2590	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613521	2–3	RE15-11-1159	0.4	33	2900	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613522	0–1	RE15-11-1160	0.0	44	2680	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613522	2–3	RE15-11-1161	0.9	44	2780	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613523	0–1	RE15-11-1162	0.0	116	2570	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613523	2–3	RE15-11-1163	0.0	88	3190	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613524	0–1	RE15-11-1164	0.0	66	2810	NA	NA	NA	NA	NA	NA
SWMU 36-006	15-613524	2–3	RE15-11-1165	0.0	77	2960	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613266	0–1	RE15-11-291	0.0	49	4340	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613266	2–3	RE15-11-266	0.0	44	2420	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613267	0–1	RE15-11-267	0.0	43	2320	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613267	2–3	RE15-11-268	0.0	49	2450	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613268	0–1	RE15-11-269	0.0	22	2010	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613268	1–2	RE15-11-270	0.0	16	2140	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613269	0–1	RE15-11-271	0.0	49	2310	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
AOC 36-004(b)	15-613269	1–2	RE15-11-272	0.0	22	2110	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613270	0–1	RE15-11-273	0.0	27	2350	NA	NA	NA	NA	NA	NA
AOC 36-004(b)	15-613270	1–2	RE15-11-274	0.0	22	2650	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	16-613279	0–0.25	RE15-11-295	0.0	27	2780	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613279	0.25–0.5	RE15-11-296	0.0	22	2570	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613280	0–0.25	RE15-11-297	0.0	22	2870	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613280	0.25–0.5	RE15-11-298	0.0	38	2430	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613281	0–1	RE15-11-299	0.0	27	2660	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613281	2–3	RE15-11-300	0.0	26	2090	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613282	0–0.5	RE15-11-301	0.0	27	2150	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613282	0.5–1	RE15-11-302	0.0	22	3060	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613283	0–1	RE15-11-313	0.0	38	2740	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613283	2–3	RE15-11-304	0.0	27	2620	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613284	0–1	RE15-11-305	0.0	15	3710	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613284	1–2	RE15-11-306	0.0	22	3780	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613285	0–1	RE15-11-307	0.0	38	3750	NA	NA	NA	NA	NA	NA
AOC 36-004 (c)	15-613285	2–3	RE15-11-308	0.0	44	2950	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613496	0–1	RE15-11-1001	0.0	33	3200	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613496	2–3	RE15-11-1002	0.0	44	3030	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613497	0–1	RE15-11-1019	0.0	49	3000	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613497	2–3	RE15-11-1004	0.2	49	3090	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613498	0–1	RE15-11-1005	0.0	16	2640	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613498	2–3	RE15-11-1006	0.0	15	2880	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613499	0–1	RE15-11-1007	0.4	27	3200	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613499	2–3	RE15-11-1008	1.8	27	2470	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613500	0–0.25	RE15-11-1009	0.3	27	3170	NA	NA	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 36-004(d)	15-613500	0.25–0.5	RE15-11-1010	0.3	44	3070	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613501	0–1	RE15-11-1011	0.0	61	2940	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613501	1–2	RE15-11-1012	0.1	44	2620	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613502	0.25–0.5	RE15-11-1014	0.2	44	4230	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613502	0–0.25	RE15-11-1020	0.2	55	3840	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613503	0–1	RE15-11-1015	0.1	38	2240	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613503	1–2	RE15-11-1016	0.0	16	2280	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613504	0–1	RE15-11-1017	0.1	22	2440	NA	NA	NA	NA	NA	NA
SWMU 36-004(d)	15-613504	1–2	RE15-11-1018	0.0	38	2340	NA	NA	NA	NA	NA	NA
SWMU 36-005	15-613507	0–1	RE15-11-1091	0.0	102	2470	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613507	2–3	RE15-11-1092	0.0	60	2400	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613507	4–5	RE15-11-1093	0.0	24	2450	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613508	0–1	RE15-11-1094	0.0	90	2050	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613508	2–3	RE15-11-1095	0.0	42	2640	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613508	4–5	RE15-11-1096	0.0	90	2390	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613509	0–1	RE15-11-1097	0.0	90	2360	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613509	2–3	RE15-11-1098	0.0	54	2960	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613509	4–5	RE15-11-1099	0.0	72	2630	ND	0.9	NA	NA	NA	NA
SWMU 36-005	15-613510	0–1	RE15-11-1100	0.0	114	2310	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613510	2–3	RE15-11-1101	0.0	54	2560	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613510	4–5	RE15-11-1102	0.0	66	2860	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613511	0–1	RE15-11-1103	0.0	66	2550	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613511	2–3	RE15-11-1104	0.0	72	2450	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613511	4–5	RE15-11-1105	0.0	126	2570	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613512	0–1	RE15-11-1106	0.0	42	2550	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613512	2–3	RE15-11-1107	0.0	90	2770	ND	ND	NA	NA	NA	NA

Table 3.2-2 (continued)

SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)	Beta/ Gamma (dpm)	HE (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 36-005	15-613512	4–5	RE15-11-1108	0.0	66	2550	ND	0.8	NA	NA	NA	NA
SWMU 36-005	15-613513	0–1	RE15-11-1109	0.0	66	2290	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613513	2–3	RE15-11-1110	0.0	72	2900	ND	ND	NA	NA	NA	NA
SWMU 36-005	15-613513	4–5	RE15-11-1111	0.0	60	2470	ND	1.1	NA	NA	NA	NA
SWMU 36-005	36-03020	0–1	RE15-11-1120	0.0	53	1948	ND	ND	NA	NA	NA	NA
SWMU 36-005	36-03020	1–2	RE15-11-1121	0.0	83	1750	ND	ND	NA	NA	NA	NA
SWMU 36-005	36-03022	0–0.5	RE15-11-1118	0.0	53	1819	ND	ND	NA	NA	NA	NA
SWMU 36-005	36-03022	0.5–1	RE15-11-1119	0.0	53	1572	ND	ND	NA	NA	NA	NA
SWMU 36-005	36-03051	0–1	RE15-11-1058	0.0	23	1390	ND	1.5	NA	NA	NA	NA
SWMU 36-005	36-03051	2–3	RE15-11-1059	0.0	41	1787	ND	2.0	NA	NA	NA	NA
SWMU 36-005	36-03051	4–5	RE15-11-1060	0.0	89	1803	ND	2.0	NA	NA	NA	NA
AOC C-36-006(e)	15-613312	0–1	RE15-11-392	0.0	55	3050	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613312	2–3	RE15-11-379	0.0	38	2820	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613313	0–1	RE15-11-380	0.0	27	2690	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613313	2–3	RE15-11-381	0.0	27	3740	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613314	0–0.25	RE15-11-382	0.0	44	4000	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613314	0.25–0.5	RE15-11-383	0.0	44	2880	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613315	0–0.5	RE15-11-384	0.0	33	2230	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613315	0.5–1	RE15-11-385	0.0	32	1970	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613316	0–0.5	RE15-11-386	0.0	61	2080	NA	NA	NA	NA	NA	NA
AOC C-36-006(e)	15-613316	0.5–1	RE15-11-387	0.0	49	2080	NA	NA	NA	NA	NA	NA

[a] ND = Not detected.

[b] NA = Not analyzed.

Table 6.2-1
Samples Collected and Analyses Requested at SWMU 15-002

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	TPH-DRO	TPH-GRO	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Thorium
RE15-11-394	15-613318	0–1	Fill	11-897	11-895	11-895	11-895	11-895	—*	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-415	15-613318	3–4	Qbt 4	11-897	11-895	11-895	11-895	11-895	11-895	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-396	15-613318	6–7	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-397	15-613319	0–1	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-398	15-613319	3–4	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-399	15-613319	6–7	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-400	15-613320	0–1	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-401	15-613320	3–4	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-402	15-613320	6–7	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-403	15-613321	0–1	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-404	15-613321	3–4	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-405	15-613321	6–7	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-406	15-613322	0–1	Fill	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-407	15-613322	3–4	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-408	15-613322	6–7	Qbt 4	11-897	11-895	11-895	11-895	11-895	—	11-895	11-896	11-897	11-897	11-897	11-898	11-898
RE15-11-2706	15-613671	0–1	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2728	15-613671	3–4	Fill	11-901	11-899	11-899	11-899	11-899	11-899	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2708	15-613671	6–7	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2709	15-613672	0–1	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2710	15-613672	3–4	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2711	15-613672	6–7	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2712	15-613673	0–1	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902

Table 6.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	TPH-DRO	TPH-GRO	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Thorium
RE15-11-2713	15-613673	3–4	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2714	15-613673	5–6	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2715	15-613674	0–1	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2716	15-613674	3–4	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2717	15-613674	6–7	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2718	15-613675	0–1	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2719	15-613675	3–4	Fill	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902
RE15-11-2720	15-613675	6–7	Qbt 4	11-901	11-899	11-899	11-899	11-899	—	11-899	11-900	11-901	11-901	11-901	11-902	11-902

* — = Analysis not requested.

Table 6.2-2
Inorganic Chemicals above BVs at SWMU 15-002

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na[b]**	**na**	**3500**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**3460**	**1.52**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**217000**	**800**	**na**	**463**	**69.5[e]**	**6190**	**496000**	**217**	**na**	**1550**	**20.4**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**795000**	**800**	**na**	**145000**	**310[f]**	**22700**	**1820000**	**795**	**na**	**5680**	**74.9**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**54800**	**400**	**na**	**10700**	**23[f]**	**1560**	**125000**	**54.8**	**na**	**391**	**5.16**	**391**	**23500**
RE15-11-394	15-613318	0–1	Fill	—[g]	—	—	—	—	—	—	—	—	0.52 (U)	—	—	—	—	1.29 (J)	—	0.71	—	—	—	—	—	—
RE15-11-415	15-613318	3–4	Qbt 4	12200	0.73 (U)	3.2	122	—	2470 (J+)	10.2	3.8	7.4	0.55 (U)	—	19.6	2050	—	0.47 (J)	7.8	0.17 (J)	—	—	1.4	—	18.7	—
RE15-11-396	15-613318	6–7	Qbt 4	—	—	—	—	—	2600 (J+)	9.1	—	—	0.52 (U)	—	12.1	—	—	0.302 (J)	—	0.1 (J)	—	—	1.7	—	—	—
RE15-11-397	15-613319	0–1	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.906 (J)	—	0.97	—	—	—	—	—	—
RE15-11-398	15-613319	3–4	Fill	—	—	—	—	—	—	—	—	—	0.53 (U)	—	32.1	—	—	0.243 (J)	—	0.22	—	—	—	—	—	—
RE15-11-399	15-613319	6–7	Qbt 4	—	—	—	—	—	—	7.6	—	—	0.53 (U)	—	13.6	—	—	0.351 (J)	—	0.09 (J)	—	—	1.8	—	—	—
RE15-11-400	15-613320	0–1	Fill	—	—	—	—	—	—	—	10.2	—	0.54 (U)	—	—	—	745	0.345 (J)	—	0.84	—	—	—	—	—	—
RE15-11-401	15-613320	3–4	Fill	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	0.314 (J)	—	0.26	0.0032 (J)	—	—	—	—	—
RE15-11-402	15-613320	6–7	Qbt 4	—	—	—	66.1	—	2800 (J+)	8.1	—	—	0.53 (U)	—	—	—	—	0.254 (J)	7	0.24	—	—	1.7	—	—	—
RE15-11-403	15-613321	0–1	Fill	—	—	—	—	—	—	—	23.6	—	—	—	—	—	2400	—	—	1.3	—	—	—	—	—	—
RE15-11-404	15-613321	3–4	Fill	—	—	—	—	—	—	—	—	—	0.53 (U)	—	23.5	—	—	0.329 (J)	—	5.2	—	—	—	—	—	—
RE15-11-405	15-613321	6–7	Qbt 4	—	—	—	—	—	—	—	—	—	0.51 (U)	—	12	—	—	0.273 (J)	—	0.31	—	—	2	—	—	—
RE15-11-406	15-613322	0–1	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.17 (J)	—	—	—	—	—	—
RE15-11-407	15-613322	3–4	Qbt 4	9560	—	—	139	—	9850 (J+)	8.5	—	—	0.53 (U)	—	50.1	2370	—	0.284 (J)	6.9	0.1 (J)	—	—	1.9	1.3	—	—
RE15-11-408	15-613322	6–7	Qbt 4	—	—	—	—	—	—	8.1	—	—	0.52 (U)	—	21.6	—	—	—	—	—	—	—	2.2	—	—	—
RE15-11-2706	15-613671	0–1	Fill	—	12.5	—	18200	—	—	—	—	146	1.9	—	170	—	—	1120	—	1.4	0.0022 (J)	—	—	—	—	112
RE15-11-2728	15-613671	3–4	Fill	—	—	—	4490	—	—	—	—	—	—	—	31.9	—	—	8.52	—	4.6	—	4440 (J+)	1.6	—	—	—
RE15-11-2708	15-613671	6–7	Qbt 4	11800 (J+)	0.68 (U)	2.9	952	2.2	2820	32.6 (J)	3.4	795	—	—	23.2	2220	—	8.52	21 (J)	1.3	—	3520 (J+)	2.9	—	—	—
RE15-11-2709	15-613672	0–1	Fill	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.11 (J)	—	—	1.6	—	—	—
RE15-11-2710	15-613672	3–4	Fill	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.077 (J)	—	—	1.8	—	—	—
RE15-11-2711	15-613672	6–7	Qbt 4	—	—	—	—	—	—	8.6 (J)	—	—	0.53 (U)	—	22.3	—	—	—	—	0.085 (J)	—	—	2.2	—	—	—
RE15-11-2712	15-613673	0–1	Fill	—	—	—	—	—	—	—	9.2	—	0.53 (U)	—	—	—	—	—	—	0.21	—	—	—	—	—	—
RE15-11-2713	15-613673	3–4	Qbt 4	—	—	—	—	—	—	12.6 (J)	—	—	0.51 (U)	—	—	—	—	—	9.1 (J)	0.21	—	—	2	—	—	—
RE15-11-2714	15-613673	5–6	Qbt 4	—	—	—	—	—	—	9.5 (J)	—	—	0.51 (U)	—	—	—	—	—	6.9 (J)	0.099 (J)	—	—	2.3	—	—	—
RE15-11-2715	15-613674	0–1	Fill	—	—	—	357	—	—	—	—	—	0.53 (U)	—	—	—	—	—	—	0.3	—	—	—	—	—	—
RE15-11-2716	15-613674	3–4	Qbt 4	—	—	6	76.6	—	3180	7.3 (J)	—	—	0.62 (U)	—	13.3	—	—	—	6.9 (J)	—	0.0029 (J)	—	1.7	—	—	—
RE15-11-2717	15-613674	6–7	Qbt 4	—	—	3.4	—	—	—	—	—	—	0.6 (U)	—	—	—	—	—	—	0.11 (J)	—	—	2	—	—	—
RE15-11-2718	15-613675	0–1	Fill	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	0.08 (J)	—	—	—	—	—	—

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Perchlorate	Potassium	Selenium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na[b]**	**na**	**3500**	**0.3**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**na**	**3460**	**1.52**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**217000**	**800**	**na**	**463**	**69.5[e]**	**6190**	**496000**	**217**	**na**	**1550**	**20.4**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**795000**	**800**	**na**	**145000**	**310[f]**	**22700**	**1820000**	**795**	**na**	**5680**	**74.9**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**54800**	**400**	**na**	**10700**	**23[f]**	**1560**	**125000**	**54.8**	**na**	**391**	**5.16**	**391**	**23500**
RE15-11-2719	15-613675	3–4	Fill	—	—	—	—	—	—	—	—	—	0.62 (U)	—	—	—	—	—	—	0.19 (J)	NA[h]	—	1.6	—	—	—
RE15-11-2720	15-613675	6–7	Qbt 4	12500 (J+)	—	—	114	—	—	12.8 (J)	3.3	4.8	0.68 (U)	15300	—	3200	—	—	10.4 (J)	0.8	—	—	2.3	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[c] na = Not available.

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

[h] NA = Not analyzed.

Table 6.2-3
Organic Chemicals Detected at SWMU 15-002

Sample ID	Location ID	Depth (ft)	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Bis(2-ethylhexyl)phthalate	Diethylphthalate	Di-n-butylphthalate	Dinitroaniline[3,5-]	Dinitrotoluene[2,4-]	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,4,7,8-]	Hexachlorodibenzodioxin [1,2,3,6,7,8-]	Hexachlorodibenzodioxin [1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)
Construction Worker SSL[a]				**263000**	**601[b]**	**601[b]**	**4760**	**191000**	**23800**	**na[c]**	**476**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**851000**	**1900[d]**	**2000[d]**	**1370**	**547000**	**68400**	**na**	**103**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**67500**	**150[d]**	**150[d]**	**347**	**48900**	**6110**	**na**	**15.7**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-394	15-613318	0–1	Fill	—[e]	—	—	—	—	0.69 (J-)	—	—	0.0000047	0.0000138	0.00000139 (J)	0.00000367 (J)	—	—	—	0.00000126 (J)
RE15-11-415	15-613318	3–4	Qbt 4	—	—	—	0.077 (J-)	0.18 (J-)	—	—	—	0.0000045 (J)	0.00000853	0.000000642 (J)	0.00000111 (J)	—	—	—	0.00000187 (J)
RE15-11-396	15-613318	6–7	Qbt 4	—	—	—	0.093 (J-)	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-397	15-613319	0–1	Fill	—	—	—	—	—	—	—	—	0.00000489	0.0000153	0.00000203 (J)	0.00000546	—	—	—	0.000000881 (J)
RE15-11-398	15-613319	3–4	Fill	—	—	—	—	—	—	—	—	0.00000835	0.00003	0.00000333 (J)	0.0000112	—	—	—	0.00000076 (J)
RE15-11-399	15-613319	6–7	Qbt 4	—	—	—	0.16 (J-)	—	—	—	—	0.00000066 (J)	0.00000175 (J)	—	—	—	—	—	—
RE15-11-400	15-613320	0–1	Fill	—	—	—	0.14 (J-)	—	0.037 (J-)	—	—	0.00000136 (J)	0.00000315 (J)	—	0.000000659 (J)	—	—	—	—
RE15-11-401	15-613320	3–4	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-402	15-613320	6–7	Qbt 4	—	—	—	0.094 (J-)	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-403	15-613321	0–1	Fill	—	—	—	—	—	—	—	—	0.00000286 (J)	0.00000661	0.000000962 (J)	0.000000962 (J)	—	—	—	—
RE15-11-404	15-613321	3–4	Fill	0.083	—	—	—	—	—	—	—	—	—	—	0.000000877 (J)	—	—	—	—
RE15-11-405	15-613321	6–7	Qbt 4	—	—	—	0.18 (J-)	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-406	15-613322	0–1	Fill	—	—	—	—	—	—	—	—	0.00000769	0.0000175	0.00000237 (J)	0.00000945	—	—	—	0.000000513 (J)
RE15-11-407	15-613322	3–4	Qbt 4	—	—	—	0.084 (J-)	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-408	15-613322	6–7	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2706	15-613671	0–1	Fill	—	0.15	0.12	—	—	—	0.037 (J)	0.012 (J)	0.0000386	0.000133	0.0000073	0.0000288	0.000000927 (J)	0.00000245 (J)	0.0000023 (J)	0.0000321
RE15-11-2728	15-613671	3–4	Fill	—	0.0068 (J)	—	—	—	—	0.0043 (J)	—	0.000000732 (J)	0.00000227 (J)	—	—	—	—	—	—
RE15-11-2708	15-613671	6–7	Qbt 4	—	0.02 (J)	0.013 (J)	—	—	—	0.0074 (J)	—	0.00000237 (J)	0.00000643	—	0.000000842 (J)	—	—	—	0.000000782 (J)
RE15-11-2709	15-613672	0–1	Fill	—	—	—	0.13 (J-)	—	—	—	—	0.00000065 (J)	0.0000016 (J)	—	—	—	—	—	—
RE15-11-2711	15-613672	6–7	Qbt 4	—	—	—	0.068 (J-)	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2712	15-613673	0–1	Fill	—	—	—	—	—	—	—	—	0.00000113 (J)	0.00000273 (J)	—	—	—	—	—	—
RE15-11-2715	15-613674	0–1	Fill	—	—	—	—	—	—	—	—	0.00000518	0.0000146	0.00000114 (J)	0.00000337 (J)	—	—	—	0.00000162 (J)
RE15-11-2718	15-613675	0–1	Fill	—	—	—	—	—	—	—	—	0.00000386 (J)	0.00000754	—	0.00000111 (J)	—	—	—	—

Table 6.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzofuran [2,3,4,6,7,8-]	Hexachlorodibenzofurans (Total)	HMX	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxin [1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofurans (Totals)	RDX	Tetrachlorodibenzodioxin [2,3,7,8-]	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofurans (Totals)	TPH-DRO	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**na**	**na**	**11900**	**na**	**na**	**na**	**na**	**na**	**715**	**0.000284**	**na**	**na**	**na**	**8760[b]**	**141**
Industrial SSL[a]				**na**	**na**	**34200**	**na**	**na**	**na**	**na**	**na**	**174**	**0.000204**	**na**	**na**	**2000[f]**	**27000[d]**	**469**
Residential SSL[a]				**na**	**na**	**3060**	**na**	**na**	**na**	**na**	**na**	**44.2**	**0.000045**	**na**	**na**	**800[f]**	**2200[d]**	**35.9**
RE15-11-394	15-613318	0–1	Fill	—	0.00000102 (J)	—	0.0000488	0.00000312 (J)	—	—	—	—	—	—	—	—	—	—
RE15-11-415	15-613318	3–4	Qbt 4	—	—	—	0.0000161	—	—	—	—	—	—	0.000000167 (J)	—	—	—	—
RE15-11-396	15-613318	6–7	Qbt 4	—	—	—	0.00000253 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-397	15-613319	0–1	Fill	—	0.000000733 (J)	—	0.0000517	0.00000485 (J)	—	—	—	—	—	—	—	—	—	—
RE15-11-398	15-613319	3–4	Fill	—	—	—	0.000116	0.0000129	—	—	—	—	—	—	—	—	—	—
RE15-11-399	15-613319	6–7	Qbt 4	—	—	—	0.00000573 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-400	15-613320	0–1	Fill	—	—	—	0.000014	—	—	—	—	—	—	—	—	—	—	—
RE15-11-401	15-613320	3–4	Fill	—	—	—	0.0000051 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-402	15-613320	6–7	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-403	15-613321	0–1	Fill	—	0.000000456 (J)	—	0.0000265	0.00000203 (J)	—	—	—	—	—	—	—	—	—	—
RE15-11-404	15-613321	3–4	Fill	—	—	—	0.0000116	0.00000151 (J)	—	—	—	—	—	—	—	—	—	—
RE15-11-405	15-613321	6–7	Qbt 4	—	—	—	0.00000148 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-406	15-613322	0–1	Fill	—	0.00000121 (J)	—	0.0000735	0.0000113	—	—	—	—	—	—	—	8.1 (J)	—	—
RE15-11-407	15-613322	3–4	Qbt 4	—	—	—	0.00000184 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-408	15-613322	6–7	Qbt 4	—	—	—	0.00000381 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2706	15-613671	0–1	Fill	0.000000486 (J)	0.00000777	0.44	0.000251	0.0000226 (J)	0.000000754 (J)	0.0000076	0.00000272 (J)	2.6 (J)	0.000000237 (J)	0.00000328	0.00000437 (J)	18 (J)	0.0097 (J)	0.11
RE15-11-2728	15-613671	3–4	Fill	—	—	0.6	—	—	—	—	—	2.5 (J)	—	—	—	—	—	—
RE15-11-2708	15-613671	6–7	Qbt 4	—	—	0.1 (J)	0.000013 (J)	—	—	—	—	1.3 (J)	—	—	—	4.3 (J)	—	—
RE15-11-2709	15-613672	0–1	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2711	15-613672	6–7	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2712	15-613673	0–1	Fill	—	—	—	0.0000121 (J)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-2715	15-613674	0–1	Fill	—	—	—	0.0000386 (J)	—	—	—	—	—	—	—	—	11 (J)	—	—
RE15-11-2718	15-613675	0–1	Fill	—	—	—	0.0000404 (J)	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] Value based on NMED screening guidelines for diesel fuel #2 (NMED 2006, 094614).

Table 6.3-1
Samples Collected and Analyses Requested at SWMU 15-007(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Thorium
RE15-11-784	15-613391	4–5	Soil	11-770	11-769	11-769	—*	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-805	15-613391	8–9	Qbt 4	11-770	11-769	11-769	11-769	11-769	11-835	11-770	11-770	11-770	11-771	11-771
RE15-11-804	15-613392	5–6	Soil	11-770	11-769	11-769	11-769	11-769	11-835	11-770	11-770	11-770	11-771	11-771
RE15-11-786	15-613392	9–10	Qbt 4	11-770	11-769	11-769	—	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-787	15-613393	5.5–6.5	Qbt 4	11-770	11-769	11-769	—	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-788	15-613393	9.5–10.5	Qbt 4	11-770	11-769	11-769	—	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-789	15-613394	5–6	Soil	11-770	11-769	11-769	—	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-790	15-613394	9–10	Soil	11-770	11-769	11-769	—	11-769	—	11-770	11-770	11-770	11-771	11-771
RE15-11-792	15-613395	2–3	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-793	15-613395	5–6	Qbt 4	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-794	15-613396	2–3	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-795	15-613396	5–6	Qbt 4	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-796	15-613397	2–3	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-797	15-613397	5–6	Qbt 4	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-798	15-613398	2–3	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-799	15-613398	5–6	Qbt 4	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-806	15-613399	2–3	Qbt 4	11-859	11-857	11-857	11-857	11-857	11-858	11-859	11-859	11-859	11-859	11-859
RE15-11-801	15-613399	5–6	Qbt 4	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-802	15-613400	2–3	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859
RE15-11-803	15-613400	5–6	Fill	11-859	11-857	11-857	—	11-857	—	11-859	11-859	11-859	11-859	11-859

* — = Analysis not requested.

Table 6.3-2
Inorganic Chemicals above BVs at SWMU 15-007(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**11.2**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**63.5**
Soil BV [a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**800**	**na**	**69.5[e]**	**6190**	**496000**	**217**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**800**	**na**	**310[f]**	**22700**	**1820000**	**795**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**na**	**23[f]**	**1560**	**125000**	**54.8**	**391**	**23500**
RE15-11-784	15-613391	4–5	Soil	—[g]	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	0.3	—	—	52.1 (J+)
RE15-11-805	15-613391	8–9	Qbt 4	—	—	—	—	—	—	—	—	—	0.52 (U)	11.7	—	0.104	—	—	—	2.4 (J-)	—
RE15-11-804	15-613392	5–6	Soil	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	0.58	—	—	—
RE15-11-786	15-613392	9–10	Qbt 4	7750	—	—	63.7	1.3	—	—	—	—	0.54 (U)	20.6	1880	—	6.8	—	—	2.3 (J-)	—
RE15-11-787	15-613393	5.5–6.5	Qbt 4	8310	—	—	105	—	—	—	—	—	0.52 (U)	21.1	1710	—	7.1	1.1	—	1.3 (J-)	—
RE15-11-788	15-613393	9.5–10.5	Qbt 4	—	—	—	58.3	—	—	—	—	—	0.52 (U)	22.7	—	—	—	0.8	—	1.6 (J-)	—
RE15-11-789	15-613394	5–6	Soil	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	2	—	—	—
RE15-11-790	15-613394	9–10	Soil	—	—	—	—	—	—	—	—	—	0.54 (U)	30.6	—	—	—	1.5	—	—	—
RE15-11-792	15-613395	2–3	Fill	—	—	—	—	—	—	—	—	—	0.55 (UJ)	—	—	—	—	0.41	—	—	—
RE15-11-793	15-613395	5–6	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	0.52 (UJ)	—	—	—	—	0.16 (J)	—	1.1	—
RE15-11-794	15-613396	2–3	Fill	—	—	—	—	—	—	—	—	—	0.54 (UJ)	23.9 (J)	—	—	—	0.99	0.0033 (J)	—	—
RE15-11-795	15-613396	5–6	Qbt 4	—	—	—	—	—	—	—	—	—	0.52 (UJ)	168 (J)	—	—	—	0.29	0.0024 (J)	1.5	125
RE15-11-796	15-613397	2–3	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.64	—	—	—
RE15-11-797	15-613397	5–6	Qbt 4	11600	0.53 (U)	3.4	178	1.3	4180 (J-)	10	3.4 (J)	5.2	0.55 (UJ)	33.3 (J)	2780	—	10 (J)	0.28	0.0025 (J)	1.7	—
RE15-11-798	15-613398	2–3	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.7	0.0024 (J)	—	—
RE15-11-799	15-613398	5–6	Qbt 4	10000	—	—	92.5	—	—	9.3	—	—	—	—	1880	—	7.9 (J)	13.5	—	1.3	—
RE15-11-806	15-613399	2–3	Qbt 4	—	—	—	58.7	—	3240 (J-)	—	—	—	—	—	—	—	6.9 (J)	0.54	—	1.5	—
RE15-11-801	15-613399	5–6	Qbt 4	—	—	—	—	—	—	—	—	—	0.59 (UJ)	—	—	—	—	0.18 (J)	—	1.7	—
RE15-11-802	15-613400	2–3	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1	—	—	—
RE15-11-803	15-613400	5–6	Fill	—	—	—	—	—	—	—	—	—	0.56 (UJ)	24 (J)	—	—	—	17.1	0.003 (J)	—	52.3

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 6.3-3
Organic Chemicals Detected at SWMU 15-007(a)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Bis(2-ethylhexyl)phthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]
Construction Worker SSL[a]				**263000**	**4760**	**na[b]**	**na**	**na**
Industrial SSL[a]				**851000**	**1370**	**na**	**na**	**na**
Residential SSL[a]				**67500**	**347**	**na**	**na**	**na**
RE15-11-784	15-613391	4–5	Soil	0.0073 (J)	—[c]	NA[d]	NA	NA
RE15-11-805	15-613391	8–9	Qbt 4	0.02 (J)	—	—	—	0.00000128 (J)
RE15-11-804	15-613392	5–6	Soil	—	—	0.000000927 (J)	0.00000202 (J)	0.00000837 (J)
RE15-11-786	15-613392	9–10	Qbt 4	0.031	—	NA	NA	NA
RE15-11-787	15-613393	5.5–6.5	Qbt 4	0.14	0.048 (J)	NA	NA	NA
RE15-11-788	15-613393	9.5–10.5	Qbt 4	0.024	—	NA	NA	NA
RE15-11-793	15-613395	5–6	Qbt 4	—	0.14 (J)	NA	NA	NA
RE15-11-806	15-613399	2–3	Qbt 4	—	—	—	—	0.00000175 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] na = Not available.
[c] — = Not detected or not analyzed.
[d] NA = Not analyzed.

Table 6.4-1
Samples Collected and Analyses Requested at SWMUs 15-003 and 15-006(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Gamma Spectroscopy
RE15-11-418	15-613324	0–0.25	Sed	11-826	11-825	11-825	—*	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-419	15-613324	0.25–0.5	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-420	15-613325	0–1	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-421	15-613325	1–2	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-422	15-613326	0–1	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-423	15-613326	1–2	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-432	15-613327	0–1	Sed	11-826	11-825	11-825	11-825	11-825	11-824	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-425	15-613327	1–2	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-426	15-613328	0–0.75	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826
RE15-11-427	15-613328	0.75–1.5	Sed	11-826	11-825	11-825	—	11-825	—	11-826	11-826	11-826	11-826	11-826	11-826

* — = Analysis not requested.

Table 6.4-2
Inorganic Chemicals above BVs at SWMUs 15-003 and 15-006(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Arsenic	Barium	Beryllium	Calcium	Chromium	Cobalt	Iron	Magnesium	Nickel	Nitrate	Potassium	Selenium	Vanadium
Sediment BV[a]				**15400**	**3.98**	**127**	**1.31**	**4420**	**10.5**	**4.73**	**13800**	**2370**	**9.38**	**na[b]**	**2690**	**0.3**	**19.7**
Construction Worker SSL[c]				**40700**	**65.4**	**4350**	**144**	**na**	**449[d]**	**34.6[e]**	**217000**	**na**	**6190**	**496000**	**na**	**1550**	**1550**
Industrial SSL[c]				**1130000**	**17.7**	**224000**	**2260**	**na**	**2920[d]**	**300[f]**	**795000**	**na**	**22700**	**1820000**	**na**	**5680**	**5680**
Residential SSL[c]				**78100**	**3.9**	**15600**	**156**	**na**	**219[d]**	**23[f]**	**54800**	**na**	**1560**	**125000**	**na**	**391**	**391**
RE15-11-418	15-613324	0–0.25	Sed	—[g]	—	—	—	—	—	—	—	—	—	0.1 (J)	—	0.95	—
RE15-11-419	15-613324	0.25–0.5	Sed	—	—	—	—	—	—	4.8 (J)	—	—	—	—	—	1.1	—
RE15-11-420	15-613325	0–1	Sed	—	—	—	—	—	—	5.2 (J)	—	—	—	0.58	—	1.1	—
RE15-11-421	15-613325	1–2	Sed	—	—	—	—	—	—	—	—	—	—	0.12 (J)	—	1.1	—
RE15-11-422	15-613326	0–1	Sed	—	—	—	—	—	—	5.8 (J)	—	—	—	0.22	—	0.89	20.5
RE15-11-423	15-613326	1–2	Sed	—	—	—	—	—	—	5.5 (J)	14200	—	—	0.11 (J)	—	1.2	23.5
RE15-11-432	15-613327	0–1	Sed	—	—	—	—	—	—	5.8 (J)	—	—	9.5	0.47	—	1.4	20.6
RE15-11-425	15-613327	1–2	Sed	—	—	—	—	—	—	—	—	—	—	0.41	—	1.5	—
RE15-11-426	15-613328	0–0.75	Sed	—	—	139 (J)	—	—	—	5.6 (J)	—	—	—	0.23	—	1.1	—
RE15-11-427	15-613328	0.75–1.5	Sed	18200	5.4	480 (J)	1.9	11400	16.5	—	18400	4180 (J+)	15.1	0.38	3230 (J+)	3.2	24.9

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 6.4-3
Organic Chemicals Detected at SWMUs 15-003 and 15-006(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]
Construction Worker SSL[a]				**18600**	**952000[b]**	**4760**	**na[c]**	**na**	**na**
Industrial SSL[a]				**36700**	**2500000[d]**	**1370**	**na**	**na**	**na**
Residential SSL[a]				**3440**	**240000[d]**	**347**	**na**	**na**	**na**
RE15-11-419	15-613324	0.25–0.5	Sed	—[e]	1.3 (J)	—	NA[f]	NA	NA
RE15-11-421	15-613325	1–2	Sed	—	—	0.18 (J)	NA	NA	NA
RE15-11-422	15-613326	0–1	Sed	0.039 (J)	—	—	NA	NA	NA
RE15-11-423	15-613326	1–2	Sed	0.047 (J)	—	—	NA	NA	NA
RE15-11-432	15-613327	0–1	Sed	—	—	—	0.000000965 (J)	0.00000197 (J)	0.00000699 (J)
RE15-11-425	15-613327	1–2	Sed	—	—	0.068 (J)	NA	NA	NA
RE15-11-426	15-613328	0–0.75	Sed	—	—	0.25 (J)	NA	NA	NA
RE15-11-427	15-613328	0.75–1.5	Sed	—	—	0.051 (J)	NA	NA	NA

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[c] na = Not available.
[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[e] — = Not detected or not analyzed.
[f] NA = Not analyzed.

Table 6.4-4
Radionuclides Detected or Detected above BVs at SWMUs 15-003 and 15-006(a)

Sample ID	Location ID	Depth (ft)	Media	Uranium-238
Sediment BV[a]				**2.29**
Construction Worker SAL[b]				**160**
Industrial SAL[b]				**430**
Residential SAL[b]				**87**
RE15-11-418	15-613324	0–0.25	Sed	3.9
RE15-11-419	15-613324	0.25–0.5	Sed	4.11
RE15-11-420	15-613325	0–1	Sed	2.3

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs from LANL (2009, 107655).

Table 6.6-1
Samples Collected and Analyses Requested at SWMUs 15-004(b) and 15-004(c)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	TCLP Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Americium-241	Gamma Spectroscopy
0215-96-0106	15-02428	0.67–1.17	Soil	2529	—*	—	—	—	2535	—	—	—	—	2530	—	—
0215-96-0105	15-02434	0.67–1.17	Soil	2529	—	—	—	—	2535	—	—	—	—	2530	—	—
0215-96-0104	15-02444	0.83–1.17	Soil	2529	—	—	—	—	2535	—	—	—	—	2530	—	—
0215-96-0116	15-02444	1–1.08	Soil	2560	2561	—	—	—	2558	—	—	—	—	2562	—	—
0215-96-0117	15-02464	2.75–2.92	Soil	2560	—	—	—	—	2558-1	—	—	—	—	2562-1	—	—
RE15-11-440	15-613330	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-441	15-613330	3–4	Qbt 4	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-442	15-613331	0–1	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-443	15-613331	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-444	15-613332	0–1	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-445	15-613332	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-446	15-613333	0–1	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-447	15-613333	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-448	15-613334	0–1	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-449	15-613334	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-450	15-613335	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-451	15-613335	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-452	15-613336	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-453	15-613336	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-456	15-613338	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-457	15-613338	3–4	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-458	15-613339	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-459	15-613339	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-460	15-613340	0–1	Soil	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381
RE15-11-461	15-613340	3–4	Soil	11-384	—	11-382	11-382	—	11-382	—	11-384	11-384	11-384	11-385	11-385	11-385
RE15-11-462	15-613341	0–1	Soil	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-463	15-613341	3–4	Fill	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-469	15-613342	0–1	Soil	11-419	—	11-418	11-418	11-418	11-418	11-421	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-464	15-613342	3–4	Qbt 4	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-466	15-613343	0–1	Soil	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-467	15-613343	3–4	Qbt 4	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-468	15-613344	0–1	Soil	11-384	—	11-382	11-382	11-382	11-382	11-383	11-384	11-384	11-384	11-385	11-385	11-385
RE15-11-454	15-613344	3–4	Fill	11-380	—	11-379	11-379	—	11-379	—	11-380	11-380	11-380	11-381	11-381	11-381

Table 6.6-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	TCLP Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Americium-241	Gamma Spectroscopy
RE15-11-470	15-613345	0–1	Soil	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-471	15-613345	1–2	Qbt 4	11-419	—	11-418	11-418	—	11-418	—	11-419	11-419	11-419	11-420	11-420	11-420
RE15-11-472	15-613346	0–1	Fill	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-473	15-613346	3–4	Fill	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-474	15-613347	0–1	Fill	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-475	15-613347	3–4	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-476	15-613348	0–1	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-477	15-613348	3–4	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-478	15-613349	0–1	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-479	15-613349	3–4	Fill	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-480	15-613350	0–1	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-481	15-613350	3–4	Fill	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-482	15-613351	0–1	Soil	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481
RE15-11-483	15-613351	3–4	Qbt 4	11-482	—	11-481	11-481	—	11-481	—	11-482	11-482	11-482	11-481	11-481	11-481

* — = Analysis not requested.

Table 6.6-2
Inorganic Chemicals above BVs at SWMUs 15-004(b) and 15-004(c)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Selenium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**[b]	**0.3**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449**[d]	**34.6**[e]	**12400**	**6190**	**217000**	**800**	**na**	**463**	**69.5**[e]	**6190**	**496000**	**1550**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**[d]	**300**[f]	**45400**	**22700**	**795000**	**800**	**na**	**145000**	**310**[f]	**22700**	**1820000**	**5680**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**1560**	**54800**	**400**	**na**	**10700**	**23**[f]	**1560**	**125000**	**391**
0215-96-0106	15-02428	0.67–1.17	Soil	—[g]	11 (UJ)	—	—	—	0.53 (U)	—	—	—	—	NA[h]	—	50	—	—	NA	—	NA	—
0215-96-0105	15-02434	0.67–1.17	Soil	—	11 (U)	—	310	—	1.3	—	—	—	20	NA	—	88	—	—	0.11 (U)	—	NA	—
0215-96-0116	15-02444	1–1.08	Soil	—	12 (U)	—	920	—	3.7	—	—	8.7	180	NA	—	370	—	—	0.12 (U)	—	NA	—
0215-96-0104	15-02444	0.83–1.17	Soil	—	11 (UJ)	—	510	—	0.66	—	—	—	700	NA	—	100	—	—	0.11 (U)	—	NA	—
0215-96-0117	15-02464	2.75–2.92	Soil	—	11 (U)	—	—	—	0.53 (U)	—	—	—	—	NA	—	—	—	—	0.11 (U)	—	NA	—
RE15-11-440	15-613330	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	1.8	—
RE15-11-441	15-613330	3–4	Qbt 4	10400	—	5.3	131	—	—	—	10.3	—	—	0.55 (U)	—	51.3	2280 (J+)	—	—	7.8	0.23	2.2
RE15-11-442	15-613331	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	1.3	—
RE15-11-443	15-613331	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.6 (U)	—	—	—	—	—	—	0.092 (J)	—
RE15-11-444	15-613332	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	22.9	—	—	0.575	—	2.4	—
RE15-11-445	15-613332	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.98	—
RE15-11-446	15-613333	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.08 (J)	—
RE15-11-447	15-613333	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.27	—
RE15-11-448	15-613334	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—	—	—	—	1.2	—
RE15-11-449	15-613334	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.58 (U)	—	—	—	—	—	—	0.088 (J)	2.1
RE15-11-450	15-613335	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.61 (U)	—	—	—	—	—	—	0.28	—
RE15-11-451	15-613335	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.087 (J)	—
RE15-11-452	15-613336	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	0.54	—
RE15-11-453	15-613336	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.26	—
RE15-11-456	15-613338	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.37	—
RE15-11-457	15-613338	3–4	Soil	—	—	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	—	—	—	0.1 (J)	1.7
RE15-11-458	15-613339	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.39	—
RE15-11-459	15-613339	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.21 (J)	—
RE15-11-460	15-613340	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.57 (U)	—	—	—	—	—	—	0.34	—
RE15-11-461	15-613340	3–4	Soil	—	—	—	—	—	—	8140	—	—	—	0.56 (U)	—	—	—	—	—	—	0.11 (J)	—
RE15-11-462	15-613341	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	0.83	—
RE15-11-463	15-613341	3–4	Fill	—	—	—	482 (J+)	1.9	—	—	—	—	—	0.58 (U)	—	26.2	—	—	—	—	1.8	2.3

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Nitrate	Selenium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na[b]**	**0.3**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**217000**	**800**	**na**	**463**	**69.5[e]**	**6190**	**496000**	**1550**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**795000**	**800**	**na**	**145000**	**310[f]**	**22700**	**1820000**	**5680**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**54800**	**400**	**na**	**10700**	**23[f]**	**1560**	**125000**	**391**
RE15-11-469	15-613342	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.85	1.9
RE15-11-464	15-613342	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	0.14 (J)	1.5
RE15-11-466	15-613343	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.2 (J)	—
RE15-11-467	15-613343	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	8.4	—	—	0.51 (U)	—	—	—	—	—	—	0.1 (J)	1.4
RE15-11-468	15-613344	0–1	Soil	—	—	—	—	—	—	—	—	8.9	—	0.56 (U)	—	—	—	699 (J-)	—	—	1.3	—
RE15-11-454	15-613344	3–4	Fill	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.5	—
RE15-11-470	15-613345	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	—	—	—	—	—	0.4	—
RE15-11-471	15-613345	1–2	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	—	—	—	0.12 (J)	1.3
RE15-11-472	15-613346	0–1	Fill	—	—	—	1000	—	8.5	—	—	—	46.6 (J-)	—	—	645	—	—	0.175	—	0.57	—
RE15-11-473	15-613346	3–4	Fill	—	—	—	379	—	1.5	—	—	—	22.6 (J-)	0.55 (U)	—	117	—	—	—	—	0.12 (J)	—
RE15-11-474	15-613347	0–1	Fill	—	—	—	708	—	4.4	—	—	14.8	89 (J-)	0.53 (U)	—	383	—	—	0.342	—	0.2 (J)	—
RE15-11-475	15-613347	3–4	Soil	—	—	—	—	—	—	—	—	12.3	19.6 (J-)	0.56 (U)	—	57.5	—	—	—	16.7	0.15 (J)	—
RE15-11-476	15-613348	0–1	Soil	—	—	—	322	—	0.42	—	—	9.8	18.3 (J-)	0.53 (U)	—	70.8	—	—	—	—	1.2	1.6
RE15-11-477	15-613348	3–4	Soil	—	—	—	—	—	—	—	—	—	—	0.55 (U)	—	24.6	—	—	—	—	0.68	1.9
RE15-11-478	15-613349	0–1	Soil	—	—	—	890	—	87	—	—	—	59 (J-)	0.55 (U)	—	1520	—	—	—	—	0.98	1.9
RE15-11-479	15-613349	3–4	Fill	—	—	—	—	—	1.1	—	—	—	—	0.6 (U)	—	52.7	—	—	—	—	0.4	1.8
RE15-11-480	15-613350	0–1	Soil	—	—	—	324	—	—	—	—	10.4	27.2 (J-)	0.54 (U)	—	330	—	—	—	—	1.6	1.7
RE15-11-481	15-613350	3–4	Fill	—	—	—	—	—	—	—	23	9	16.2 (J-)	0.55 (U)	—	48.6	—	—	—	15.5	0.8	1.6
RE15-11-482	15-613351	0–1	Soil	—	—	—	—	—	—	—	—	9.5	—	0.55 (U)	—	33.8	—	—	—	—	0.82	1.7
RE15-11-483	15-613351	3–4	Qbt4	16600	0.55 (U)	5.5	169	—	—	5580 (J+)	30.1	3.7	10.7 (J-)	0.55 (U)	16500	124	3560 (J+)	—	—	18.9	0.25	2.8

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**1.0**	**2770**	**1.1**	**17**	**63.5**
Soil BV[a]				**1.0**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**1550**	**na**	**20.4**	**1550**	**92900**
Industrial SSL[c]				**5680**	**na**	**74.9**	**5680**	**341000**
Residential SSL[c]				**391**	**na**	**5.16**	**391**	**23500**
0215-96-0106	15-02428	0.67–1.17	Soil	2.1 (U)	—	1.3 (U)	—	—
0215-96-0105	15-02434	0.67–1.17	Soil	2.1 (U)	—	1.3 (U)	—	—
0215-96-0104	15-02444	0.83–1.17	Soil	2.2 (U)	—	1.3 (U)	—	49 (J-)
0215-96-0116	15-02444	1–1.08	Soil	2.4 (U)	—	1.2 (U)	—	—
0215-96-0117	15-02464	2.75–2.92	Soil	2.1 (U)	—	1.1 (U)	—	49
RE15-11-440	15-613330	0–1	Soil	—	—	1.7	—	—
RE15-11-441	15-613330	3–4	Qbt 4	—	—	5	—	—
RE15-11-442	15-613331	0–1	Fill	—	—	—	—	—
RE15-11-443	15-613331	3–4	Fill	—	—	—	—	—
RE15-11-444	15-613332	0–1	Fill	—	—	—	—	—
RE15-11-445	15-613332	3–4	Fill	—	—	—	—	—
RE15-11-446	15-613333	0–1	Fill	—	—	—	—	—
RE15-11-447	15-613333	3–4	Fill	—	—	—	—	—
RE15-11-448	15-613334	0–1	Fill	—	—	—	—	—
RE15-11-449	15-613334	3–4	Fill	—	—	—	—	—
RE15-11-450	15-613335	0–1	Soil	—	—	—	—	—
RE15-11-451	15-613335	3–4	Fill	—	—	—	—	—
RE15-11-452	15-613336	0–1	Soil	—	—	—	—	—
RE15-11-453	15-613336	3–4	Fill	—	—	—	—	—
RE15-11-456	15-613338	0–1	Soil	—	—	—	—	—
RE15-11-457	15-613338	3–4	Soil	—	—	—	—	—
RE15-11-458	15-613339	0–1	Soil	—	—	—	—	—
RE15-11-459	15-613339	3–4	Fill	—	—	—	—	—
RE15-11-460	15-613340	0–1	Soil	—	—	—	—	—
RE15-11-461	15-613340	3–4	Soil	—	1010	—	—	—
RE15-11-462	15-613341	0–1	Soil	—	—	—	—	—
RE15-11-463	15-613341	3–4	Fill	—	922	0.94 (J)	—	—
RE15-11-469	15-613342	0–1	Soil	—	—	—	—	—
RE15-11-464	15-613342	3–4	Qbt 4	—	—	—	—	—
RE15-11-466	15-613343	0–1	Soil	—	—	—	—	—

Table 6.6-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Silver	Sodium	Thallium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**1.0**	**2770**	**1.1**	**17**	**63.5**
Soil BV[a]				**1.0**	**915**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[c]				**1550**	**na**	**20.4**	**1550**	**92900**
Industrial SSL[c]				**5680**	**na**	**74.9**	**5680**	**341000**
Residential SSL[c]				**391**	**na**	**5.16**	**391**	**23500**
RE15-11-467	15-613343	3–4	Qbt 4	—	—	—	—	—
RE15-11-468	15-613344	0–1	Soil	—	—	—	—	—
RE15-11-454	15-613344	3–4	Fill	—	—	—	—	—
RE15-11-470	15-613345	0–1	Soil	—	—	—	—	—
RE15-11-471	15-613345	1–2	Qbt 4	—	—	—	—	—
RE15-11-472	15-613346	0–1	Fill	—	—	—	—	54.2
RE15-11-473	15-613346	3–4	Fill	—	—	—	—	51.2
RE15-11-474	15-613347	0–1	Fill	—	—	—	—	—
RE15-11-475	15-613347	3–4	Soil	—	—	—	—	—
RE15-11-476	15-613348	0–1	Soil	—	—	—	—	—
RE15-11-477	15-613348	3–4	Soil	—	—	—	—	—
RE15-11-478	15-613349	0–1	Soil	—	—	—	—	78.5
RE15-11-479	15-613349	3–4	Fill	—	—	—	—	—
RE15-11-480	15-613350	0–1	Soil	—	—	—	—	—
RE15-11-481	15-613350	3–4	Fill	—	—	—	—	—
RE15-11-482	15-613351	0–1	Soil	—	—	—	—	—
RE15-11-483	15-613351	3–4	Qbt 4	—	—	2	21.4	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

[h] NA = Not analyzed.

Table 6.6-3
Organic Chemicals Detected at SWMUs 15-004(b) and 15-004(c)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	HMX	Isopropyltoluene[4-]	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	RDX	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Trinitrotoluene[2,4,6-]	Xylene (Total)
Construction Worker SSL[a]				**263000**	**601[b]**	**601[b]**	**23800[b]**	**4760**	**23800**	**11900**	**10300[c]**	**na[d]**	**715**	**329[b]**	**3100[b]**	**141**	**3130**
Industrial SSL[a]				**851000**	**1900[e]**	**2000[e]**	**62000[e]**	**1370**	**68400**	**34200**	**14900[c]**	**na**	**174**	**260[e]**	**10000[e]**	**469**	**3610**
Residential SSL[a]				**67500**	**150[e]**	**150[e]**	**6100[e]**	**347**	**6110**	**3060**	**3210[c]**	**na**	**44.2**	**62[e]**	**780[e]**	**35.9**	**1090**
RE15-11-443	15-613331	3–4	Fill	—[f]	—	—	0.054 (J)	—	—	—	—	NA[g]	—	—	—	—	—
RE15-11-444	15-613332	0–1	Fill	—	—	—	—	—	—	—	—	NA	—	—	0.00045 (J)	—	—
RE15-11-445	15-613332	3–4	Fill	—	—	—	—	—	—	—	—	NA	—	0.00097 (J)	—	NA	—
RE15-11-450	15-613335	0–1	Soil	—	—	—	—	—	—	—	—	NA	—	0.00081 (J)	—	—	—
RE15-11-452	15-613336	0–1	Soil	—	—	—	—	—	—	—	—	NA	—	0.001 (J)	—	—	—
RE15-11-453	15-613336	3–4	Fill	—	—	—	0.045 (J)	—	—	—	—	NA	—	—	—	—	—
RE15-11-457	15-613338	3–4	Soil	—	—	—	0.097 (J)	0.065 (J)	—	—	—	NA	—	—	—	—	—
RE15-11-458	15-613339	0–1	Soil	—	—	—	—	—	—	—	—	NA	—	0.00099 (J)	—	—	—
RE15-11-460	15-613340	0–1	Soil	—	—	—	—	—	—	—	—	NA	—	—	0.00061 (J)	—	—
RE15-11-462	15-613341	0–1	Soil	—	—	—	—	0.47	—	—	—	NA	—	—	—	—	—
RE15-11-469	15-613342	0–1	Soil	—	—	—	—	—	—	—	—	0.00000101 (J)	—	—	—	—	—
RE15-11-466	15-613343	0–1	Soil	—	—	—	0.061 (J)	—	—	—	—	NA	—	—	—	—	—
RE15-11-468	15-613344	0–1	Soil	—	—	—	—	0.11 (J)	—	—	—	0.00000272 (J)	—	—	—	—	—
RE15-11-454	15-613344	3–4	Fill	—	—	—	—	0.21 (J)	—	—	—	NA	—	—	—	—	—
RE15-11-470	15-613345	0–1	Soil	—	—	—	0.063 (J)	—	—	—	—	NA	—	—	—	—	—
RE15-11-471	15-613345	1–2	Qbt 4	—	—	—	—	0.05 (J)	—	—	—	NA	—	0.0011 (J)	—	—	0.00095 (J)
RE15-11-472	15-613346	0–1	Fill	—	—	—	—	0.12 (J)	0.99	—	—	NA	—	—	—	0.0072 (J)	—
RE15-11-473	15-613346	3–4	Fill	—	—	—	—	—	0.15 (J)	—	—	NA	—	—	—	—	—
RE15-11-474	15-613347	0–1	Fill	—	0.0074 (J)	0.0076 (J)	—	0.064 (J)	0.18 (J)	—	0.00058 (J)	NA	—	—	—	—	—
RE15-11-475	15-613347	3–4	Soil	0.012 (J)	—	—	—	—	—	0.086 (J)	—	NA	0.31	—	—	0.0098 (J)	—
RE15-11-478	15-613349	0–1	Soil	—	—	—	—	—	0.97	—	—	NA	—	—	—	—	—
RE15-11-481	15-613350	3–4	Fill	—	—	—	—	0.078 (J)	—	—	—	NA	—	—	—	—	—
RE15-11-483	15-613351	3–4	Qbt 4	—	—	—	—	0.064 (J)	—	—	—	NA	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[c] Isopropylbenzene used as a surrogate based on structural similarity.
[d] na = Not available.
[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[f] — = Not detected or not analyzed.
[g] NA = Not analyzed.

Table 6.6-4
Radionuclides Detected or Detected above BVs at SWMUs 15-004(b) and 15-004(c)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-238
Soil BV[a]				**2.59**	**2.29**
Construction Worker SAL[b]				**220**	**160**
Industrial SAL[b]				**1500**	**430**
Residential SAL[b]				**170**	**87**
RE15-11-474	15-613347	0–1	Fill	2.98	3.76

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs from LANL (2009, 107655).

Table 6.7-1
Samples Collected and Analyses Requested at SWMU 15-004(f)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
AAB3451	15-02100	1.5–2	Soil	18681	19509	—*	—	—	—	—	—	—	19509
RE15-11-543	15-02100	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-542	15-02101	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
AAB3461	15-02112	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-540	15-02112	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-576	15-02113	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-577	15-02113	3–4	Qbt 4	11-599	—	—	11-599	—	—	—	—	11-599	—
AAB3476	15-02114	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-541	15-02114	3–4	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-544	15-02115	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-555	15-02119	3–4	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-546	15-02123	3–4	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-572	15-02124	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-573	15-02124	3–4	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-539	15-02125	3–4	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
AAB3340	15-02127	1.5–2	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-545	15-02127	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—

Table 6.7-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-592	15-02132	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-593	15-02132	1–2	Qbt 3	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-568	15-02136	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-569	15-02136	3–4	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
AAB3332	15-02137	1.5–2	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-538	15-02137	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-557	15-02139	3–4	Qbt 4	11-542	—	—	11-542	—	—	—	—	11-542	—
RE15-11-554	15-02141	3–3.5	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-595	15-02142	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-596	15-02142	1–2	Qbt 3	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-550	15-02144	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-590	15-02145	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-591	15-02145	3–4	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-548	15-02147	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-574	15-02148	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-575	15-02148	3–4	Qbt 4	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-529	15-02149	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
RE15-11-582	15-02150	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-583	15-02150	3–4	Qbt 4	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-535	15-02151	3–4	Soil	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-536	15-02152	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
AAB3304	15-02153	1–1	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-558	15-02153	3–4	Qbt 4	11-542	—	—	11-542	—	—	—	—	11-542	—
RE15-11-551	15-02155	3–3.5	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-586	15-02156	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-587	15-02156	3–4	Qbt 4	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-549	15-02157	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-580	15-02162	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-581	15-02162	3–4	Qbt 4	11-599	—	—	11-599	—	—	—	—	11-599	—
AAB3342	15-02166	0–0.33	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-552	15-02166	3–3.5	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-553	15-02167	3–3.5	Qbt 4	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-526	15-02170	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
RE15-11-578	15-02171	0–1	Soil	11-599	—	—	11-599	—	—	—	—	11-599	—
RE15-11-579	15-02171	1–2	Qbt 4	11-599	—	—	11-599	—	—	—	—	11-599	—
AAB3477	15-02172	1.5–2	Soil	18681	19509	—	—	—	—	—	—	—	19509

Table 6.7-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-528	15-02172	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
RE15-11-532	15-02173	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-560	15-02177	3–3.5	Qbt 3	11-535	—	—	11-536	—	—	—	—	11-535	—
AAB3336	15-02178	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-559	15-02178	3–3.5	Qbt 3	11-535	—	—	11-536	—	—	—	—	11-535	—
RE15-11-561	15-02179	3–3.5	Qbt 4	11-535	—	—	11-536	—	—	—	—	11-535	—
RE15-11-524	15-02180	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
AAB3470	15-02182	1.5–2	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-523	15-02191	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
RE15-11-547	15-02196	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
AAB3485	15-02198	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-556	15-02198	3–4	Soil	11-513	—	—	11-512	—	—	—	—	11-514	—
RE15-11-670	15-02203	0–1	Soil	11-598	—	11-598	11-598	11-617	—	—	—	11-598	—
RE15-11-594	15-02203	3–4	Qbt 4	11-598	—	—	11-598	—	—	—	—	11-598	—
AAB3295	15-02206	0–0.33	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-562	15-02206	3–3.5	Qbt 3	11-535	—	—	11-536	—	—	—	—	11-535	—
RE15-11-537	15-02226	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-533	15-02228	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-588	15-02229	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-589	15-02229	1–2	Qbt 4	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-597	15-02230	0–0.5	Qbt 4	11-639	—	—	11-639	—	—	—	—	11-639	—
RE15-11-598	15-02230	0.5–1	Qbt 4	11-639	—	—	11-639	—	—	—	—	11-639	—
RE15-11-527	15-02231	3–4	Soil	11-310	—	—	11-310	—	—	—	—	11-310	—
AAB3298	15-02240	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-531	15-02240	3–4	Fill	11-310	—	—	11-310	—	—	—	—	11-310	—
RE15-11-530	15-02241	3–4	Fill	11-310	—	—	11-310	—	—	—	—	11-310	—
AAB3445	15-02246	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
AAB3321	15-02277	0–0.42	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-565	15-02277	3–3.5	Qbt 4	11-535	—	11-536	11-536	11-537	—	—	—	11-535	—
RE15-11-525	15-02278	3–4	Qbt 4	11-310	—	—	11-310	—	—	—	—	11-310	—
AAB3525	15-02279	0–0.42	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-584	15-02279	0–1	Soil	11-598	—	—	11-598	—	—	—	—	11-598	—
RE15-11-585	15-02279	3–4	Qbt 4	11-598	—	—	11-598	—	—	—	—	11-598	—
AAB3325	15-02295	0–0.5	Soil	18681	19509	—	—	—	—	—	—	—	19509
RE15-11-534	15-02295	3–4	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
AAB3480	15-02299	1.5–2	Soil	18681	19509	—	—	—	—	—	—	—	19509

Table 6.7-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-563	15-02299	3–4	Qbt 4	11-535	—	—	11-536	—	—	—	—	11-535	—
RE15-11-671	15-613365	0–1	Fill	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-672	15-613365	6–7	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-673	15-613365	9–10	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-604	15-613365	10.5–11	Qbt 4	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-674	15-613366	0–1	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-675	15-613366	6–7	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-676	15-613366	9–10	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-677	15-613367	0–1	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-678	15-613367	2–3	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-680	15-613368	0–1	Fill	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-681	15-613368	6–7	Fill	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-682	15-613368	9–10	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-683	15-613369	0–1	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-684	15-613369	6–7	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-685	15-613369	9–10	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-600	15-613369	11–12	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-686	15-613370	0–1	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-687	15-613370	6–7	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-688	15-613370	8–8.5	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-689	15-613371	0–1	Fill	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-690	15-613371	6–7	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-691	15-613371	9–10	Qbt 4	11-478	—	—	11-478	—	—	—	—	11-478	—
RE15-11-692	15-613372	0–1	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-693	15-613372	6–7	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-694	15-613372	9–10	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-603	15-613372	10.9–11.1	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-695	15-613373	0–1	Fill	11-483	—	—	11-483	—	—	—	—	11-483	—
RE15-11-696	15-613373	6–6.25	Fill	11-483	—	—	11-483	—	—	—	—	11-483	—
RE15-11-698	15-613374	0–1	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-699	15-613374	6–7	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-700	15-613374	8–8.5	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-701	15-613375	0–1	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-702	15-613375	6–7	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-703	15-613375	9–10	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-599	15-613375	11–12	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—

Table 6.7-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-704	15-613376	0–1	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-705	15-613376	6–7	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-706	15-613376	8.25–9.25	Qbt 4	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-601	15-613376	10–11	Qbt 4	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-707	15-613377	0–1	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-708	15-613377	3–3.5	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-710	15-613378	0–1	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-711	15-613378	6–7	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-712	15-613378	9–10	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-713	15-613379	0–1	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-714	15-613379	6–7	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-715	15-613379	9–10	Qbt 4	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-716	15-613380	0–1	Fill	11-483	—	—	11-483	—	—	—	—	11-483	—
RE15-11-717	15-613380	6–7	Fill	11-483	—	—	11-483	—	—	—	—	11-483	—
RE15-11-718	15-613380	9–9.5	Fill	11-483	—	—	11-483	—	—	—	—	11-483	—
RE15-11-725	15-613381	0–1	Fill	11-480	—	11-480	11-480	11-573	—	—	—	11-480	—
RE15-11-720	15-613381	6–7	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-721	15-613381	9–10	Fill	11-480	—	—	11-480	—	—	—	—	11-480	—
RE15-11-602	15-613381	11–12	Fill	11-640	—	—	11-641	—	—	—	—	11-640	—
RE15-11-722	15-613382	0–1	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-723	15-613382	6–7	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-724	15-613382	9–10	Fill	11-479	—	—	11-479	—	—	—	—	11-479	—
RE15-11-728	15-613384	0–0.5	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-729	15-613384	0.5–1	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-730	15-613385	0–1	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-731	15-613385	1–1.5	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-732	15-613386	0–1	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-733	15-613386	1–2	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-734	15-613387	0–1	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-735	15-613387	2–3	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-736	15-613388	0–1	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-737	15-613388	1–1.5	Sed	11-645	—	—	11-646	—	11-645	11-645	11-645	11-645	—
RE15-11-740	15-613389	0–0.5	Sed	11-675	—	11-675	11-675	11-676	11-675	11-675	11-675	11-675	—
RE15-11-739	15-613389	0.5–1	Sed	11-708	—	—	11-708	—	11-708	11-708	11-708	11-708	—

* — = Analysis not requested.

Table 6.7-2
Inorganic Chemicals above BVs at SWMU15-004(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**[c]	**449**[d]	**34.6**[e]	**12400**	**217000**	**800**	**na**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**[d]	**300**[f]	**45400**	**795000**	**800**	**na**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**54800**	**400**	**na**
AAB3451	15-02100	1.5–2	Soil	—[g]	3.9 (U)	—	—	—	1 (U)	—	—	—	—	—	—	—
RE15-11-543	15-02100	3–4	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-542	15-02101	3–4	Soil	—	—	—	—	—	—	6750	—	—	—	—	—	—
AAB3461	15-02112	0–0.5	Soil	—	3.8 (U)	—	—	—	0.96 (U)	—	—	—	49.4	—	48.5	—
RE15-11-576	15-02113	0–1	Soil	—	—	—	—	—	—	—	—	—	16.2	—	—	—
RE15-11-577	15-02113	3–4	Qbt 4	—	—	—	83.8	—	—	2500	—	—	—	—	—	—
AAB3476	15-02114	0–0.5	Soil	—	3.7 (U)	—	—	—	1.1	—	—	—	17.3	—	—	—
RE15-11-541	15-02114	3–4	Qbt 4	11200	—	3.5	209 (J+)	—	—	—	15.6	7.2	6.2	—	13.2	2290 (J+)
RE15-11-555	15-02119	3–4	Qbt 4	—	—	—	89.8 (J+)	—	—	—	—	—	—	—	—	1720 (J+)
RE15-11-546	15-02123	3–4	Qbt 4	11600	—	3	102 (J+)	—	—	2720	8.2	3.2	5.2	15100	11.3	2450 (J+)
RE15-11-539	15-02125	3–4	Qbt 4	—	0.51 (U)	2.9	52.5 (J+)	—	—	—	10.2	—	—	—	—	—
AAB3340	15-02127	1.5–2	Soil	—	4 (U)	—	—	—	1 (U)	—	—	—	—	—	—	—
RE15-11-593	15-02132	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3332	15-02137	1.5–2	Soil	30700	4 (U)	—	650	—	1 (U)	10000	—	11.1 (U)	—	—	—	—
RE15-11-538	15-02137	3–4	Qbt 4	—	0.52 (U)	—	115	—	—	—	11.9	—	—	—	—	—
RE15-11-557	15-02139	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-554	15-02141	3–3.5	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-596	15-02142	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-550	15-02144	3–4	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-575	15-02148	3–4	Qbt 4	—	—	—	67.4	—	—	3450	—	—	—	—	—	—
RE15-11-529	15-02149	3–4	Qbt 4	—	0.55 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-582	15-02150	0–1	Soil	—	—	—	—	—	—	—	—	—	17.5	—	—	—
RE15-11-583	15-02150	3–4	Qbt 4	11600 (J+)	—	3.5	113	—	—	7320	12.5	—	5.6	14900	—	2420
RE15-11-536	15-02152	3–4	Qbt 4	—	0.51 (U)	—	53.6	—	—	8860 (J)	14.7	—	—	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449**[d]	**34.6**[e]	**12400**	**217000**	**800**	**na**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**[d]	**300**[f]	**45400**	**795000**	**800**	**na**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**54800**	**400**	**na**
AAB3304	15-02153	1–1	Soil	—	3.9 (U)	—	—	—	0.79 (U)	—	—	—	—	—	—	—
RE15-11-558	15-02153	3–4	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-551	15-02155	3–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-587	15-02156	3–4	Qbt 4	7950	—	—	104 (J+)	—	—	5340	20.7	—	5.5	—	—	2030 (J+)
RE15-11-549	15-02157	3–4	Soil	—	—	—	—	—	—	7160	—	—	—	—	—	—
RE15-11-580	15-02162	0–1	Soil	—	—	—	—	—	—	—	—	10.8	—	22200	23.1	—
RE15-11-581	15-02162	3–4	Qbt 4	—	—	—	63.1	—	—	2770	—	—	—	—	—	—
AAB3342	15-02166	0–0.33	Soil	—	3.7 (U)	—	—	—	0.68 (U)	—	—	—	15.4	—	—	—
RE15-11-552	15-02166	3–3.5	Qbt 4	—	0.51 (U)	—	—	—	—	—	35.5	—	—	—	—	—
RE15-11-553	15-02167	3–3.5	Qbt 4	—	—	—	51.4 (J+)	—	—	—	—	—	—	—	—	1710 (J+)
RE15-11-526	15-02170	3–4	Qbt 4	—	0.53 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-578	15-02171	0–1	Soil	—	—	—	307	—	—	—	—	—	18.8	—	—	—
RE15-11-579	15-02171	1–2	Qbt 4	—	—	—	47	—	—	—	—	—	—	—	—	—
AAB3477	15-02172	1.5–2	Soil	—	4.3 (U)	—	—	—	1 (U)	—	—	—	—	—	—	—
RE15-11-528	15-02172	3–4	Qbt 4	—	0.54 (U)	—	75.5	—	—	—	—	—	—	—	—	—
RE15-11-532	15-02173	3–4	Qbt 4	—	0.54 (U)	—	70.5	—	—	—	9	—	—	—	—	—
RE15-11-560	15-02177	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	21.8	—	—	—	—	—
AAB3336	15-02178	0–0.5	Soil	—	3.7 (U)	—	—	—	0.6 (U)	—	—	—	—	—	—	—
RE15-11-559	15-02178	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-561	15-02179	3–3.5	Qbt 4	—	0.53 (U)	—	154	—	—	6640	—	—	—	—	—	—
RE15-11-524	15-02180	3–4	Qbt 4	—	—	—	67.8	—	—	13300 (J)	10.1	—	—	—	—	—
AAB3470	15-02182	1.5–2	Soil	—	4 (U)	—	387	—	1.2	—	—	—	—	—	—	—
RE15-11-523	15-02191	3–4	Qbt 4	—	—	—	—	—	—	—	9.7	—	—	—	—	—
AAB3485	15-02198	0–0.5	Soil	—	3.7 (U)	—	—	—	0.87 (U)	—	—	—	—	—	23.3	—
RE15-11-594	15-02203	3–4	Qbt 4	—	—	—	—	—	—	—	9.8	—	—	—	—	—
AAB3295	15-02206	0–0.33	Soil	—	3.7 (U)	—	—	—	0.78 (U)	—	—	—	—	—	—	—
RE15-11-562	15-02206	3–3.5	Qbt 3	—	0.51 (U)	—	—	—	—	—	27.8	—	—	—	—	—
RE15-11-537	15-02226	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	9.9	—	—	—	—	—
RE15-11-533	15-02228	3–4	Qbt 4	—	—	—	—	—	—	—	—	—	4.7	—	—	—
RE15-11-588	15-02229	0–1	Soil	—	—	—	—	—	—	—	—	—	62.1	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449**[d]	**34.6**[e]	**12400**	**217000**	**800**	**na**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**[d]	**300**[f]	**45400**	**795000**	**800**	**na**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**54800**	**400**	**na**
RE15-11-589	15-02229	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	4.8	—	—	—
RE15-11-597	15-02230	0–0.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-598	15-02230	0.5–1	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-527	15-02231	3–4	Soil	—	—	—	—	—	—	—	22.2	—	—	—	—	—
AAB3298	15-02240	0–0.5	Soil	—	3.9 (U)	—	—	—	0.76 (U)	—	—	—	53.1	—	—	—
RE15-11-531	15-02240	3–4	Fill	—	—	—	—	—	—	7090 (J)	—	—	—	—	—	—
RE15-11-530	15-02241	3–4	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
AAB3445	15-02246	0–0.5	Soil	—	3.9 (U)	—	—	2.5	0.43 (U)	—	—	—	147	—	23.6	—
AAB3321	15-02277	0–0.42	Soil	—	3.8 (U)	—	—	—	3.2	—	—	—	43.9	—	91.2	—
RE15-11-565	15-02277	3–3.5	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-525	15-02278	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—
AAB3525	15-02279	0–0.42	Soil	—	3.7 (U)	—	—	—	1.4	—	—	—	22.2	—	30.1	—
RE15-11-585	15-02279	3–4	Qbt 4	—	—	—	—	—	—	—	15.7	—	—	—	—	—
AAB3325	15-02295	0–0.5	Soil	—	3.7 (U)	—	—	—	1 (U)	—	—	—	40.9	—	—	—
RE15-11-534	15-02295	3–4	Qbt 4	—	0.53 (U)	—	92.1	—	—	5840 (J)	7.9	—	—	—	—	—
AAB3480	15-02299	1.5–2	Soil	—	4 (U)	—	315	—	0.98 (U)	—	—	—	—	—	—	—
RE15-11-563	15-02299	3–4	Qbt 4	—	0.52 (U)	—	—	—	—	—	—	—	—	—	—	—
RE15-11-671	15-613365	0–1	Fill	—	5.4	—	755	7.9	3.8	—	31.2	—	8250	—	177	—
RE15-11-672	15-613365	6–7	Qbt 4	—	0.54 (U)	—	—	1.7	—	—	—	—	95.8	—	—	—
RE15-11-673	15-613365	9–10	Qbt 4	—	0.54 (U)	4.4	51.9	—	—	—	8.2	—	27.7	—	—	2170 (J+)
RE15-11-604	15-613365	10.5–11	Qbt 4	—	1.2 (J)	—	82.5 (J+)	1.8	—	—	8.5	8.6	485	—	13.2	—
RE15-11-674	15-613366	0–1	Fill	—	—	—	—	—	—	—	—	9.6	40.9	—	—	—
RE15-11-675	15-613366	6–7	Fill	—	—	—	307 (J+)	—	0.43	—	—	9.4	88.4	—	23.3	—
RE15-11-676	15-613366	9–10	Fill	—	—	—	—	—	0.82	—	—	9.4	3540	—	22.5	—
RE15-11-677	15-613367	0–1	Fill	—	10.4	—	296 (J+)	42.1	12.9	—	—	—	8140	—	375	—
RE15-11-678	15-613367	2–3	Fill	—	6.6	—	344 (J+)	18.9	9.9	6140	—	—	1250	—	140	—
RE15-11-680	15-613368	0–1	Fill	—	17.5	—	365	18.7	1.2	—	—	—	423	—	43.2	—
RE15-11-681	15-613368	6–7	Fill	—	—	—	—	—	—	7030 (J)	—	—	20.6	—	—	—
RE15-11-682	15-613368	9–10	Qbt 4	—	0.6	—	—	—	—	—	—	—	16.2	—	—	—
RE15-11-683	15-613369	0–1	Fill	—	—	—	296 (J+)	—	—	—	—	—	24	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**217000**	**800**	**na**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**795000**	**800**	**na**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**54800**	**400**	**na**
RE15-11-684	15-613369	6–7	Fill	—	—	—	—	—	0.51	—	—	8.9	49.1	—	23.3	—
RE15-11-685	15-613369	9–10	Fill	—	—	—	—	—	0.84	—	—	—	92.9	—	23.3	—
RE15-11-600	15-613369	11–12	Fill	—	—	—	—	—	—	—	—	16.8	26.7	—	22.5	—
RE15-11-686	15-613370	0–1	Fill	—	—	—	—	—	—	—	—	—	37.6	—	—	—
RE15-11-687	15-613370	6–7	Fill	—	—	—	471 (J+)	—	1.7	—	—	—	108000	—	25.7	—
RE15-11-688	15-613370	8–8.5	Fill	—	—	—	675 (J+)	—	3.5	—	21.2	9	637	—	51.6	—
RE15-11-689	15-613371	0–1	Fill	—	2.2	—	379	20.4	1.2	—	—	—	281	—	48.5	—
RE15-11-690	15-613371	6–7	Qbt 4	—	0.52 (U)	—	57	—	—	—	—	—	284	—	—	—
RE15-11-691	15-613371	9–10	Qbt 4	—	0.51 (U)	—	—	—	—	—	—	—	6.6	—	—	—
RE15-11-692	15-613372	0–1	Fill	—	—	—	—	—	—	—	—	—	42.6	—	—	—
RE15-11-693	15-613372	6–7	Fill	—	—	—	297 (J+)	—	0.42	—	—	9	61.3	—	—	—
RE15-11-694	15-613372	9–10	Fill	—	—	—	311 (J+)	—	0.45	—	—	8.8	49.7	—	25.7	—
RE15-11-603	15-613372	10.9–11.1	Fill	—	—	—	—	—	0.87	—	—	—	79.8	—	—	—
RE15-11-695	15-613373	0–1	Fill	—	—	—	—	—	—	—	—	—	47.3 (J-)	—	—	—
RE15-11-696	15-613373	6–6.25	Fill	—	—	—	375	—	0.55	—	—	—	119 (J-)	—	88.9	—
RE15-11-698	15-613374	0–1	Fill	—	—	—	339 (J+)	—	—	—	—	—	313	—	—	—
RE15-11-699	15-613374	6–7	Fill	—	—	—	—	—	—	—	—	—	112	—	—	—
RE15-11-700	15-613374	8–8.5	Fill	—	—	—	857 (J+)	—	44.9	—	—	—	3970	—	87.8	—
RE15-11-701	15-613375	0–1	Fill	—	—	—	—	—	—	—	—	—	106	—	—	—
RE15-11-702	15-613375	6–7	Fill	—	—	—	409 (J+)	—	—	—	—	—	—	—	—	—
RE15-11-703	15-613375	9–10	Fill	—	—	—	390 (J+)	—	0.43	—	—	—	69.2	—	23.7	—
RE15-11-599	15-613375	11–12	Fill	—	—	—	—	—	0.57	—	—	—	39.2	—	—	—
RE15-11-704	15-613376	0–1	Fill	—	1 (J)	—	439 (J+)	2	1.1	—	—	—	626	—	30.9	—
RE15-11-705	15-613376	6–7	Fill	—	—	—	—	—	—	—	—	—	35.2 (J)	—	—	—
RE15-11-706	15-613376	8.25–9.25	Qbt 4	11600	0.54	2.8	195	—	—	2260	13.6	5	526 (J)	—	15.7	1870
RE15-11-601	15-613376	10–11	Qbt 4	—	—	—	79.1 (J+)	—	—	—	9	—	189	—	—	—
RE15-11-707	15-613377	0–1	Fill	—	—	—	337 (J+)	—	0.45	—	—	—	119	—	25.5	—
RE15-11-708	15-613377	3–3.5	Fill	—	—	—	—	—	0.51	—	26.6	9.7	113	—	41.9	—
RE15-11-710	15-613378	0–1	Fill	—	—	—	—	—	—	—	—	—	41.8 (J)	—	—	—
RE15-11-711	15-613378	6–7	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Iron	Lead	Magnesium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**14500**	**11.2**	**1690**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**1.31**	**0.4**	**4420**	**10.5**	**4.73**	**11.2**	**13800**	**19.7**	**2370**
Soil BV				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**21500**	**22.3**	**4610**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**217000**	**800**	**na**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**795000**	**800**	**na**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**54800**	**400**	**na**
RE15-11-713	15-613379	0–1	Fill	—	1.3	—	—	2	0.58	—	—	—	94.9 (J)	—	28.9	—
RE15-11-714	15-613379	6–7	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-715	15-613379	9–10	Qbt 4	9040	0.52 (U)	3.8	78.7	—	—	2370	7.5	—	4.7 (J)	—	—	2350
RE15-11-716	15-613380	0–1	Fill	—	0.89	—	—	3.7	0.97	—	—	—	141 (J-)	—	33.5	—
RE15-11-717	15-613380	6–7	Fill	—	—	—	308	—	0.59	—	20.6	9.6	160 (J-)	—	25.1	—
RE15-11-718	15-613380	9–9.5	Fill	—	—	—	658	—	2.1	—	23.9	—	255 (J-)	—	112	—
RE15-11-725	15-613381	0–1	Fill	—	2.1 (J)	—	537 (J+)	2.4	0.68	—	—	—	356	—	50.1	—
RE15-11-720	15-613381	6–7	Fill	—	—	—	—	—	—	—	—	—	137	—	—	—
RE15-11-721	15-613381	9–10	Fill	—	—	—	359 (J+)	—	0.79	—	—	9	168	—	89.8	—
RE15-11-602	15-613381	11–12	Fill	—	—	—	—	—	—	—	—	9.8	—	—	—	—
RE15-11-722	15-613382	0–1	Fill	—	—	—	550	—	0.87	—	—	—	135 (J)	—	26.8	—
RE15-11-723	15-613382	6–7	Fill	—	—	—	327	—	—	6180	—	9.1	15.6 (J)	—	—	—
RE15-11-724	15-613382	9–10	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-728	15-613384	0–0.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-729	15-613384	0.5–1	Sed	—	—	—	—	—	—	—	—	—	14.4	—	—	—
RE15-11-730	15-613385	0–1	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-731	15-613385	1–1.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-732	15-613386	0–1	Sed	—	—	—	160	—	—	—	—	—	51.5	—	—	—
RE15-11-733	15-613386	1–2	Sed	—	—	—	—	—	—	—	—	—	39.2	—	—	—
RE15-11-734	15-613387	0–1	Sed	—	—	—	158	—	—	—	—	6.2	12.1	—	—	—
RE15-11-735	15-613387	2–3	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-736	15-613388	0–1	Sed	—	—	—	150	—	—	—	—	6.2	19.6	—	—	—
RE15-11-737	15-613388	1–1.5	Sed	—	—	—	149	—	—	—	—	5.7	—	—	—	—
RE15-11-740	15-613389	0–0.5	Sed	—	—	—	—	—	—	—	—	—	587	—	—	—
RE15-11-739	15-613389	0.5–1	Sed	—	—	—	154	1.9	0.48	—	—	—	177	—	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na**	**3500**	**0.3**	**1.0**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1.0**	**1470**	**0.73**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1.0**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**463**	**69.5[e]**	**6190**	**496000**	**na**	**1550**	**1550**	**na**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[b]				**145000**	**310[f]**	**22700**	**1820000**	**na**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[b]				**10700**	**23[f]**	**1560**	**125000**	**na**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
AAB3451	15-02100	1.5–2	Soil	—	0.11 (U)	—	NA[h]	—	—	—	—	—	3.17	—	—
RE15-11-543	15-02100	3–4	Soil	—	—	—	NA	—	2	—	—	—	NA	—	—
RE15-11-542	15-02101	3–4	Soil	—	—	—	NA	—	—	—	—	—	NA	—	—
AAB3461	15-02112	0–0.5	Soil	—	0.27 (J)	—	NA	—	—	—	—	—	66.3	—	—
RE15-11-576	15-02113	0–1	Soil	—	2.3	—	NA	—	—	—	—	—	NA	—	—
RE15-11-577	15-02113	3–4	Qbt 4	—	—	—	NA	—	1.6	—	—	—	NA	—	—
AAB3476	15-02114	0–0.5	Soil	—	0.65 (J)	—	NA	—	—	—	—	—	21.1	—	—
RE15-11-541	15-02114	3–4	Qbt 4	—	—	9.9	NA	—	1.2	—	—	—	NA	22.8	—
RE15-11-555	15-02119	3–4	Qbt 4	—	—	—	NA	—	2	—	—	—	NA	—	—
RE15-11-546	15-02123	3–4	Qbt 4	—	—	9.5	NA	—	2.3	—	—	—	NA	—	—
RE15-11-539	15-02125	3–4	Qbt 4	—	—	7.4	NA	—	2.6	—	—	—	NA	—	—
AAB3340	15-02127	1.5–2	Soil	—	—	—	NA	—	—	—	—	—	3.93	—	—
RE15-11-593	15-02132	1–2	Qbt 3	—	—	—	NA	—	1.7	—	—	—	NA	—	—
AAB3332	15-02137	1.5–2	Soil	—	0.14 (J)	—	NA	—	—	—	1340 (J)	—	6.47	—	—
RE15-11-538	15-02137	3–4	Qbt 4	—	—	8.5	NA	—	2.1	—	—	—	NA	—	—
RE15-11-557	15-02139	3–4	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	—	—
RE15-11-554	15-02141	3–3.5	Qbt 4	—	—	—	NA	—	2.7	—	—	—	NA	—	—
RE15-11-596	15-02142	1–2	Qbt 3	—	—	—	NA	—	1.4	—	—	—	NA	—	—
RE15-11-550	15-02144	3–4	Soil	—	—	—	NA	—	2.2	—	—	—	NA	—	—
RE15-11-575	15-02148	3–4	Qbt 4	—	—	7 (J)	NA	—	1.3	—	—	—	NA	—	—
RE15-11-529	15-02149	3–4	Qbt 4	—	—	—	NA	—	3.6	—	—	—	NA	—	—
RE15-11-582	15-02150	0–1	Soil	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-583	15-02150	3–4	Qbt 4	—	—	10.7	NA	—	1.1	—	—	—	NA	—	—
RE15-11-536	15-02152	3–4	Qbt 4	—	—	9.6	NA	—	2	—	—	—	NA	—	—
AAB3304	15-02153	1–1	Soil	—	0.28 (J)	—	NA	—	—	—	—	—	21.7	—	—
RE15-11-558	15-02153	3–4	Qbt 4	—	—	—	NA	—	1.2	—	—	—	NA	—	—
RE15-11-551	15-02155	3–3.5	Qbt 4	—	—	—	NA	—	2.2	—	—	—	NA	—	—
RE15-11-587	15-02156	3–4	Qbt 4	—	—	13.1	NA	—	1.6	—	—	—	NA	—	—
RE15-11-549	15-02157	3–4	Soil	—	—	—	NA	—	2.4	—	—	—	NA	—	—
RE15-11-580	15-02162	0–1	Soil	824	—	—	NA	—	1.8	—	—	—	NA	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na**	**3500**	**0.3**	**1.0**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1.0**	**1470**	**0.73**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1.0**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**463**	**69.5[e]**	**6190**	**496000**	**na**	**1550**	**1550**	**na**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[b]				**145000**	**310[f]**	**22700**	**1820000**	**na**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[b]				**10700**	**23[f]**	**1560**	**125000**	**na**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE15-11-581	15-02162	3–4	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	—	—
AAB3342	15-02166	0–0.33	Soil	—	—	—	NA	—	—	—	—	—	49.2	—	—
RE15-11-552	15-02166	3–3.5	Qbt 4	—	—	18.8	NA	—	3.1	—	—	—	NA	—	—
RE15-11-553	15-02167	3–3.5	Qbt 4	—	—	6.9	NA	—	1.7	—	—	—	NA	—	—
RE15-11-526	15-02170	3–4	Qbt 4	—	0.561	—	NA	—	1.5	—	—	—	NA	—	—
RE15-11-578	15-02171	0–1	Soil	—	0.182	—	NA	—	—	—	1030	—	NA	—	—
RE15-11-579	15-02171	1–2	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	—	—
AAB3477	15-02172	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	1240 (J)	0.75 (U)	10.3	—	—
RE15-11-528	15-02172	3–4	Qbt 4	—	—	—	NA	—	2.5	—	—	—	NA	—	—
RE15-11-532	15-02173	3–4	Qbt 4	—	—	8.3	NA	—	1.8	—	—	—	NA	—	—
RE15-11-560	15-02177	3–3.5	Qbt 3	—	—	10.9	NA	—	1.8	—	—	—	NA	—	—
AAB3336	15-02178	0–0.5	Soil	—	0.53 (J)	—	NA	—	—	—	—	—	46.1	—	—
RE15-11-559	15-02178	3–3.5	Qbt 3	—	—	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-561	15-02179	3–3.5	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	—	—
RE15-11-524	15-02180	3–4	Qbt 4	—	0.664	7.7	NA	—	1.1	—	—	—	NA	—	—
AAB3470	15-02182	1.5–2	Soil	—	1.8 (J)	—	NA	3940	—	—	1290 (J)	—	15.2	—	—
RE15-11-523	15-02191	3–4	Qbt 4	—	—	—	NA	—	1.6	—	—	—	NA	—	—
AAB3485	15-02198	0–0.5	Soil	—	—	—	NA	—	—	—	—	—	21.6	—	—
RE15-11-594	15-02203	3–4	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	—	—
AAB3295	15-02206	0–0.33	Soil	—	0.11 (J)	—	NA	—	—	—	—	—	12.1	—	—
RE15-11-562	15-02206	3–3.5	Qbt 3	—	—	13.4	NA	—	1.7	—	—	—	NA	—	—
RE15-11-537	15-02226	3–4	Qbt 4	—	—	—	NA	—	1.8	—	—	—	NA	—	—
RE15-11-533	15-02228	3–4	Qbt 4	—	—	—	NA	—	1.8	—	—	1.3	NA	—	—
RE15-11-588	15-02229	0–1	Soil	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-589	15-02229	1–2	Qbt 4	—	—	—	NA	—	1.1	—	—	—	NA	—	—
RE15-11-597	15-02230	0–0.5	Qbt 4	—	—	—	NA	—	1.4	—	—	—	NA	—	—
RE15-11-598	15-02230	0.5–1	Qbt 4	—	—	—	NA	—	1.8	—	—	—	NA	—	—
RE15-11-527	15-02231	3–4	Soil	—	—	—	NA	—	1.6	—	—	—	NA	—	—
AAB3298	15-02240	0–0.5	Soil	—	0.21 (J)	—	NA	—	—	—	—	—	47.5	—	—
RE15-11-531	15-02240	3–4	Fill	—	0.101	—	NA	—	—	—	—	—	NA	—	—

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na**	**3500**	**0.3**	**1.0**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1.0**	**1470**	**0.73**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1.0**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**463**	**69.5[e]**	**6190**	**496000**	**na**	**1550**	**1550**	**na**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[b]				**145000**	**310[f]**	**22700**	**1820000**	**na**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[b]				**10700**	**23[f]**	**1560**	**125000**	**na**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE15-11-530	15-02241	3–4	Fill	—	0.722	—	NA	—	—	—	—	—	NA	—	—
AAB3445	15-02246	0–0.5	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	2763	—	52.1
AAB3321	15-02277	0–0.42	Soil	—	0.11 (U)	—	NA	—	—	—	—	—	41.1	—	—
RE15-11-565	15-02277	3–3.5	Qbt 4	—	—	—	NA	—	1.2	—	—	—	NA	—	—
RE15-11-525	15-02278	3–4	Qbt 4	—	—	—	NA	—	1.3	—	—	—	NA	—	—
AAB3525	15-02279	0–0.42	Soil	—	—	—	NA	—	—	—	—	—	39.1	—	—
RE15-11-585	15-02279	3–4	Qbt 4	—	—	8.4	NA	—	1	—	—	—	NA	—	—
AAB3325	15-02295	0–0.5	Soil	—	—	—	NA	—	—	4.1 (J)	—	—	190	—	—
RE15-11-534	15-02295	3–4	Qbt 4	—	—	7.4	NA	—	1.8	—	—	—	NA	—	—
AAB3480	15-02299	1.5–2	Soil	—	0.11 (U)	—	NA	—	—	—	1160 (J)	—	12.7	—	—
RE15-11-563	15-02299	3–4	Qbt 4	—	—	—	NA	—	1.4	—	—	—	NA	—	—
RE15-11-671	15-613365	0–1	Fill	—	—	27.5	NA	—	—	8.4	—	—	NA	—	520
RE15-11-672	15-613365	6–7	Qbt 4	—	—	—	NA	—	1.7	—	—	—	NA	—	—
RE15-11-673	15-613365	9–10	Qbt 4	—	—	9.6	NA	—	2.6	—	—	—	NA	—	—
RE15-11-604	15-613365	10.5–11	Qbt 4	—	—	8.6	NA	—	1.5	2.9	—	—	NA	—	—
RE15-11-674	15-613366	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	—	49.9
RE15-11-675	15-613366	6–7	Fill	—	—	—	NA	—	2	—	—	—	NA	—	—
RE15-11-676	15-613366	9–10	Fill	—	—	—	NA	—	1.6	—	—	—	NA	—	51.6
RE15-11-677	15-613367	0–1	Fill	—	—	18.1	NA	—	—	25.5	—	—	NA	—	716
RE15-11-678	15-613367	2–3	Fill	—	—	15.5	NA	—	—	13.8	—	—	NA	—	173
RE15-11-680	15-613368	0–1	Fill	—	—	—	NA	—	1.8	1.3	—	—	NA	—	75.9
RE15-11-681	15-613368	6–7	Fill	—	—	—	NA	—	1.9	—	—	—	NA	—	—
RE15-11-682	15-613368	9–10	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	—	—
RE15-11-683	15-613369	0–1	Fill	—	—	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-684	15-613369	6–7	Fill	—	—	—	NA	—	1.8	—	—	—	NA	—	52.7
RE15-11-685	15-613369	9–10	Fill	—	—	—	NA	—	1.9	—	—	—	NA	—	53.1
RE15-11-600	15-613369	11–12	Fill	893	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-686	15-613370	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-687	15-613370	6–7	Fill	—	—	—	NA	—	—	8.4	—	—	NA	—	55.8
RE15-11-688	15-613370	8–8.5	Fill	726	—	15.6	NA	—	1.7	—	—	—	NA	—	114

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na**	**3500**	**0.3**	**1.0**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1.0**	**1470**	**0.73**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1.0**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**463**	**69.5[e]**	**6190**	**496000**	**na**	**1550**	**1550**	**na**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[b]				**145000**	**310[f]**	**22700**	**1820000**	**na**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[b]				**10700**	**23[f]**	**1560**	**125000**	**na**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE15-11-689	15-613371	0–1	Fill	—	—	17.7	NA	—	—	—	—	—	NA	—	80.1
RE15-11-690	15-613371	6–7	Qbt 4	—	—	—	NA	—	1.9	—	—	—	NA	—	—
RE15-11-691	15-613371	9–10	Qbt 4	—	—	—	NA	—	2	—	—	—	NA	—	—
RE15-11-692	15-613372	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	—	—
RE15-11-693	15-613372	6–7	Fill	—	—	—	NA	—	2	—	—	—	NA	—	49.1
RE15-11-694	15-613372	9–10	Fill	—	—	—	NA	—	2	—	—	—	NA	—	—
RE15-11-603	15-613372	10.9–11.1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	—	—
RE15-11-695	15-613373	0–1	Fill	—	—	—	NA	—	1.9	—	—	—	NA	—	—
RE15-11-696	15-613373	6–6.25	Fill	—	—	—	NA	—	2.2	—	—	—	NA	—	56.1
RE15-11-698	15-613374	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	—	51.2
RE15-11-699	15-613374	6–7	Fill	—	—	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-700	15-613374	8–8.5	Fill	—	—	—	NA	—	—	—	—	—	NA	—	349
RE15-11-701	15-613375	0–1	Fill	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-702	15-613375	6–7	Fill	—	—	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-703	15-613375	9–10	Fill	—	0.342	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-599	15-613375	11–12	Fill	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-704	15-613376	0–1	Fill	—	—	—	NA	—	1.7	—	—	—	NA	—	71.9
RE15-11-705	15-613376	6–7	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	—	—
RE15-11-706	15-613376	8.25–9.25	Qbt 4	—	—	10.1	NA	—	1.8 (J)	—	—	—	NA	20.8	—
RE15-11-601	15-613376	10–11	Qbt 4	—	—	—	NA	—	1.5	—	—	—	NA	—	—
RE15-11-707	15-613377	0–1	Fill	—	—	—	NA	—	1.6	—	—	—	NA	—	—
RE15-11-708	15-613377	3–3.5	Fill	—	—	18.2	NA	—	—	—	—	—	NA	—	—
RE15-11-710	15-613378	0–1	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	—	—
RE15-11-711	15-613378	6–7	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	—	—
RE15-11-713	15-613379	0–1	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	—	59.6
RE15-11-714	15-613379	6–7	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	—	—
RE15-11-715	15-613379	9–10	Qbt 4	—	—	9.2	NA	—	4.2 (J)	—	—	2.3	NA	—	—
RE15-11-716	15-613380	0–1	Fill	—	—	—	NA	—	1.8	—	—	—	NA	—	69.3
RE15-11-717	15-613380	6–7	Fill	—	—	15.7	NA	—	2.7	—	—	—	NA	—	50.2
RE15-11-718	15-613380	9–9.5	Fill	—	—	16	NA	—	1.8	—	—	—	NA	—	87.9

Table 6.7-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Manganese	Mercury	Nickel	Nitrate	Potassium	Selenium	Silver	Sodium	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**482**	**0.1**	**6.58**	**na**	**3500**	**0.3**	**1.0**	**2770**	**1.1**	**2.4**	**17**	**63.5**
Sediment BV[a]				**543**	**0.1**	**9.38**	**na**	**2690**	**0.3**	**1.0**	**1470**	**0.73**	**na**	**19.7**	**60.2**
Soil BV[a]				**671**	**0.1**	**15.4**	**na**	**3460**	**1.52**	**1.0**	**915**	**0.73**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[b]				**463**	**69.5[e]**	**6190**	**496000**	**na**	**1550**	**1550**	**na**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[b]				**145000**	**310[f]**	**22700**	**1820000**	**na**	**5680**	**5680**	**na**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[b]				**10700**	**23[f]**	**1560**	**125000**	**na**	**391**	**391**	**na**	**5.16**	**235**	**391**	**23500**
RE15-11-725	15-613381	0–1	Fill	—	—	—	NA	—	1.7	1.5	—	—	NA	—	75.7
RE15-11-720	15-613381	6–7	Fill	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-721	15-613381	9–10	Fill	—	—	—	NA	—	1.9	—	—	—	NA	—	93.9
RE15-11-602	15-613381	11–12	Fill	—	—	—	NA	—	—	—	—	—	NA	—	—
RE15-11-722	15-613382	0–1	Fill	—	—	—	NA	—	1.9 (J)	—	—	—	NA	—	66
RE15-11-723	15-613382	6–7	Fill	—	—	—	NA	—	1.8 (J)	—	—	—	NA	—	—
RE15-11-724	15-613382	9–10	Fill	—	—	—	NA	—	2.1 (J)	—	—	—	NA	—	—
RE15-11-728	15-613384	0–0.5	Sed	—	—	—	—	—	0.74	—	—	—	NA	—	—
RE15-11-729	15-613384	0.5–1	Sed	—	—	—	0.074 (J)	—	0.95	—	—	—	NA	—	—
RE15-11-730	15-613385	0–1	Sed	—	—	—	—	—	1.1	—	—	—	NA	—	—
RE15-11-731	15-613385	1–1.5	Sed	—	—	—	0.074 (J)	—	1.1	—	—	—	NA	—	—
RE15-11-732	15-613386	0–1	Sed	—	—	—	0.073 (J)	—	0.87	—	—	—	NA	—	—
RE15-11-733	15-613386	1–2	Sed	—	—	—	0.073 (J)	—	1.7	—	—	—	NA	—	—
RE15-11-734	15-613387	0–1	Sed	—	—	—	0.4	—	1.6	—	—	—	NA	—	—
RE15-11-735	15-613387	2–3	Sed	—	—	—	0.12 (J)	—	1.7	—	—	—	NA	—	—
RE15-11-736	15-613388	0–1	Sed	—	—	—	0.5	—	1.1	—	—	—	NA	19.9	—
RE15-11-737	15-613388	1–1.5	Sed	—	—	—	0.52	—	1.5	—	—	—	NA	—	—
RE15-11-740	15-613389	0–0.5	Sed	—	—	—	0.07 (J)	—	0.93	—	—	—	NA	—	—
RE15-11-739	15-613389	0.5–1	Sed	—	—	—	—	—	1.2	—	—	—	NA	—	70.4 (J+)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

[h] NA = Not analyzed.

Table 6.7-3
Organic Chemicals Detected at SWMU 15-004(f)

Sample ID	Location ID	Depth (ft)	Media	Amino-4,6-dinitrotoluene[2-]	Dinitroaniline [3,5-]	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Tris (o-cresyl) phosphate
Construction Worker SSL[a]				**601[b]**	**na[c]**	**476**	**239**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**2000[d]**	**na**	**103**	**687**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**150[d]**	**na**	**15.7**	**61.2**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-670	15-02203	0–1	Soil	0.0072 (J)	0.0048 (J)	0.004 (J)	0.0064 (J)	0.00000108 (J)	0.00000217 (J)	—[e]	—	—	—	0.00000926 (J)	0.00000126 (J)	—
RE15-11-565	15-02277	3–3.5	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.00000476 (J)	—	—
RE15-11-674	15-613366	0–1	Fill	—	—	0.0038 (J)	—	NA[f]	NA	NA	NA	NA	NA	NA	NA	—
RE15-11-677	15-613367	0–1	Fill	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA	0.064
RE15-11-678	15-613367	2–3	Fill	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA	0.025 (J)
RE15-11-725	15-613381	0–1	Fill	—	—	—	—	0.00000923	0.0000211	0.00000163 (J)	0.000004 (J)	0.00000266 (J)	0.00000133 (J)	0.0000719	0.00000275 (J)	—
RE15-11-740	15-613389	0–0.5	Sed	—	—	—	—	0.00000133 (J)	0.00000288 (J)	—	—	—	—	0.0000076 (J)	0.00000189 (J)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[c] na = Not available.
[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[e] — = Not detected or not analyzed.
[f] NA = Not analyzed.

Table 6.7-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 15-004(f)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na[b]**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE15-11-576	15-02113	0–1	Soil	NA[d]	4.7	0.253	6.71
RE15-11-572	15-02124	0–1	Soil	NA	6.02	0.349	7.88
RE15-11-592	15-02132	0–1	Soil	NA	39 (J)	2.35 (J)	40.4 (J)
RE15-11-593	15-02132	1–2	Qbt 3	NA	13.5	0.55	13.3
RE15-11-568	15-02136	0–1	Soil	NA	15.4	0.844	16.5
RE15-11-595	15-02142	0–1	Soil	NA	3.77	0.249	5.5
RE15-11-590	15-02145	0–1	Soil	NA	6.08	0.397	17.4
RE15-11-574	15-02148	0–1	Soil	NA	7.59	0.472	13.7
RE15-11-529	15-02149	3–4	Qbt 4	NA	—[e]	0.109	2.96
RE15-11-582	15-02150	0–1	Soil	NA	7.53	0.399	15
RE15-11-583	15-02150	3–4	Qbt 4	NA	—	0.12	2.81
RE15-11-536	15-02152	3–4	Qbt 4	NA	—	0.11	3.26
RE15-11-586	15-02156	0–1	Soil	NA	3.92	0.222	6.62
RE15-11-580	15-02162	0–1	Soil	NA	5.98	0.374	11.1
RE15-11-578	15-02171	0–1	Soil	NA	12.8 (J)	1.76 (J)	90.6 (J)
AAB3470	15-02182	1.5–2	Soil	0.13	NA	NA	NA
RE15-11-670	15-02203	0–1	Soil	NA	5.93	0.323	6.61
RE15-11-533	15-02228	3–4	Qbt 4	NA	—	—	2.97
RE15-11-588	15-02229	0–1	Soil	NA	32.9 (J)	1.86 (J)	57.5 (J)
RE15-11-589	15-02229	1–2	Qbt 4	NA	2.03	0.166	2.79
RE15-11-531	15-02240	3–4	Fill	NA	—	—	3.17
RE15-11-584	15-02279	0–1	Soil	NA	5.17	0.281	9.57
AAB3480	15-02299	1.5–2	Soil	0.06	NA	NA	NA
RE15-11-671	15-613365	0–1	Fill	NA	327 (J)	22.4 (J)	709 (J)
RE15-11-672	15-613365	6–7	Qbt 4	NA	3.29	0.205	8.84
RE15-11-673	15-613365	9–10	Qbt 4	NA	4.69	0.376	14.9
RE15-11-604	15-613365	10.5–11	Qbt 4	NA	37.9	3.52	129 (J)
RE15-11-674	15-613366	0–1	Fill	NA	15.7	1.17	45.3 (J)
RE15-11-675	15-613366	6–7	Fill	NA	14.8	0.678	14.9 (J)
RE15-11-676	15-613366	9–10	Fill	NA	14	0.83	15.4 (J)

Table 6.7-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE15-11-677	15-613367	0–1	Fill	NA	523 (J+)	73 (J+)	3140 (J+)
RE15-11-678	15-613367	2–3	Fill	NA	335 (J+)	33.1 (J+)	1850 (J+)
RE15-11-680	15-613368	0–1	Fill	NA	65.1 (J)	3.77 (J)	130 (J)
RE15-11-681	15-613368	6–7	Fill	NA	2.94	—	4.5
RE15-11-683	15-613369	0–1	Fill	NA	7.9	0.656	16.3 (J)
RE15-11-684	15-613369	6–7	Fill	NA	8.9	0.41	9.35 (J)
RE15-11-685	15-613369	9–10	Fill	NA	15.5	0.79	15.8 (J)
RE15-11-600	15-613369	11–12	Fill	NA	5.88	0.298	6.52 (J)
RE15-11-686	15-613370	0–1	Fill	NA	38.1	3.67	123 (J)
RE15-11-687	15-613370	6–7	Fill	NA	27.3	1.17	31.8 (J)
RE15-11-688	15-613370	8–8.5	Fill	NA	404	21.3	404 (J)
RE15-11-689	15-613371	0–1	Fill	NA	70.6 (J)	4.2 (J)	113 (J)
RE15-11-690	15-613371	6–7	Qbt 4	NA	3.29	0.187	4.58
RE15-11-691	15-613371	9–10	Qbt 4	NA	—	—	1.96
RE15-11-692	15-613372	0–1	Fill	NA	22.5	1.56	43.6 (J)
RE15-11-693	15-613372	6–7	Fill	NA	17.7	0.83	18.9 (J)
RE15-11-694	15-613372	9–10	Fill	NA	13	0.685	13.2 (J)
RE15-11-603	15-613372	10.9–11.1	Fill	NA	28	1.43	41.5 (J)
RE15-11-695	15-613373	0–1	Fill	NA	58.6 (J)	3.12 (J)	70.6 (J)
RE15-11-696	15-613373	6–6.25	Fill	NA	53.7 (J)	2.43 (J)	61.1 (J)
RE15-11-698	15-613374	0–1	Fill	NA	120	5.92	120 (J)
RE15-11-699	15-613374	6–7	Fill	NA	25.1	1.32	25.4 (J)
RE15-11-700	15-613374	8–8.5	Fill	NA	221	12.1	222 (J)
RE15-11-701	15-613375	0–1	Fill	NA	65.6	3.71	86.7 (J)
RE15-11-702	15-613375	6–7	Fill	NA	3.18	—	3.61 (J)
RE15-11-703	15-613375	9–10	Fill	NA	14	0.389	13.6 (J)
RE15-11-599	15-613375	11–12	Fill	NA	10.5	0.48	11.5 (J)
RE15-11-704	15-613376	0–1	Fill	NA	102	5.61	138 (J)
RE15-11-705	15-613376	6–7	Fill	NA	25.2 (J)	1.1 (J)	28.4 (J)
RE15-11-706	15-613376	8.25–9.25	Qbt 4	NA	54 (J)	2.59 (J)	63.8 (J)
RE15-11-601	15-613376	10–11	Qbt 4	NA	36	1.87	42.3 (J)
RE15-11-707	15-613377	0–1	Fill	NA	56.2	3.37	93.5 (J)
RE15-11-708	15-613377	3–3.5	Fill	NA	22.1	1.66	50.7 (J)

Table 6.7-4 (continued)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE15-11-710	15-613378	0–1	Fill	NA	13.2	0.879	27.4
RE15-11-711	15-613378	6–7	Fill	NA	—	—	2.52
RE15-11-712	15-613378	9–10	Fill	NA	3.09	—	3.09
RE15-11-713	15-613379	0–1	Fill	NA	57.6 (J)	3.78 (J)	115 (J)
RE15-11-714	15-613379	6–7	Fill	NA	—	—	3.29
RE15-11-716	15-613380	0–1	Fill	NA	38.5 (J)	2.66 (J)	108 (J)
RE15-11-717	15-613380	6–7	Fill	NA	18.4	1.03	22
RE15-11-718	15-613380	9–9.5	Fill	NA	145 (J)	6.99 (J)	169 (J)
RE15-11-725	15-613381	0–1	Fill	NA	169	8.98	222 (J)
RE15-11-720	15-613381	6–7	Fill	NA	3.9	0.27	5.03 (J)
RE15-11-721	15-613381	9–10	Fill	NA	40.9	1.94	42.6 (J)
RE15-11-602	15-613381	11–12	Fill	NA	3.44	—	4.2 (J)
RE15-11-722	15-613382	0–1	Fill	NA	212 (J)	10.8 (J)	228 (J)
RE15-11-723	15-613382	6–7	Fill	NA	6.91	0.391	7.5
RE15-11-724	15-613382	9–10	Fill	NA	3.79	—	3.97
RE15-11-728	15-613384	0–0.5	Sed	NA	—	—	3.18
RE15-11-729	15-613384	0.5–1	Sed	NA	3.02	—	3.37
RE15-11-732	15-613386	0–1	Sed	NA	35.8	1.98	54.6 (J)
RE15-11-733	15-613386	1–2	Sed	NA	68.1	4	93.8 (J)
RE15-11-734	15-613387	0–1	Sed	NA	3.24	—	4.76
RE15-11-736	15-613388	0–1	Sed	NA	9.28	0.551	17.4
RE15-11-737	15-613388	1–1.5	Sed	NA	2.86	—	5.18
RE15-11-740	15-613389	0–0.5	Sed	NA	108 (J)	6.5 (J)	177 (J)
RE15-11-739	15-613389	0.5–1	Sed	NA	110 (J)	6.64 (J)	184 (J)

Note: All activities are in pCi/g.

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

[b] na = Not available.

[c] SALs from LANL (2009, 107655).

[d] NA = Not analyzed.

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

Table 6.8-1
Samples Collected and Analyses Requested at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Uranium	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
AAB3473	15-02242	0–1	Soil	18681	19509	—*	—	—	—	—	—	—	—	—	19509
RE15-11-816	15-613403	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-817	15-613403	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-818	15-613404	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-819	15-613404	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-820	15-613405	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-821	15-613405	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-840	15-613406	0–1	Soil	11-911	—	11-909	11-909	11-909	11-909	11-910	11-911	11-911	11-911	11-911	—
RE15-11-823	15-613406	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-824	15-613407	0–1	Soil	11-941	—	11-941	11-941	11-941	11-941	—	11-941	11-941	11-941	11-941	—
RE15-11-825	15-613407	2–3	Qbt 4	11-940	—	11-940	11-940	11-940	11-940	—	11-940	11-940	11-940	11-940	—
RE15-11-826	15-613408	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-827	15-613408	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-828	15-613409	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-829	15-613409	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-830	15-613410	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-831	15-613410	3–4	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-832	15-613411	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-833	15-613411	3–4	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-834	15-613412	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-835	15-613412	3–4	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-836	15-613413	0–1	Soil	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-837	15-613413	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—
RE15-11-841	15-613414	0–1	Soil	11-911	—	11-909	11-909	11-909	11-909	11-910	11-911	11-911	11-911	11-911	—
RE15-11-839	15-613414	1–2	Qbt 4	11-907	—	11-906	11-906	11-906	11-906	—	11-907	11-907	11-907	11-908	—

* — = Analysis not requested.

Table 6.8-2
Inorganic Chemicals above BVs at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**1.0**	**2.4**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1.0**	**1.82**	**39.6**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**217000**	**800**	**na**	**69.5[e]**	**6190**	**496000**	**217**	**1550**	**1550**	**929**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**795000**	**800**	**na**	**310[f]**	**22700**	**1820000**	**795**	**5680**	**5680**	**3410**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**54800**	**400**	**na**	**23[f]**	**1560**	**125000**	**54.8**	**391**	**391**	**235**	**391**	**23500**
AAB3473	15-02242	0–1	Soil	—[g]	3.8 (U)	—	834	—	0.59 (U)	—	—	—	7720	NA[h]	—	58.2	—	1.4 (J)	57.3	NA	NA	—	—	2820	—	309
RE15-11-816	15-613403	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.53 (U)	—	—	—	0.154	—	0.19 (J)	—	—	—	NA	—	—
RE15-11-817	15-613403	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.129	—	—	—	1.3	—	NA	—	—
RE15-11-818	15-613404	0–1	Soil	—	—	—	—	—	0.42	—	—	—	35.7	0.55 (U)	—	—	—	0.173	—	0.21 (J)	—	—	—	NA	—	—
RE15-11-819	15-613404	1–2	Qbt 4	—	—	—	47.8	—	—	—	—	—	7.4	0.53 (U)	—	—	—	0.138	—	0.2 (J)	—	1.2	—	NA	—	—
RE15-11-820	15-613405	0–1	Soil	—	1.3	—	—	—	1.1	—	—	—	441	0.53 (U)	—	—	—	0.2	—	0.41	0.0044 (J)	—	—	NA	—	—
RE15-11-821	15-613405	1–2	Qbt 4	10500	0.81 (U)	2.8	140	—	—	2400	11.3	4.5	88.3	0.53 (U)	—	21.1	1760	0.22	8.8	0.31	0.0026 (J-)	1.4	3.1	NA	18.6	—
RE15-11-840	15-613406	0–1	Soil	—	2.5 (J)	—	—	—	0.74 (J)	—	—	—	242 (J-)	—	—	24.2	—	—	—	0.59	0.0024 (J)	—	—	NA	—	58.1
RE15-11-823	15-613406	1–2	Qbt 4	15100	1.2	3.6	263	—	—	—	9.5	3.4	139	0.57 (U)	15800	17.4	1980	0.195	6.7	0.13 (J)	0.0026 (J)	1.4	—	NA	20.8	—
RE15-11-824	15-613407	0–1	Soil	—	—	—	509 (J-)	2.8	1.1	—	—	—	437	—	—	30.4	—	—	—	0.86	—	2.7	—	NA	—	163
RE15-11-825	15-613407	2–3	Qbt 4	8570	—	—	228 (J-)	1.5	—	2320	8.5	4	136	0.53 (U)	—	15	—	—	8.9	4.2	—	3	—	NA	—	74.1
RE15-11-826	15-613408	0–1	Soil	—	—	—	—	—	—	—	—	—	49.9	—	—	—	—	0.186	—	1.7	0.0024 (J)	—	—	NA	—	—
RE15-11-827	15-613408	1–2	Qbt 4	8630	—	—	101	—	—	2570	11	3.3	9.6	0.53 (U)	—	—	—	0.24	7.5	0.88	—	1.9	—	NA	—	—
RE15-11-828	15-613409	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.194	—	0.43	—	—	—	NA	—	—
RE15-11-829	15-613409	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.53 (U)	—	—	—	0.143	—	0.19 (J)	0.0049 (J)	1.6	—	NA	—	—
RE15-11-830	15-613410	0–1	Soil	—	—	—	—	2.9	—	—	—	—	—	—	—	—	—	0.199	—	0.18 (J)	—	1.6	—	NA	—	—
RE15-11-831	15-613410	3–4	Qbt 4	—	—	—	—	1.8	—	2980	18	—	—	0.52 (U)	—	—	—	0.132	11	0.073 (J)	—	2	—	NA	—	—
RE15-11-832	15-613411	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.146	—	0.2	0.0036 (J)	—	—	NA	—	—
RE15-11-833	15-613411	3–4	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.119	—	0.08 (J)	—	1.2	—	NA	—	—
RE15-11-834	15-613412	0–1	Soil	—	2.2	—	—	—	0.44	—	—	—	219	0.52 (U)	—	55.1	—	0.237	—	0.12 (J)	—	—	—	NA	—	60.6
RE15-11-835	15-613412	3–4	Qbt 4	—	—	—	—	—	—	—	8.3	—	15.7	0.51 (U)	—	—	—	0.128	—	0.09 (J)	0.0027 (J)	0.48 (J)	—	NA	—	—
RE15-11-836	15-613413	0–1	Soil	—	1.7	—	—	—	—	—	—	—	86.9	0.51 (U)	—	31.2	—	0.168	—	0.1 (J)	—	—	—	NA	—	—
RE15-11-837	15-613413	1–2	Qbt 4	—	—	—	—	—	—	—	—	—	—	0.51 (U)	—	—	—	0.117	—	—	—	1.9	—	NA	—	—
RE15-11-841	15-613414	0–1	Soil	—	1.1 (U)	—	327 (J-)	—	0.61 (J)	—	—	—	260 (J-)	—	—	29.2	—	—	—	—	—	—	—	NA	—	104
RE15-11-839	15-613414	1–2	Qbt 4	—	—	—	78.3	—	—	—	—	—	58	0.52 (U)	—	—	—	0.138	—	0.088 (J)	0.0022 (J)	1.3	—	NA	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for hexavalent chromium.
[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[g] — = Not detected or not detected above BV.
[h] NA = Not analyzed.

Table 6.8-3
Organic Chemicals Detected at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Diethylphthalate	Di-n-butylphthalate	Di-n-octylphthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,4,7,8-]	Hexachlorodibenzodioxin [1,2,3,6,7,8-]	Hexachlorodibenzodioxin [1,2,3,7,8,9-]
Construction Worker SSL[a]				**18600**	**263000**	**952000[b]**	**4760**	**191000**	**23800**	**23800[c]**	**na[d]**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**36700**	**851000**	**2500000[e]**	**1370**	**547000**	**68400**	**68400[c]**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**3440**	**67500**	**240000[e]**	**347**	**48900**	**6110**	**6110[c]**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-816	15-613403	0–1	Soil	—[f]	0.014 (J)	—	—	—	—	—	NA[g]	NA	NA	NA	NA	NA	NA
RE15-11-817	15-613403	1–2	Qbt 4	—	0.19	—	0.15 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-818	15-613404	0–1	Soil	—	0.012 (J)	—	0.079 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-819	15-613404	1–2	Qbt 4	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-820	15-613405	0–1	Soil	—	0.2	—	0.31 (J)	—	0.21 (J)	0.069 (J)	NA	NA	NA	NA	NA	NA	NA
RE15-11-821	15-613405	1–2	Qbt 4	—	0.044	—	1.7	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-840	15-613406	0–1	Soil	—	—	—	0.067 (J)	—	—	—	0.00000338 (J)	0.00000749	0.00000106 (J)	0.00000197 (J)	—	—	—
RE15-11-823	15-613406	1–2	Qbt 4	—	0.012 (J)	—	0.12 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-824	15-613407	0–1	Soil	—	0.022	—	0.073 (J)	—	0.044 (J)	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-825	15-613407	2–3	Qbt 4	0.068 (J)	—	—	0.12 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-826	15-613408	0–1	Soil	0.1 (J)	0.028 (J+)	—	0.1 (J)	—	0.099 (J)	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-827	15-613408	1–2	Qbt 4	—	—	0.8 (J)	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-828	15-613409	0–1	Soil	—	—	—	0.1 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-829	15-613409	1–2	Qbt 4	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-830	15-613410	0–1	Soil	0.21 (J)	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-831	15-613410	3–4	Qbt 4	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-832	15-613411	0–1	Soil	0.12 (J)	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-833	15-613411	3–4	Qbt 4	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-834	15-613412	0–1	Soil	0.044 (J)	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-835	15-613412	3–4	Qbt 4	0.13 (J)	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-836	15-613413	0–1	Soil	—	—	—	0.06 (J)	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-837	15-613413	1–2	Qbt 4	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-841	15-613414	0–1	Soil	—	—	—	0.17 (J)	—	—	—	0.000031	0.0000526	0.00000192 (J)	0.00000583	0.000000656 (J)	0.00000149 (J)	0.00000174 (J)
RE15-11-839	15-613414	1–2	Qbt 4	—	—	—	0.099 (J)	0.05 (J)	—	—	NA	NA	NA	NA	NA	NA	NA

Table 6.8-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Isopropyltoluene[4-]	Methylene Chloride	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran 1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxin [1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Tetrachlorodibenzodioxin [2,3,7,8-]	Tetrachlorodibenzodioxins (Total)
Construction Worker SSL[a]				**na**	**na**	**10300[h]**	**10600**	**na**	**na**	**na**	**na**	**0.000284**	**na**
Industrial SSL[a]				**na**	**na**	**14900[h]**	**1090**	**na**	**na**	**na**	**na**	**0.000204**	**na**
Residential SSL[a]				**na**	**na**	**3210[h]**	**199**	**na**	**na**	**na**	**na**	**0.000045**	**na**
RE15-11-816	15-613403	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-817	15-613403	1–2	Qbt 4	NA	NA	—	0.0033 (J)	NA	NA	NA	NA	NA	NA
RE15-11-818	15-613404	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-819	15-613404	1–2	Qbt 4	NA	NA	—	0.0039 (J)	NA	NA	NA	NA	NA	NA
RE15-11-820	15-613405	0–1	Soil	NA	NA	0.013	—	NA	NA	NA	NA	NA	NA
RE15-11-821	15-613405	1–2	Qbt 4	NA	NA	0.0046 (J)	—	NA	NA	NA	NA	NA	NA
RE15-11-840	15-613406	0–1	Soil	0.000000668 (J)	0.000000508 (J)	—	—	0.0000215 (J)	—	—	—	—	0.00000012 (J)
RE15-11-823	15-613406	1–2	Qbt 4	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-824	15-613407	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-825	15-613407	2–3	Qbt 4	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-826	15-613408	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-827	15-613408	1–2	Qbt 4	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-828	15-613409	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-829	15-613409	1–2	Qbt 4	NA	NA	—	0.0029 (J)	NA	NA	NA	NA	NA	NA
RE15-11-830	15-613410	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-831	15-613410	3–4	Qbt 4	NA	NA	—	0.0026 (J)	NA	NA	NA	NA	NA	NA
RE15-11-832	15-613411	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-833	15-613411	3–4	Qbt 4	NA	NA	—	0.0042 (J)	NA	NA	NA	NA	NA	NA
RE15-11-834	15-613412	0–1	Soil	NA	NA	—	—	NA	NA	NA	NA	NA	NA
RE15-11-835	15-613412	3–4	Qbt 4	NA	NA	—	0.0047 (J)	NA	NA	NA	NA	NA	NA
RE15-11-836	15-613413	0–1	Soil	NA	NA	0.00043 (J)	—	NA	NA	NA	NA	NA	NA
RE15-11-837	15-613413	1–2	Qbt 4	NA	NA	—	0.0039 (J)	NA	NA	NA	NA	NA	NA
RE15-11-841	15-613414	0–1	Soil	0.0000131	0.00000184 (J)	—	—	0.000105	0.00000548 (J)	0.000000497 (J)	0.000000497 (J)	0.0000000943 (J)	0.0000000943 (J)
RE15-11-839	15-613414	1–2	Qbt 4	NA	NA	—	—	NA	NA	NA	NA	NA	NA

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] Di-n-butylphthalate SSL used as a surrogate based on structural similarity.

[d] na = Not available.

[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected or not analyzed.

[g] NA = Not analyzed.

[h] Isopropylbenzene used as surrogate based on structural similarity.

Table 6.8-4
Radionuclides Detected or Detected above BVs at SWMU 15-008(a)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**1.98**	**0.09**	**1.93**
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**220**	**43**	**160**
Industrial SAL[b]				**1500**	**87**	**430**
Residential SAL[b]				**170**	**17**	**87**
RE15-11-818	15-613404	0–1	Soil	8.96	0.482	10.8
RE15-11-819	15-613404	1–2	Qbt 4	3.09	0.159	3.98
RE15-11-820	15-613405	0–1	Soil	7.83	0.392	17.2
RE15-11-821	15-613405	1–2	Qbt 4	9.98	0.689	19.8
RE15-11-840	15-613406	0–1	Soil	67.3	4.48	124
RE15-11-823	15-613406	1–2	Qbt 4	11.3	0.759	19.5
RE15-11-824	15-613407	0–1	Soil	492	26.5	681
RE15-11-825	15-613407	2–3	Qbt 4	212	12.2	268
RE15-11-826	15-613408	0–1	Soil	12.1	1.03	27.5
RE15-11-827	15-613408	1–2	Qbt 4	2.88	0.212	9.99
RE15-11-828	15-613409	0–1	Soil	4.07	0.248	6.92
RE15-11-830	15-613410	0–1	Soil	3.15	0.267	14.2
RE15-11-834	15-613412	0–1	Soil	44.3	2.84 (J)	100
RE15-11-835	15-613412	3–4	Qbt 4	3.47	0.2	6.59
RE15-11-836	15-613413	0–1	Soil	47	3.09 (J)	105
RE15-11-841	15-613414	0–1	Soil	155	8.31	192
RE15-11-839	15-613414	1–2	Qbt 4	80.8	5.31 (J)	103

Note: All activities are in pCi/g. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SALs from LANL (2009, 107655).

Table 6.9-1
Samples Collected and Analyses Requested at AOC 15-005(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate
RE15-11-217	15-613251	0–1	Fill	11-681	11-680	11-680	—*	11-680	—	11-681	11-681	11-681
RE15-11-218	15-613251	4–5	Fill	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681
RE15-11-219	15-613252	0–1	Fill	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681
RE15-11-220	15-613252	4–5	Qbt 4	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681
RE15-11-281	15-613253	0–1	Fill	11-681	11-680	11-680	11-680	11-680	11-682	11-681	11-681	11-681
RE15-11-222	15-613253	4–5	Qbt 4	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681
RE15-11-223	15-613254	0–1	Fill	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681
RE15-11-224	15-613254	4–5	Fill	11-681	11-680	11-680	—	11-680	—	11-681	11-681	11-681

* — = Analysis not requested.

Table 6.9-2
Inorganic Chemicals above BVs at AOC 15-005(b)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Chromium	Cobalt	Cyanide (Total)	Lead	Manganese	Nickel	Nitrate	Perchlorate	Selenium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**7.14**	**3.14**	**0.5**	**11.2**	**482**	**6.58**	**na**[b]	**na**	**0.3**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**6120**	**19.3**	**8.64**	**0.5**	**22.3**	**671**	**15.4**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**na**	**449**[d]	**34.6**[e]	**6190**	**800**	**463**	**6190**	**496000**	**217**	**1550**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**na**	**2920**[d]	**300**[f]	**22700**	**800**	**145000**	**22700**	**1820000**	**795**	**5680**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**na**	**219**[d]	**23**[f]	**1560**	**400**	**10700**	**1560**	**125000**	**54.8**	**391**
RE15-11-217	15-613251	0–1	Fill	—[g]	—	—	—	—	—	—	0.56 (U)	—	—	—	2.5	—	—
RE15-11-218	15-613251	4–5	Fill	—	—	—	—	—	—	—	0.62 (U)	—	—	—	0.41	—	—
RE15-11-219	15-613252	0–1	Fill	—	—	—	—	—	—	—	0.53 (U)	27.6 (J)	—	—	0.82	—	—
RE15-11-220	15-613252	4–5	Qbt 4	—	0.52 (U)	—	52	2540 (J+)	7.5	—	0.52 (U)	—	—	—	0.096 (J)	—	0.96
RE15-11-281	15-613253	0–1	Fill	—	—	—	—	—	—	—	0.54 (U)	—	—	—	0.18 (J)	—	—
RE15-11-222	15-613253	4–5	Qbt 4	10400	0.58 (U)	4.3	192	4490 (J+)	12.9	—	0.58 (U)	—	—	7.6 (J)	0.22 (J)	0.0033 (J)	0.65
RE15-11-223	15-613254	0–1	Fill	—	—	—	—	—	—	—	0.57 (U)	—	—	—	1.3	—	—
RE15-11-224	15-613254	4–5	Fill	—	—	—	310	—	—	11.9	0.56 (U)	—	776	—	0.28	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 6.9-3
Organic Chemicals Detected at AOC 15-005(b)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	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	Dibenzofuran	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**66800**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**20600**	**21.3**	**310[c]**	**8910**	**8910**
Industrial SSL[a]				**36700**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**2.34**	**1000[d]**	**24400**	**24400**
Residential SSL[a]				**3440**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**0.621**	**78[d]**	**2290**	**2290**
RE15-11-217	15-613251	0–1	Fill	0.084 (J)	0.2 (J)	0.98	0.79	0.9	0.42	0.84	—[e]	1	0.17 (J)	—	2.1	0.081 (J)
RE15-11-218	15-613251	4–5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-219	15-613252	0–1	Fill	0.29 (J)	0.54	2.3	1.8	2.1	0.95	1.9	—	2.4	0.4	0.17 (J)	6.2	0.3 (J)
RE15-11-220	15-613252	4–5	Qbt 4	—	—	0.047 (J)	0.041 (J)	0.043 (J)	—	0.046 (J)	0.21 (J)	0.053 (J)	—	—	0.11 (J)	—
RE15-11-281	15-613253	0–1	Fill	—	0.055 (J)	0.3 (J)	0.26 (J)	0.28 (J)	0.15 (J)	0.3 (J)	—	0.33 (J)	—	—	0.76	—
RE15-11-222	15-613253	4–5	Qbt 4	—	—	—	—	—	—	—	—	—	—	—	0.05 (J)	—
RE15-11-223	15-613254	0–1	Fill	—	0.066 (J)	0.25 (J)	0.2 (J)	0.22 (J)	0.11 (J)	0.21 (J)	0.11 (J)	0.26 (J)	—	—	0.63	—
RE15-11-224	15-613254	4–5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.9-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Phenanthrene	Pyrene	Tetrachlorodibenzodioxins (Total)
Construction Worker SSL[a]				**na[f]**	**na**	**na**	**na**	**213**	**10600**	**1240[c]**	**702**	**na**	**7150**	**6680**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**23.4**	**1090**	**4100[d]**	**252**	**na**	**20500**	**18300**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**6.21**	**199**	**310[d]**	**45**	**na**	**1830**	**1720**	**na**
RE15-11-217	15-613251	0–1	Fill	NA[g]	NA	NA	NA	0.45	0.0056 (J+)	—	—	NA	0.95	1.2	NA
RE15-11-218	15-613251	4–5	Fill	NA	NA	NA	NA	—	0.0065	—	—	NA	—	—	NA
RE15-11-219	15-613252	0–1	Fill	NA	NA	NA	NA	1.1	0.0052 (J)	0.043 (J)	0.075 (J)	NA	3.3	3.4	NA
RE15-11-220	15-613252	4–5	Qbt 4	NA	NA	NA	NA	—	0.0041 (J)	—	—	NA	0.055 (J)	0.068 (J)	NA
RE15-11-281	15-613253	0–1	Fill	0.00000213 (J)	0.00000373 (J)	0.0000005 (J)	0.0000005 (J)	0.18 (J)	0.0046 (J)	—	—	0.0000144	0.38	0.45	0.000000105 (J)
RE15-11-222	15-613253	4–5	Qbt 4	NA	NA	NA	NA	—	0.0042 (J)	—	—	NA	—	—	NA
RE15-11-223	15-613254	0–1	Fill	NA	NA	NA	NA	0.13 (J)	0.0047 (J)	—	—	NA	0.38	0.37 (J)	NA
RE15-11-224	15-613254	4–5	Fill	NA	NA	NA	NA	—	0.0048 (J)	—	—	NA	—	—	NA

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene SSL used as a surrogate based on structural similarity.

[c] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] na = Not available.

[g] NA = Not analyzed.

Table 6.11-1
Samples Collected and Analyses Requested at AOC 15-008(f)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Gamma Spectroscopy
RE15-11-231	15-613255	0–1	Soil	11-829	11-828	11-828	—*	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-232	15-613255	1–2	Qbt 4	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-233	15-613256	0–1	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-234	15-613256	1–2	Qbt 4	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-283	15-613257	0–1	Soil	11-832	11-831	11-831	11-831	11-831	11-830	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-236	15-613257	1.5–2.5	Qbt 4	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-237	15-613258	0–1	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-238	15-613258	1–2	Qbt 3	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-239	15-613259	0–1	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-240	15-613259	1.5–2.5	Qbt 3	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-241	15-613260	0–0.5	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-242	15-613260	0.5–1	Qbt 3	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-243	15-613261	0–1	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-244	15-613261	1–2	Soil	11-829	11-828	11-828	—	11-828	—	11-829	11-829	11-829	11-829	11-829	11-829
RE15-11-245	15-613262	0–1	Soil	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-246	15-613262	1.5–2.5	Soil	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-247	15-613263	0–0.5	Sed	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-248	15-613263	0.5–1	Sed	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-249	15-613264	0–1	Sed	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832
RE15-11-250	15-613264	1–2	Qbt 3	11-832	11-831	11-831	—	11-831	—	11-832	11-832	11-832	11-832	11-832	11-832

* — = Analysis not requested.

Table 6.11-2
Inorganic Chemicals above BVs at AOC 15-008(f)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**63.5**
Sediment BV[a]				**15400**	**0.83**	**3.98**	**127**	**4420**	**10.5**	**4.73**	**11.2**	**0.82**	**2370**	**0.1**	**9.38**	**na**	**na**	**0.3**	**60.2**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**na**	**69.5[e]**	**6190**	**496000**	**217**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**na**	**310[f]**	**22700**	**1820000**	**795**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**na**	**23[f]**	**1560**	**125000**	**54.8**	**391**	**23500**
RE15-11-231	15-613255	0–1	Soil	—[g]	—	—	—	—	—	—	—	0.52 (U)	—	0.158	—	—	—	1.9	—
RE15-11-232	15-613255	1–2	Qbt 4	8340	0.55 (U)	3.7	77.9	—	8.9	3.4	4.7	0.54 (U)	1710	0.186	7.5	0.13 (J)	0.0048 (J)	1.7	—
RE15-11-233	15-613256	0–1	Soil	—	—	—	—	—	—	—	—	0.52 (U)	—	0.175	—	0.28	0.0033 (J)	—	—
RE15-11-234	15-613256	1–2	Qbt 4	—	—	3.8	79.9	2910	7.7	—	5.1	0.52 (U)	2040	0.182	7.6	0.12 (J)	—	2.2	—
RE15-11-283	15-613257	0–1	Soil	—	1.7 (U)	—	—	—	—	—	19.6	0.52 (U)	—	—	—	0.92	—	—	—
RE15-11-236	15-613257	1.5–2.5	Qbt 4	—	—	—	—	—	11.1	—	—	0.51 (U)	—	0.156	7.2	—	0.0037 (J)	1.5	—
RE15-11-237	15-613258	0–1	Soil	—	—	—	—	—	—	—	—	0.51 (U)	—	0.169	—	0.11 (J)	—	—	—
RE15-11-238	15-613258	1–2	Qbt 3	—	—	—	—	—	—	—	—	0.51 (U)	—	0.14 (U)	—	—	—	0.96	—
RE15-11-239	15-613259	0–1	Soil	—	1 (U)	—	—	—	—	—	—	0.51 (U)	—	0.154	—	0.69	—	1.6	—
RE15-11-240	15-613259	1.5–2.5	Qbt 3	—	—	—	—	—	9.4	—	—	0.51 (U)	—	0.148	—	—	—	1.7	—
RE15-11-241	15-613260	0–0.5	Soil	—	—	—	—	—	—	—	—	0.53 (U)	—	0.181	—	—	0.0037 (J)	—	—
RE15-11-242	15-613260	0.5–1	Qbt 3	—	0.57 (U)	—	56.7	—	16.3	—	5.9	0.52 (U)	—	0.164	8.9	0.31	—	1.4	—
RE15-11-243	15-613261	0–1	Soil	—	1.2 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-244	15-613261	1–2	Soil	—	1.8 (J)	—	—	—	—	—	—	0.51 (U)	—	0.163	—	—	—	1.9	146
RE15-11-245	15-613262	0–1	Soil	—	—	—	—	—	—	—	—	0.56 (U)	—	—	—	2	—	—	—
RE15-11-246	15-613262	1.5–2.5	Soil	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	1.1	—	—	—
RE15-11-247	15-613263	0–0.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	0.087 (J)	—	0.72	—
RE15-11-248	15-613263	0.5–1	Sed	—	—	—	—	—	—	—	—	—	—	—	—	0.084 (J)	—	1.1	—
RE15-11-249	15-613264	0–1	Sed	—	—	—	—	—	—	—	—	—	—	—	—	0.31	—	0.92	—
RE15-11-250	15-613264	1–2	Qbt 3	—	—	—	—	—	—	—	—	0.52 (U)	—	—	—	0.086 (J)	—	2.1	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 6.11-3
Organic Chemicals Detected at AOC 15-008(f)

Sample ID	Location ID	Depth (ft)	Media	Aniline	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran [2,3,4,6,7,8-]	Hexachlorodibenzofurans (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Pentachlorodibenzofuran [2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**1410[b]**	**952000[b]**	**4760**	**8910**	**na[c]**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**300[d]**	**2500000[d]**	**1370**	**24400**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**85[d]**	**240000[d]**	**347**	**2290**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-283	15-613257	0–1	Soil	—[e]	—	—	—	0.00000113 (J)	0.00000272 (J)	0.00000131 (J)	0.000000624 (J)	0.00000643	0.00000597 (J)	0.000000716 (J)	0.0000138
RE15-11-239	15-613259	0–1	Soil	—	—	—	0.059 (J-)	NA[f]	NA	NA	NA	NA	NA	NA	NA
RE15-11-241	15-613260	0–0.5	Soil	0.18 (J-)	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-242	15-613260	0.5–1	Qbt 3	0.082 (J-)	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-243	15-613261	0–1	Soil	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-244	15-613261	1–2	Soil	—	—	0.048 (J-)	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-245	15-613262	0–1	Soil	—	1.2 (J)	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-246	15-613262	1.5–2.5	Soil	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-249	15-613264	0–1	Sed	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA

Table 6.11-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	PETN	Phenanthrene	Pyrene	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofurans (Totals)	Toluene
Construction Worker SSL[a]				**na**	**7150**	**6680**	**na**	**na**	**21100**
Industrial SSL[a]				**na**	**20500**	**18300**	**na**	**na**	**57900**
Residential SSL[a]				**na**	**1830**	**1720**	**na**	**na**	**5570**
RE15-11-283	15-613257	0–1	Soil	—	—	—	0.000000307 (J)	0.00000742 (J)	—
RE15-11-239	15-613259	0–1	Soil	—	0.04 (J-)	0.051 (J-)	NA	NA	—
RE15-11-241	15-613260	0–0.5	Soil	—	—	—	NA	NA	—
RE15-11-242	15-613260	0.5–1	Qbt 3	—	—	—	NA	NA	0.0008 (J)
RE15-11-243	15-613261	0–1	Soil	—	—	—	NA	NA	0.001 (J)
RE15-11-244	15-613261	1–2	Soil	—	—	—	NA	NA	0.0021 (J)
RE15-11-245	15-613262	0–1	Soil	—	—	—	NA	NA	—
RE15-11-246	15-613262	1.5–2.5	Soil	—	—	—	NA	NA	0.00072 (J+)
RE15-11-249	15-613264	0–1	Sed	0.039 (J)	—	—	NA	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 6.11-4
Radionuclides Detected or Detected above BVs/FVs at AOC 15-008(f)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt 2, 3, 4 BV[a]				**na[b]**	**1.98**	**0.09**	**1.93**
Sediment BV[a]				**0.9**	**2.59**	**0.2**	**2.29**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE15-11-233	15-613256	0–1	Soil	—[d]	6.2	0.436	7.67
RE15-11-283	15-613257	0–1	Soil	—	10.7	0.594	18
RE15-11-241	15-613260	0–0.5	Soil	—	63.3	5.5	143
RE15-11-242	15-613260	0.5–1	Qbt 3	0.221	34	3.08	129
RE15-11-243	15-613261	0–1	Soil	—	—	—	4.25
RE15-11-244	15-613261	1–2	Soil	0.142	—	—	2.66
RE15-11-245	15-613262	0–1	Soil	—	—	—	4.76
RE15-11-246	15-613262	1.5–2.5	Soil	0.496	3.87	0.241	7.11
RE15-11-247	15-613263	0–0.5	Sed	—	—	—	2.84
RE15-11-248	15-613263	0.5–1	Sed	—	3.61	—	4.93
RE15-11-249	15-613264	0–1	Sed	—	2.95	0.209	4.19

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SALs from LANL (2009, 107655).
[d] — = Not detected or not detected above BV/FV.

Table 6.12-1
Samples Collected and Analyses Requested at SWMU 15-009(e)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium
0215-97-0021	15-02510	0–0.5	Soil	3359R	—*	—	—	3358R	—	—	—	—	—
0215-97-0023	15-02510	0.83–1.17	Soil	3359R	—	—	—	3358R	—	—	—	—	—
0215-97-0024	15-02511	0–0.5	Soil	3359R	—	—	—	3358R	—	—	—	—	—
0215-97-0025	15-02511	0.83–1	Soil	3359R	—	—	—	3358R	—	—	—	—	—
0215-97-0026	15-02512	0–0.5	Soil	3359R	—	—	—	3358R	—	—	—	—	—
0215-97-0027	15-02512	0.83–1	Soil	3359R	—	—	—	3358R	—	—	—	—	—
0215-97-0030	15-02513	6–7	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
0215-97-0031	15-02513	9.67–10.17	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
0215-97-0032	15-02514	6–6.67	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
0215-97-0033	15-02514	9.67–10.08	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
0215-97-0034	15-02515	3–3.5	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
0215-97-0035	15-02516	2.17–2.67	Soil	3607R	3605R	3605R	—	3606R	—	—	—	—	—
RE15-11-861	15-613421	0–1	Soil	11-631	11-630	11-630	—	11-630	—	11-631	11-631	11-631	11-632
RE15-11-862	15-613421	2.5–3	Qbt 3	11-631	11-630	11-630	—	11-630	—	11-631	11-631	11-631	11-632
RE15-11-863	15-613422	0–0.5	Soil	11-631	11-630	11-630	—	11-630	—	11-631	11-631	11-631	11-632
RE15-11-864	15-613422	0.5–1	Qbt 3	11-631	11-630	11-630	—	11-630	—	11-631	11-631	11-631	11-632
RE15-11-870	15-613423	0–1	Soil	11-631	11-630	11-630	11-630	11-630	11-633	11-631	11-631	11-631	11-632
RE15-11-866	15-613423	2–2.5	Qbt 3	11-631	11-630	11-630	—	11-630	—	11-631	11-631	11-631	11-632

* — = Analysis not requested.

Table 6.12-2
Inorganic Chemicals Detected above BVs at SWMU 15-009(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Chromium	Copper	Cyanide (Total)	Lead	Nickel	Nitrate	Selenium	Silver	Uranium	Zinc
Qbt 2, 3, 4 BV[a]				**0.5**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**6.58**	**na[b]**	**0.3**	**1.0**	**2.4**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**15.4**	**na**	**1.52**	**1.0**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**na**	**449[d]**	**12400**	**6190**	**800**	**6190**	**496000**	**1550**	**1550**	**929**	**92900**
Industrial SSL[c]				**454**	**1120**	**na**	**2920[d]**	**45400**	**22700**	**800**	**22700**	**1820000**	**5680**	**5680**	**3410**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219[d]**	**3130**	**1560**	**400**	**1560**	**125000**	**391**	**391**	**235**	**23500**
0215-97-0021	15-02510	0–0.5	Soil	8.6 (J-)	0.63 (U)	—[e]	—	—	NA[f]	—	—	NA	—	4.1	33.5 (U)	—
0215-97-0023	15-02510	0.83–1.17	Soil	7.1 (UJ)	0.62 (U)	—	—	—	NA	—	—	NA	—	1.8 (U)	26.8 (U)	—
0215-97-0024	15-02511	0–0.5	Soil	7.2 (UJ)	0.62 (U)	—	—	—	NA	—	—	NA	—	2.4	67.8 (U)	—
0215-97-0025	15-02511	0.83–1	Soil	7.4 (UJ)	0.64 (U)	—	—	—	NA	—	—	NA	—	1.8 (U)	34.9 (U)	—
0215-97-0026	15-02512	0–0.5	Soil	7.2 (J-)	0.83 (J)	—	—	15.6	NA	—	—	NA	—	1.7 (U)	61.3 (U)	—
0215-97-0027	15-02512	0.83–1	Soil	7.6 (UJ)	0.66 (U)	—	—	—	NA	—	—	NA	—	1.9 (U)	29.4 (U)	—
0215-97-0030	15-02513	6–7	Soil	—	—	6200	—	—	NA	—	—	NA	—	—	2.15	—
0215-97-0034	15-02515	3–3.5	Soil	—	—	—	—	—	NA	135	—	NA	—	—	2.67	—
0215-97-0035	15-02516	2.17–2.67	Soil	—	—	—	—	—	NA	—	—	NA	—	—	18.9	—
RE15-11-861	15-613421	0–1	Soil	—	—	—	—	—	0.52 (U)	—	—	0.85	—	—	NA	71
RE15-11-862	15-613421	2.5–3	Qbt 3	0.52 (U)	—	—	11.9 (J+)	—	0.52 (U)	—	6.7 (J+)	0.093 (J)	1.6	—	NA	—
RE15-11-863	15-613422	0–0.5	Soil	—	—	—	—	—	0.52 (U)	22.8	—	0.53	1.9	—	NA	—
RE15-11-864	15-613422	0.5–1	Qbt 3	0.53 (U)	—	—	11.7 (J+)	—	0.53 (U)	—	7.3 (J+)	0.29	1.8	—	NA	—
RE15-11-870	15-613423	0–1	Soil	—	0.6	—	—	—	0.53 (U)	—	—	0.15 (J)	1.7	—	NA	—
RE15-11-866	15-613423	2–2.5	Qbt 3	0.51 (U)	—	—	13 (J+)	—	0.51 (U)	—	6.9 (J+)	0.12 (J)	1.3	—	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSL for hexavalent chromium.

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 6.12-3
Organic Chemicals Detected at SWMU 15-009(e)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)
Construction Worker SSL[a]				**263000**	**213**	**21.3**	**213**	**2060**	**20600**	**8910**	**na**[b]	**na**	**na**	**na**
Industrial SSL[a]				**851000**	**23.4**	**2.34**	**23.4**	**234**	**2340**	**24400**	**na**	**na**	**na**	**na**
Residential SSL[a]				**67500**	**6.21**	**0.621**	**6.21**	**62.1**	**621**	**2290**	**na**	**na**	**na**	**na**
0215-97-0030	15-02513	6–7	Soil	0.0079 (J)	—[c]	—	—	NA[d]	—	—	NA	NA	NA	NA
0215-97-0031	15-02513	9.67–10.17	Soil	0.0093 (J)	—	—	—	NA	—	—	NA	NA	NA	NA
0215-97-0034	15-02515	3–3.5	Soil	—	—	—	0.058 (J)	NA	—	—	NA	NA	NA	NA
0215-97-0035	15-02516	2.17–2.67	Soil	—	—	—	0.048 (J)	NA	—	—	NA	NA	NA	NA
RE15-11-861	15-613421	0–1	Soil	—	0.067 (J)	0.048 (J)	0.05 (J)	0.045 (J)	0.066 (J)	0.089 (J)	NA	NA	NA	NA
RE15-11-863	15-613422	0–0.5	Soil	—	—	—	—	—	—	—	NA	NA	NA	NA
RE15-11-870	15-613423	0–1	Soil	—	—	—	—	—	—	—	0.00000525	0.0000117	0.00000186 (J)	0.00000307 (J)

Table 6.12-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Isopropyltoluene[4-]	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pyrene	Tetrachlorodibenzodioxins (Total)	Toluene
Construction Worker SSL[a]				**na**	**na**	**10300[e]**	**na**	**na**	**6680**	**na**	**21100**
Industrial SSL[a]				**na**	**na**	**14900[e]**	**na**	**na**	**18300**	**na**	**57900**
Residential SSL[a]				**na**	**na**	**3210[e]**	**na**	**na**	**1720**	**na**	**5570**
0215-97-0030	15-02513	6–7	Soil	NA	NA	—	NA	NA	—	NA	—
0215-97-0031	15-02513	9.67–10.17	Soil	NA	NA	—	NA	NA	—	NA	—
0215-97-0034	15-02515	3–3.5	Soil	NA	NA	—	NA	NA	—	NA	—
RE15-11-861	15-613421	0–1	Soil	NA	NA	—	NA	NA	0.073 (J)	NA	—
RE15-11-863	15-613422	0–0.5	Soil	NA	NA	0.003 (J+)	NA	NA	—	NA	0.0021 (J+)
RE15-11-870	15-613423	0–1	Soil	0.00000213 (J)	0.00000131 (J)	—	0.0000344	0.00000153 (J)	—	0.000000146 (J)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

[c] — = Not detected or not analyzed.

[d] NA = Not analyzed.

[e] Isopropylbenzene used as surrogate based on structural similarity.

Table 6.12-4
Radionuclides Detected or Detected above BVs at SWMU 15-009(e)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**220**	**43**	**160**
Industrial SAL[b]				**1500**	**87**	**430**
Residential SAL[b]				**170**	**17**	**87**
RE15-11-861	15-613421	0–1	Soil	—[c]	0.204	5.21
RE15-11-863	15-613422	0–0.5	Soil	4.85	0.264	6.08
RE15-11-870	15-613423	0–1	Soil	8.85	0.488	16.1

Note: All activities are in pCi/g.

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

[b] SALs from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.13-1
Samples Collected and Analyses Requested at SWMU 15-010(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium
0215-97-0063	15-02520	9–9.5	Qbt 2	3493R, 3494R	—*	3491R	—	3492R	—	—	—	—	—
0215-97-0064	15-02521	8–8.5	Qbt 2	3493R, 3494R	—	3491R	—	3492R	—	—	—	—	—
0215-97-0065	15-02522	8.5–9	Qbt 2	3493R, 3494R	—	3491R	—	3492R	—	—	—	—	—
0215-97-0066	15-02523	8.5–9	Qbt 2	3493R, 3494R	—	3491R	—	3492R	—	—	—	—	—
RE15-11-902	15-613427	4–5	Fill	11-925	11-924	11-924	11-924	11-924	11-927	11-925	11-925	11-925	11-926
RE15-11-883	15-613427	7–8	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-884	15-613428	4–5	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-885	15-613428	7–8	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-886	15-613429	4–5	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-887	15-613429	7–8	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-2947	15-613429	9–9.5	Fill	11-981	11-981	11-981	—	11-981	—	11-981	11-981	11-981	11-981
RE15-11-888	15-613430	4–5	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-889	15-613430	6–7	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-890	15-613431	4–5	Fill	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926
RE15-11-891	15-613431	7–8	Qbt 4	11-925	11-924	11-924	—	11-924	—	11-925	11-925	11-925	11-926

* — = Analysis not requested.

Table 6.13-2
Inorganic Chemicals above BVs at SWMU 15-010(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Calcium	Chromium	Cobalt	Copper	Cyanide (Total)	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Thallium	Uranium	Vanadium	Zinc
Qbt 2, 3, 4 BV[a]				**0.5**	**46**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**11.2**	**0.1**	**na[b]**	**na**	**0.3**	**1.0**	**1.1**	**2.4**	**17**	**63.5**
Soil BV[a]				**0.83**	**295**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1.0**	**0.73**	**na**	**39.6**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**800**	**69.5[e]**	**496000**	**217**	**1550**	**1550**	**20.4**	**929**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**800**	**310[f]**	**1820000**	**795**	**5680**	**5680**	**74.9**	**3410**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**23[f]**	**125000**	**54.8**	**391**	**391**	**5.16**	**235**	**391**	**23500**
0215-97-0063	15-02520	9–9.5	Qbt 2	6.6 (UJ)	147	—[g]	10	5.3 (J)	11.2	NA[h]	18.6	3.7	NA	NA	0.55 (U)	1.9 (U)	—	2.62	—	—
0215-97-0064	15-02521	8–8.5	Qbt 2	6.7 (UJ)	139	2460	9.3	5.5 (J)	9.5	NA	26	5.5	NA	NA	0.55 (U)	3.3	—	2.55	17.4	—
0215-97-0065	15-02522	8.5–9	Qbt 2	6.7 (UJ)	120	2850	8	5.4 (J)	8.2	NA	26.5	3.5	NA	NA	0.49 (U)	2 (U)	—	2.79	—	—
0215-97-0066	15-02523	8.5–9	Qbt 2	6.5 (UJ)	153	4070	18	4.4 (J)	13.1	NA	22.8	10.5	NA	NA	0.35 (U)	4.9	—	2.54	—	—
RE15-11-902	15-613427	4–5	Fill	—	—	—	—	—	—	0.53 (UJ)	—	2.35	0.94	NA	2.5	—	—	NA	—	—
RE15-11-883	15-613427	7–8	Fill	—	—	—	—	—	—	0.52 (UJ)	—	0.327	1.8	0.0021 (J)	3.3	—	—	NA	—	—
RE15-11-884	15-613428	4–5	Fill	—	—	—	—	—	—	0.53 (UJ)	—	5.82	0.57	0.0025 (J)	2.3	—	—	NA	—	—
RE15-11-885	15-613428	7–8	Fill	—	—	—	—	—	—	0.52 (UJ)	—	0.338	0.28	—	3.6	—	—	NA	—	—
RE15-11-886	15-613429	4–5	Fill	—	—	—	—	—	—	0.54 (UJ)	—	4.81	22.3	0.0034 (J)	2.1	—	—	NA	—	—
RE15-11-887	15-613429	7–8	Fill	—	—	—	—	—	—	0.53 (UJ)	173	0.809	65	0.0025 (J)	4.9	—	0.83 (J)	NA	—	—
RE15-11-2947	15-613429	9–9.5	Fill	—	—	—	—	—	—	0.52 (U)	100	0.456	40.4	—	1.6	—	—	NA	—	—
RE15-11-888	15-613430	4–5	Fill	0.97	—	—	—	—	15.4	—	25.1	11.5	29.5	0.0023 (J)	2.4	—	—	NA	—	64.3
RE15-11-889	15-613430	6–7	Fill	—	—	—	—	—	—	0.52 (UJ)	—	4.57	9.1	0.0024 (J)	2.9	1.3	—	NA	—	—
RE15-11-890	15-613431	4–5	Fill	—	551 (J-)	—	—	—	—	0.54 (UJ)	—	3.6	2.1	NA	2.2	—	—	NA	—	—
RE15-11-891	15-613431	7–8	Qbt 4	0.52 (U)	824 (J-)	—	—	—	—	0.52 (UJ)	—	—	0.85	—	3.6	—	—	NA	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] — = Not detected or not analyzed.

[h] NA = Not analyzed.

Table 6.13-3
Organic Chemicals Detected at SWMU 15-010(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Bis(2-ethylhexyl)phthalate	Diethylphthalate	Di-n-butylphthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran [1,2,3,4,7,8-]	Hexachlorodibenzofurans (Total)	Isopropyltoluene[4-]	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]
Construction Worker SSL[a]				**18600**	**4760**	**191000**	**23800**	**na[b]**	**na**	**na**	**na**	**na**	**na**	**na**	**10300[c]**	**na**	**na**
Industrial SSL[a]				**36700**	**1370**	**547000**	**68400**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**14900[c]**	**na**	**na**
Residential SSL[a]				**3440**	**347**	**48900**	**6110**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**3210[c]**	**na**	**na**
0215-97-0063	15-02520	9–9.5	Qbt 2	—[d]	0.099 (J)	—	0.19 (J)	NA[e]	NA	NA	NA	NA	NA	NA	NA	NA	NA
0215-97-0064	15-02521	8–8.5	Qbt 2	—	0.044 (J)	—	0.047 (J)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0215-97-0065	15-02522	8.5–9	Qbt 2	—	0.044 (J)	—	0.1 (J)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
0215-97-0066	15-02523	8.5–9	Qbt 2	—	0.049 (J)	—	0.11 (J)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-902	15-613427	4–5	Fill	—	—	—	—	0.00000706	0.0000188	0.00000508	0.00000936	0.0000013 (J)	0.000000488 (J)	0.00000272 (J)	—	0.000075	0.00000775 (J)
RE15-11-885	15-613428	7–8	Fill	—	—	—	0.12 (J)	NA	NA	NA	NA	NA	NA	NA	—	NA	NA
RE15-11-2947	15-613429	9–9.5	Fill	—	0.054 (J-)	—	—	NA	NA	NA	NA	NA	NA	NA	—	NA	NA
RE15-11-888	15-613430	4–5	Fill	0.096 (J)	—	—	0.048 (J)	NA	NA	NA	NA	NA	NA	NA	0.0017 (J)	NA	NA
RE15-11-890	15-613431	4–5	Fill	—	—	—	0.077 (J)	NA	NA	NA	NA	NA	NA	NA	—	NA	NA
RE15-11-891	15-613431	7–8	Qbt 4	—	—	1.5	—	NA	NA	NA	NA	NA	NA	NA	—	NA	NA

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] na = Not available.
[c] Isopropylbenzene used as surrogate based on structural similarity.
[d] — = Not detected or not analyzed.
[e] NA = Not analyzed.

Table 6.14-1
Samples Collected and Analyses Requested at AOC C-15-004

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	PCBs	Dioxins/Furans	Isotopic Uranium
RE15-11-333	15-613295	0–1	Fill	11-644	11-643	—*	11-644
RE15-11-334	15-613295	2–3	Fill	11-644	11-643	—	11-644
RE15-11-339	15-613296	0–1	Soil	11-644	11-643	11-674	11-644
RE15-11-336	15-613296	2–3	Soil	11-644	11-643	—	11-644

* — = Analysis not requested.

Table 6.14-2
Inorganic Chemicals above BVs at AOC C-15-004

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Zinc
Soil BV[a]				**0.83**	**0.4**	**14.7**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**12400**	**92900**
Industrial SSL[b]				**454**	**1120**	**45400**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**3130**	**23500**
RE15-11-333	15-613295	0–1	Fill	1 (J)	2	17.7	184 (J+)
RE15-11-334	15-613295	2–3	Fill	—[c]	—	—	57 (J+)
RE15-11-339	15-613296	0–1	Soil	—	0.65	21.1	97.7 (J+)
RE15-11-336	15-613296	2–3	Soil	—	—	52.6	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] — = Not detected or not detected above BV.

Table 6.14-3
Organic Chemicals Detected at AOC C-15-004

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofuran [1,2,3,4,7,8,9-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,4,7,8-]	Hexachlorodibenzodioxin [1,2,3,6,7,8-]	Hexachlorodibenzodioxin [1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran [1,2,3,4,7,8-]	Hexachlorodibenzofuran [1,2,3,6,7,8-]	Hexachlorodibenzofuran [2,3,4,6,7,8-]
Construction Worker SSL[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-339	15-613296	0–1	Soil	0.000156	0.000413	0.0000827	0.0000025 (J)	0.000187	0.00000238 (J)	0.00000524	0.00000321 (J)	0.0000462	0.00000171 (J)	0.00000143 (J)	0.00000234 (J)

Table 6.14-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzofurans (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxin [1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofuran [2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)	Tetrachlorodibenzodioxin [2,3,7,8-]	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.000284**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.000204**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.000045**	**na**	**na**
RE15-11-339	15-613296	0–1	Soil	0.0000551	0.0011	0.000142	0.000000885 (J)	0.00000354 (J)	0.000000691 (J)	0.0000147	0.000000181 (J)	0.000000784 (J)	0.00000782 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

Table 6.14-4
Radionuclides Detected or Detected above BVs at AOC C-15-004

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**220**	**43**	**160**
Industrial SAL[b]				**1500**	**87**	**430**
Residential SAL[b]				**170**	**17**	**87**
RE15-11-333	15-613295	0–1	Fill	—[c]	—	13.9
RE15-11-339	15-613296	0–1	Soil	6.08	0.311	10.4
RE15-11-336	15-613296	2–3	Soil	—	—	4.21

Note: All activities are in pCi/g.

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

[b] SALs from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.15-1
Samples Collected and Analyses Requested at AOC C-15-005

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Thorium
RE15-11-341	15-613298	0–1	Fill	11-873	11-868	11-868	—*	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-342	15-613298	2–3	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-343	15-613299	0.5–1.5	Fill	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-344	15-613299	2.5–3.5	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-345	15-613300	0–1	Fill	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-346	15-613300	2–3	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-347	15-613301	0–1	Fill	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-348	15-613301	2–3	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-349	15-613302	0–1	Fill	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-350	15-613302	2–3	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879
RE15-11-357	15-613303	0–1	Fill	11-873	11-868	11-868	11-868	11-868	11-913	11-873	11-873	11-873	11-879	11-879
RE15-11-352	15-613303	2–3	Qbt 4	11-873	11-868	11-868	—	11-868	—	11-873	11-873	11-873	11-879	11-879

* — = Analysis not requested.

Table 6.15-2
Inorganic Chemicals above BVs at AOC C-15-005

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Calcium	Chromium	Copper	Cyanide (Total)	Lead	Magnesium	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**1690**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**4610**	**0.1**	**15.4**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**65.4**	**4350**	**na**	**449[d]**	**12400**	**6190**	**800**	**na**	**69.5[e]**	**6190**	**496000**	**217**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**17.7**	**224000**	**na**	**2920[d]**	**45400**	**22700**	**800**	**na**	**310[f]**	**22700**	**1820000**	**795**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**3.9**	**15600**	**na**	**219[d]**	**3130**	**1560**	**400**	**na**	**23[f]**	**1560**	**125000**	**54.8**	**391**	**23500**
RE15-11-341	15-613298	0–1	Fill	—[g]	—	—	—	—	—	—	—	—	—	1.11	—	0.94	NA[h]	1.9	—
RE15-11-342	15-613298	2–3	Qbt 4	—	—	—	61.7	2890	—	—	0.58 (U)	—	—	—	—	0.14 (J)	0.0027 (J)	1.5	—
RE15-11-343	15-613299	0.5–1.5	Fill	—	—	—	—	—	—	—	—	22.6	—	2.68	—	0.083 (J)	—	—	—
RE15-11-344	15-613299	2.5–3.5	Qbt 4	—	—	—	—	3280	—	—	0.54 (U)	14.1	—	—	—	0.089 (J)	—	1.4	—
RE15-11-345	15-613300	0–1	Fill	—	—	—	—	—	—	—	0.57 (U)	—	—	—	—	0.21 (J)	—	1.8	—
RE15-11-346	15-613300	2–3	Qbt 4	13200	—	—	89.5	2720	8.9	—	0.56 (U)	45.4	2360 (J+)	—	7.1	—	—	1.9	—
RE15-11-347	15-613301	0–1	Fill	—	2.6 (J)	—	—	—	—	—	—	33.8	—	2.97	—	0.4	—	—	90.8
RE15-11-348	15-613301	2–3	Qbt 4	—	—	—	54.2	—	—	—	0.54 (U)	35.8	—	—	—	—	—	1.3	—
RE15-11-349	15-613302	0–1	Fill	—	—	—	—	—	—	—	0.54 (U)	24	—	0.9	—	0.11 (J)	—	—	57.6
RE15-11-350	15-613302	2–3	Qbt 4	14100	—	3.3	129	3310	10.6	5.1	0.55 (U)	33	2650 (J+)	—	8.9	0.18 (J)	—	1.4	138
RE15-11-357	15-613303	0–1	Fill	—	—	—	—	—	—	—	0.58 (U)	—	—	0.121 (U)	—	0.18 (J)	0.0051 (J)	—	—
RE15-11-352	15-613303	2–3	Qbt 4	15300	—	3	113	4790	10.5	—	0.54 (U)	21.6	2540 (J+)	—	9	1.4	0.023	1.3	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

[h] NA = Not analyzed.

Table 6.15-3
Organic Chemicals Detected at AOC C-15-005

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Benzyl Alcohol	Butylbenzylphthalate	Chrysene	Diethylphthalate	Di-n-butylphthalate	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Phenanthrene	Pyrene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**213**	**2060**	**23800[b]**	**47600[b]**	**20600**	**191000**	**23800**	**8910**	**na[c]**	**na**	**na**	**na**	**na**	**na**	**7150**	**6680**
Industrial SSL[a]				**36700**	**851000**	**183000**	**23.4**	**234**	**62000[d]**	**9100[d]**	**2340**	**547000**	**68400**	**24400**	**na**	**na**	**na**	**na**	**na**	**na**	**20500**	**18300**
Residential SSL[a]				**3440**	**67500**	**17200**	**6.21**	**62.1**	**6100[d]**	**2600[d]**	**621**	**48900**	**6110**	**2290**	**na**	**na**	**na**	**na**	**na**	**na**	**1830**	**1720**
RE15-11-341	15-613298	0–1	Fill	—[e]	—	—	—	—	—	—	—	—	—	0.039 (J)	NA[f]	NA	NA	NA	NA	NA	—	—
RE15-11-343	15-613299	0.5–1.5	Fill	—	0.01 (J)	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	—	—
RE15-11-344	15-613299	2.5–3.5	Qbt 4	—	0.012 (J)	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	—	—
RE15-11-345	15-613300	0–1	Fill	0.41	—	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	—	—
RE15-11-347	15-613301	0–1	Fill	—	0.0093 (J)	0.52	0.11 (J)	0.046 (J)	—	0.038 (J)	0.17 (J)	13	0.093 (J)	0.69	NA	NA	NA	NA	NA	NA	0.52	0.44
RE15-11-348	15-613301	2–3	Qbt 4	—	0.0093 (J)	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	NA	—	—
RE15-11-350	15-613302	2–3	Qbt 4	—	—	—	—	—	0.044 (J)	—	—	—	—	—	NA	NA	NA	NA	NA	NA	—	—
RE15-11-357	15-613303	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.065 (J)	0.00000346 (J)	0.0000193	0.00000053 (J)	0.00000172 (J)	0.00000148 (J)	0.0000286 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 6.16-1
Samples Collected and Analyses Requested at AOC C-15-006

Sample ID	Location ID	Depth (ft)	Field QC Type	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Thorium
RE15-11-360	15-613305	0–1	Fill	11-856	11-855	11-855	—*	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-361	15-613305	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-362	15-613306	0–1	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-363	15-613306	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-364	15-613307	0–1	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-365	15-613307	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-366	15-613308	0–1	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-367	15-613308	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-368	15-613309	0–1	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-369	15-613309	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856
RE15-11-376	15-613310	0–1	Fill	11-856	11-855	11-855	11-855	11-855	11-854	11-856	11-856	11-856	11-856	11-856
RE15-11-371	15-613310	2–3	Fill	11-856	11-855	11-855	—	11-855	—	11-856	11-856	11-856	11-856	11-856

* — = Analysis not requested.

Table 6.16-2
Inorganic Chemicals above BVs at AOC C-15-006

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cobalt	Copper	Cyanide (Total)	Iron	Lead	Manganese	Mercury	Nitrate	Perchlorate	Zinc
Soil BV[a]				**0.83**	**0.4**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**671**	**0.1**	**na[b]**	**na**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**34.6[d]**	**12400**	**6190**	**217000**	**800**	**463**	**69.5[d]**	**496000**	**217**	**92900**
Industrial SSL[c]				**454**	**1120**	**300[e]**	**45400**	**22700**	**795000**	**800**	**145000**	**310[e]**	**1820000**	**795**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**23[e]**	**3130**	**1560**	**54800**	**400**	**10700**	**23[e]**	**125000**	**54.8**	**23500**
RE15-11-360	15-613305	0–1	Fill	—[f]	—	—	—	0.54 (UJ)	—	—	—	0.184	—	0.0044 (J)	—
RE15-11-361	15-613305	2–3	Fill	—	—	15.3	—	0.53 (UJ)	—	—	1120	—	0.21	0.0039 (J)	—
RE15-11-362	15-613306	0–1	Fill	3.8 (J)	—	—	—	—	—	—	—	0.187	0.3	0.0038 (J)	—
RE15-11-363	15-613306	2–3	Fill	—	—	—	—	—	—	—	—	0.426	0.25	—	—
RE15-11-364	15-613307	0–1	Fill	—	—	—	—	0.55 (UJ)	—	—	—	—	0.45	—	—
RE15-11-365	15-613307	2–3	Fill	10	1.2	—	—	—	—	43.6	—	4.47	0.18 (J)	0.0038 (J)	78.6
RE15-11-366	15-613308	0–1	Fill	—	—	—	—	—	—	—	—	0.244	2.9	NA[g]	—
RE15-11-367	15-613308	2–3	Fill	3.5 (J)	0.45	—	—	—	—	33	673	1.49	4.1	0.0041 (J)	57
RE15-11-368	15-613309	0–1	Fill	4.9 (J)	—	—	—	0.56 (UJ)	35800	25.9	—	14.4	—	0.004 (J)	52.3
RE15-11-369	15-613309	2–3	Fill	5.4 (J)	—	—	—	0.58 (UJ)	—	23.6	—	0.179	0.2 (J)	—	—
RE15-11-376	15-613310	0–1	Fill	3.6 (J)	—	9.7	—	0.59 (UJ)	—	27.8	—	0.476	0.084 (J)	0.0044 (J)	85.5
RE15-11-371	15-613310	2–3	Fill	2.3 (J)	—	—	16.2	0.55 (UJ)	—	29.2	—	0.594	0.36	—	58.3

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[f] — = Not detected or not detected above BV.
[g] NA = Not analyzed.

Table 6.16-3
Organic Chemicals Detected at AOC C-15-006

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Aroclor-1254	Aroclor-1260	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Chrysene	Di-n-butylphthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,6,7,8-]	Hexachlorodibenzodioxin [1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)
Construction Worker SSL[a]				**18600**	**4.36**	**75.8**	**952000[b]**	**4760**	**47600[b]**	**20600**	**23800**	**na[c]**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**36700**	**8.26**	**8.26**	**2500000[d]**	**1370**	**9100[d]**	**2340**	**68400**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**3440**	**1.12**	**2.22**	**240000[d]**	**347**	**2600[d]**	**621**	**6110**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
RE15-11-365	15-613307	2–3	Fill	—[e]	NA[f]	NA	—	0.14 (J)	—	0.14 (J)	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-367	15-613308	2–3	Fill	—	NA	NA	0.55 (J)	—	—	—	—	NA	NA	NA	NA	NA	NA	NA
RE15-11-368	15-613309	0–1	Fill	0.064 (J)	NA	NA	—	—	—	—	0.052 (J)	NA	NA	NA	NA	NA	NA	NA
RE15-11-376	15-613310	0–1	Fill	—	0.032 (J)	0.018 (J)	—	—	—	—	—	0.0000144	0.0000327	0.0000033 (J)	0.0000083	0.000000768 (J)	0.000000736 (J)	0.00000568
RE15-11-371	15-613310	2–3	Fill	—	NA	NA	—	—	0.042 (J)	—	—	NA	NA	NA	NA	NA	NA	NA

Table 6.16-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzofuran [1,2,3,4,7,8-]	Hexachlorodibenzofurans (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pentachlorodibenzofuran [2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofuran [2,3,7,8-]	Tetrachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.0127**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.00147**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**0.000374**	**na**
RE15-11-365	15-613307	2–3	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-367	15-613308	2–3	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-368	15-613309	0–1	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA
RE15-11-376	15-613310	0–1	Fill	0.000000534 (J)	0.00000357 (J)	0.000115	0.00000538 (J)	0.000000644 (J)	0.00000651	0.000000145 (J)	0.00000109	0.0000119
RE15-11-371	15-613310	2–3	Fill	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 7.2-1
Samples Collected and Analyses Requested at SWMU 36-001

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	TCLP Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Strontium-90	Tritium	Gross Alpha/Beta	Gamma Spectroscopy
0236-96-0009	36-03127	10.83–13.33	Soil	1809	—*	1808	1808	—	1808	—	—	—	—	1810	—	—	—	—	—	—	—
0236-96-0010	36-03127	14.25–16.67	Soil	1809	—	1808	1808	—	1808	—	—	—	—	1810	—	—	—	—	—	—	—
0236-96-0022	36-03131	5.5–7.58	Soil	1792	—	1791	1791	—	1791	—	—	—	—	1793	—	—	—	—	—	—	—
0236-96-0023	36-03131	9.17–11.67	Soil	1792	—	1791	1791	—	1791	—	—	—	—	1793	—	—	—	—	—	—	—
RE36-11-2862	36-613721	2–4	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2863	36-613721	5–6.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2864	36-613721	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2865	36-613722	0–1.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2866	36-613722	5–6.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2867	36-613722	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2868	36-613723	0–1.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2869	36-613723	5–6	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2870	36-613723	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2871	36-613724	0–1.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2872	36-613724	5–6.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2873	36-613724	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2874	36-613725	0–1	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2875	36-613725	5–6.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2876	36-613725	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2877	36-613726	0–1.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2878	36-613726	5–6.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2879	36-613726	10–11.5	Fill	11-972	11-972	11-971	11-971	11-971	11-971	11-973	11-972	11-972	11-972	11-974	11-974	11-974	11-974	11-974	11-974	11-974	11-974
RE36-11-2880	36-613727	0–1.5	Fill	11-977	11-977	11-975	11-975	11-975	11-975	11-976	11-977	11-977	11-977	11-978	11-978	11-978	11-978	11-978	11-978	11-978	11-978
RE36-11-2881	36-613727	5–6.5	Fill	11-977	11-977	11-975	11-975	11-975	11-975	11-976	11-977	11-977	11-977	11-978	11-978	11-978	11-978	11-978	11-978	11-978	11-978
RE36-11-2882	36-613727	10–11.5	Fill	11-977	11-977	11-975	11-975	11-975	11-975	11-976	11-977	11-977	11-977	11-978	11-978	11-978	11-978	11-978	11-978	11-978	11-978
RE36-11-2949	36-613727	13.5–15	Fill	11-979	11-979	11-979	11-979	11-979	11-979	11-980	11-979	11-979	11-979	11-979	11-979	11-979	11-979	11-979	11-979	11-979	11-979

* — = Analysis not requested.

Table 7.2-2
Inorganic Chemicals above BVs at SWMU 36-001

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Copper	Cyanide (Total)	Iron	Lead	Mercury	Nickel	Nitrate	Perchlorate	Silver	Sodium	Thallium	Uranium	Zinc
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**14.7**	**0.5**	**21500**	**22.3**	**0.1**	**15.4**	**na**[b]	**na**	**1.0**	**915**	**0.73**	**1.82**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**449**[d]	**12400**	**6190**	**217000**	**800**	**69.5**[e]	**6190**	**496000**	**217**	**1550**	**na**	**20.4**	**929**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**2920**[d]	**45400**	**22700**	**795000**	**800**	**310**[f]	**22700**	**1820000**	**795**	**5680**	**na**	**74.9**	**3410**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**219**[d]	**3130**	**1560**	**54800**	**400**	**23**[f]	**1560**	**125000**	**54.8**	**391**	**na**	**5.16**	**235**	**23500**
0236-96-0009	36-03127	10.83–13.33	Soil	5.6 (U)	—[g]	0.56 (U)	—	—	NA[h]	—	—	—	—	NA	NA	—	—	—	NA	—
0236-96-0010	36-03127	14.25–16.67	Soil	5.7 (U)	—	0.57 (UJ)	—	—	NA	—	—	—	—	NA	NA	—	—	—	NA	—
0236-96-0022	36-03131	5.5–7.58	Soil	0.87 (UJ)	—	—	—	43.1	NA	—	—	—	—	NA	NA	—	—	0.89 (J)	NA	77.6
0236-96-0023	36-03131	9.17–11.67	Soil	0.85 (UJ)	—	—	—	—	NA	—	—	—	—	NA	NA	—	—	—	NA	—
RE36-11-2862	36-613721	2–4	Fill	5 (J)	—	—	—	1160	0.52 (U)	—	79.7	0.393 (U)	—	7.5	NA	—	—	—	107	260
RE36-11-2863	36-613721	5–6.5	Fill	12.6 (J)	—	—	—	54.3	0.55 (U)	—	—	0.433 (U)	—	4.2	—	—	—	—	30.9	61.8
RE36-11-2864	36-613721	10–11.5	Fill	—	—	—	—	—	0.52 (U)	—	—	0.266 (U)	—	2.3	—	—	—	—	3.8	—
RE36-11-2865	36-613722	0–1.5	Fill	—	—	—	—	—	0.53 (U)	—	—	0.315 (U)	—	1.9	—	—	—	—	—	—
RE36-11-2866	36-613722	5–6.5	Fill	—	—	—	—	—	—	—	—	0.399 (U)	—	4.9	0.0035 (J)	—	—	—	—	—
RE36-11-2867	36-613722	10–11.5	Fill	—	—	—	—	—	0.56 (U)	—	—	0.391 (U)	—	7.7	—	—	—	—	—	—
RE36-11-2868	36-613723	0–1.5	Fill	—	—	—	—	—	—	—	—	0.279 (U)	—	0.24	—	—	—	—	—	—
RE36-11-2869	36-613723	5–6	Fill	1.8 (J)	—	—	—	598	0.52 (U)	—	25.8	0.306 (U)	—	0.82	NA	—	—	—	7.4	95.8
RE36-11-2870	36-613723	10–11.5	Fill	—	—	—	—	—	—	—	—	0.411 (U)	—	1.7	—	—	—	—	2.1	—
RE36-11-2871	36-613724	0–1.5	Fill	—	—	—	—	—	0.54 (U)	—	—	0.301 (U)	—	0.41	—	—	—	—	—	—
RE36-11-2872	36-613724	5–6.5	Fill	1.4 (U)	—	0.42	—	81.1	—	—	—	0.284 (U)	—	20	—	—	—	—	1.9	—
RE36-11-2873	36-613724	10–11.5	Fill	—	—	—	—	—	0.54 (U)	—	—	0.352 (U)	—	5.6	—	—	—	—	—	—
RE36-11-2874	36-613725	0–1	Fill	—	—	—	—	—	0.53 (U)	—	—	0.3 (U)	—	0.42	NA	—	—	—	2.2	—
RE36-11-2875	36-613725	5–6.5	Fill	22.6	622	—	31	1890	0.53 (U)	27100	668	0.307 (U)	22.7	0.72	—	4.4	1450	—	274	397
RE36-11-2876	36-613725	10–11.5	Fill	0.91 (U)	—	—	—	—	0.56 (U)	—	23.8	0.348 (U)	—	4.8	—	—	—	—	4	52
RE36-11-2877	36-613726	0–1.5	Fill	—	—	—	—	—	0.53 (U)	—	—	0.329 (U)	—	0.66	—	—	—	—	—	—
RE36-11-2878	36-613726	5–6.5	Fill	—	—	—	—	—	0.57 (U)	—	—	0.405 (U)	—	1.2	—	—	—	—	—	—
RE36-11-2879	36-613726	10–11.5	Fill	—	—	—	—	—	0.56 (U)	—	—	0.421 (U)	—	3.9	—	—	—	—	—	—
RE36-11-2880	36-613727	0–1.5	Fill	—	—	—	—	—	0.56 (U)	—	—	—	—	5.2	—	—	—	—	2.7 (J)	—
RE36-11-2881	36-613727	5–6.5	Fill	—	—	—	—	88.6 (J)	—	—	—	—	132	6.6	—	—	—	—	95.1 (J)	105
RE36-11-2882	36-613727	10–11.5	Fill	—	—	—	—	2340 (J)	0.56 (U)	—	—	—	—	1	—	—	—	—	27.3 (J)	59.6
RE36-11-2949	36-613727	13.5–15	Fill	—	—	—	—	60 (J)	0.59 (U)	—	—	—	—	1.5	—	—	—	—	10.2 (J)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] SSL for hexavalent chromium.
[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[g] — = Not detected or not detected above BV.
[h] NA = Not analyzed.

Table 7.2-3
Organic Chemicals Detected at SWMU 36-001

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzyl Alcohol	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Dinitroaniline [3,5-]	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofuran [1,2,3,4,7,8,9-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,4,7,8-]	Hexachlorodibenzodioxin [1,2,3,6,7,8-]
Construction Worker SSL[a]				**263000**	**23800**[b]	**4760**	**23800**	**na**[c]	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**851000**	**62000**[d]	**1370**	**68400**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**67500**	**6100**[d]	**347**	**6110**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**
0236-96-0009	36-03127	10.83–13.33	Soil	—[e]	—	—	—	NA[f]	NA	NA	NA	NA	NA	NA	NA
0236-96-0010	36-03127	14.25–16.67	Soil	—	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
0236-96-0023	36-03131	9.17–11.67	Soil	0.041	—	—	—	NA	NA	NA	NA	NA	NA	NA	NA
RE36-11-2862	36-613721	2–4	Fill	—	—	0.15 (J)	0.076 (J)	—	0.000197	0.000367	0.00000937	0.000000602 (J)	0.0000211	0.00000257 (J)	0.00000646
RE36-11-2863	36-613721	5–6.5	Fill	—	—	—	—	—	0.00000364 (J)	0.00000695	—	—	—	—	—
RE36-11-2864	36-613721	10–11.5	Fill	—	—	—	—	—	0.00000099 (J)	0.00000191 (J)	—	—	—	—	—
RE36-11-2865	36-613722	0–1.5	Fill	—	—	—	—	—	0.00000152 (J)	0.00000333 (J)	—	—	—	—	—
RE36-11-2866	36-613722	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2867	36-613722	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2868	36-613723	0–1.5	Fill	—	—	—	—	—	0.00000144 (J)	0.00000298 (J)	—	—	—	—	—
RE36-11-2869	36-613723	5–6	Fill	—	—	—	—	—	0.00000461 (J)	0.00000834	0.00000417 (J)	0.000000512 (J)	0.00000566	—	—
RE36-11-2870	36-613723	10–11.5	Fill	—	—	—	—	—	0.000000787 (J)	0.00000171 (J)	—	—	—	—	—
RE36-11-2871	36-613724	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2872	36-613724	5–6.5	Fill	—	—	—	—	—	0.00000729	0.0000148	0.0000241	0.00000167 (J)	0.000032	0.000000939 (J)	0.00000145 (J)
RE36-11-2873	36-613724	10–11.5	Fill	—	—	—	—	—	0.000000481 (J)	0.000000481 (J)	0.000000603 (J)	—	0.000000603 (J)	—	—
RE36-11-2874	36-613725	0–1	Fill	—	—	—	—	—	—	0.000000728 (J)	—	—	—	—	—
RE36-11-2875	36-613725	5–6.5	Fill	—	—	0.062 (J)	—	0.004 (J)	0.0000675	0.00018	0.000136	0.0000101	0.000183	0.00000428 (J)	0.00000996
RE36-11-2876	36-613725	10–11.5	Fill	—	—	—	—	—	—	0.00000054 (J)	—	—	—	—	—
RE36-11-2877	36-613726	0–1.5	Fill	—	—	—	—	—	0.000000586 (J)	0.00000115 (J)	—	—	—	—	—
RE36-11-2878	36-613726	5–6.5	Fill	—	0.073 (J)	—	—	—	0.00000138 (J)	0.00000248 (J)	—	—	—	—	—
RE36-11-2879	36-613726	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2880	36-613727	0–1.5	Fill	—	—	0.31 (J-)	—	—	0.0000199	0.0000514	0.00000627	—	0.00000901	0.00000126 (J)	0.00000201 (J)
RE36-11-2881	36-613727	5–6.5	Fill	—	—	0.069 (J-)	—	—	0.000822	0.00112	0.00015	0.0000187 (J)	0.000552	—	0.0000134 (J)
RE36-11-2882	36-613727	10–11.5	Fill	—	—	—	—	—	0.0000159	0.000026	0.0000103	0.000000737 (J)	0.0000155	0.000000476 (J)	—
RE36-11-2949	36-613727	13.5–15	Fill	—	—	—	—	—	0.0000525 (J)	0.0000798	0.000023	0.00000222 (J)	0.0000507	—	0.00000172 (J)

Table 7.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Hexachlorodibenzodioxin [1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran [1,2,3,4,7,8-]	Hexachlorodibenzofuran [1,2,3,6,7,8-]	Hexachlorodibenzofuran [1,2,3,7,8,9-]	Hexachlorodibenzofuran [2,3,4,6,7,8-]	Hexachlorodibenzofurans (Total)	Methylene Chloride	Methylphenol[2-]	Methylphenol[4-]	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**10600**	**11900**[b]	**1190**[b]	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**1090**	**31000**[d]	**3100**[d]	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**199**	**3100**[d]	**310**[d]	**na**	**na**
0236-96-0009	36-03127	10.83–13.33	Soil	NA	NA	NA	NA	NA	NA	NA	0.006 (J)	—	—	NA	NA
0236-96-0010	36-03127	14.25–16.67	Soil	NA	NA	NA	NA	NA	NA	NA	0.004 (J)	—	—	NA	NA
0236-96-0023	36-03131	9.17–11.67	Soil	NA	NA	NA	NA	NA	NA	NA	—	—	—	NA	NA
RE36-11-2862	36-613721	2–4	Fill	0.00000728	0.0000675	0.00000215 (J)	—	0.00000054 (J)	0.0000022 (J)	0.0000204	—	—	—	0.00151	0.0000154
RE36-11-2863	36-613721	5–6.5	Fill	—	0.000000482 (J)	—	—	—	—	—	—	—	—	0.0000292	—
RE36-11-2864	36-613721	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000726 (J)	—
RE36-11-2865	36-613722	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	0.0000196	—
RE36-11-2866	36-613722	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000242 (J)	—
RE36-11-2867	36-613722	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000195 (J)	—
RE36-11-2868	36-613723	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000955	—
RE36-11-2869	36-613723	5–6	Fill	—	0.00000351 (J)	0.00000283 (J)	0.00000277 (J)	0.00000093 (J)	—	0.0000185	—	—	—	0.0000247	0.00000122 (J)
RE36-11-2870	36-613723	10–11.5	Fill	—	—	—	—	—	—	0.000000494 (J)	—	—	—	0.00000773 (J)	—
RE36-11-2871	36-613724	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000184 (J)	—
RE36-11-2872	36-613724	5–6.5	Fill	0.00000138 (J)	0.0000132	0.00000943	0.00000674	0.00000187 (J)	0.00000842	0.0000658	—	—	—	0.0000163	0.00000606 (J)
RE36-11-2873	36-613724	10–11.5	Fill	—	—	—	—	—	—	0.000000609 (J)	—	—	—	0.0000023 (J)	—
RE36-11-2874	36-613725	0–1	Fill	—	—	—	—	—	—	—	—	—	—	0.00000414 (J)	—
RE36-11-2875	36-613725	5–6.5	Fill	0.00000983	0.000205	0.0000458	0.0000486	0.0000203	0.0000757	0.000474	—	—	—	0.000154	0.000032
RE36-11-2876	36-613725	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000295 (J)	—
RE36-11-2877	36-613726	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000463 (J)	—
RE36-11-2878	36-613726	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000494 (J)	—
RE36-11-2879	36-613726	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	0.00000212 (J)	—
RE36-11-2880	36-613727	0–1.5	Fill	0.00000207 (J)	0.0000272	0.00000217 (J)	0.00000187 (J)	—	0.00000247 (J)	0.0000188	—	0.047 (J-)	0.12 (J-)	0.0000706 (J+)	0.00000282 (J)
RE36-11-2881	36-613727	5–6.5	Fill	0.00000465 (J)	0.0000393	0.00000487 (J)	0.00000674 (J)	—	0.00000853 (J)	0.000153	—	—	—	0.00815 (J+)	0.000926
RE36-11-2882	36-613727	10–11.5	Fill	—	0.0000081	0.00000289 (J)	0.00000243 (J)	—	0.00000307 (J)	0.0000243	—	—	—	0.000148 (J+)	0.0000114
RE36-11-2949	36-613727	13.5–15	Fill	0.00000121 (J)	0.0000153	0.00000315 (J)	0.00000343 (J)	—	0.00000302 (J)	0.0000372	—	—	—	NA	0.0000466

Table 7.2-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Pentachlorodibenzodioxin [1,2,3,7,8-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofuran [1,2,3,7,8-]	Pentachlorodibenzofuran [2,3,4,7,8-]	Pentachlorodibenzofurans (Totals)	Phenol	Tetrachlorodibenzodioxin [2,3,7,8-]	Tetrachlorodibenzodioxins (Total)	Tetrachlorodibenzofuran [2,3,7,8-]	Tetrachlorodibenzofurans (Totals)	Trichlorofluoromethane
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**68800**	**0.000284**	**na**	**0.0127**	**na**	**5820**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**205000**	**0.000204**	**na**	**0.00147**	**na**	**6760**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**18300**	**0.000045**	**na**	**0.000374**	**na**	**2010**
0236-96-0009	36-03127	10.83–13.33	Soil	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	—
0236-96-0010	36-03127	14.25–16.67	Soil	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	—
0236-96-0023	36-03131	9.17–11.67	Soil	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	—
RE36-11-2862	36-613721	2–4	Fill	0.00000316 (J)	0.0000236	0.0000013 (J)	0.00000259 (J)	0.0000253	—	0.00000172	0.0000171	0.00000282 (J)	0.0000422	—
RE36-11-2863	36-613721	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2864	36-613721	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2865	36-613722	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2866	36-613722	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2867	36-613722	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2868	36-613723	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2869	36-613723	5–6	Fill	0.000000616 (J)	0.00000335 (J)	0.00000316 (J)	0.00000512	0.0000517	—	0.000000436 (J)	0.00000367	0.0000054 (J)	0.000086	—
RE36-11-2870	36-613723	10–11.5	Fill	—	—	—	—	0.00000108 (J)	—	—	—	—	0.00000613 (J)	—
RE36-11-2871	36-613724	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2872	36-613724	5–6.5	Fill	—	0.0000103	0.00000323 (J)	0.00000774	0.0000623	—	0.000000243 (J)	0.00000913	0.00000369 (J)	0.0000558	—
RE36-11-2873	36-613724	10–11.5	Fill	—	—	—	—	—	—	—	0.000000359 (J)	—	—	—
RE36-11-2874	36-613725	0–1	Fill	—	—	—	—	—	—	—	0.000000239 (J)	—	—	—
RE36-11-2875	36-613725	5–6.5	Fill	0.00000714	0.000139	0.0000311	0.0000589	0.000684	—	0.00000318	0.000136	0.0000384	0.00112	0.00071 (J+)
RE36-11-2876	36-613725	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2877	36-613726	0–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2878	36-613726	5–6.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2879	36-613726	10–11.5	Fill	—	—	—	—	—	—	—	—	—	—	—
RE36-11-2880	36-613727	0–1.5	Fill	0.00000132 (J)	0.0000129	0.00000093 (J)	0.00000175 (J)	0.0000199	0.64 (J-)	0.000000409 (J)	0.00000593	—	0.0000182 (J)	—
RE36-11-2881	36-613727	5–6.5	Fill	—	0.000000904 (J)	—	—	0.0000189 (J)	—	—	—	—	—	—
RE36-11-2882	36-613727	10–11.5	Fill	—	0.00000721	0.00000161 (J)	0.00000263 (J)	0.0000292	—	—	0.00000666	0.00000213 (J)	0.0000353	—
RE36-11-2949	36-613727	13.5–15	Fill	—	0.0000087	0.00000177 (J)	0.00000222 (J)	0.0000295	—	0.000000368 (J)	0.00000974	0.00000189 (J)	0.0000342	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 7.2-4
Radionuclides Detected or Detected above BVs at SWMU 36-001

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**220**	**43**	**160**
Industrial SAL[b]				**1500**	**87**	**430**
Residential SAL[b]				**170**	**17**	**87**
0236-96-0022	36-03131	5.5–7.58	Soil	—[c]	—	3.862
RE36-11-2862	36-613721	2–4	Fill	4.42 (J+)	0.606 (J+)	26.7 (J+)
RE36-11-2863	36-613721	5–6.5	Fill	—	—	6.36
RE36-11-2864	36-613721	10–11.5	Fill	—	—	—
RE36-11-2865	36-613722	0–1.5	Fill	—	—	—
RE36-11-2866	36-613722	5–6.5	Fill	—	—	—
RE36-11-2867	36-613722	10–11.5	Fill	—	—	—
RE36-11-2868	36-613723	0–1.5	Fill	—	—	—
RE36-11-2869	36-613723	5–6	Fill	—	—	2.62
RE36-11-2870	36-613723	10–11.5	Fill	—	—	—
RE36-11-2871	36-613724	0–1.5	Fill	—	—	—
RE36-11-2872	36-613724	5–6.5	Fill	—	—	—
RE36-11-2873	36-613724	10–11.5	Fill	—	—	—
RE36-11-2874	36-613725	0–1	Fill	—	—	—
RE36-11-2875	36-613725	5–6.5	Fill	11.9	1.8	88.6
RE36-11-2876	36-613725	10–11.5	Fill	—	—	—
RE36-11-2877	36-613726	0–1.5	Fill	—	—	—
RE36-11-2878	36-613726	5–6.5	Fill	—	—	—
RE36-11-2879	36-613726	10–11.5	Fill	—	—	—
RE36-11-2880	36-613727	0–1.5	Fill	—	—	—
RE36-11-2881	36-613727	5–6.5	Fill	61.3	6.7	464
RE36-11-2882	36-613727	10–11.5	Fill	—	—	5.17
RE36-11-2949	36-613727	13.5–15	Fill	—	—	3.42

Note: All activities are in pCi/g. Data qualifiers are defined in Appendix A.

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

[b] SALs from LANL (2009, 107655).

[c] — = Not detected or not analyzed.

Table 7.3-1
Samples Collected and Analyses Requested at SWMU 36-003(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium
RE15-11-975	15-613464	0–1	Fill	11-733	11-732	11-732	—*	11-732	—	11-733	11-733	11-733	11-734
RE15-11-976	15-613464	3–4	Qbt 3	11-733	11-732	11-732	—	11-732	—	11-733	11-733	11-733	11-734
RE15-11-983	15-613465	0–1	Fill	11-733	11-732	11-732	11-732	11-732	11-735	11-733	11-733	11-733	11-734
RE15-11-978	15-613465	3–4	Fill	11-733	11-732	11-732	—	11-732	—	11-733	11-733	11-733	11-734
RE15-11-979	15-613466	0–1	Fill	11-733	11-732	11-732	—	11-732	—	11-733	11-733	11-733	11-734
RE15-11-980	15-613466	3–4	Qbt 3	11-733	11-732	11-732	—	11-732	—	11-733	11-733	11-733	11-734

* — = Analysis not requested.

Table 7.3-2
Inorganic Chemicals above BVs at SWMU 36-003(b)

Sample ID	Location ID	Depth (ft)	Media	Copper	Cyanide (Total)	Nitrate	Selenium
Qbt 2, 3, 4 BV[a]				**4.66**	**0.5**	**na**[b]	**0.3**
Soil BV[a]				**14.7**	**0.5**	**na**	**1.52**
Construction Worker SSL[c]				**12400**	**6190**	**496000**	**1550**
Industrial SSL[c]				**45400**	**22700**	**1820000**	**5680**
Residential SSL[c]				**3130**	**1560**	**125000**	**391**
RE15-11-975	15-613464	0–1	Fill	15.2	0.54 (UJ)	0.64	—[d]
RE15-11-976	15-613464	3–4	Qbt 3	—	0.51 (UJ)	—	1.3
RE15-11-983	15-613465	0–1	Fill	—	0.54 (UJ)	3.1	—
RE15-11-978	15-613465	3–4	Fill	—	0.51 (UJ)	6.8	—
RE15-11-979	15-613466	0–1	Fill	—	0.51 (UJ)	0.48	—
RE15-11-980	15-613466	3–4	Qbt 3	—	—	0.16 (J)	1.3

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] — = Not detected or not detected above BV.

Table 7.3-3
Organic Chemicals Detected at SWMU 36-003(b)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pentachlorodibenzofurans (Totals)	Phenanthrene	Pyrene
Construction Worker SSL[a]				**8910**	**na**[b]	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**7150**	**6680**
Industrial SSL[a]				**24400**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**20500**	**18300**
Residential SSL[a]				**2290**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**na**	**1830**	**1720**
RE15-11-983	15-613465	0–1	Fill	0.091 (J)	0.0000119	0.0000393	0.00000184 (J)	0.00000424 (J)	0.0000029 (J)	0.00000218 (J)	0.000107	0.000004 (J)	0.00000101 (J)	0.086 (J)	0.062 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] na = Not available.

Table 7.4-1
Samples Collected and Analyses Requested at AOC 36-004(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	PCBs	Explosive Compounds	Dioxins/ Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-259	15-613265	0–1	Fill	11-622	—*	11-622	—	11-622	11-622	11-622	11-622	11-622
RE15-11-285	15-613265	2–3	Fill	11-622	11-622	11-622	11-623	11-622	11-622	11-622	11-622	11-622

* — = Analysis not requested.

Table 7.4-2
Inorganic Chemicals above BVs at AOC 36-004(a)

Sample ID	Location ID	Depth (ft)	Media	Copper	Cyanide (Total)	Nitrate	Selenium
Soil BV[a]				**14.7**	**0.5**	**na**[b]	**1.52**
Construction Worker SSL[c]				**12400**	**6190**	**496000**	**1550**
Industrial SSL[c]				**45400**	**22700**	**1820000**	**5680**
Residential SSL[c]				**3130**	**1560**	**125000**	**391**
RE15-11-259	15-613265	0–1	Fill	23	0.54 (U)	2.3	—[d]
RE15-11-285	15-613265	2–3	Fill	—	0.54 (U)	1.2	1.9

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] — = Not detected or not detected above BV.

Table 7.4-3
Organic Chemicals Detected at AOC 36-004(a)

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	HMX	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	TATB
Construction Worker SSL[a]				**na**[b]	**na**	**na**	**na**	**na**	**na**	**11900**	**na**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**34200**	**na**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**3060**	**na**	**na**	**na**
RE15-11-259	15-613265	0–1	Fill	NA[c]	NA	NA	NA	NA	NA	0.048 (J)	NA	NA	0.9 (J+)
RE15-11-285	15-613265	2–3	Fill	0.00000835	0.0000172	0.000000943 (J)	0.00000246 (J)	0.00000219 (J)	0.00000117 (J)	—[d]	0.0000786	0.00000217 (J)	0.49 (J+)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

[c] NA = Not analyzed.

[d] — = Not detected or not analyzed.

Table 7.4-4
Radionuclides Detected or Detected above BVs at AOC 36-004(a)

Sample ID	Location ID	Depth (ft)	Media	Uranium-238
Soil BV[a]				**2.29**
Construction Worker SAL[b]				**160**
Industrial SAL[b]				**430**
Residential SAL[b]				**87**
RE15-11-259	15-613265	0–1	Fill	3.03

Note: All activities are in pCi/g.

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

[b] SALs from LANL (2009, 107655).

Table 7.5-1
Samples Collected and Analyses Requested at SWMU 36-006

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium
0236-95-0083	36-03145	0–0.33	Soil	1713	1712	1712	—*	1711	—	—	—	—	1714
0236-95-0087	36-03145	1.33–2	Soil	1713	1712	1712	—	1711	—	—	—	—	1714
0236-95-0084	36-03146	0–0.33	Soil	1713	1712	1712	—	1711	—	—	—	—	1714
0236-95-0123	36-03146	1.33–2	Soil	1713	1712	1712	—	1711	—	—	—	—	1714
0236-95-0086	36-03147	0–0.33	Soil	1713	1712	1712	—	1711	—	—	—	—	1714
0236-95-0088	36-03149	0–0.33	Soil	1713	1712	1712	—	1711	—	—	—	—	1714
RE15-11-1144	15-613514	0–1	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1145	15-613514	2–3	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1146	15-613515	0–1	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1147	15-613515	2–3	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1148	15-613516	0–1	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1149	15-613516	2–3	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1150	15-613517	0–1	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1151	15-613517	2–3	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1166	15-613518	0–1	Fill	11-628	11-627	11-627	11-627	11-627	11-629	11-628	11-628	11-628	11-628
RE15-11-1153	15-613518	2–3	Fill	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1167	15-613519	0–1	Soil	11-628	11-627	11-627	11-627	11-627	11-629	11-628	11-628	11-628	11-628
RE15-11-1155	15-613519	2–3	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1156	15-613520	0–1	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1157	15-613520	2–3	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1158	15-613521	0–1	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1159	15-613521	2–3	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1160	15-613522	0–1	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1161	15-613522	2–3	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1162	15-613523	0–1	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1163	15-613523	2–3	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1164	15-613524	0–1	Soil	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626
RE15-11-1165	15-613524	2–3	Qbt 2	11-625	11-624	11-624	—	11-624	—	11-625	11-625	11-625	11-626

* — = Analysis not requested.

Table 7.5-2
Inorganic Chemicals above BVs at SWMU 36-006

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide (Total)	Lead	Mercury	Nickel	Nitrate	Selenium	Silver	Thallium	Zinc
Qbt 2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**0.1**	**6.58**	**na[b]**	**0.3**	**1.0**	**1.1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**15.4**	**na**	**1.52**	**1.0**	**0.73**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**6190**	**800**	**69.5[e]**	**6190**	**496000**	**1550**	**1550**	**20.4**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**22700**	**1820000**	**5680**	**5680**	**74.9**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**1560**	**125000**	**391**	**391**	**5.16**	**23500**
0236-95-0083	36-03145	0–0.33	Soil	11 (UJ)	—[g]	1.5	15000	410	52 (J-)	NA[h]	200	0.11 (U)	200	NA	—	2.1 (U)	1.3 (U)	—
0236-95-0087	36-03145	1.33–2	Soil	11 (UJ)	380	0.54 (U)	13000	—	55 (J-)	NA	54	0.11 (U)	—	NA	—	2.2 (U)	1.3 (U)	150
0236-95-0084	36-03146	0–0.33	Soil	11 (UJ)	—	0.56 (U)	—	—	—	NA	—	0.11	—	NA	—	2.2 (U)	1.4 (U)	—
0236-95-0123	36-03146	1.33–2	Soil	11 (UJ)	—	0.54 (U)	—	—	—	NA	—	0.11 (U)	—	NA	—	2.2 (U)	1.4 (U)	—
0236-95-0086	36-03147	0–0.33	Soil	11 (UJ)	—	0.57 (U)	—	—	—	NA	—	0.11 (U)	—	NA	—	2.3 (U)	1.4 (U)	—
0236-95-0088	36-03149	0–0.33	Soil	10 (UJ)	—	0.52 (U)	—	—	—	NA	—	—	—	NA	—	2.1 (U)	1.3 (U)	—
RE15-11-1144	15-613514	0–1	Fill	—	—	—	—	—	—	0.53 (U)	—	—	—	0.41	2 (J)	—	—	—
RE15-11-1145	15-613514	2–3	Fill	—	—	—	—	—	—	0.53 (U)	—	—	—	0.17 (J)	2 (J)	—	—	—
RE15-11-1146	15-613515	0–1	Fill	—	—	—	—	—	—	0.54 (U)	—	—	—	0.46	2.3 (J)	—	—	—
RE15-11-1147	15-613515	2–3	Fill	—	—	—	—	—	—	0.53 (U)	—	—	—	0.13 (J)	2.5 (J)	—	—	—
RE15-11-1148	15-613516	0–1	Fill	—	—	—	—	—	—	0.54 (U)	—	0.146	—	2.4	1.6 (J)	—	—	—
RE15-11-1149	15-613516	2–3	Fill	—	—	—	—	—	—	0.53 (U)	—	—	—	0.78	2 (J)	—	—	—
RE15-11-1150	15-613517	0–1	Fill	—	—	—	—	—	73.7	0.53 (U)	—	—	—	3.9	1.9 (J)	—	—	52.2
RE15-11-1151	15-613517	2–3	Fill	—	—	—	—	—	—	0.53 (U)	—	—	—	0.92	—	—	—	—
RE15-11-1166	15-613518	0–1	Fill	—	—	—	7680	—	—	0.54 (U)	—	—	—	0.16 (J)	—	—	—	—
RE15-11-1153	15-613518	2–3	Fill	—	—	—	—	—	—	0.55 (U)	—	—	—	0.47	—	—	—	—
RE15-11-1167	15-613519	0–1	Soil	—	—	—	—	—	—	0.55 (U)	—	—	—	0.096 (J)	—	—	—	—
RE15-11-1155	15-613519	2–3	Soil	—	—	—	—	—	—	0.53 (U)	—	—	—	0.21	—	—	—	—
RE15-11-1156	15-613520	0–1	Soil	—	—	—	—	—	—	—	—	—	—	0.22	—	—	—	—
RE15-11-1157	15-613520	2–3	Soil	—	—	—	—	—	—	0.52 (U)	—	—	—	0.23	—	—	—	—
RE15-11-1158	15-613521	0–1	Soil	—	—	—	—	—	17.3	0.55 (U)	—	0.118	—	1.3	1.7 (J)	—	—	—
RE15-11-1159	15-613521	2–3	Soil	—	—	—	—	—	—	0.52 (U)	—	—	—	0.3	—	—	—	—
RE15-11-1160	15-613522	0–1	Soil	—	—	—	—	—	43	0.55 (U)	28.2	1.48	—	0.21 (J)	—	—	—	51.2
RE15-11-1161	15-613522	2–3	Soil	—	—	—	—	—	—	0.53 (U)	—	—	—	0.28	1.7 (J)	—	—	—
RE15-11-1162	15-613523	0–1	Soil	1.6 (J)	—	—	7940	—	3140	0.52 (U)	69.4	—	—	0.75	—	—	—	168
RE15-11-1163	15-613523	2–3	Soil	—	—	—	—	—	69.8	0.53 (U)	—	—	—	0.37	1.8 (J)	—	—	49.6

Table 7.5-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide (Total)	Lead	Mercury	Nickel	Nitrate	Selenium	Silver	Thallium	Zinc
Qbt 2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**0.1**	**6.58**	**na[b]**	**0.3**	**1.0**	**1.1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**15.4**	**na**	**1.52**	**1.0**	**0.73**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**6190**	**800**	**69.5[e]**	**6190**	**496000**	**1550**	**1550**	**20.4**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**22700**	**1820000**	**5680**	**5680**	**74.9**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**1560**	**125000**	**391**	**391**	**5.16**	**23500**
RE15-11-1164	15-613524	0–1	Soil	—	—	—	6220	—	18.1	0.54 (U)	28.5	—	—	3.7	1.7 (J)	—	—	50.2
RE15-11-1165	15-613524	2–3	Qbt 2	—	—	—	—	—	—	0.52 (U)	14.5	—	—	0.32	1.7 (J)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

[h] NA = Not analyzed.

Table 7.5-3
Organic Chemicals Detected at SWMU 36-006

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Benzoic Acid	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Dinitroaniline[3,5-]	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**263000**	**601[b]**	**601[b]**	**66800**	**213**	**21.3**	**213**	**6680[c]**	**2060**	**952000[b]**	**20600**	**21.3**	**310[b]**	**na[d]**	**8910**	**8910**
Industrial SSL[a]				**36700**	**851000**	**1900[e]**	**2000[e]**	**183000**	**23.4**	**2.34**	**23.4**	**18300[c]**	**234**	**2500000[e]**	**2340**	**2.34**	**1000[e]**	**na**	**24400**	**24400**
Residential SSL[a]				**3440**	**67500**	**150[e]**	**150[e]**	**17200**	**6.21**	**0.621**	**6.21**	**1720[c]**	**62.1**	**240000[e]**	**621**	**0.621**	**78[e]**	**na**	**2290**	**2290**
0236-95-0087	36-03145	1.33–2	Soil	—[f]	—	—	—	—	—	—	—	—	—	—	—	—	—	NA[g]	—	—
RE15-11-1149	15-613516	2–3	Fill	—	0.007 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1150	15-613517	0–1	Fill	1.4	—	—	—	1.3	4.8	3.6	5.1	1.2	2.2	—	4.6	—	0.58	—	9.9	0.94
RE15-11-1151	15-613517	2–3	Fill	—	—	—	—	—	0.084 (J)	0.079 (J)	0.12 (J)	—	0.048 (J)	—	0.087 (J)	—	—	—	0.19 (J)	—
RE15-11-1166	15-613518	0–1	Fill	0.079 (J)	—	—	—	0.17 (J)	0.41	0.35 (J)	0.34 (J)	0.19 (J)	0.35 (J)	—	0.41	0.061 (J)	—	—	1.1	0.074 (J)
RE15-11-1153	15-613518	2–3	Fill	—	0.016 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1167	15-613519	0–1	Soil	—	0.0087 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1155	15-613519	2–3	Soil	—	0.022	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1156	15-613520	0–1	Soil	—	—	—	—	—	—	—	0.04 (J)	—	—	—	—	—	—	—	0.054 (J)	—
RE15-11-1158	15-613521	0–1	Soil	—	0.016 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1159	15-613521	2–3	Soil	—	0.0077 (J)	—	—	—	—	—	—	—	—	0.64 (J)	—	—	—	—	—	—
RE15-11-1160	15-613522	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE15-11-1162	15-613523	0–1	Soil	—	—	0.084	0.055	—	—	—	—	—	—	—	—	—	—	0.036 (J)	—	—

Table 7.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**213**	**10300**[h]	**10600**	**1240**[b]	**702**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**23.4**	**14900**[h]	**1090**	**4100**[e]	**252**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**6.21**	**3210**[h]	**199**	**310**[e]	**45**	**na**	**na**
0236-95-0087	36-03145	1.33–2	Soil	NA	NA	NA	NA	NA	NA	—	—	0.0086 (J+)	—	—	NA	NA
RE15-11-1149	15-613516	2–3	Fill	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1150	15-613517	0–1	Fill	NA	NA	NA	NA	NA	NA	1.5	—	—	0.22 (J)	0.95	NA	NA
RE15-11-1151	15-613517	2–3	Fill	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1166	15-613518	0–1	Fill	0.0000112	0.0000392	0.00000258 (J)	0.0000101	0.00000476	0.00000268 (J)	0.2 (J)	—	—	—	—	0.000135	0.000011
RE15-11-1153	15-613518	2–3	Fill	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1167	15-613519	0–1	Soil	0.00000595	0.0000122	—	0.00000138 (J)	0.000000518 (J)	—	—	—	—	—	—	0.0000484	0.00000202 (J)
RE15-11-1155	15-613519	2–3	Soil	NA	NA	NA	NA	NA	NA	—	0.0037 (J)	—	—	—	NA	NA
RE15-11-1156	15-613520	0–1	Soil	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1158	15-613521	0–1	Soil	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1159	15-613521	2–3	Soil	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1160	15-613522	0–1	Soil	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA
RE15-11-1162	15-613523	0–1	Soil	NA	NA	NA	NA	NA	NA	—	—	—	—	—	NA	NA

Table 7.5-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Pentachlorodibenzofurans (Totals)	Phenanthrene	Pyrene	RDX	TATB	Tetrachlorodibenzodioxins (Total)	Trichlorofluoromethane	Trinitrobenzene[1,3,5-]	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**na**	**7150**	**6680**	**715**	**na**	**na**	**5820**	**8760[b]**	**141**
Industrial SSL[a]				**na**	**20500**	**18300**	**174**	**na**	**na**	**6760**	**27000[e]**	**469**
Residential SSL[a]				**na**	**1830**	**1720**	**44.2**	**na**	**na**	**2010**	**2200[e]**	**35.9**
0236-95-0087	36-03145	1.33–2	Soil	NA	—	—	—	NA	NA	—	—	—
RE15-11-1149	15-613516	2–3	Fill	NA	—	—	—	—	NA	—	—	—
RE15-11-1150	15-613517	0–1	Fill	NA	7.2	6.9	—	—	NA	—	—	—
RE15-11-1151	15-613517	2–3	Fill	NA	0.12 (J)	0.14 (J)	—	—	NA	—	—	—
RE15-11-1166	15-613518	0–1	Fill	0.000000639 (J)	0.73	0.67	—	—	0.000000214 (J)	—	—	—
RE15-11-1153	15-613518	2–3	Fill	NA	—	—	—	—	NA	—	—	—
RE15-11-1167	15-613519	0–1	Soil	0.000000526 (J)	—	—	—	—	0.000000128 (J)	—	—	—
RE15-11-1155	15-613519	2–3	Soil	NA	—	—	—	—	NA	—	—	—
RE15-11-1156	15-613520	0–1	Soil	NA	—	0.042 (J)	—	—	NA	0.00045 (J)	—	—
RE15-11-1158	15-613521	0–1	Soil	NA	—	—	—	—	NA	—	—	—
RE15-11-1159	15-613521	2–3	Soil	NA	—	—	—	—	NA	—	—	—
RE15-11-1160	15-613522	0–1	Soil	NA	—	—	—	2.7	NA	—	—	—
RE15-11-1162	15-613523	0–1	Soil	NA	—	—	0.49	—	NA	—	0.037 (J)	0.047 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] SSL for Pyrene used as a surrogate based on structural similarity.

[d] na = Not available.

[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[f] — = Not detected or not analyzed.

[g] NA = Not analyzed.

[h] SSL for Isopropylbenzene used as a surrogate based on structural similarity.

Table 7.5-4
Radionuclides Detected or Detected above BVs at SWMU 36-006

Sample ID	Location ID	Depth (ft)	Media	Uranium-238
Soil BV[a]				**2.29**
Construction Worker SAL[b]				**160**
Industrial SAL[b]				**430**
Residential SAL[b]				**87**
RE15-11-1158	15-613521	0–1	Soil	2.38
RE15-11-1160	15-613522	0–1	Soil	3.14
RE15-11-1162	15-613523	0–1	Soil	5.26

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs from LANL (2009, 107655).

Table 7.6-1
Samples Collected and Analyses Requested at AOC 36-004(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-291	15-613266	0–1	Sed	11-818	11-817	11-817	11-817	11-817	11-816	11-818	11-818	11-818	11-818	11-818
RE15-11-266	15-613266	2–3	Sed	11-818	11-817	11-817	—*	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-267	15-613267	0–1	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-268	15-613267	2–3	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-269	15-613268	0–1	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-270	15-613268	1–2	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-271	15-613269	0–1	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-272	15-613269	1–2	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-273	15-613270	0–1	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818
RE15-11-274	15-613270	1–2	Sed	11-818	11-817	11-817	—	11-817	—	11-818	11-818	11-818	11-818	11-818

* — = Analysis not requested.

Table 7.6-2
Inorganic Chemicals above BVs at AOC 36-004(b)

Sample ID	Location ID	Depth (ft)	Media	Barium	Nitrate	Perchlorate	Selenium
Sediment BV[a]				**127**	**na[b]**	**na**	**0.3**
Construction Worker SSL[c]				**4350**	**496000**	**217**	**1550**
Industrial SSL[c]				**224000**	**1820000**	**795**	**5680**
Residential SSL[c]				**15600**	**125000**	**54.8**	**391**
RE15-11-291	15-613266	0–1	Sed	—[d]	0.98	0.0029 (J)	1.5
RE15-11-266	15-613266	2–3	Sed	—	0.26	NA[e]	0.73
RE15-11-267	15-613267	0–1	Sed	—	0.34	—	1.1
RE15-11-268	15-613267	2–3	Sed	—	0.43	—	0.87
RE15-11-269	15-613268	0–1	Sed	—	0.084 (J)	—	1.1
RE15-11-270	15-613268	1–2	Sed	—	0.12 (J)	—	1.3
RE15-11-271	15-613269	0–1	Sed	—	0.35	—	1.4
RE15-11-272	15-613269	1–2	Sed	—	0.43	—	1.2
RE15-11-273	15-613270	0–1	Sed	—	0.46	—	1.5
RE15-11-274	15-613270	1–2	Sed	184	0.7	—	1.2

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] — = Not detected or not detected above BV.
[e] NA = Not analyzed.

Table 7.6-3
Organic Chemicals Detected at AOC 36-004(b)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Chrysene	Diethylphthalate	Di-n-butylphthalate	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,6,7,8-]
Construction Worker SSL[a]				**263000**	**4.36**	**75.8**	**213**	**21.3**	**213**	**2060**	**4760**	**20600**	**191000**	**23800**	**8910**	**na[b]**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**851000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**234**	**1370**	**2340**	**547000**	**68400**	**24400**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**67500**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**62.1**	**347**	**621**	**48900**	**6110**	**2290**	**na**	**na**	**na**	**na**	**na**
RE15-11-291	15-613266	0–1	Sed	NA[c]	0.013 (J)	0.011 (J)	0.048 (J)	0.036 (J)	0.048 (J)	0.037 (J)	—[d]	0.052 (J)	0.58	—	0.094 (J)	0.000145	0.00028	0.0000332	0.0000974	0.00000513
RE15-11-266	15-613266	2–3	Sed	—	NA	NA	—	—	—	—	—	—	—	—	0.05 (J)	NA	NA	NA	NA	NA
RE15-11-267	15-613267	0–1	Sed	—	NA	NA	—	—	—	—	—	—	—	—	0.055 (J)	NA	NA	NA	NA	NA
RE15-11-269	15-613268	0–1	Sed	0.032	NA	NA	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA
RE15-11-270	15-613268	1–2	Sed	0.079	NA	NA	—	—	—	—	—	—	—	—	—	NA	NA	NA	NA	NA
RE15-11-271	15-613269	0–1	Sed	—	NA	NA	—	—	—	—	—	—	—	—	0.054 (J)	NA	NA	NA	NA	NA
RE15-11-273	15-613270	0–1	Sed	—	NA	NA	—	0.039 (J)	0.039 (J)	0.041 (J)	0.077 (J)	—	—	0.06 (J)	0.092 (J)	NA	NA	NA	NA	NA

Table 7.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxin [1,2,3,6,7,8-]	Hexachlorodibenzodioxin [1,2,3,7,8,9-]	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofuran [1,2,3,6,7,8-]	Hexachlorodibenzofuran [2,3,4,6,7,8-]	Hexachlorodibenzofurans (Total)	Isopropyltoluene[4-]	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran [1,2,3,4,6,7,8,9-]	Pentachlorodibenzodioxins (Total)	Pentachlorodibenzofuran [1,2,3,7,8-]	Pentachlorodibenzofurans (Totals)
Construction Worker SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**10300[e]**	**na**	**na**	**na**	**na**	**na**
Industrial SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**14900[e]**	**na**	**na**	**na**	**na**	**na**
Residential SSL[a]				**na**	**na**	**na**	**na**	**na**	**na**	**na**	**3210[e]**	**na**	**na**	**na**	**na**	**na**
RE15-11-291	15-613266	0–1	Sed	0.0000974	0.00000513	0.00000492	0.0000317	0.00000142 (J)	0.00000182 (J)	0.0000403	NA	0.0011	0.000114	0.00000154 (J)	0.00000049 (J)	0.00000554
RE15-11-266	15-613266	2–3	Sed	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA
RE15-11-267	15-613267	0–1	Sed	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA
RE15-11-269	15-613268	0–1	Sed	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA
RE15-11-270	15-613268	1–2	Sed	NA	NA	NA	NA	NA	NA	NA	0.0042 (J)	NA	NA	NA	NA	NA
RE15-11-271	15-613269	0–1	Sed	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA
RE15-11-273	15-613270	0–1	Sed	NA	NA	NA	NA	NA	NA	NA	—	NA	NA	NA	NA	NA

Table 7.6-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Phenanthrene	Pyrene	Tetrachlorodibenzofurans (Totals)	Toluene
Construction Worker SSL[a]				**7150**	**6680**	**na**	**21100**
Industrial SSL[a]				**20500**	**18300**	**na**	**57900**
Residential SSL[a]				**1830**	**1720**	**na**	**5570**
RE15-11-291	15-613266	0–1	Sed	—	0.07 (J)	0.00000518 (J)	NA
RE15-11-266	15-613266	2–3	Sed	—	—	NA	—
RE15-11-267	15-613267	0–1	Sed	—	0.037 (J)	NA	—
RE15-11-269	15-613268	0–1	Sed	—	—	NA	—
RE15-11-270	15-613268	1–2	Sed	—	—	NA	0.0007 (J)
RE15-11-271	15-613269	0–1	Sed	0.039 (J)	0.035 (J)	NA	—
RE15-11-273	15-613270	0–1	Sed	—	0.058 (J)	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] NA = Not analyzed.

[c] — = Not detected or not analyzed.

[d] na = Not available.

[e] Isopropylbenzene used as a surrogate based on structural similarity.

Table 7.7-1
Samples Collected and Analyses Requested at AOC 36-004(c)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-295	15-613279	0–0.25	Sed	11-821	11-820	11-820	—*	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-296	15-613279	0.25–0.5	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-297	15-613280	0–0.25	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-298	15-613280	0.25–0.5	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-299	15-613281	0–1	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-300	15-613281	2–3	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-301	15-613282	0–0.5	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-302	15-613282	0.5–1	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-313	15-613283	0–1	Fill	11-821	11-820	11-820	11-820	11-820	11-819	11-821	11-821	11-821	11-821	11-821
RE15-11-304	15-613283	2–3	Fill	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-305	15-613284	0–1	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-306	15-613284	1–2	Sed	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-307	15-613285	0–1	Fill	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821
RE15-11-308	15-613285	2–3	Fill	11-821	11-820	11-820	—	11-820	—	11-821	11-821	11-821	11-821	11-821

* — = Analysis not requested.

Table 7.7-2
Inorganic Chemicals above BVs at AOC 36-004(c)

Sample ID	Location ID	Depth (ft)	Media	Barium	Calcium	Cobalt	Copper	Cyanide (Total)	Lead	Nitrate	Perchlorate	Selenium
Sediment BV[a]				**127**	**4420**	**4.73**	**11.2**	**0.82**	**19.7**	**na[b]**	**na**	**0.3**
Soil BV[a]				**295**	**6120**	**8.64**	**14.7**	**0.5**	**22.3**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**4350**	**na**	**34.6[d]**	**12400**	**6190**	**800**	**496000**	**217**	**1550**
Industrial SSL[c]				**224000**	**na**	**300[e]**	**45400**	**22700**	**800**	**1820000**	**795**	**5680**
Residential SSL[c]				**15600**	**na**	**23[e]**	**3130**	**1560**	**400**	**125000**	**54.8**	**391**
RE15-11-295	15-613279	0–0.25	Sed	—[f]	9590	—	—	—	—	1.6	—	0.86
RE15-11-296	15-613279	0.25–0.5	Sed	—	—	—	—	—	—	0.92	—	1
RE15-11-297	15-613280	0–0.25	Sed	214 (J+)	—	4.9	31.2	—	26.6	0.19 (J)	—	1.7
RE15-11-298	15-613280	0.25–0.5	Sed	—	—	—	14.8	—	—	0.076 (J)	—	0.76
RE15-11-299	15-613281	0–1	Sed	—	—	—	—	—	—	0.36	—	1.2
RE15-11-300	15-613281	2–3	Sed	—	—	—	—	—	—	0.23	—	2.1
RE15-11-301	15-613282	0–0.5	Sed	—	—	—	—	—	—	0.14 (J)	—	0.87
RE15-11-302	15-613282	0.5–1	Sed	—	—	—	—	—	—	0.094 (J)	—	0.91
RE15-11-313	15-613283	0–1	Fill	—	—	—	18.8	0.53 (U)	—	1.4	0.0069 (J-)	—
RE15-11-304	15-613283	2–3	Fill	—	—	—	—	0.54 (U)	—	0.65	0.012 (J-)	—
RE15-11-305	15-613284	0–1	Sed	—	—	—	—	—	—	0.31	—	0.71
RE15-11-306	15-613284	1–2	Sed	—	—	—	—	—	—	0.4	—	1.2
RE15-11-307	15-613285	0–1	Fill	—	—	—	25.3	0.53 (U)	—	4.1	—	—
RE15-11-308	15-613285	2–3	Fill	—	—	—	16.6	0.53 (U)	—	3.5	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 7.7-3
Organic Chemicals Detected at AOC 36-004(c)

Sample ID	Location ID	Depth (ft)	Media	Amino-2,6-dinitrotoluene[4-]	Amino-4,6-dinitrotoluene[2-]	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Di-n-butylphthalate	Dinitrotoluene[2,4-]	Dinitrotoluene[2,6-]	Heptachlorodibenzodioxin[1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran[1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	HMX	Octachlorodibenzodioxin[1,2,3,4,6,7,8,9-]	Octachlorodibenzofuran[1,2,3,4,6,7,8,9-]	TATB
Construction Worker SSL[a]				**601[b]**	**601[b]**	**952000[b]**	**4760**	**23800**	**476**	**239**	**na[c]**	**na**	**na**	**na**	**na**	**11900**	**na**	**na**	**na**
Industrial SSL[a]				**1900[d]**	**2000[d]**	**2500000[d]**	**1370**	**68400**	**103**	**687**	**na**	**na**	**na**	**na**	**na**	**34200**	**na**	**na**	**na**
Residential SSL[a]				**150[d]**	**150[d]**	**240000[d]**	**347**	**6110**	**15.7**	**61.2**	**na**	**na**	**na**	**na**	**na**	**3060**	**na**	**na**	**na**
RE15-11-295	15-613279	0–0.25	Sed	—[e]	—	—	0.057 (J)	—	—	—	NA[f]	NA	NA	NA	NA	—	NA	NA	1.3 (J)
RE15-11-296	15-613279	0.25–0.5	Sed	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	—	NA	NA	0.36 (J)
RE15-11-297	15-613280	0–0.25	Sed	—	—	—	0.076 (J)	0.037 (J)	0.0048 (J)	—	NA	NA	NA	NA	NA	—	NA	NA	6.9 (J)
RE15-11-298	15-613280	0.25–0.5	Sed	—	—	—	0.049 (J)	—	—	—	NA	NA	NA	NA	NA	—	NA	NA	3.1 (J)
RE15-11-299	15-613281	0–1	Sed	—	—	0.65 (J)	—	—	—	—	NA	NA	NA	NA	NA	—	NA	NA	—
RE15-11-301	15-613282	0–0.5	Sed	—	—	—	—	0.56	—	—	NA	NA	NA	NA	NA	—	NA	NA	—
RE15-11-302	15-613282	0.5–1	Sed	—	—	—	0.047 (J)	0.054 (J)	—	—	NA	NA	NA	NA	NA	—	NA	NA	—
RE15-11-313	15-613283	0–1	Fill	0.012 (J)	0.014 (J)	—	0.68	0.86	1.4	0.1 (J)	0.00000597	0.0000112	0.000000899 (J)	0.00000185 (J)	0.00000117 (J)	0.25 (J+)	0.0000435	0.00000221 (J)	8.3 (J)
RE15-11-304	15-613283	2–3	Fill	—	—	—	—	—	—	—	NA	NA	NA	NA	NA	—	NA	NA	1.1 (J)
RE15-11-305	15-613284	0–1	Sed	—	—	—	0.18 (J)	0.27 (J)	—	—	NA	NA	NA	NA	NA	—	NA	NA	—
RE15-11-307	15-613285	0–1	Fill	—	—	—	0.098 (J)	—	—	—	NA	NA	NA	NA	NA	—	NA	NA	1.8 (J)
RE15-11-308	15-613285	2–3	Fill	—	—	—	—	0.14 (J)	—	—	NA	NA	NA	NA	NA	—	NA	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 7.7-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 36-004(c)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-238
Sediment BV[a]				**0.9**	**2.29**
Soil BV[a]				**1.65**	**2.29**
Construction Worker SAL[b]				**18**	**160**
Industrial SAL[b]				**23**	**430**
RE15-11-297	15-613280	0–0.25	Sed	—[c]	2.33
RE15-11-307	15-613285	0–1	Fill	—	4.62
RE15-11-308	15-613285	2–3	Fill	0.259	—

Note: All activities are in pCi/g.

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

[b] SALs from LANL (2009, 107655).

[c] — = Not detected or not detected above BVs/FVs.

Table 7.8-1
Samples Collected and Analyses Requested at SWMU 36-004(d)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
0236-95-0001	36-03175	0.5–1.08	Soil	1699	1698	1698	—*	1698	—	—	—	—	1700	1700
0236-95-0002	36-03175	2.33–2.75	Soil	1699	1698	1698	—	1698	—	—	—	—	1700	1700
0236-95-0003	36-03176	0.5–1	Soil	1699	1698	1698	—	1698	—	—	—	—	1700	1700
0236-95-0004	36-03176	2–2.58	Soil	1699	1698	1698	—	1698	—	—	—	—	1700	1700
0236-96-0001	36-03177	2–2.58	Soil	1726	1725	1725	—	1727	—	—	—	—	1728	1728
0236-96-0002	36-03177	4.42–5.08	Soil	1726	1725	1725	—	1727	—	—	—	—	1728	1728
0236-96-0003	36-03177	5.58–6.33	Qbt 2	1726	1725	1725	—	1727	—	—	—	—	1728	1728
0236-96-0004	36-03178	0.33–1.08	Soil	1726	1725	1725	—	1727	—	—	—	—	1728	1728
0236-96-0005	36-03178	3.17–3.67	Soil	1726	1725	1725	—	1727	—	—	—	—	1728	1728
0236-96-0007	36-03179	3.33–4.17	Soil	1726	1725	1725	—	1727	—	—	—	—	1728	1728
RE15-11-1001	15-613496	0–1	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1002	15-613496	2–3	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1019	15-613497	0–1	Sed	11-814	11-813	11-813	11-813	11-813	11-815	11-814	11-814	11-814	11-814	11-814
RE15-11-1004	15-613497	2–3	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1005	15-613498	0–1	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1006	15-613498	2–3	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1007	15-613499	0–1	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1008	15-613499	2–3	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1009	15-613500	0–0.25	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1010	15-613500	0.25–0.5	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1011	15-613501	0–1	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1012	15-613501	1–2	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1020	15-613502	0–0.25	Sed	11-814	11-813	11-813	11-813	11-813	11-815	11-814	11-814	11-814	11-814	11-814
RE15-11-1014	15-613502	0.25–0.5	Sed	11-812	11-811	11-811	—	11-811	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1015	15-613503	0–1	Sed	11-812	11-813	11-813	—	11-813	—	11-812	11-812	11-812	11-812	11-812
RE15-11-1016	15-613503	1–2	Sed	11-814	11-813	11-813	—	11-813	—	11-814	11-814	11-814	11-814	11-814
RE15-11-1017	15-613504	0–1	Sed	11-814	11-813	11-813	—	11-813	—	11-814	11-814	11-814	11-814	11-814
RE15-11-1018	15-613504	1–2	Sed	11-814	11-813	11-813	—	11-813	—	11-814	11-814	11-814	11-814	11-814

* — = Analysis not requested.

Table 7.8-2
Inorganic Chemicals above BVs at SWMU 36-004(d)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Calcium	Cobalt	Lead	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Silver	Thallium
Qbt 2, 3, 4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**2200**	**3.14**	**11.2**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**1.0**	**1.1**
Sediment BV[a]				**15400**	**0.83**	**127**	**0.4**	**4420**	**4.73**	**19.7**	**0.1**	**9.38**	**na**	**na**	**0.3**	**1.0**	**0.73**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**6120**	**8.64**	**22.3**	**0.1**	**15.4**	**na**	**na**	**1.52**	**1.0**	**0.73**
Construction Worker SSL[c]				**40700**	**124**	**4350**	**309**	**na**	**34.6[d]**	**800**	**69.5[d]**	**6190**	**496000**	**217**	**1550**	**1550**	**20.4**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**na**	**300[e]**	**800**	**310[e]**	**22700**	**1820000**	**795**	**5680**	**5680**	**74.9**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**na**	**23[e]**	**400**	**23[e]**	**1560**	**125000**	**54.8**	**391**	**391**	**5.16**
0236-96-0001	36-03177	2–2.58	Soil	—[f]	11 (UJ)	—	0.56 (U)	—	—	—	0.11 (U)	—	NA	NA	—	2.2 (U)	1.5 (UJ)
0236-96-0002	36-03177	4.42–5.08	Soil	NA[g]	NA	NA	NA	NA	NA	NA	0.11 (U)	NA	NA	NA	—	NA	1.4 (UJ)
0236-96-0003	36-03177	5.58–6.33	Qbt 2	8400	11 (UJ)	100	—	2400	3.2	—	0.11 (U)	12	NA	NA	1.1 (UJ)	2.2 (U)	1.4 (UJ)
0236-96-0004	36-03178	0.33–1.08	Soil	—	11 (UJ)	—	0.54 (U)	—	—	—	0.11 (U)	—	NA	NA	—	2.2 (U)	1.4 (UJ)
0236-96-0005	36-03178	3.17–3.67	Soil	—	11 (UJ)	—	0.54 (U)	—	—	—	0.11 (U)	—	NA	NA	—	2.2 (U)	1.4 (UJ)
0236-96-0007	36-03179	3.33–4.17	Soil	—	11 (UJ)	—	0.56 (U)	—	—	—	0.11 (U)	17	NA	NA	—	2.2 (U)	1.5 (UJ)
RE15-11-1001	15-613496	0–1	Sed	—	—	—	—	—	—	21.6 (J)	—	—	0.38	—	1.3	—	—
RE15-11-1002	15-613496	2–3	Sed	—	—	—	—	—	—	—	—	—	0.61	—	1.2	—	—
RE15-11-1019	15-613497	0–1	Sed	—	—	—	—	—	—	—	—	—	2	—	1.4 (J+)	—	—
RE15-11-1004	15-613497	2–3	Sed	—	—	—	—	—	—	—	—	—	0.59	—	0.85	—	—
RE15-11-1005	15-613498	0–1	Sed	—	—	—	—	—	—	—	—	—	1.2	—	1.5	—	—
RE15-11-1006	15-613498	2–3	Sed	—	—	—	—	—	—	—	—	—	1.5	—	1.3	—	—
RE15-11-1007	15-613499	0–1	Sed	—	—	—	—	—	—	—	—	—	11	—	1	—	—
RE15-11-1008	15-613499	2–3	Sed	—	—	—	—	—	—	—	—	—	0.57	—	1	—	—
RE15-11-1009	15-613500	0–0.25	Sed	—	—	—	—	—	—	—	—	—	0.35	—	0.99	—	—
RE15-11-1010	15-613500	0.25–0.5	Sed	—	—	—	—	—	—	—	—	—	0.23	—	1	—	—
RE15-11-1011	15-613501	0–1	Sed	—	—	—	—	—	—	—	—	—	1.7	—	1.1	—	—
RE15-11-1012	15-613501	1–2	Sed	—	—	—	—	—	—	—	—	—	0.47	—	1.6	—	—
RE15-11-1020	15-613502	0–0.25	Sed	—	—	—	—	—	—	—	—	—	0.44	—	1.7 (J+)	—	—
RE15-11-1014	15-613502	0.25–0.5	Sed	—	—	—	—	—	—	—	—	—	0.54	—	1	—	—
RE15-11-1015	15-613503	0–1	Sed	—	—	—	—	4450	—	—	—	—	10.4	—	0.95	—	—
RE15-11-1016	15-613503	1–2	Sed	—	—	—	—	—	—	—	—	—	5.1	0.0029 (J)	1 (J+)	—	—
RE15-11-1017	15-613504	0–1	Sed	—	—	—	—	—	—	—	—	—	0.23	0.0023 (J)	1.2 (J+)	—	—
RE15-11-1018	15-613504	1–2	Sed	—	—	—	—	—	—	—	—	—	0.11 (J)	—	0.75 (J+)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070) unless otherwise noted.
[d] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[f] — = Not detected or not detected above BV.
[g] NA = Not analyzed.

Table 7.8-3
Organic Chemicals Detected at SWMU 36-004(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Butylbenzene[tert-]	Chrysene	Dibromo-3-Chloropropane[1,2-]	Fluoranthene	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Hexanone[2-]
Construction Worker SSL[a]				**263000**	**66800**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**148000**	**15500[c]**	**20600**	**23**	**8910**	**na[d]**	**na**	**1530[e]**
Industrial SSL[a]				**851000**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**369000**	**58600[c]**	**2340**	**1.09**	**24400**	**na**	**na**	**1400[f]**
Residential SSL[a]				**67500**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**39600**	**3910[c]**	**621**	**0.194**	**2290**	**na**	**na**	**210[f]**
0236-95-0001	36-03175	0.5–1.08	Soil	—[g]	—	—	—	—	—	—	0.098 (J)	—	—	—	0.002 (J)	—	NA[h]	NA	—
0236-95-0002	36-03175	2.33–2.75	Soil	—	—	—	—	—	—	—	—	—	0.001 (J)	—	—	—	NA	NA	—
0236-95-0004	36-03176	2–2.58	Soil	—	—	—	—	—	—	—	0.074 (J)	—	—	—	—	—	NA	NA	—
0236-96-0003	36-03177	5.58–6.33	Qbt 2	0.026	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	0.034
0236-96-0004	36-03178	0.33–1.08	Soil	NA	—	—	—	—	—	—	—	NA	NA	—	NA	—	NA	NA	NA
0236-96-0007	36-03179	3.33–4.17	Soil	0.039	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE15-11-1019	15-613497	0–1	Sed	—	—	—	—	—	—	—	0.071 (J-)	—	—	—	—	—	0.0000015 (J)	0.00000385 (J)	—
RE15-11-1010	15-613500	0.25–0.5	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE15-11-1020	15-613502	0–0.25	Sed	—	—	—	—	—	—	—	0.059 (J-)	—	—	—	—	—	0.000000812 (J)	0.00000241 (J)	—
RE15-11-1015	15-613503	0–1	Sed	—	—	—	—	—	—	—	—	0.012 (J)	—	—	—	—	NA	NA	—
RE15-11-1016	15-613503	1–2	Sed	—	—	—	—	—	—	—	—	—	—	—	—	—	NA	NA	—
RE15-11-1017	15-613504	0–1	Sed	—	0.11 (J-)	0.39 (J-)	0.35 (J-)	0.37 (J-)	0.23 (J-)	0.37 (J-)	—	—	—	0.42 (J-)	—	0.86 (J-)	NA	NA	—
RE15-11-1018	15-613504	1–2	Sed	—	—	—	—	—	—	—	—	—	—	0.035 (J-)	—	—	NA	NA	—

Table 7.8-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Naphthalene	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Phenanthrene	Pyrene	Tetrachloroethene	Toluene	Trimethylbenzene[1,2,4-]
Construction Worker SSL[a]				**213**	**10300[i]**	**10600**	**702**	**na**	**7150**	**6680**	**338**	**21100**	**329[e]**
Industrial SSL[a]				**23.4**	**14900[i]**	**1090**	**252**	**na**	**20500**	**18300**	**36.4**	**57900**	**260[f]**
Residential SSL[a]				**6.21**	**3210[i]**	**199**	**45**	**na**	**1830**	**1720**	**6.99**	**5570**	**62[f]**
0236-95-0001	36-03175	0.5–1.08	Soil	—	0.031	—	0.002 (J)	NA	—	—	0.002 (J)	0.0012 (J)	—
0236-95-0002	36-03175	2.33–2.75	Soil	—	0.011	—	—	NA	—	—	—	—	—
0236-95-0004	36-03176	2–2.58	Soil	—	—	—	—	NA	—	—	—	—	—
0236-96-0003	36-03177	5.58–6.33	Qbt 2	—	—	—	—	NA	—	—	—	—	—
0236-96-0004	36-03178	0.33–1.08	Soil	—	NA	0.0085 (J+)	—	NA	—	—	NA	NA	NA
0236-96-0007	36-03179	3.33–4.17	Soil	—	—	—	—	NA	—	—	—	—	—
RE15-11-1019	15-613497	0–1	Sed	—	—	—	—	0.0000122	—	—	—	—	—
RE15-11-1010	15-613500	0.25–0.5	Sed	—	—	—	—	NA	—	—	—	0.0016 (J)	—
RE15-11-1020	15-613502	0–0.25	Sed	—	—	—	—	0.0000046 (J)	—	—	—	—	—
RE15-11-1015	15-613503	0–1	Sed	—	0.016 (J+)	—	—	NA	—	—	—	0.0033 (J+)	0.0012 (J+)
RE15-11-1016	15-613503	1–2	Sed	—	0.0031 (J+)	—	—	NA	—	—	—	0.0013 (J+)	0.00083 (J+)
RE15-11-1017	15-613504	0–1	Sed	0.26 (J-)	—	—	—	NA	0.44 (J-)	0.56 (J-)	—	—	—
RE15-11-1018	15-613504	1–2	Sed	—	—	—	—	NA	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] SSL for Pyrene used as a surrogate based on structural similarity.

[c] SSLs calculated using n-butylbenzene surrogate oral reference dose (0.05 mg/kg-day), which is a provisional peer-reviewed toxicity value derived by EPA's Superfund Health Risk Technical Support Center, and the equation and parameters from NMED (2009, 108070).

[d] na = Not available.

[e] Construction worker SSL calculated using toxicity value from EPA 2010 (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[g] — = Not detected or not analyzed.

[h] NA = Not analyzed.

[i] SSL for Isopropylbenzene used as a surrogate based on structural similarity.

Table 7.8-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 36-004(d)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**18**	**220**	**43**	**160**
Industrial SAL[b]				**23**	**1500**	**87**	**430**
Residential SAL[b]				**5.6**	**170**	**17**	**87**
0236-95-0001	36-03175	0.5–1.08	Soil	0.24	—[c]	—	—
0236-95-0002	36-03175	2.33–2.75	Soil	0.066	—	—	—
0236-96-0001	36-03177	2–2.58	Soil	0.221	—	—	2.69

Note: All activities are in pCi/g.

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

[b] SALs from LANL (2009, 107655).

[c] — = Not detected or not detected above BVs/FVs.

Table 7.10-1
Samples Collected and Analyses Requested at SWMU 36-005

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/Furans	Nitrate	Cyanide	Perchlorate	Isotopic Uranium
RE15-11-1091	15-613507	0–1	Soil	11-929	11-928	11-928	—*	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1092	15-613507	2–3	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1093	15-613507	4–5	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1094	15-613508	0–1	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1095	15-613508	2–3	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1096	15-613508	4–5	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1097	15-613509	0–1	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1098	15-613509	2–3	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1099	15-613509	4–5	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1100	15-613510	0–1	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1101	15-613510	2–3	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1102	15-613510	4–5	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1103	15-613511	0–1	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1104	15-613511	2–3	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1105	15-613511	4–5	Qbt 3	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1106	15-613512	0–1	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1107	15-613512	2–3	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1108	15-613512	4–5	Soil	11-929	11-928	11-928	—	11-928	—	11-929	11-929	11-929	11-930
RE15-11-1109	15-613513	0–1	Soil	11-929	11-928	11-928	11-928	11-928	11-931	11-929	11-929	11-929	11-930
RE15-11-1110	15-613513	2–3	Qbt 3	11-933	11-932	11-932	11-932	11-932	—	11-933	11-933	11-933	11-933
RE15-11-1111	15-613513	4–5	Qbt 3	11-933	11-932	11-932	11-932	11-932	—	11-933	11-933	11-933	11-933
RE15-11-1120	36-03020	0–1	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1121	36-03020	1–2	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1118	36-03022	0–0.5	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1119	36-03022	0.5–1	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1058	36-03051	0–1	Fill	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1059	36-03051	2–3	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738
RE15-11-1060	36-03051	4–5	Soil	11-737	11-736	11-736	—	11-736	—	11-737	11-737	11-737	11-738

* — = Analysis not requested.

Table 7.10-2
Inorganic Chemicals above BVs at SWMU 36-005

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Beryllium	Calcium	Chromium	Copper	Cyanide (Total)	Nickel	Nitrate	Perchlorate	Selenium
Qbt 2, 3, 4 BV[a]				**0.5**	**46**	**1.21**	**2200**	**7.14**	**4.66**	**0.5**	**6.58**	**na[b]**	**na**	**0.3**
Soil BV[a]				**0.83**	**295**	**1.83**	**6120**	**19.3**	**14.7**	**0.5**	**15.4**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**4350**	**144**	**na**	**449[d]**	**12400**	**6190**	**6190**	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**224000**	**2260**	**na**	**2920[d]**	**45400**	**22700**	**22700**	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**15600**	**156**	**na**	**219[d]**	**3130**	**1560**	**1560**	**125000**	**54.8**	**391**
RE15-11-1091	15-613507	0–1	Soil	—[e]	—	—	—	—	—	0.52 (UJ)	—	0.18 (J)	—	—
RE15-11-1092	15-613507	2–3	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.15 (J)	0.0038 (J)	1.6 (J-)
RE15-11-1093	15-613507	4–5	Qbt 3	—	—	—	—	7.2	—	0.51 (UJ)	—	0.14 (J)	—	1.3 (J-)
RE15-11-1094	15-613508	0–1	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.16 (J)	—	—
RE15-11-1095	15-613508	2–3	Soil	—	—	—	—	—	—	0.52 (UJ)	—	0.12 (J)	—	1.9 (J-)
RE15-11-1096	15-613508	4–5	Qbt 3	—	—	—	—	27.2	—	—	12.4	0.073 (J)	—	1.6 (J-)
RE15-11-1097	15-613509	0–1	Soil	—	—	—	—	—	—	—	—	16.4	—	—
RE15-11-1098	15-613509	2–3	Qbt 3	—	257	1.4	—	—	—	0.53 (UJ)	—	3.1	—	2.3 (J-)
RE15-11-1099	15-613509	4–5	Qbt 3	—	—	—	—	15	—	0.52 (UJ)	7.7	0.39	—	1.2 (J-)
RE15-11-1100	15-613510	0–1	Soil	—	—	—	—	—	—	0.54 (UJ)	—	0.26	—	—
RE15-11-1101	15-613510	2–3	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.17 (J)	—	2.2 (J-)
RE15-11-1102	15-613510	4–5	Qbt 3	—	—	—	—	8.4	—	0.52 (UJ)	—	—	—	0.98 (J-)
RE15-11-1103	15-613511	0–1	Soil	—	—	—	—	—	—	0.56 (UJ)	—	3	—	—
RE15-11-1104	15-613511	2–3	Qbt 3	—	—	—	—	—	—	0.53 (UJ)	—	1.1	—	1.5 (J-)
RE15-11-1105	15-613511	4–5	Qbt 3	—	—	—	—	—	—	0.53 (UJ)	—	1.3	0.0033 (J)	1.7 (J-)
RE15-11-1106	15-613512	0–1	Soil	—	—	—	—	—	17.7	0.53 (UJ)	—	1.4	0.0048 (J)	—
RE15-11-1107	15-613512	2–3	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.88	0.0046 (J)	—
RE15-11-1108	15-613512	4–5	Soil	—	—	—	—	—	—	0.59 (UJ)	—	1.4	—	1.6 (J-)
RE15-11-1109	15-613513	0–1	Soil	—	—	—	—	—	—	0.53 (UJ)	—	1.8	—	—
RE15-11-1110	15-613513	2–3	Qbt 3	—	—	—	2300	—	—	0.54 (U)	—	—	—	2.6
RE15-11-1111	15-613513	4–5	Qbt 3	0.54 (U)	—	—	5840	—	—	0.54 (U)	—	0.14 (J)	0.0036 (J)	3.2
RE15-11-1120	36-03020	0–1	Soil	—	—	—	—	—	—	0.53 (UJ)	—	3.3	—	—
RE15-11-1121	36-03020	1–2	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.92	—	—
RE15-11-1118	36-03022	0–0.5	Soil	—	—	—	—	—	—	0.52 (UJ)	—	1.6	—	—
RE15-11-1119	36-03022	0.5–1	Soil	—	—	—	—	—	—	0.54 (UJ)	—	0.51	—	—
RE15-11-1058	36-03051	0–1	Fill	—	—	—	—	—	—	0.54 (UJ)	—	0.11 (J)	—	1.6
RE15-11-1059	36-03051	2–3	Soil	—	—	—	—	—	—	0.54 (UJ)	—	—	—	—
RE15-11-1060	36-03051	4–5	Soil	—	—	—	—	—	—	0.53 (UJ)	—	0.083 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] SSL for hexavalent chromium.
[e] — = Not detected or not detected above BV.

Table 7.10-3
Organic Chemicals Detected at SWMU 36-005

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Di-n-butylphthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Methylene Chloride	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Pentachlorophenol
Construction Worker SSL[a]				**263000**	**952000[b]**	**4760**	**47600[b]**	**23800**	**na[c]**	**na**	**10600**	**na**	**1030**
Industrial SSL[a]				**851000**	**2500000[d]**	**1370**	**9100[d]**	**68400**	**na**	**na**	**1090**	**na**	**100**
Residential SSL[a]				**67500**	**240000[d]**	**347**	**2600[d]**	**6110**	**na**	**na**	**199**	**na**	**29.8**
RE15-11-1091	15-613507	0–1	Soil	—[e]	0.61 (J)	—	—	—	NA[f]	NA	—	NA	—
RE15-11-1092	15-613507	2–3	Soil	—	—	—	—	—	NA	NA	0.0024 (J)	NA	—
RE15-11-1095	15-613508	2–3	Soil	—	—	0.047 (J)	—	—	NA	NA	0.0018 (J)	NA	—
RE15-11-1096	15-613508	4–5	Qbt 3	—	—	0.048 (J)	—	—	NA	NA	0.0019 (J)	NA	—
RE15-11-1099	15-613509	4–5	Qbt 3	—	—	—	—	—	NA	NA	0.0018 (J)	NA	—
RE15-11-1100	15-613510	0–1	Soil	—	—	0.052 (J)	—	—	NA	NA	—	NA	—
RE15-11-1101	15-613510	2–3	Soil	—	—	—	—	—	NA	NA	0.0018 (J)	NA	—
RE15-11-1102	15-613510	4–5	Qbt 3	—	—	—	—	—	NA	NA	0.0021 (J)	NA	—
RE15-11-1104	15-613511	2–3	Qbt 3	—	—	—	—	—	NA	NA	0.0023 (J)	NA	—
RE15-11-1105	15-613511	4–5	Qbt 3	—	—	0.079 (J)	—	—	NA	NA	0.0022 (J)	NA	—
RE15-11-1106	15-613512	0–1	Soil	—	—	—	—	0.2 (J)	NA	NA	—	NA	—
RE15-11-1108	15-613512	4–5	Soil	—	—	—	—	—	NA	NA	0.0019 (J)	NA	—
RE15-11-1109	15-613513	0–1	Soil	—	—	—	—	—	0.00000122 (J)	0.00000456 (J)	—	0.00000717 (J)	—
RE15-11-1110	15-613513	2–3	Qbt 3	—	—	0.048 (J-)	—	—	NA	NA	—	NA	—
RE15-11-1120	36-03020	0–1	Soil	—	—	—	—	—	NA	NA	0.0029 (J)	NA	—
RE15-11-1121	36-03020	1–2	Soil	—	—	—	—	—	NA	NA	0.0063	NA	—
RE15-11-1118	36-03022	0–0.5	Soil	—	—	—	0.043 (J)	—	NA	NA	0.0063	NA	—
RE15-11-1119	36-03022	0.5–1	Soil	0.029	—	—	—	—	NA	NA	0.0032 (J)	NA	—
RE15-11-1058	36-03051	0–1	Fill	0.31	—	—	—	—	NA	NA	0.0034 (J)	NA	0.37 (J)
RE15-11-1059	36-03051	2–3	Soil	0.24	—	—	—	—	NA	NA	0.0033 (J)	NA	—
RE15-11-1060	36-03051	4–5	Soil	0.14	—	—	—	—	NA	NA	0.0031 (J)	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] na = Not available.

[d] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

[e] — = Not detected or not analyzed.

[f] NA = Not analyzed.

Table 7.12-1
Samples Collected and Analyses Requested at AOC C-36-006(e)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Explosive Compounds	Dioxins/ Furans	Cyanide	Perchlorate	Isotopic Uranium	Gamma Spectroscopy
RE15-11-392	15-613312	0–1	Fill	11-876	11-876	11-876	11-876	11-876	11-912	11-876	11-876	11-876	11-876
RE15-11-379	15-613312	2–3	Fill	11-822	11-823	11-823	—*	11-823	—	11-822	11-822	11-822	11-822
RE15-11-380	15-613313	0–1	Fill	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-381	15-613313	2–3	Fill	11-823	11-823	11-823	—	11-823	—	—	—	11-823	11-823
RE15-11-382	15-613314	0–0.25	Soil	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-383	15-613314	0.25–0.5	Soil	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-384	15-613315	0–0.5	Sed	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-385	15-613315	0.5–1	Sed	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-386	15-613316	0–0.5	Soil	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822
RE15-11-387	15-613316	0.5–1	Soil	11-822	11-823	11-823	—	11-823	—	11-822	11-822	11-822	11-822

* — = Analysis not requested.

Table 7.12-2
Inorganic Chemicals above BVs at AOC C-36-006(e)

Sample ID	Location ID	Depth (ft)	Media	Cyanide (Total)	Mercury	Perchlorate	Selenium
Sediment BV[a]				**0.82**	**0.1**	**na**[b]	**0.3**
Soil BV[a]				**0.5**	**0.1**	**na**	**1.52**
Construction Worker SSL[c]				**6190**	**69.5**[d]	**217**	**1550**
Industrial SSL[c]				**22700**	**310**[e]	**795**	**5680**
Residential SSL[c]				**1560**	**23**[e]	**54.8**	**391**
RE15-11-392	15-613312	0–1	Fill	0.52 (U)	0.151 (U)	0.0022 (J-)	—[f]
RE15-11-379	15-613312	2–3	Fill	0.53 (U)	—	—	—
RE15-11-380	15-613313	0–1	Fill	0.52 (U)	—	0.0031 (J)	—
RE15-11-383	15-613314	0.25–0.5	Soil	0.52 (U)	—	—	—
RE15-11-384	15-613315	0–0.5	Sed	—	—	—	1.3
RE15-11-385	15-613315	0.5–1	Sed	—	—	0.0021 (J)	1.1
RE15-11-387	15-613316	0.5–1	Soil	0.55 (U)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).

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

Table 7.12-3
Organic Chemicals Detected at AOC C-36-006(e)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Heptachlorodibenzodioxin [1,2,3,4,6,7,8-]	Heptachlorodibenzodioxins (Total)	Heptachlorodibenzofuran [1,2,3,4,6,7,8-]	Heptachlorodibenzofurans (Total)	Hexachlorodibenzodioxins (Total)	Hexachlorodibenzofurans (Total)	Isopropyltoluene[4-]	Methylene Chloride	Octachlorodibenzodioxin [1,2,3,4,6,7,8,9-]	Toluene
Construction Worker SSL[a]				**263000**	**952000[b]**	**4760**	**na[c]**	**na**	**na**	**na**	**na**	**na**	**10300[d]**	**10600**	**na**	**21100**
Industrial SSL[a]				**851000**	**2500000[e]**	**1370**	**na**	**na**	**na**	**na**	**na**	**na**	**14900[d]**	**1090**	**na**	**57900**
Residential SSL[a]				**67500**	**240000[e]**	**347**	**na**	**na**	**na**	**na**	**na**	**na**	**3210[d]**	**199**	**na**	**5570**
RE15-11-392	15-613312	0–1	Fill	—[f]	0.36 (J)	0.057 (J)	0.00000529	0.0000174	0.000000977 (J)	0.00000272 (J)	0.00000126 (J)	0.000000543 (J)	—	—	0.0000445 (J)	—
RE15-11-379	15-613312	2–3	Fill	0.0099 (J)	—	—	NA[g]	NA	NA	NA	NA	NA	—	0.019	NA	—
RE15-11-380	15-613313	0–1	Fill	0.012 (J)	—	—	NA	NA	NA	NA	NA	NA	—	0.017	NA	—
RE15-11-381	15-613313	2–3	Fill	0.029	—	—	NA	NA	NA	NA	NA	NA	—	0.018	NA	—
RE15-11-382	15-613314	0–0.25	Soil	—	—	—	NA	NA	NA	NA	NA	NA	—	—	NA	0.001 (J)
RE15-11-383	15-613314	0.25–0.5	Soil	0.017 (J)	—	—	NA	NA	NA	NA	NA	NA	—	0.036	NA	0.001 (J+)
RE15-11-384	15-613315	0–0.5	Sed	0.0095 (J+)	—	—	NA	NA	NA	NA	NA	NA	0.0025 (J+)	0.021 (J+)	NA	0.00081 (J+)
RE15-11-385	15-613315	0.5–1	Sed	0.016 (J)	—	—	NA	NA	NA	NA	NA	NA	0.0011 (J)	0.024	NA	0.0012 (J)
RE15-11-386	15-613316	0–0.5	Soil	—	—	—	NA	NA	NA	NA	NA	NA	—	0.028	NA	—
RE15-11-387	15-613316	0.5–1	Soil	—	—	—	NA	NA	NA	NA	NA	NA	—	0.019	NA	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Construction worker SSL calculated using toxicity value from EPA (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[c] na = Not available.
[d] Isopropylbenzene used as surrogate based on structural similarity.
[e] SSLs from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm).
[f] — = Not detected or not analyzed.
[g] NA = Not analyzed.

Table 7.12-4
Radionuclides Detected or Detected above BVs at AOC C-36-006(e)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236	Uranium-238
Soil BV[a]				**2.59**	**0.2**	**2.29**
Construction Worker SAL[b]				**220**	**43**	**160**
Industrial SAL[b]				**1500**	**87**	**430**
Residential SAL[b]				**170**	**17**	**87**
RE15-11-386	15-613316	0–0.5	Soil	2.65	0.336	12

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs from LANL (2009, 107655).

Appendix A

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

A-1.0 ACRONYMS AND ABBREVIATIONS

%R	percent recovery
%RSD	percent relative standard deviation
AGI	Advanced Geosciences, Inc.
AK	acceptable knowledge
AOC	area of concern
ARS	American Radiation Services
bgs	below ground surface
BV	background value
CCV	continuing calibration verification
COC	chain of custody
Consent Order	Compliance Order on Consent
COPC	chemical of potential concern
cpm	counts per minute
CVAA	cold vapor atomic absorption
DARHT	Dual-Axis Radiographic Hydrodynamic Test
DGPS	differential global-positioning system
DL	detection limit
DOE	Department of Energy (U.S.)
dpm	disintegrations per minute
DRO	diesel range organics
DU	depleted uranium
EDL	estimated detection limit
EM	electromagnetic induction instrument
EPA	Environmental Protection Agency (U.S.)
EQL	estimated quantitation limit
ERG	Environmental Restoration Group, Inc.
ES&H	environment, safety, and health
FIDLER	Field Instrument for Detection of Low-Energy Radiation
FTL	field team leader
FV	fallout value
GC/MS	gas chromatography/mass spectrometry
GPR	ground-penetrating radar
GPS	global positioning system

GRO	gasoline range organics
HE	high explosive
HIR	historical investigation report
HMX	octahydro-1,3,5,7-tetranitro-1,3,5,7 tetrazocine
ICS	interference check sample
ICV	initial calibration verification
ID	identification
IDW	investigation-derived waste
IP	individual permit
IS	internal standard
LAL	lower acceptance limit
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LLW	low-level waste
MDA	material disposal area
MDC	minimum detectable concentration
MDL	method detection limit
MS	matrix spike
MSD	matrix spike duplicate
MSW	municipal solid waste
NFA	no further action
NMED	New Mexico Environment Department
NPDES	National Pollutant Discharge Elimination System
OD	open detonation
OU	operable unit
PAH	polycyclic aromatic hydrocarbon
PCB	polychlorinated biphenyl
PETN	pentaerythritol tetranitrate
PHERMEX	Pulsed High-Energy Radiographic Machine Emitting X-rays (facility)
PID	photoionization detector
PPE	personal protective equipment
PQL	practical quantitation limit
PRG	preliminary remediation goal
QA	quality assurance

QC	quality control
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RDX	hexahydro-1,3,5-trinitro-1,3,5-triazine
RFI	RCRA facility investigation
RL	reporting limit
RPD	relative percent difference
RRF	relative response factor
RWP	radiological work permit
SAL	screening action level
SCL	sample collection log
SMO	Sample Management Office
SOP	standard operating procedure
SOW	statement of work
SSHASP	site-specific health and safety plan
SSL	soil screening level
SVOC	semivolatile organic compound
SWMU	solid waste management unit
TA	technical area
TAL	target analyte list
TATB	1,3,5-triamino-2,4,6-trinitrobenzene
TCDD	tetrachlorodibenzodioxin
TCLP	toxicity characteristic leaching procedure
TNT	2,4,6-trinitrotoluene
TPH	total petroleum hydrocarbons
TPU	total propagated uncertainty
UAL	upper acceptance limit
VCA	voluntary corrective action
VOC	volatile organic compound
WCSF	waste characterization strategy form
XRF	x-ray fluorescence

A-2.0 METRIC CONVERSION TABLE

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

A-3.0 DATA QUALIFIER DEFINITIONS

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

Appendix B

Field Methods

B-1.0 INTRODUCTION

This appendix summarizes field methods implemented during the 2010 investigation at Potrillo and Fence Canyons Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Table B-1.0-1 summarizes the field investigation methods, and the following sections provide more detailed descriptions of these methods. All activities were conducted in accordance with approved subcontractor procedures technically equivalent to Laboratory standard operating procedures (SOPs) listed in Table B-1.0-2. These procedures are available at http://www.lanl.gov/environment/all/qa/adep.shtml.

B-2.0 EXPLORATORY DRILLING CHARACTERIZATION

No exploratory drilling characterization was conducted during the 2010 Potrillo and Fence Canyons Aggregate Area investigation.

B-3.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used during the investigation activities. Field screening for organic vapors was performed for health and safety purposes. Field screening for radioactivity was performed on all samples before submittal to the Sample Management Office (SMO) and, if elevated readings were encountered, to guide confirmation sampling. Field screening for metals and explosive compounds was performed in accordance with the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677) to guide sample collection for chemical and radiological analyses. Field-screening results for all investigation activities are described in section 3.2.4 of the investigation report. Table 3.2-2 of the investigation report presents field-screening results for samples collected and submitted for off-site analysis, and Table B-3.0-1 of this appendix presents field-screening results for samples collected and not submitted for off-site analysis.

B-3.1 Field Screening for Organic Vapors

Field screening for organic vapors was conducted for all samples using a MiniRAE 2000 photoionization detector (PID) equipped with an 11.7-electronvolt lamp. Screening was performed in accordance with the manufacturer's specifications and SOP-06.33, Headspace Vapor Screening with a Photoionization Detector. Screening was performed on each characterization sample collected, and screening measurements were recorded on the sample collection logs (SCLs) and chain-of-custody (COC) forms provided on DVD in Appendix G. The field-screening results are presented in Table 3.2-2 of the investigation report.

B-3.2 Field Screening for Radioactivity

All samples collected were field screened for gross-alpha, -beta, and -gamma radioactivity before they were submitted to the SMO. A Laboratory radiation control technician (RCT) conducted radiological screening using an Eberline E-600 radiation meter with an SHP-380AB alpha/beta scintillation detector held within 1 in. of the sample. The Eberline E-600 with attachment SHP-380AB consists of a dual phosphor plate covered by two Mylar windows housed in a light-excluding metal body. The phosphor plate is a plastic scintillator used to detect beta and gamma emissions and is thinly coated with zinc sulfide to detect alpha emissions. The operational range varies from trace emissions to 1 million disintegrations per minute (dpm). If elevated radioactivity was encountered (5000 dpm over the daily background), a sample was collected and submitted to American Radiation Services (ARS) for analysis

before shipment from the SMO. Screening measurements were recorded on the SCLs and COC forms and are provided on DVD in Appendix G. The screening results are presented in Table 3.2-2 of the investigation report.

B-3.3 Field Screening for Metals

All samples collected from Solid Waste Management Units (SWMUs) 15-004(b), 15-004(c), 15-004(f), 15-007(a), 15-008(a), 36-001, and 36-006 were field screened for the specific metals barium, copper, lead, and uranium using a handheld Thermo Scientific Niton XL3t 600 x-ray fluorescence (XRF) analyzer. Additional samples were collected if XRF results for barium, copper, lead, or uranium exceeded 2 times the background value (BV) of the sample matrix. Screening measurements were recorded in the field. The screening results are presented in Table 3.2-2 of the investigation report or Table B-3.0-1 of this appendix.

B-3.4 Field Screening for Explosive Compounds

All samples collected from SWMUs 15-002, 15-004(b), 15-004(c), 15-004(f), 15-007(a), 15-008(a), 15-010(a), 36-001, 36-005, and 36-006 were field screened for RDX (hexahydro-1,3,5-trinitro-1,3,5-triazine) and TNT (2,4,6-trinitrotoluene) using Strategic Diagnostics, Inc., Ensys immunoassay test kits. The operational range for the RDX/TNT soil tests is between 1 and 30 ppm. The lowest detectable concentrations of RDX and TNT were 0.8 ppm and 0.7 ppm, respectively. Additional samples were collected if TNT or RDX results exceeded the industrial soil screening levels (SSLs). The screening results are presented in Table 3.2-2 of the investigation report or Table B-3.0-1 of this appendix.

B-4.0 FIELD INSTRUMENT CALIBRATION

Instrument calibration and/or function check was completed daily. Several environmental factors affected the instruments' integrity, including air temperature, atmospheric pressure, wind speed, and humidity. Calibration of the PID was conducted by the environment, safety, and health (ES&H) representative. The RCT calibrated the Eberline E-600 instrument according to the manufacturer's specifications and requirements. The field team leader (FTL) performed a daily calibration check on the XRF analyzer.

B-4.1 MiniRAE 2000 Instrument Calibration

The ES&H representative performed a daily calibration check of the MiniRAE 2000 PID to ambient air and a standard reference gas (100 ppm isobutylene). The ambient-air calibration determined the zero point of the instrument sensor calibration curve in ambient air. Calibration with the standard reference gas determined a second point of the sensor calibration curve. Each calibration was within 3% of 100 ppm isobutylene, qualifying the instrument for use.

The following calibration information was recorded daily on operational calibration logs:

- instrument identification number
- final span settings
- date and time
- concentration and type of calibration gas used (isobutylene at 100 ppm)
- name of the person performing the calibration

All daily calibration procedures for the MiniRAE 2000 PID met the manufacturer's specifications for standard reference gas calibration.

B-4.2 Eberline E-600 Instrument Calibration

The RCT calibrated the Eberline E-600 daily before local background levels for radioactivity were measured. The instrument was calibrated using plutonium-239 and chloride-36 sources for alpha and beta emissions, respectively. The following five checks were performed as part of the calibration procedures:

- calibration date
- physical damage
- battery
- response to a source of radioactivity
- background

All calibrations performed for the Eberline E-600 met the manufacturer's specifications and the applicable radiation detection instrument manual.

B-4.3 XRF Instrument Calibration

The FTL performed a daily calibration check of the XRF analyzer. The check consisted of a negative test using a known nondetect blank and a positive test using a standard with a known concentration of metals.

The following calibration information was recorded daily on operational calibration logs:

- instrument identification number
- date and time
- concentration in mg/kg and error (+/-) of lead, barium, copper, mercury, arsenic, selenium, chromium, cadmium, and uranium
- name of the person performing the calibration

B-5.0 SURFACE AND SUBSURFACE SAMPLING

This section summarizes the methods used for collecting surface and subsurface samples, including soil, fill, tuff, and sediment samples, according to the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677).

B-5.1 Surface and Subsurface Sampling Methods

Surface and subsurface samples were collected in Technical Area 15 (TA-15) and TA-36 using either hand auger or spade and scoop methods. Surface and subsurface samples were collected in accordance with approved subcontractor procedures technically equivalent to SOP-06.10, Hand Auger and Thin-Wall Tube Sampler, or SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples. A hand auger or spade and scoop was used to collect material in approximately 6-in. increments. Samples for volatile organic compound (VOC) analysis were immediately transferred from the sampling device to the sample container. Containers for VOC samples were filled as completely as possible, leaving no or minimal

headspace, and sealed with a Teflon-lined cap. The remaining sample material was placed in a stainless-steel bowl with a stainless-steel scoop, after which it was transferred to sterile sample collection jars or bags. Samples were preserved using coolers to maintain the required temperature in accordance with an approved subcontractor procedure technically equivalent to SOP-5056, Sample Containers and Preservation.

Samples were appropriately labeled, sealed with custody seals, and documented before transporting to the SMO. Samples were managed according to approved subcontractor procedures technically equivalent to SOP-5057, Handling, Packaging, and Transporting Field Samples, and WES-EDA-QP-219, Sample Control and Field Documentation.

Sample collection tools were decontaminated immediately before each sample was collected in accordance with a subcontractor procedure technically equivalent to SOP-5061, Field Decontamination of Equipment (see section B-5.6).

B-5.2 Borehole Logging

No drilling characterization was conducted during the 2010 investigation.

B-5.3 Quality Control Samples

Quality control (QC) samples were collected in accordance with an approved subcontractor procedure technically equivalent to SOP-5059, Field Quality Control Samples. The QC samples included field duplicates, field rinsate blanks, and field trip blanks. Field duplicate samples were collected from the same material as a regular investigation sample and submitted for the same analyses. Field duplicate samples were collected at a frequency of at least 1 duplicate sample for every 10 samples.

Field rinsate blanks were collected to evaluate field decontamination procedures. Rinsate blanks were collected by rinsing sampling equipment (i.e., sampling bowls and spoons), after decontamination, with deionized water. The rinsate water was collected in a sample container and submitted to the SMO. Field rinsate blank samples were analyzed for inorganic chemicals (target analyte list metals) and were collected from sampling equipment at a frequency of at least 1 rinsate sample for every 10 solid samples.

Field trip blanks also were collected at a frequency of 1 per d at the time samples were collected for VOCs. Trip blanks consisted of containers of certified clean sand and were kept with the other sample containers during the sampling process.

B-5.4 Sample Documentation and Handling

Field personnel completed a SCL/COC form for each sample. Sample containers were sealed with custody seals and placed in coolers at approximately 4°C. Samples were handled in accordance with approved subcontractor procedures technically equivalent to SOP-5057, Handling, Packaging, and Transporting Field Samples, and SOP-5056, Sample Containers and Preservation. Swipe samples were collected from the exterior of sample containers and analyzed by the RCT before the sample containers were removed from the site. Samples were transported to the SMO for processing and shipment to off-site contract analytical laboratories. The SMO personnel reviewed and approved the SCL/COC forms and accepted custody of the samples.

B-5.5 Borehole Abandonment

No borehole abandonment activities were conducted during the 2010 investigation.

B-5.6 Decontamination of Sampling Equipment

All sampling equipment that came (or could have come) in contact with sample material was decontaminated after each sample was retrieved. Decontamination included wiping the equipment with Fantastik and paper towels. Decontamination of the remediation equipment was conducted before mobilization of the heavy equipment to another location to avoid cross-contamination between samples and locations. Residual material adhering to equipment was removed using dry decontamination methods such as the use of wire brushes and scrapers. Decontamination activities were performed in accordance with an approved subcontractor procedure technically equivalent to SOP-5061, Field Decontamination of Equipment. Decontaminated equipment was surveyed by an RCT before it was released from the site.

B-5.7 Site Demobilization and Restoration

All remediation equipment was demobilized from the site on December 21, 2010, and January 18, 2011. Before equipment was removed from the site, a Laboratory RCT screened the equipment for radioactivity to ensure all materials were clean of site contamination. Before equipment was removed from a beryllium site, beryllium swipe samples were collected and submitted to Test America for analysis. Equipment was released from the site after passing the beryllium release criteria (0.2 µg/100 cm^2). All temporary fencing and staging areas (except the waste management area) were dismantled and returned to preinvestigation conditions. All excavated and disturbed areas will be regraded and reseeded with native grass mix in spring 2011.

B-6.0 REMEDIATION ACTIVITIES

Remediation activities included the excavation of the inactive landfill at SWMU 36-001, removal of debris from the inactive landfill at SWMU 15-007(a), removal of surface debris at SWMUs 36-006 and 15-008(a), and an attempt to locate and remove a septic tank at SWMU 15-010(a). The specific sequence of activities associated with the waste removal activities was as follows: (1) mobilization, including preparing excavation documents, identifying underground utilities, and conducting excavation readiness assessment; (2) site preparation, including the installation of fencing and stormwater controls and conducting a preexcavation survey; (3) removal of waste, including stockpiling, characterizing, and disposing of waste at the appropriate facility; (4) performing confirmation sampling; and (5) backfilling, including compacting, and revegetating the surface after demobilization.

Two test pits were excavated in the northeast and northwest sections of SWMU 36-001. An ash layer was encountered in the northeast trench at a depth of approximately 4 to 5 ft below ground surface (bgs). Underlying the ash layer was wood and metal debris. The metal debris consisted of a large piece (3 ft long × 3 ft wide) of crumpled metal. The on-site RCT screened the metal, and elevated readings of 200,000 dpm beta and 904 dpm alpha were recorded. Levels of radiation on the metal exceeded the thresholds allowable in the radiological work permit (RWP); therefore, the metal debris was placed back in the test pit and work was stopped pending a review of the RWP. After reviewing the RWP, the Laboratory determined that the RWP needed to be revised. The Laboratory also decided that beryllium contamination may be a potential concern at SWMU 36-001. Therefore, excavation of the landfill at SMWU 36-001 was not completed because of the conditions encountered during excavation of test pits and the associated potential health and safety issues. In lieu of excavating and removing the debris at SWMU 36-001, characterization samples were collected (LANL 2010, 111304; NMED 2010, 111464).

Two excavators were used to remove overburden and concrete from the inactive landfill at SWMU 15-007(a). The excavators removed concrete, rebar, wire, and conduit pipe to approximately 6 ft bgs. Approximately 125 yd^3 of concrete and 1550 yd^3 of overburden and soil were excavated from the

inactive landfill. The overburden material was stockpiled to facilitate waste characterization sampling. Following removal of the concrete and debris, a backhoe bucket was used to collect confirmation samples. Details describing the samples collected and analyses requested for confirmation sampling are presented in Table 6.3-1 of the investigation report.

A long reach track excavator was used to remove surface debris at SWMU 36-006. All surface debris was placed in 1-yd^3 Wrangler bags and stored within the area of contamination. Approximately 12.5 yd^3 of debris and/or soil, 4 fence posts with concrete, and 2 guardrails (approximately 20 ft in length) were removed from the inactive surface disposal area and placed in the area of contamination until waste data was acquired for characterization. Debris consisted of concrete, cord, tin cans, wood, cloth, metal, plastic, and Styrofoam. Confirmation samples were collected with a hand auger immediately following debris removal activities. Specific sample depths and analyses requested are presented in Table 7.5-1 of the investigation report.

Excavation activities were implemented at SWMU 15-010(a) to remove a decommissioned septic tank. An excavator was used to remove soil/tuff, which was stockpiled near excavation. Before test trenches were excavated to locate the tank, areas of disturbed soil/tuff were evident in the area, suggesting the septic tank may have been removed. Test trenches confirmed that the tank was not present. Subsequent discussions with knowledgeable site personnel additionally confirmed the tank's removal. All soil/tuff was placed back in the excavated area at SWMU 15-010(a). Confirmation samples were collected using a hand auger. Specific sample depths and analyses requested are presented in Table 6.13-1 of the investigation report.

All debris at two small surface disposal areas at SWMU 15-008(a) was removed. Field crew members used jackhammers to break up concrete and collected the debris using hand tools. Surface debris consisted of concrete, soil, wire, metal, and connectors. Approximately 18.5 yd^3 of debris and/or soil was removed from the two small surface disposal areas and stored in 1-yd^3 Wrangler bags within the area of contamination until waste data was acquired for characterization. Confirmation samples were collected with a hand auger or spade and scoop. Specific sample depths and analyses requested are presented in Table 6.8-1 of the investigation report.

B-7.0 GEODETIC SURVEYING

Geodetic surveys were performed to demarcate the SWMU boundaries at the remediation sites [SWMUs 15-007(a), 15-008(a), 15-010(a), 36-001, and 36-006] before mobilizing heavy equipment to the sites (see Table 3.2-1 of the investigation report). Geodetic surveys were also performed to locate both historical and proposed sampling locations at the areas of concern (AOCs) and SWMUs at TA-15 and TA-36. Geodetic surveys were conducted using a Trimble RTK 5700 differential global-positioning system (DGPS) referenced from published and monumented external Laboratory survey control points in the vicinity. All sampling locations were surveyed in accordance with an approved subcontractor procedure technically equivalent to SOP-5028, Coordinating and Evaluating Geodetic Surveys. Horizontal accuracy of the monumented control points is within 0.1 ft. The DGPS instrument referenced from Laboratory control points is accurate within 0.2 ft. The surveyed coordinates are presented in Table 3.2-1 of the investigation report.

B-8.0 RADIOLOGICAL SURVEYS

Environmental Restoration Group, Inc., (ERG) performed radiological surveys at SWMUs 15-007(a) and 36-001 (inactive landfills) and at SWMU 15-004(f) (the inactive E-F Firing Site) using a Trimble Pro XRS mapping grade global positioning system (GPS), an Alpha Spectra FIDLER (Field Instrument for

Detection of Low-Energy Radiation), a Ludlum Model 44-10 2-in. × 2-in. sodium iodide detector, and a Ludlum Model 2221 ratemeter/scaler.

Formal surveying was conducted over spatial control and data acquisition grids, which were established using a GPS. The results of the radiological surveys are included in Appendix D.

B-9.0 GEOPHYSICAL SURVEYS

Sunbelt Geophysics performed a nonintrusive geophysical investigation at SWMUs 15-007(a) and 36-001, inactive landfills, using ground-penetrating radar (GPR) and data from a Geonics Ltd. EM-31 ground conductivity meter (Serial #08003), Geonics Ltd. EM-61 high-resolution metal detector (Serial #930204), and a Geometrics Inc. G-858 magnetometer (Serial #29004).

Formal surveying was conducted over spatial control and data acquisition grids that were established using a transit and tape. The EM-31, EM-61, and G-858, along with a Sensors & Software Inc. 250-MHz GPR (Serial #0057-006) and an Advanced Geosciences, Inc. (AGI) MiniSting Memory Earth resistivity/induced polarization meter (Serial #S0604039), were used during the surveys.

Data from the EM-61 and GPR were recorded with data loggers intrinsic to each system and transferred daily to a computer for quality assurance (QA), analysis, mapping, and archiving. The DAT61 and DAT31 (Geonics Ltd.), MagMapper (Geometrics Inc.), Ekko View (Sensors & Software Inc.) and the Oasis montaj (Geosoft Inc.) programs were used for processing and image preparation. The results of the geophysical surveys are included in Appendix E.

B-10.0 INVESTIGATION-DERIVED WASTE STORAGE AND DISPOSAL

All investigation-derived waste (IDW) generated during the field investigation was managed in accordance with SOP-5238, Characterization and Management of Environmental Program Waste. This procedure incorporates the requirements of all applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy orders, and Laboratory implementation requirements. All IDW was also managed in accordance with the approved waste characterization strategy form and the IDW management appendix of the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677). Details of IDW management for the Potrillo and Fence Canyons Aggregate Area investigation are presented in Appendix C.

B-11.0 DEVIATIONS FROM THE WORK PLAN

Several proposed sampling locations identified in the approved investigation work plan were moved as a result of site conditions encountered during the field activities because they were sited on top of or next to underground utilities, could not be sampled because of refusal, or were inaccessible. When locations were moved, the new locations were sited as close as possible to the proposed locations. Deviations to specific sampling locations are summarized in Table B-11.0-1. Additional deviations to the approved investigation work plan (LANL 2009, 106657.8; NMED 2009, 106677) are discussed below and are also summarized in Table B-11.0-1.

- The approved investigation work plan required samples to be collected from a step-out location north of the southeastern burn pit at SWMU 15-002. Location 15-613675 was moved 25 ft south because the proposed location was surveyed above the concrete apron of building 15-0534.

- The approved investigation work plan required samples to be collected from a location downgradient of the Pulsed High-Energy Radiographic Machine Emitting X-rays facility (PHERMEX) at SWMU 15-003. Location 15-613328 was moved 170 ft northeast within the same drainage, because the proposed location was surveyed within the fenced and posted beryllium area around SWMUs 15-003 and 15-006(a).
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from five locations at deferred site SWMU 15-003. Since the sediment-tuff interface was encountered at variable depths below the ground surface, two samples were collected above the sediment-tuff interface at the five proposed locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required 24 samples to be collected from 12 random locations at SWMUs 15-004(b) and 15-004(c) from 0–1 ft bgs and 3–4 ft bgs. Two samples were collected from one location from 0–1 ft bgs and 1–2 ft bgs because the soil-tuff contact was encountered close to the surface (0.25 ft bgs). Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required 42 samples to be collected from 42 Resource Conservation and Recovery Act facility investigation grid locations from 3–4 ft bgs at SWMU 15-004(f). Since the soil-tuff interface was encountered at a very shallow depth (0.5–1 ft bgs) or tuff was exposed at the surface at eight locations in the southernmost part of E-F Firing Site and one location (15-02141) in the northeasternmost part (steep cliff-walls of Potrillo Canyon and Threemile Canyon, respectively), nine samples were collected from 3–3.5 ft bgs. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required 52 samples to be collected from 18 earthen mound locations from 0–1 ft bgs, 6–7 ft bgs, and 9–10 ft bgs at SWMU 15-004(f). Refusal was encountered at the base of 6 of these 18 boreholes. Nine samples were collected from three earthen mound locations (15-613370, 15-613374, and 15-613380) from 0–1 ft bgs and 6–7 ft bgs (at all three locations), and from 8–8.5 ft bgs; 8–8.5 ft bgs; and 9–9.5 ft bgs, respectively. Six samples were collected from three earthen mound locations (15-613367, 15-613373, and 15-613377) from 0–1 ft bgs and 2–3 ft bgs; 0–1 ft bgs and 6–6.25 ft bgs; and 0–1 ft bgs and 3–3.5 ft bgs, respectively. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from six locations at SWMU 15-004(f). Since the sediment-tuff interface was encountered at variable depths below the ground surface, two samples were collected above the sediment-tuff or soil-tuff interface at all six locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan proposed that step-out sampling locations be collected 6 ft from the edge of the landfill excavation at SWMU 15-007(a). The map in the approved investigation work plan showed sampling locations approximately 30 ft from the edge of the SWMU boundary. Survey results at SWMU 15-007(a) showed buried wastes and disturbed soil wider (east-west) and shorter (north-south) than the anticipated landfill boundaries. Safety fencing was placed in a square around the open excavation immediately after soil and debris were removed for health and safety purposes. Step-out locations were sited approximately 8 to 25 ft from the excavation boundary to avoid entering the fenced area and to avoid stockpiled soil and debris and areas where heavy equipment was operating. Specific location details are summarized in Table B-11.0-1.

- The approved investigation work plan required four samples to be collected from two locations beneath each of the surface debris removal locations at SWMU 15-008(a) from 0–1 ft bgs and 3–4 ft bgs. A total of eight samples were collected from 0–1 ft bgs and 1–2 ft bgs because the soil-tuff contact was encountered close to the surface (0.25 ft bgs to 0.75 ft bgs). Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required eight samples to be collected from four locations around each of the surface debris removal locations at SWMU 15-008(a) from 0–1 ft bgs and 3–4 ft bgs. Six samples from the northern debris pile were collected from 0–1 ft bgs and 1–2 ft bgs because the soil-tuff contact was encountered close to the surface (0.25–0.5 ft bgs). Two samples from the northern debris pile were collected from 0–1 ft bgs and 2–3 ft bgs because the soil-tuff interface was encountered close to the surface at 1 ft bgs. Two samples from the southern debris pile were collected from from 0–1 ft bgs and 1–2 ft bgs because the soil-tuff interface was encountered close to the surface at 0.5 ft bgs. The remaining six samples were collected as required in the investigation work plan. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient samples from 10 locations at deferred site AOC 15-008(f). Eight of these samples were collected from 0–1 ft bgs and 1–2 ft bgs because the soil-tuff interface was encountered at variable depths close to the ground surface (0.25–1 ft bgs). Four of these samples were collected from 0–1 ft bgs and 1.5–2.5 ft bgs because the soil-tuff interface was encountered close to the ground surface at 1 ft bgs. Two of these samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs because the soil-tuff interface was encountered close to the ground surface at 0.5 ft bgs. Six of these samples were collected from depths ranging from 0–1 ft bgs and from 0.5–2.5 ft bgs because refusal was encountered at 1 to 2 ft bgs because of the contact with the tuff (Qbt 2) interface. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required six samples to be collected from two depths (0–1 ft and 3–4 ft below structures) at three locations: next to the tank inlet, next to the tank outlet, and on the east side of the tank at SWMU 15-009(e). All six samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs, not below the structures. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required four samples to be collected from two depths at two locations along the tank inlet drainline at SWMU 15-009(e). All four samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs, not below the drainline. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required six samples to be collected from two depths (0–1 ft bgs and 3–4 ft bgs) in sediment catchments at three locations at the outfall and in the drainage below the outfall at SWMU 15-009(e). Because the soil-tuff contact was encountered close to the surface (0.3–1 ft bgs), samples were collected from two depth intervals ranging from 0.5–1 ft bgs to 1.5–2.5 ft bgs at each location. Specific location and depth interval details are summarized in Table B-11.0-1.
- A septic tank at SWMU 15-010(a) identified for excavation and removal in the approved investigation work plan was not excavated because of prior removal. Before test trenches to locate the tank were excavated, areas of disturbed soil/tuff were evident in the area, suggesting the septic tank may have been removed. Test trenches confirmed that the tank was not present. Subsequent discussions with knowledgeable site personnel also confirmed the tank's removal.

- The approved investigation work plan required 20 confirmation samples to be collected from 10 locations beneath the septic system (0–1 ft and 3–4 ft), along the inlet drain lines, and within the outfall area at SWMU 15-010(a). Because the septic system was not located, characterization samples were collected from the following locations and depth intervals: six samples from three locations associated with the former septic tank inlet, the former septic tank, and north of the former septic tank from 4–5 ft bgs and 7–8 ft bgs; three samples from one location south of the former septic tank location from 4–5 ft bgs, 7–8 ft bgs, and 9–9.5 ft bgs where field-screening results were elevated at 7–8 ft bgs and refusal was encountered at 9.5 ft bgs; and two samples from one location associated with the former septic tank outlet from 4–5 ft bgs and 6–7 ft bgs because refusal was encountered at 7 ft bgs. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan proposed the excavation of four test pits and trenches at SWMU 36-001 (Material Disposal Area AA) to locate and define the inactive landfill boundaries (LANL 2009, 106657.8; NMED 2009, 106677). These activities were initiated but were suspended because of potential health and safety concerns. Specifically, higher than expected radiation levels and the potential presence of beryllium were encountered during the initial stages of waste removal at SWMU 36-001. Details are provided in section B-6.0 of this appendix.
- The approved investigation work plan required 34 confirmation and step-out samples to be collected from 17 locations beneath and around the landfill excavation at SWMU 36-001. The alternative sampling plan required using a hand auger to collect three samples from three depth intervals (0–5 ft bgs, 5–10 ft bgs, and 10–15 ft bgs) at seven locations based on the results of the geophysical survey. Fifteen characterization samples were collected from five locations within the proposed landfill boundaries from 0–1.5 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs. Three characterization samples were collected at location 36-613721, which was within a test pit, from 2–4 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs. Four characterization samples were collected from location 36-613727 from 0–1.5 ft bgs, 5–6.5 ft bgs, 10–11.5 ft bgs, and 13.5–15 ft bgs, based on elevated field-screening results at the 10–11.5 ft bgs depth. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required six samples to be collected from two depths (0–1 ft and 3–4 ft below structures) at three locations: next to the tank inlet, next to the tank outlet, and on the south side of the tank at SWMU 36-003(b). All six samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs and not below the structures. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required four samples to be collected from two depths (0–1 ft and 3–4 ft beneath the drainline) at two locations along the tank inlet drainline at SWMU 36-003(b). All four samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs and not below the drainline. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from six locations at AOC 36-004(b). Since the sediment-tuff (Qbt 2) interface was encountered at 2 ft bgs at three of the six locations, six samples were collected from 0–1 ft bgs and 1–2 ft bgs at these three locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from seven locations at AOC 36-004(c). Since the sediment-tuff interface was encountered at variable depths below the ground surface,

two samples were collected above the sediment-tuff interface at four of the seven proposed locations. Specific location and depth interval details are summarized in Table B-11.0-1.

- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from nine locations at SWMU 36-004(d). Since the sediment-tuff (Qbt 2) interface was encountered at variable depths below the ground surface, two samples were collected above the sediment-tuff interface at five of the nine proposed locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required 48 characterization samples to be collected at 16 locations from 3 depth intervals, and 6 sediment samples to be collected at 3 locations from 2 depths at SWMU 36-005. This sampling approach could not be implemented because of cultural resource restrictions (see section 7.10.4 of the investigation report). As a result of the cultural resources restrictions, 27 of the 30 characterization samples and 2 of the sediment samples were not collected. Twenty-one samples were collected, from three depth intervals, at seven alternate locations downgradient of the site.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from nine locations at SWMU 36-005. Since the sediment-tuff interface was encountered at variable depths below the ground surface, two samples were collected above the sediment-tuff interface at two of the three proposed locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required specific depth intervals (e.g., 0–1 ft bgs and 2–3 ft bgs) for downgradient sediment samples from five locations at AOC C-36-006(e). Since the sediment-tuff interface was encountered at variable depths below the ground surface, two samples were collected above the sediment-tuff interface at three of the five proposed locations. Specific location and depth interval details are summarized in Table B-11.0-1.
- The approved investigation work plan required cyanide and perchlorate analyses to be performed on all samples collected at AOC C-36-006(e). Cyanide and perchlorate analyses were inadvertently excluded from the analyses request paperwork for sample RE15-11-381 at location 15-613313 from 2–3 ft bgs. One sample will be collected at location 15-613313 from 2–3 ft bgs during the Phase II investigation and analyzed for cyanide and perchlorate.

B-12.0 REFERENCES

The following list includes all documents cited in this appendix. 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.

LANL (Los Alamos National Laboratory), July 2009. "Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-09-4327, Los Alamos, New Mexico. (LANL 2009, 106657.8)

LANL (Los Alamos National Laboratory), November 12, 2010. "Status of Corrective Actions at Solid Waste Management Unit 36-001, Material Disposal Area AA," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2010, 111304)

NMED (New Mexico Environment Department), July 30, 2009. "Approval, Investigation Work Plan for Potrillo and Fence Canyons Aggregate Area, Revision 1," New Mexico Environment Department letter to D. Gregory (DOE-LASO) and D. McInroy (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2009, 106677)

NMED (New Mexico Environment Department), December 2, 2010. "Status of Work Plan Implementation, Material Disposal Area (MDA) AA Solid Waste Management Unit 36-001, Technical Area 36, Potrillo-Fence Canyons Aggregate Area Work Plan " New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 111464)

Table B-1.0-1
Summary of Field Investigation Methods

Method	Summary
Spade and Scoop Collection of Soil Samples	This method is typically used to collect shallow (i.e., approximately 0–12 in.) soil or sediment samples. The spade and scoop method involves digging a hole to the desired depth, as prescribed in the work plan, and collecting a discrete grab sample. Samples for VOC analysis were transferred immediately into sample containers. Containers for VOC analysis were filled as completely as possible and sealed with Teflon-lined caps. Remaining sample material was 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 10–15 ft but may in some cases be used to collect samples of weathered or nonwelded tuff. The method involves hand-turning a stainless-steel bucket auger (typically 3–4 in. inside diameter), creating a vertical hole that can be advanced to the desired sampling depth. When the desired depth was reached during the investigation, the auger was decontaminated before the hole was advanced through the sampling depth. Samples for VOC analysis were transferred immediately into sample containers. Containers for VOC analysis were filled as completely as possible and sealed with Teflon-lined caps. Remaining sample material was placed in a clean stainless-steel bowl for transfer into various sample containers. The remaining sample material was transferred from the auger bucket to a stainless-steel sampling bowl before the other required sample containers were filled.
Headspace Vapor Screening	Individual soil, rock, or sediment samples were field screened for VOCs by placing a portion of the sample in a plastic sample bag or in a glass container with a foil-sealed cover. The container was sealed and gently shaken and allowed to equilibrate for 5 min. The sample was then screened by inserting a PID probe into the container and measuring and recording any detected vapors.
Radiological Screening	Radiological field screening for gross-alpha, -beta, and -gamma radioactivity was performed to guide collection of additional samples. If elevated radioactivity was encountered (5000 dpm over the daily background), an additional sample was collected and submitted to ARS for analysis before shipment from the SMO. Screening measurements for all collected samples were recorded on the SCLs and COC forms. Screening measurements for locations not sampled were recorded in field logbooks and data collection forms.
XRF Screening	All collected samples were screened for metals using an XRF analyzer. Additional samples were collected for analysis if XRF results for barium, copper, lead, or uranium exceeded 2 times the BV of the sample matrix for screened locations not initially identified for sample collection. XRF screening measurements for all collected samples were recorded on the SCLs and COC forms. Screening measurements for locations not sampled were recorded in field logbooks and data collection forms.
Explosive Compounds Screening	All collected samples were screened for TNT and RDX. Additional samples were collected for analysis if TNT or RDX results exceeded the industrial SSLs for locations not initially identified for sample collection. Explosive compound screening measurements for all collected samples were recorded on the SCLs and COC forms. Screening measurements for locations not sampled were recorded in field logbooks and data collection forms.
Handling, Packaging, and Shipping of Samples	Field team members sealed and labeled samples before packing them to ensure the sample containers and the containers used for transport were free of external contamination. Field team members packaged all samples to minimize the possibility of breakage during transport. After all environmental samples were collected, packaged, and preserved; a field team member transported them to the SMO. The SMO arranged for shipping the samples to analytical laboratories.

Table B-1.0-1 (continued)

Method	Summary
Sample Control and Field Documentation	The collection, screening, and transport of samples were documented on standard forms generated by the SMO. These included SCLs, COC forms, and sample container labels. SCLs were completed at the time of sample collection and the logs were signed by the sampler and a reviewer who verified the logs for completeness and accuracy. Corresponding labels were initialed and applied to each sample container, and custody seals were placed around each sample container. COC forms were completed and signed to verify that the samples were not left unattended.
Field QC Samples	Field QC samples were collected as follows: *Field Duplicates:* 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 that was 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 blank containers of certified clean sand were opened and kept with the other sample containers during the sampling process.
Field Decontamination of Remediation and Sampling Equipment	Dry decontamination was used to minimize the generation of liquid waste. Dry decontamination included the use of a wire brush or other tool to remove soil or other material adhering to the sampling equipment, followed by use of a commercial cleaning agent (nonacid, waxless cleaners) and paper wipes.
Containers and Preservation of Samples	Specific requirements/processes for sample containers, preservation techniques, and holding times are based on EPA guidance for environmental sampling, preservation, and QA. Specific requirements for each sample were printed on the SCL provided by the SMO (size and type of container [e.g., glass, amber glass, or polyethylene]). All samples were preserved by placing them with ice in insulated containers to maintain a temperature of 4°C.
Coordinating and Evaluating Geodetic Surveys	Geodetic surveys focused on obtaining survey data of acceptable quality to use during project investigations. Geodetic surveys were conducted with a Trimble 5700 DGPS. The survey data conformed to Laboratory Information Architecture project standards IA-CB02, GIS Horizontal Spatial Reference System; and IA-D802, Geospatial Positioning Accuracy Standards for A/E/C and Facility Management. All coordinates were expressed as State Plane Coordinate System 83, NM Central, U.S. feet. All elevation data were reported relative to the National Geodetic Vertical Datum of 1983.
Geophysical Logging and Mapping	Nonintrusive geophysical investigations were performed at SWMUs 15-007(a) and 36-001 using GPR. Geophysical data were recorded with data loggers and transferred daily to a computer for QA, analysis, mapping, and archiving. The results of the geophysical surveys are included in Appendix E.
Management of Environmental Restoration Project Waste, Waste Characterization	IDW is managed, characterized, and stored in accordance with an approved waste characterization strategy form that documents site history, field activities, and characterization approach for each waste stream managed. Waste characterization complied with on- or off-site waste acceptance criteria. All stored IDW was marked with appropriate signage and labels and contained within an area of contamination. A waste storage area was established before waste was generated. Waste storage areas were located in controlled areas of the Laboratory to prevent unauthorized personnel from inadvertently adding or managing wastes. Each container of waste generated was individually labeled with waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination. Management of IDW is described in Appendix C.

Table B-1.0-2
SOPs Used for Investigation Activities Conducted at Potrillo and Fence Canyons Aggregate Area

P101-17, R0, Excavation/Fill/Soil Disturbance Permit Process
P101-18, R0, Procedure for Pause/Stop Work
PD315, R0, Conduct of Operations Manual
P409, R1, Waste Management
SOP-5181, R1, Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities
TPMC-SOP-01.12, R0 ICN2, Field Site Closeout Checklist
TPMC-SOP-01.13, R0, Initiating and Managing Data Set Requests
TPMC-SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples
TPMC-SOP-06.10, R4, Hand Auger and Thin- Wall Tube Sampler
TPMC-SOP-06.33, Headspace Vapor Screening with a Photoionization Detector
TPMC-SOP-10.08, R2, Operation of the Spectrace 9000 Field-Portable X-Ray Fluorescence Instrument
TPMC-SOP-5028, R0, Coordinating and Evaluating Geodetic Surveys
TPMC-SOP-5030, R0, Contract Geophysical Logging
TPMC-SOP-5055, R0, General Instructions for Field Investigations
TPMC-SOP-5056, R0, Sample Containers and Preservation
TPMC-SOP-5057, R0, Handling, Packaging, and Transporting Field Samples
WES-EDA-QP-219, Sample Control and Field Documentation
TPMC-SOP-5059, R0, Field Quality Control Samples
TPMC-SOP-5060, Operational Guidelines for Taking Soil and Water Samples in Explosive Areas
TPMC-SOP-5061, R1, Field Decontamination of Equipment
TPMC-SOP-5238, R0, Characterization and Management of Environmental Program Waste
EP-DIR-SOP-2011, R4, Personnel Training and Qualification
EP-DIR-SOP-4004, R3, Record Transmittal and Retrieval Process

Note: Procedures used were approved subcontractor procedures technically equivalent to the procedures listed.

Table B-3.0-1
Field-Screening Results for Samples Collected and Not Submitted for Off-Site Analysis

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
TA-15												
SWMU 15-004(f)	15-02102	0–1	1625935.56	1762180.05	21	2470	0.8	ND[a]	149	ND	15	ND
SWMU 15-004(f)	15-02102	3–4	1625935.56	1762180.05	43	2710	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02103	0–1	1626135.57	1762180.05	26	2720	ND	ND	137	ND	21	ND
SWMU 15-004(f)	15-02103	3–4	1626135.57	1762180.05	43	2410	ND	ND	180	ND	ND	ND
SWMU 15-004(f)	15-02104	0–1	1626335.57	1762180.05	76	2210	ND	3.1	267	ND	ND	ND
SWMU 15-004(f)	15-02104	3–4	1626335.57	1762180.05	46	1971	ND	2.1	158	ND	ND	ND
SWMU 15-004(f)	15-02111	0–1	1625535.56	1761980.05	48	2610	ND	2.2	283	ND	ND	ND
SWMU 15-004(f)	15-02111	3–4	1625535.56	1761980.05	70	2100	ND	1.1	133	ND	15	ND
SWMU 15-004(f)	15-02120	0–1	1627335.57	1761980.05	92	2090	ND	ND	175	ND	28	ND
SWMU 15-004(f)	15-02120	3–4	1627335.57	1761980.05	97	2000	ND	ND	283	ND	ND	ND
SWMU 15-004(f)	15-02121	0–1	1627535.57	1761980.05	107	2080	ND	ND	181	ND	14	ND
SWMU 15-004(f)	15-02121	3–4	1627535.57	1761980.05	92	2300	ND	2.2	ND	ND	ND	ND
SWMU 15-004(f)	15-02122	0–1	1625535.56	1761780.05	80	2520	ND	ND	246	ND	ND	ND
SWMU 15-004(f)	15-02122	3–4	1625535.56	1761780.05	32	2540	ND	1.1	277	ND	19	ND
SWMU 15-004(f)	15-02126	0–1	1626335.56	1761780.05	21	2380	ND	ND	179	3	ND	ND
SWMU 15-004(f)	15-02126	3–4	1626335.56	1761780.05	16	2130	ND	ND	83	ND	ND	ND
SWMU 15-004(f)	15-02130	0–1	1627135.57	1761780.05	133	1891	ND	2.3	87	ND	ND	ND
SWMU 15-004(f)	15-02130	3–4	1627135.57	1761780.05	30	2320	ND	ND	ND	ND	15	ND
SWMU 15-004(f)	15-02133	0–1	1625535.57	1761580.05	102	2710	ND	1.1	145	ND	17	ND
SWMU 15-004(f)	15-02133	3–4	1625535.57	1761580.05	43	2950	ND	ND	ND	ND	21	ND
SWMU 15-004(f)	15-02135	0–1	1625935.56	1761580.05	117	1971	ND	ND	358	3	ND	ND
SWMU 15-004(f)	15-02135	3–4	1625935.56	1761580.05	35	2050	ND	0.9	172	ND	16	ND
SWMU 15-004(f)	15-02140	0–1	1626907.71	1761580.05	71	2570	ND	ND	133	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02140	3–4	1626907.71	1761580.05	40	2550	ND	ND	64	ND	17	ND
SWMU 15-004(f)	15-02143	0–1	1627535.57	1761580.05	92	2470	ND	3.5	ND	ND	ND	ND
SWMU 15-004(f)	15-02143	1–2	1627535.57	1761580.05	n/a[b]	n/a	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02146	0–1	1625935.57	1761380.05	39	449	ND	ND	62	ND	18	ND
SWMU 15-004(f)	15-02146	3–4	1625935.57	1761380.05	71	2070	ND	ND	ND	ND	20	ND
SWMU 15-004(f)	15-02154	0–1	1627535.57	1761380.05	71	2010	ND	ND	163	ND	18	ND
SWMU 15-004(f)	15-02154	3–4	1627535.57	1761380.05	56	2270	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02158	0–1	1626135.57	1761180.05	126	2080	ND	ND	168	ND	14	ND
SWMU 15-004(f)	15-02158	3–4	1626135.57	1761180.05	87	2760	ND	ND	75	ND	ND	ND
SWMU 15-004(f)	15-02163	0–1	1627135.57	1761180.05	86	1927	ND	ND	255	ND	ND	ND
SWMU 15-004(f)	15-02163	3–4	1627135.57	1761180.05	81	2050	ND	ND	107	ND	20	ND
SWMU 15-004(f)	15-02164	0–1	1627335.57	1761180.05	51	1876	ND	2.8	181	ND	ND	ND
SWMU 15-004(f)	15-02164	3–4	1627335.57	1761180.05	51	2290	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02165	0–1	1627535.57	1761180.05	56	1674	ND	2.8	196	ND	ND	ND
SWMU 15-004(f)	15-02165	3–4	1627535.57	1761180.05	20	2290	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02174	0–1	1627135.57	1760980.05	97	2320	ND	ND	219	ND	ND	ND
SWMU 15-004(f)	15-02174	3–4	1627135.57	1760980.05	56	2230	ND	ND	90	ND	20	ND
SWMU 15-004(f)	15-02176	0–1	1627535.57	1760980.05	117	1804	ND	0.8	196	4	15	ND
SWMU 15-004(f)	15-02176	3–4	1627535.57	1760980.05	61	2210	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02183	0–1	1626735.57	1760780.05	150	2230	ND	ND	173	ND	ND	ND
SWMU 15-004(f)	15-02183	3–4	1626735.57	1760780.05	97	2230	ND	ND	188	ND	ND	ND
SWMU 15-004(f)	15-02184	0–1	1626935.57	1760780.05	92	3210	ND	2.8	215	ND	ND	ND
SWMU 15-004(f)	15-02184	3–4	1626935.57	1760780.05	48	2880	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02185	0–1	1627135.57	1760780.05	59	5330	ND	ND	201	ND	ND	ND
SWMU 15-004(f)	15-02185	3–4	1627135.57	1760780.05	148	2230	ND	ND	117	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02186	0–1	1627335.57	1760780.05	76	2310	ND	ND	305	ND	15	ND
SWMU 15-004(f)	15-02186	3–4	1627335.57	1760780.05	76	2020	ND	1.3	113	ND	ND	ND
SWMU 15-004(f)	15-02187	0–1	1627535.57	1760780.05	86	1992	ND	ND	143	ND	ND	ND
SWMU 15-004(f)	15-02187	3–4	1627535.57	1760780.05	97	2210	ND	ND	80	ND	25	ND
SWMU 15-004(f)	15-02189	0–1	1625717.19	1760719.79	102	3050	ND	1.6	ND	ND	ND	ND
SWMU 15-004(f)	15-02189	3–4	1625717.19	1760719.79	77	3190	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02194	0–1	1626735.57	1760580.05	92	3160	ND	ND	93	ND	ND	ND
SWMU 15-004(f)	15-02194	3–4	1626735.57	1760580.05	102	3140	ND	ND	220	ND	ND	ND
SWMU 15-004(f)	15-02199	0–1	1627335.57	1760980.05	143	1898	ND	ND	170	ND	17	ND
SWMU 15-004(f)	15-02199	3–4	1627335.57	1760980.05	97	2010	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02200	0–1	1626935.57	1760580.05	97	2620	ND	ND	143	ND	ND	ND
SWMU 15-004(f)	15-02200	3–4	1626935.57	1760580.05	48	2640	ND	ND	ND	ND	23	ND
SWMU 15-004(f)	15-02201	0–1	1627135.57	1760580.05	117	1659	ND	ND	198	ND	19	ND
SWMU 15-004(f)	15-02201	3–4	1627135.57	1760580.05	122	2020	ND	ND	81	ND	ND	ND
SWMU 15-004(f)	15-02202	0–1	1627335.57	1760580.05	71	1789	ND	ND	192	ND	ND	ND
SWMU 15-004(f)	15-02202	3–4	1627335.57	1760580.05	35	2270	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02210	0–1	1626735.57	1760380.05	111	4400	ND	ND	79	ND	ND	ND
SWMU 15-004(f)	15-02210	3–4	1626735.57	1760380.05	126	3140	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02211	0–1	1626935.57	1760380.05	87	2500	ND	ND	63	ND	15	ND
SWMU 15-004(f)	15-02211	3–4	1626935.57	1760380.05	150	2520	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02212	0–1	1627135.57	1760380.05	150	2510	ND	ND	182	ND	ND	ND
SWMU 15-004(f)	15-02212	3–4	1627135.57	1760380.05	34	4170	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02213	0–1	1627335.57	1760380.05	163	1884	ND	ND	192	ND	14	ND
SWMU 15-004(f)	15-02213	3–4	1627335.57	1760380.05	51	2100	ND	ND	ND	ND	ND	ND
SWMU 15-004(f)	15-02214	0–1	1627535.57	1760380.05	66	1978	ND	ND	176	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-004(f)	15-02214	3–4	1627535.57	1760380.05	86	2230	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	1	0–1	1622716.889	1761252.355	38	2270	ND	3.1	210	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	1	3–4	1622716.889	1761252.355	27	2370	ND	8.4	252	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	2	0–1	1622816.889	1761252.355	22	2530	ND	ND	222	ND	26	ND
SWMUs 15-004(b) and 15-004(c)	2	3–4	1622816.889	1761252.355	66	2360	ND	ND	178	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	3	0–1	1622916.889	1761252.355	77	2160	ND	ND	340	34	18	ND
SWMUs 15-004(b) and 15-004(c)	3	3–4	1622916.889	1761252.355	22	2280	ND	ND	147	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	4	0–1	1623016.889	1761252.355	22	2240	ND	ND	243	ND	19	ND
SWMUs 15-004(b) and 15-004(c)	4	3–4	1623016.889	1761252.355	27	2320	ND	ND	92	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	6	0–1	1623216.889	1761252.355	105	2950	ND	ND	233	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	6	3–4	1623216.889	1761252.355	111	2690	ND	ND	247	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	7	0–1	1623316.889	1761252.355	93	2860	ND	ND	105	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	7	3–4	1623316.889	1761252.355	134	2600	ND	ND	320	ND	21	ND
SWMUs 15-004(b) and 15-004(c)	8	0–1	1622716.889	1761152.355	55	2050	ND	ND	62	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	8	3–4	1622716.889	1761152.355	27	2360	ND	2.3	257	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	11	0–1	1623016.889	1761152.355	38	2300	ND	ND	271	ND	16	ND
SWMUs 15-004(b) and 15-004(c)	11	3–4	1623016.889	1761152.355	44	2100	ND	ND	268	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	14	0–1	1623316.889	1761152.355	158	2560	ND	ND	257	ND	22	ND
SWMUs 15-004(b) and 15-004(c)	14	3–4	1623316.889	1761152.355	105	2610	ND	ND	224	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	15	0–1	1622716.889	1761052.355	22	2550	ND	3.0	127	ND	19	ND
SWMUs 15-004(b) and 15-004(c)	15	3–4	1622716.889	1761052.355	38	2610	ND	1.0	142	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	19	0–1	1623116.889	1761052.355	82	2670	ND	ND	185	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	19	3–4	1623116.889	1761052.355	99	2590	ND	ND	215	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	20	0–1	1623216.889	1761052.355	99	2640	ND	ND	225	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	20	3–4	1623216.889	1761052.355	76	3110	ND	ND	135	ND	21	ND
SWMUs 15-004(b) and 15-004(c)	22	0–1	1622716.889	1760952.355	33	2490	ND	ND	116	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	22	3–4	1622716.889	1760952.355	27	2290	ND	1.8	168	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	23	0–1	1622816.889	1760952.355	105	2711	ND	2.8	224	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	23	3–4	1622816.889	1760952.355	76	2820	ND	ND	189	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	24	0–1	1622916.889	1760952.355	87	2820	ND	ND	214	ND	17	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	24	3–4	1622916.889	1760952.355	76	2830	ND	ND	282	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	25	0–1	1623016.889	1760952.355	82	2930	ND	ND	271	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	25	3–4	1623016.889	1760952.355	58	2640	ND	ND	160	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	26	0–1	1623116.889	1760952.355	61	2390	ND	ND	144	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	26	3–4	1623116.889	1760952.355	61	2250	ND	ND	130	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	27	0–1	1623216.889	1760952.355	83	2590	ND	ND	172	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	27	3–4	1623216.889	1760952.355	71	2330	ND	ND	339	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	28	0–1	1623316.889	1760952.355	37	1036	ND	ND	200	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	28	3–4	1623316.889	1760952.355	48	1162	ND	ND	250	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	30	0–1	1622716.889	1760852.355	49	2310	ND	ND	272	24	ND	ND
SWMUs 15-004(b) and 15-004(c)	30	3–4	1622716.889	1760852.355	38	2470	ND	ND	174	ND	13	ND
SWMUs 15-004(b) and 15-004(c)	31	0–1	1622816.889	1760852.355	105	2870	ND	ND	132	ND	18	ND
SWMUs 15-004(b) and 15-004(c)	31	3–4	1622816.889	1760852.355	128	2710	ND	ND	192	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	33	0–1	1622916.889	1760852.355	128	3070	ND	5.6	149	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	33	3–4	1622916.889	1760852.355	111	3200	ND	1.2	201	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	35	0–1	1623116.889	1760852.355	46	2260	ND	ND	149	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	35	3–4	1623116.889	1760852.355	46	2260	ND	ND	201	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	37	0–1	1623316.889	1760852.355	41	2010	ND	ND	134	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	37	3–4	1623316.889	1760852.355	36	2360	ND	ND	261	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	38	0–1	1622716.889	1760752.355	33	2240	ND	ND	192	17	ND	ND
SWMUs 15-004(b) and 15-004(c)	38	3–4	1622716.889	1760752.355	33	2490	ND	ND	172	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	39	0–1	1622816.889	1760752.355	140	2790	ND	1.7	145	ND	18	ND
SWMUs 15-004(b) and 15-004(c)	39	3–4	1622816.889	1760752.355	140	2610	ND	ND	152	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	40	0–1	1622916.889	1760752.355	76	2910	ND	ND	184	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	40	3–4	1622916.889	1760752.355	105	2890	ND	ND	160	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	41	0–1	1623016.889	1760752.355	134	2710	ND	ND	352	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	41	3–4	1623016.889	1760752.355	123	2640	ND	ND	197	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	42	0–1	1623116.889	1760752.355	31	2240	ND	ND	176	ND	17	ND
SWMUs 15-004(b) and 15-004(c)	42	3–4	1623116.889	1760752.355	46	2020	ND	ND	199	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	43	0–1	1623216.889	1760752.355	51	2300	ND	ND	112	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	43	3–4	1623216.889	1760752.355	45	2260	ND	ND	118	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	44	0–1	1623316.889	1760752.355	36	2110	ND	ND	115	ND	17	ND
SWMUs 15-004(b) and 15-004(c)	44	3–4	1623316.889	1760752.355	31	2320	ND	ND	143	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	45	0–1	1622716.889	1760652.355	61	2360	ND	ND	140	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	45	3–4	1622716.889	1760652.355	44	2420	ND	ND	251	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	46	0–1	1622816.889	1760652.355	117	2650	ND	ND	189	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	46	3–4	1622816.889	1760652.355	134	2840	ND	ND	135	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	47	0–1	1622916.889	1760652.355	87	2670	ND	ND	185	12	ND	ND
SWMUs 15-004(b) and 15-004(c)	47	3–4	1622916.889	1760652.355	87	2570	ND	1.3	117	ND	33	ND
SWMUs 15-004(b) and 15-004(c)	48	0–1	1623016.889	1760652.355	93	2760	ND	0.9	237	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	48	3–4	1623016.889	1760652.355	111	2610	ND	ND	78	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	49	0–1	1623116.889	1760652.355	31	2210	ND	ND	245	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	49	3–4	1623116.889	1760652.355	40	2270	ND	ND	205	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	50	0–1	1623216.889	1760652.355	41	2200	ND	ND	188	ND	17	ND
SWMUs 15-004(b) and 15-004(c)	50	3–4	1623216.889	1760652.355	20	2390	ND	ND	176	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	52	0–1	1622716.889	1760552.355	38	2430	ND	ND	152	ND	14	ND
SWMUs 15-004(b) and 15-004(c)	52	3–4	1622716.889	1760552.355	22	2500	ND	ND	ND	ND	19	ND
SWMUs 15-004(b) and 15-004(c)	53	0–1	1622816.889	1760552.355	39	55	ND	0.9	61	ND	19	ND
SWMUs 15-004(b) and 15-004(c)	53	3–4	1622816.889	1760552.355	1805	1878	ND	1.5	174	ND	17	ND
SWMUs 15-004(b) and 15-004(c)	54	0–1	1622916.889	1760552.355	93	2670	ND	5.0	247	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	54	3–4	1622916.889	1760552.355	76	3060	ND	1.6	68	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	55	0–1	1623016.889	1760552.355	146	2800	ND	1.8	236	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	55	3–4	1623016.889	1760552.355	105	2660	ND	ND	210	22	ND	ND
SWMUs 15-004(b) and 15-004(c)	56	0–1	1623116.889	1760552.355	152	2800	ND	12.1	206	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	56	3–4	1623116.889	1760552.355	82	2560	ND	1.4	240	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	57	0–1	1623216.889	1760552.355	82	2730	ND	ND	159	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	57	3–4	1623216.889	1760552.355	111	2820	ND	7.7	132	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	58	0–1	1623316.889	1760552.355	99	2640	ND	ND	245	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	58	3–4	1623316.889	1760552.355	82	2670	ND	ND	260	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	59	0–1	1622716.889	1760452.355	87	2470	ND	ND	ND	10	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	59	3–4	1622716.889	1760452.355	140	2890	ND	2.0	ND	ND	13	ND
SWMUs 15-004(b) and 15-004(c)	61	0–1	1622916.889	1760452.355	123	2580	ND	1.1	190	15	ND	ND
SWMUs 15-004(b) and 15-004(c)	61	3–4	1622916.889	1760452.355	169	2910	ND	ND	126	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	62	0–1	1623016.889	1760452.355	99	2790	ND	1.8	162	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	62	3–4	1623016.889	1760452.355	128	2960	ND	ND	185	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	63	0–1	1623116.889	1760452.355	99	2660	ND	ND	263	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	63	3–4	1623116.889	1760452.355	70	2640	ND	0.8	117	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	64	0–1	1623216.889	1760452.355	99	2710	ND	ND	270	ND	30	ND
SWMUs 15-004(b) and 15-004(c)	64	3–4	1623216.889	1760452.355	93	2760	ND	1.1	346	11	ND	ND
SWMUs 15-004(b) and 15-004(c)	65	0–1	1623316.889	1760452.355	93	2530	ND	ND	259	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	65	3–4	1623316.889	1760452.355	123	2560	ND	2.4	151	ND	18	ND
SWMUs 15-004(b) and 15-004(c)	66	0–1	1622716.889	1760352.355	87	2610	ND	1.6	ND	ND	37	ND
SWMUs 15-004(b) and 15-004(c)	66	1–2	1622716.889	1760352.355	76	2410	ND	ND	ND	ND	20	ND
SWMUs 15-004(b) and 15-004(c)	68	0–1	1622916.889	1760352.355	169	2680	ND	ND	128	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	68	3–4	1622916.889	1760352.355	58	2890	ND	ND	90	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	69	0–1	1623016.889	1760352.355	87	2890	ND	ND	239	24	ND	ND
SWMUs 15-004(b) and 15-004(c)	69	3–4	1623016.889	1760352.355	93	2570	ND	ND	62	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	72	0–1	1623316.889	1760352.355	26	2150	ND	ND	79	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	72	3–4	1623316.889	1760352.355	36	1379	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	73	0–1	1622816.889	1760252.355	15	2620	ND	ND	125	ND	16	ND
SWMUs 15-004(b) and 15-004(c)	73	1–2	1622816.889	1760252.355	20	2320	ND	ND	210	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	75	0–1	1623016.889	1760252.355	15	2540	ND	2.0	208	ND	15	ND
SWMUs 15-004(b) and 15-004(c)	75	1–2	1623016.889	1760252.355	51	1978	ND	1.1	185	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	76	0–1	1623116.889	1760252.355	46	2240	ND	0.8	204	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	76	1–2	1623116.889	1760252.355	30	2660	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	78	0–1	1623316.889	1760252.355	31	2220	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	78	3–4	1623316.889	1760252.355	10	2290	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	80	0–1	1623016.889	1760152.355	31	2360	ND	ND	159	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	80	1–2	1623016.889	1760152.355	36	2540	ND	ND	284	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	81	0–1	1623116.889	1760152.355	26	2190	ND	ND	163	ND	ND	ND

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMUs 15-004(b) and 15-004(c)	81	2–3	1623116.889	1760152.355	20	2140	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	82	0–1	1623216.889	1760152.355	36	2490	ND	ND	202	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	82	1–2	1623216.889	1760152.355	20	2590	ND	ND	ND	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	83	0–1	1623316.889	1760152.355	31	2570	ND	ND	144	ND	ND	ND
SWMUs 15-004(b) and 15-004(c)	83	1–2	1623316.889	1760152.355	20	2440	ND	ND	139	ND	ND	ND
SWMU 15-007(a)	s4	2–2.4	1623314.218	1762779.827	<2×BV[c]	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s7	2–2.4	1623338.733	1762720.552	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s8	2–2.4	1623331.795	1762677.537	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s10	2–2.4	1623305.849	1762703.523	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s6	2–2.4	1623324.652	1762746.333	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s1	2–2.4	1623278.596	1762735.118	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s9	2–2.4	1623299.79	1762677.51	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s5	2–2.4	1623339.367	1762773.525	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s3	2–2.4	1623285.092	1762775.514	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	s2	2–2.4	1623266.926	1762748.595	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b10	4–4.5	1623326.248	1762757.676	<2×BV	<2×BV	ND	1.6	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b9	4–4.5	1623295.085	1762748.759	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b8	4–4.5	1623305.663	1762770.407	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b7	4–4.5	1623277.732	1762762.743	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b6	4–4.5	1623292.071	1762729.748	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b5	4–4.5	1623316.818	1762743.124	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b4	4–4.5	1623330.022	1762722.66	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV

Table B-3.0-1 (continued)

SWMU/AOC	Screening Location ID	Depth (ft)	Easting (ft)	Northing (ft)	Alpha (dpm)	Beta/ Gamma (dpm)	High Explosives (ppm)		Metals (ppm)			
							TNT	RDX	Barium	Copper	Lead	Uranium
SWMU 15-007(a)	b3	4–4.5	1623308.000	1762717.811	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b2	4–4.5	1623324.939	1762692.817	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-007(a)	b1	4–4.5	1623317.449	1762674.234	<2×BV	<2×BV	ND	ND	<2×BV	<2×BV	<2×BV	<2×BV
SWMU 15-008(a)	B-01	0–0.5	1626131.917	1760533.432	<2×BV	<2×BV	ND	ND	ND	459	24	822
SWMU 15-008(a)	B-02	0–0.5	1626142.567	1760523.171	<2×BV	<2×BV	ND	ND	ND	35	22	23
SWMU 15-008(a)	B-03	0–0.5	1626152.397	1760514.556	<2×BV	<2×BV	ND	ND	ND	298	73	459
SWMU 15-008(a)	A-02	0–0.5	1626335.248	1760823.259	<2×BV	<2×BV	ND	ND	95	15	14	18
SWMU 15-008(a)	A-01	0–0.5	1626368.284	1760852.778	<2×BV	<2×BV	ND	ND	149	108	24	350
SWMU 15-008(a)	A-03	0–0.5	1626368.945	1760819.263	<2×BV	<2×BV	ND	ND	ND	298	28	1189
TA-36												
SWMU 36-006	c1	0–0.5	1631159.588	1758644.007	<2×BV	<2×BV	ND	1.0	ND	54	219	100
SWMU 36-006	c2	0–0.5	1631179.667	1758692.198	<2×BV	<2×BV	ND	ND	207	1188	63	31
SWMU 36-006	b3	0–0.5	1631115.859	1758733.695	<2×BV	<2×BV	ND	ND	252	36	55	ND
SWMU 36-006	a3	0–0.5	1631036.434	1758750.651	<2×BV	<2×BV	ND	ND	159	47	60	ND
SWMU 36-006	se	0–0.5	1631200.193	1758628.39	<2×BV	<2×BV	ND	5.6	88	ND	ND	ND
SWMU 36-006	nw	0–0.5	1630905.695	1758744.404	<2×BV	<2×BV	ND	2.4	ND	ND	ND	ND
SWMU 36-006	b2	0–0.5	1631115.859	1758733.695	<2×BV	<2×BV	ND	ND	341	863	82	24
SWMU 36-006	c3	0–0.5	1631223.396	1758695.321	<2×BV	<2×BV	ND	ND	224	ND	74	ND
SWMU 36-006	b1	0–0.5	1631083.286	1758670.78	<2×BV	<2×BV	ND	ND	ND	53	250	102
SWMU 36-006	a1	0–0.5	1630957.981	1758718.227	<2×BV	<2×BV	ND	ND	ND	58	254	134
SWMU 36-006	a2	0–0.5	1630993.598	1758744.85	<2×BV	<2×BV	ND	ND	352	1325	87	17

[a] ND = Not detected.

[b] n/a = Not applicable.

[c] <2×BV = Result is less than two times instrument background reading.

Table B-11.0-1
Summary of Sampling Deviations from the Approved Work Plan

Site ID	Sampling Location	Description of Deviation
TA-15		
SWMU 15-002	15-613675	The location was moved 25 ft south because the proposed location was surveyed above the concrete apron of building 15-0534.
SWMU 15-003	15-613324	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0.5 ft bgs.
	15-613325	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613326	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613327	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613328	The location was moved 170 ft northeast within the same drainage because the proposed location was surveyed within the fenced and posted beryllium area around SWMUs 15-003 and 15-006(a). Samples were collected from 0–0.75 ft bgs and 0.75–1.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1.5 ft bgs.
SWMUs 15-004(b) and 15-004(c)	15-613345	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the sediment-tuff contact was encountered at 0.25 ft bgs.
SWMU 15-004(f)	15-02141	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02155	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02166	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02167	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
	15-02177	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02178	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02179	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because tuff was encountered at ground surface.
	15-02206	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-02277	Samples were collected from 3–3.5 ft bgs, instead of from 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613370	Samples were collected from 0–1 ft bgs, 6–7 ft bgs, and 8–8.5 ft bgs, instead of 9–10 ft bgs, because of refusal at the base of the borehole at 8.5 ft bgs.
	15-613374	Samples were collected from 0–1 ft bgs, 6–7 ft bgs, and 8–8.5 ft bgs, instead of 9–10 ft bgs, because of refusal at the base of the borehole at 8.5 ft bgs.

Table B-11.0-1 (continued)

Site ID	Sampling Location	Description of Deviation
SWMU 15-004(f) (continued)	15-613380	Samples were collected from 0–1 ft bgs, 6–7 ft bgs, and 9–9.5 ft bgs, instead of 9–10 ft bgs, because of refusal at the base of the borehole at 9.5 ft bgs.
	15-613367	Samples were collected from 0–1 ft bgs and 2–3 ft bgs, instead of 0–1 ft bgs, 6–7 ft bgs, and 9–10 ft bgs, because of refusal at the base of the borehole at 3 ft bgs.
	15-613373	Samples were collected from 0–1 ft bgs and 6–6.25 ft bgs, instead of 0–1 ft bgs, 6–7 ft bgs, and 9–10 ft bgs, because of refusal at the base of the borehole at 6.25 ft bgs.
	15-613377	Samples were collected from 0–1 ft bgs and 3–3.5 ft bgs, instead of 0–1 ft bgs, 6–7 ft bgs, and 9–10 ft bgs, because of refusal at the base of the borehole at 3.5 ft bgs.
	15-613384	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
	15-613385	Samples were collected from 0–1 ft bgs and 1–1.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1.5 ft bgs.
	15-613386	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613388	Samples were collected from 0–1 ft bgs and 1–1.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1.5 ft bgs.
	15-613389	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
	15-613403	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.75 ft bgs.
SWMU 15-007(a)	15-613395	Step-out samples were collected approximately 25 ft from the edge of the excavation.
	15-613396	Step-out samples were collected approximately 25 ft from the edge of the excavation.
	15-613397	Step-out samples were collected approximately 10 ft from the edge of the excavation.
	15-613398	Step-out samples were collected approximately 10 ft from the edge of the excavation.
	15-613399	Step-out samples were collected approximately 8 ft from the edge of the excavation.
	15-613340	Step-out samples were collected approximately 15 ft from the edge of the excavation.
SWMU 15-008(a)	15-613403	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.75 ft bgs.

Table B-11.0-1 (continued)

Site ID	Sampling Location	Description of Deviation
SWMU 15-008(a) (continued)	15-613404	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613405	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613406	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.75 ft bgs.
	15-613407	Samples were collected from 0–1 ft bgs and 2–3 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
	15-613408	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613409	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.25 ft bgs.
	15-613413	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.25 ft bgs.
	15-613414	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.25 ft bgs.
AOC 15-008(f)	15-613255	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 0.75 ft bgs.
	15-613256	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 0.25 ft bgs.
	15-613257	Samples were collected from 0–1 ft bgs and 1.5–2.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
	15-613258	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613259	Samples were collected from 0–1 ft bgs and 1.5–2.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
	15-613260	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 0.5 ft bgs.
	15-613261	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because refusal with Qbt 2 was encountered at 2 ft bgs.

Table B-11.0-1 (continued)

Site ID	Sampling Location	Description of Deviation
AOC 15-008(f) (continued)	15-613262	Samples were collected from 0–1 ft bgs and 1.5–2.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because refusal with Qbt 2 was encountered at 2 ft bgs.
	15-613263	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because refusal with Qbt 2 was encountered at 1 ft bgs.
	15-613264	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
SWMU 15-009(e)	n/a*	Samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs instead of 0–1 ft and 3–4 ft below structures.
	15-613421	Samples were collected from 0–1 ft bgs and 2.5–3 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 2 ft bgs.
	15-613422	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 0.3 ft bgs.
	15-613423	Samples were collected from 0–1 ft bgs and 2–2.5 ft bgs, instead of from 0–1 ft bgs and 3–4 ft bgs, because the soil-tuff contact was encountered at 1 ft bgs.
SWMU 15-010(a)	n/a	The septic tank and the inlet and outlet lines were not removed because they were not located. The septic tank and the inlet and outlet lines have presumably been previously removed. An alternative confirmation sampling strategy was implemented.
	15-613427	Samples were collected from 4–5 ft bgs and 7–8 ft bgs at the former septic tank location, instead of 0–1 ft and 3–4 ft beneath the septic system, because the septic system was not located.
	15-613428	Samples were collected from 4–5 ft bgs and 7–8 ft bgs at the former tank inlet, instead of 0–1 ft and 3–4 ft beneath the septic system, because the septic system was not located.
	15-613429	Samples were collected from 4–5 ft bgs, 7–8 ft bgs, and 9–9.5 ft bgs directly south of the former septic tank location, instead of 0–1 ft and 3–4 ft beneath the septic system, because the septic system was not located; field-screening results were elevated at 7–8 ft bgs; and refusal was encountered at 9.5 ft bgs.
	15-613430	Samples were collected from 4–5 ft bgs and 6–7 ft bgs at the former septic tank outlet, instead of 0–1 ft and 3–4 ft beneath the septic system, because the septic system was not located and because refusal was encountered at 7 ft bgs.
	15-613431	Samples were collected from 4–5 ft bgs and 7–8 ft bgs directly north of the former septic tank location, instead of 0–1 ft and 3–4 ft beneath the septic system, because the septic system was not located.
TA 36		
SWMU 36-001	n/a	Remediation activities at SWMU 36-001 were suspended because of potential health and safety concerns, specifically, higher than expected radiation levels and the potential presence of beryllium encountered during the initial stages of waste removal.

Table B-11.0-1 (continued)

Site ID	Sampling Location	Description of Deviation
SWMU 36-001 (continued)	36-613721	Samples were collected from 2–4 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613722	Samples were collected from 0–1.5 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613723	Samples were collected from 0–1.5 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613724	Samples were collected from 0–1.5 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613725	Samples were collected from 0–1 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613726	Samples were collected from 0–1.5 ft bgs, 5–6.5 ft bgs, and 10–11.5 ft bgs, instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns.
	36-613727	Samples were collected from 0–1.5 ft bgs, 5–6.5 ft bgs,10–11.5 ft bgs, and 13.5–15 ft bgs instead of from beneath and around the excavated landfill, because remediation activities were suspended because of health and safety concerns and because field-screening results were elevated at 10–11.5 ft bgs.
SWMU 36-003(b)	n/a	Samples were inadvertently collected from 0–1 ft bgs and 3–4 ft bgs instead of 0–1 ft and 3–4 ft below structures.
AOC 36-004(b)	15-613268	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613269	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613270	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
AOC 36-004(c)	15-613279	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0.5 ft bgs.
	15-613280	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0 5 ft bgs.
	15-613282	Samples were collected from 0–0. 5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
	15-613284	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.

Table B-11.0-1 (continued)

Site ID	Sampling Location	Description of Deviation
SWMU 36-004(d)	15-613500	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0.5 ft bgs.
	15-613501	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613502	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0.5 ft bgs.
	15-613503	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	15-613504	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
SWMU 36-005	n/a	Sampling per the approved investigation work plan could not be implemented because of cultural resource restrictions (see section 7.10.4 of the investigation work plan).
	36-03020	Samples were collected from 0–1 ft bgs and 1–2 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 2 ft bgs.
	36-03022	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
AOC C-36-006(e)	15-613314	Samples were collected from 0–0.25 ft bgs and 0.25–0.5 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 0.5 ft bgs.
	15-613315	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
	15-613316	Samples were collected from 0–0.5 ft bgs and 0.5–1 ft bgs, instead of from 0–1 ft bgs and 2–3 ft bgs, because the sediment-tuff contact was encountered at 1 ft bgs.
	15-613313	Samples were not analyzed for cyanide and perchlorate. Samples will be collected and analyzed for cyanide and perchlorate during the Phase II investigation.

*n/a = Not applicable.

Appendix C

Investigation-Derived Waste Management

C-1.0 INTRODUCTION

This appendix contains the waste management records for the investigation-derived waste (IDW) generated during the implementation of the investigation work plan for the Potrillo and Fence Canyons Aggregate Area of Los Alamos National Laboratory (LANL or the Laboratory). In general, IDW generated during the field investigation was managed in accordance with Standard Operating Procedure (SOP) 5238, Characterization and Management of Environmental Program Waste. This procedure incorporates the requirements of applicable U.S. Environmental Protection Agency (EPA) and New Mexico Environment Department (NMED) regulations, U.S. Department of Energy orders, and Laboratory policies and procedures.

Consistent with Laboratory procedures, a waste characterization strategy form (WCSF) was prepared to address characterization approaches, on-site management, and final disposition options for wastes. Analytical data and information on wastes generated during previous investigations and/or acceptable knowledge (AK) were used to complete the WCSF. The WCSF is included in this appendix as Attachment C-1.

Areas of contamination were approved and granted for the investigation and remediation of Solid Waste Management Units (SWMUs) 15-007(a), 36-001, and 36-006 within Technical Area 15 (TA-15) and TA-36 (LANL 2010, 110838; NMED 2010, 110953). The purpose of requesting the area of contamination boundaries was to facilitate on-site staging and segregation of remediation waste without triggering a new point of generation or placement of waste subject to Resource Conservation and Recovery Act requirements. All staging and segregation of waste were conducted in an environmentally protective manner using a combination of containers and appropriately designed and controlled staging piles. Materials were managed in full accordance with hazardous waste regulatory requirements upon transfer outside of the area of contamination boundaries.

Following waste characterization, the selection of waste containers was based on appropriate U.S. Department of Transportation requirements, waste types, and volumes of IDW generated. Immediately following containerization, each waste container was individually labeled with a unique identification number and with information regarding waste classification, contents, and radioactivity, if applicable.

Before it was shipped, waste was staged in clearly marked, appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements were based on the type of IDW and its classification. Container and storage requirements were detailed in the WCSF and approved before waste was generated.

Investigation activities were conducted in a manner that minimized the generation of waste. Waste minimization was accomplished by implementing the most recent version of the “Los Alamos National Laboratory Hazardous Waste Minimization Report.”

C-2.0 WASTE STREAMS

The IDW streams generated and managed during the investigation of Potrillo and Fence Canyons Aggregate Area are described below and are summarized in Table C-2.0-1. The waste numbers correspond with those identified in the WCSF.

- WCSF Waste Stream #1: No drill cuttings were generated during the 2010 investigation.
- WCSF Waste Stream #2: Contact waste consisted of spent personal protective equipment used during sampling activities, supplies used for dry decontamination of sampling equipment, and materials that contacted, or potentially contacted, contaminated environmental media that could not be decontaminated. This waste stream consisted of gloves, paper towels, coveralls (e.g., Tyvek), booties, plastic and glass sample bottles, and disposable sampling supplies. These wastes were containerized at the R-40 lay-down area at TA-15 and were characterized based on AK of the waste materials, the methods of generation, and analytical data for the media with which they came into contact. Approximately 1.0 yd^3 of contact waste was generated and was disposed of at TA-54 through the Green is Clean program.
- WCSF Waste Stream #3: No Decontamination fluids were generated during the 2010 investigation.
- WCSF Waste Stream #4: Excavated environmental media consisted of overburden spoils of soil and rock removed from within or next to areas excavated. These wastes from SWMUs 15-008(a) and 36-006 were containerized in approved soft-sided bags. Overburden spoils of soil and rock from SWMU 15-007(a) were placed in 80-yd^3 soil piles and stored on the ground surface with best management practices. Approximately 2480 yd^3 of excavated environmental media was generated from SWMUs 15-007(a), 15-008(a), and 36-006. Waste from SWMUs 15-008(a) and 36-006 was characterized as low-level waste (LLW) and disposed of at TA-54. Waste from SWMU 15-007(a) was characterized as nonhazardous, passed residential cleanup standards, and was used to backfill the excavation.
- WCSF Waste Stream #5: Excavated man-made debris consisted of concrete, metal, wire, connectors, and miscellaneous metal. These wastes were containerized in approved soft-sided bags. Approximately 237 yd^3 of excavated man-made debris was generated from SWMUs 15-007(a), 15-008(a), and 36-006. Waste generated from SWMUs 15-008(a) and 36-006 was characterized as LLW and disposed of at TA-54. Waste from SWMU 15-007(a) was characterized as industrial solid waste and disposed of at an authorized off-site facility.
- WCSF Waste Stream #6: Municipal solid waste (MSW) consisted of noncontact trash and debris and empty sample preservation containers. Approximately 1 yd^3 of waste was generated and was determined to be nonhazardous, nonradioactive MSW. It was stored in plastic-lined trash cans and disposed of at the Los Alamos County landfill.
- WCSF Waste Stream #7: No petroleum-contaminated soils were generated during the 2010 investigation.
- WCSF Waste Stream #8: No returned samples were generated during the 2010 investigation.
- WCSF Waste Stream #9: High-explosive (HE) test kits consisted of spent solvent (acetone, water, and soil-crushed tuff). These wastes were containerized in locked 5-gal. buckets within a less than 90-d hazardous waste storage area. Approximately 9 gal. of spent acetone was generated from SWMUs 15-004(b), 15-004(c), 15-004(f), 15-007(a), 15-008(a), and 36-001. The soil-tuff was characterized using data from the soil from which the sample was collected. The

waste was containerized at the point of generation and will be treated and disposed of at an authorized off-site mixed-waste facility.

C-3.0 REFERENCES

The following list includes all documents cited in this appendix. 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.

LANL (Los Alamos National Laboratory), September 29, 2010. "Submittal of Request for Approval of Areas of Contamination for Investigation and Remediation Actions at Potrillo and Fence Canyon Aggregate Area Excavation Sites," Los Alamos National Laboratory letter (EP2010-0429) to J.P. Bearzi (NMED-HWB) from M.J. Graham (LANL) and G.J. Rael (DOE-LASO), Los Alamos, New Mexico. (LANL 2010, 110838)

NMED (New Mexico Environment Department), October 7, 2010. "Response to Request for Approval of Areas of Contamination for Investigation and Remediation Actions at Potrillo and Fence Canyon Aggregate Area Excavation Sites [SWMUs 15-007(a), 15-008(a), 15-010(a), 36-001, and 36-006]," New Mexico Environment Department letter to G.J. Rael (DOE-LASO) and M.J. Graham (LANL) from J.P. Bearzi (NMED-HWB), Santa Fe, New Mexico. (NMED 2010, 110953)

Table C-2.0-1
Summary of IDW Generation and Management

Waste Stream	Waste Type	Volume	Characterization Method	On-Site Management	Disposition
Contact waste	LLW	1 yd^3	AK and analytical results of site characterization	Clamshell	TA-54
Excavated environmental media	Nonhazardous fill	2480 yd^3	AK and analytical results of site characterization	Waste piles	Passed residential cleanup standards and used to backfill excavation
Man-made media	LLW and industrial	237 yd^3	AK and analytical results of site characterization	Wrangler bags within area of contamination	TA-54 and an authorized off-site disposal facility
Municipal solid waste	MSW	<1 yd^3	AK	Plastic bags	Off-site municipal landfill
HE test kits	Mixed LLW	9 gal.	AK and analytical results of site characterization	<90 day	TA-54 and an authorized off-site disposal facility

Attachment C-1

Waste Characterization Strategy Form

Environmental Programs (EP)
Document Signature Form

Document Catalog Number: EP2010-0408

(Please prefix the name of all electronic versions of this document with this number.)

Document Title/Subject: Potrillo and Fence Canyons Aggregate Area Investigations

Associated Document Catalog Number(s):

Author: Buckley, Jocelyn Y 665 5209 jbuckley@lanl.gov

Organuzation: EP-CAP

Document Team:

Document Type: Waste Characterzation Strategy Form (WCSF)

Date Due: **Date Final Complete:**

Date To ADEP: **Date To DOE:**

Date To NMED: **Date To RPF:**

Comm Tracker #: **LAUR #** **ERID #:**

Status/Comments:

Reviewer Signatures: By signing below, the reviewer indicates that he/she **reviewed** and **approves** the document.

Document Catalog Number: EP2010-0408

Waste Characterization Strategy Form

Project Title	Potrillo and Fence Canyons Aggregate Area Investigations
Solid Waste Management Unit or Area of Concern #	**SWMUs:** 15-002; 15-007(a), 15-003, 15-006(a), 15-004(b), 15-004(c), 15-004(f), 15-008(a), 15-009(e), 15-010(a), 36-001, 36-003(b), 36-006, 36-004(d), 36-005, **AOCs:** 15-005(b), 15-006(e), 15-008(f), C-15-004, C-15-005, C-15-006, 36-004(a), 36-004(b), 36-004(c), 36-004(e), 36-001, C-36-006(e)
Activity Type	**Investigation and Remediation**
TPMC Task Manager	**Pattie C. Baucom**
Waste Management Coordinator	**Michael Le Scouarnec**
Completed by	**Jocelyn Buckley**
Date	**September 7, 2010**

1.0 Description of Activity

The work will be performed in accordance with the New Mexico Environment Department (NMED)-approved Investigation Work Plan, Revision 1, for Potrillo and Fence Canyons Aggregate Area and EXHIBIT "D" Scope of Work and Technical Implementation of the Potrillo and Fence Canyons Aggregate Area, Subcontract No.85785-001-10.

This waste characterization strategy form (WCSF) describes the management of investigation-derived waste (IDW) that is expected to be generated during the investigation and limited remediation in Technical Area (TA)-15 and TA-36. The IDW may include, but is not limited to, drill cuttings, contact waste, excavated environmental media and debris, decontamination fluids, petroleum-contaminated soils, and all other waste that has potentially come into contact with contaminants.

2.0 Relevant Site History and Description

2.1 TA-15

TA-15, also known as R-Site, has been used from the mid-1940s to the present for explosives experiments. Test explosions ranging from a few kilograms of HE to as much as 650 kg were conducted. These experiments used natural uranium metal, depleted uranium (DU) metal, lesser quantities of beryllium, and other metals. In most cases, the tests were carried out aboveground, which resulted in test materials being scattered over wide areas. Based on Laboratory records, some 75 metric tons of natural uranium and DU have been expended at the firing sites within TA-15 since the mid-1940s.

2.2 TA-36

TA-36, also known as Kappa Site, consists of a series of firing sites that support explosives experiments and has been used from the 1950s to the present. The firing sites and facilities at TA-36 accommodate shipping, receiving, transporting, and testing high explosives (HE). A total of over 30,000 test shots have been fired at Kappa Site, using an estimated 2200 to 4400 lb of DU. Initially Kappa Site consisted of

group offices; four firing sites, (Eenie, Meenie, Minie, and Lower Slobbovia); and a storage magazine at Moe. In 1983, the boundary of TA-36 was expanded to incorporate the I-J Firing Site.

3.0 Characterization Strategy

This WCSF identifies the types of wastes expected, based on the data from previous investigations; however, other types of wastes may be encountered. An amendment to this strategy form will be prepared and submitted for review and approval if any of the waste streams change in description or characterization approach or a new waste stream is generated. All IDW will be managed in accordance with Los Alamos National Laboratory (LANL) Standard Operating Procedure (SOP) 5238, *Characterization and Management of Environmental Program Waste.*

In accordance with the work plan, waste will initially be managed as hazardous or non-hazardous (unless stored within an Area of Contamination) in accordance with the due diligence reviews already prepared for all potential release sites covered by these investigations. Table 3.0-1 identifies whether initial management should be hazardous or non-hazardous. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the type waste and its regulatory classification. The selection of waste containers will be based on U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be generated. Immediately following containerization, each waste container will be individually labeled with a unique identification number and with information such as waste classification, contents, radioactivity, and date generated, if applicable. A non-hazardous waste label, date of generation, the generator's name, and container contents should be placed on non-hazardous waste containers as a best management practice. Waste streams with the same regulatory classification that are destined for the same receiving facility may be combined into a single container for disposal (e.g. contact waste with drill cuttings).

IDW characterization will be completed using investigation sampling data or by direct sampling of the IDW. If the waste is directly sampled, it will be sampled within 10 days of generation, and a 21 day turnaround time for analyses will be requested, unless the waste is generated and managed in an Area of Contamination. Samples must be collected using the methods described in this WCSF by trained and qualified sampling personnel. Sampling personnel must record waste sampling information in accordance with LANL's procedure, EP-ERSS-SOP-5058, *Sample Control and Field Documentation* and EP-ERSS-SOP-5181, *Documentation of Waste and Environmental Technical Field Activities.*

A waste determination will be made within 45 days of the generation date of waste unless the waste is stored in a Satellite Accumulation Area or an approved Area of Contamination. A Waste Acceptance Criteria (WAC) exception form (WEF) can be used if the generator does not meet the 45 day deadline. The generation of no path forward wastes must be approved by Department of Energy (DOE) prior to generation of the waste; however, no such wastes are anticipated for this project.

If documentation exist that the contaminant(s) originated from a listed source but the levels are below residential screening levels and the land disposal restriction treatment standards, a "contained-in" request may be submitted to the New Mexico Environment Department (NMED), who may approve removing the listings from the waste stream. A request to submit a "contained-in" determination to NMED must be submitted to Environmental Protection (ENV-RCRA) through the Subcontract Technical Representative (STR) within 70 days of generating the waste. A copy of the due diligence reviews already prepared for this investigation or the NMED "contained-in" approval letter should accompany all waste profiles prepared for the waste(s) with potentially listed contaminants.

Investigation activities will be conducted in a manner that minimizes the generation of waste. Waste minimization will be accomplished by implementing the most recent version of the "Los Alamos National

Laboratory Hazardous Waste Minimization Report." Waste streams will be recycled/reused, as appropriate.

3.1 Waste # 1: Drill Cuttings (IDW) (potential)

This waste stream consists of soil and rock cuttings generated from the drilling of boreholes. This may include small chips or unused core samples collected with a hollow-stem auger core barrel. Drill cuttings may include excess core samples not submitted for analysis and any returned drill cutting samples. Drill cuttings may be land applied if they meet the criteria in Quality Procedure QP-011, *Land Application of Drill Cuttings*. Approximately 20 yd^3 of drill cuttings are expected to be generated.

Anticipated Regulatory Status: Industrial, Hazardous, Low-level radioactive waste (LLW), Mixed low-level radioactive waste (MLLW), New Mexico Special Waste (NMSW), Land Applied

Characterization Approach: The drill cuttings will be characterized by direct sampling of the containerized cuttings. Cuttings not generated and managed within an Area of Contamination will be sampled within 10 days of generation and submitted for analysis with a 21 day turnaround time. A hand auger or thin-wall tube sampler will be used in accordance with LANL SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler* to collect waste material from each container, augering from the surface to the bottom of the waste in a sufficient number of locations to obtain a representative sample. Samples will be analyzed for volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), radionuclides, total metals, and toxicity characteristic (TCLP) metals, if needed (see Table 3.1-1). High explosives (HE), perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation samples from the potential release site. If process knowledge, odors, or staining indicate the cuttings may be contaminated with petroleum products, the materials will also be analyzed for total petroleum hydrocarbons (TPH [DRO/GRO]) and polychlorinated biphenyls (PCBs). Other constituents may be analyzed as necessary to meet the WAC for a receiving facility.

Storage and Disposal Method: Drill cuttings will be containerized at the point of generation in LANL approved 55-gallon steel drums, 1 yd^3 Wrangler Bags or other containers appropriate for the quantity of waste generated. Wastes will be stored in secure, designated areas. Drill cuttings from a single potential release site (PRS) may be combined into a single container before sampling, but cuttings from different PRSs will not be combined before sampling. If container sizes are small, the representative sample may be collected from more than one container (e.g., one sample for every 20 cy^3 generated from a single potential release site). Waste generated and managed within an Area of Contamination will initially be managed as non-hazardous. Wastes generated outside an Area of Contamination will initially be managed as hazardous or non-hazardous in accordance with Table 3.0-1. If analytical data changes the waste classification (e.g., PCB waste) or hazardous wastes are moved outside the boundary of the Area of Contamination, the waste will be stored in an area appropriate for the type of waste. Cuttings may be land applied if they meet the criteria of the NMED-approved NOI decision tree for land application. Land application will be conducted in accordance with ENV-RCRA-QP-011, *Land Application of Drill Cuttings*. Drill cuttings that cannot be land applied will be treated and/or disposed of at authorized off-site facilities appropriate for the waste classification.

3.2 Waste # 2: Contact Waste

This waste stream includes personnel protective equipment (PPE), contaminated sampling supplies, and dry decontamination waste that may have come in contact with contaminated environmental media and cannot be decontaminated. This includes, but is not limited to plastic sheeting (e.g., tarps and liners), gloves, coveralls (e.g. Tyvek), booties, paper towels, plastic and glass sample bottles, and disposable sampling supplies. Approximately 1 yd^3 of contact waste are expected to be generated.

Anticipated Regulatory Status: Industrial, Hazardous, LLW, MLLW, Green is Clean

Characterization Approach: Contact waste will be characterized using AK based on data from the media with which they came into contact, as follows:

- If generated during drilling, data from the associated drill cuttings will be used.
- If generated during hand augering, associated investigation sample data will be used.
- If generated during excavations, data from the associated excavated environmental media will be used.

All contact waste will be inspected before being placed in containers to determine if environmental media or staining is present, indicating contamination. If staining is present, an estimate of the portion or percentage of the item stained will be recorded. Results from the analytical data will be weighted by the extent of contamination for determining whether wastes are characteristic. If the material with which the contact waste came into contact is listed, the contact waste will be assumed to be listed unless a "contained-in" approval is obtained.

Storage and Disposal Method: The contact waste may be separately containerized in drums or it may be placed into the same containers as the media with which it is contaminated if the media will not be land applied. Wastes will be stored within secure, designated areas. Waste generated and managed within an Area of Contamination will initially be managed as non-hazardous. Wastes generated outside an Area of Contamination will initially be managed as hazardous or non-hazardous in accordance with Table 3.0-1. If analytical data changes the waste classification, the waste will be stored in an area appropriate for the type of waste. For disposal, separately containerized contact waste may also be combined with the material that it contacted (the WPF will document the decision to combine the waste streams). Wastes will be treated and/or disposed of in authorized off-site facilities appropriate for the waste classification.

3.3 Waste #3: Decontamination Fluids (potential)

The decontamination fluids waste stream will consist of liquid wastes generated from decontamination of excavation, sampling and drilling equipment. Consistent with waste minimization practices, the Laboratory employs dry decontamination methods to the extent possible. If dry decontamination cannot be performed, liquid decontamination wastes will be collected in appropriate containers at the point of generation. Less than 55 gal of decontamination fluids are expected to be generated.

Anticipated Regulatory Status: Industrial, Hazardous, LLW, MLLW

Characterization Approach: All drilling equipment and tooling will be steam-cleaned by the drilling subcontractor prior to arriving onsite. If tooling appears unclean or odors are detected, the equipment must be steam-clean onsite in accordance with EP-ERSS-SOP-5061, *Field Decontamination of Equipment* or an approved equivalent procedure. The rinsate must be separately collected and sampled (do not mix with any other decontamination fluids).

Decontamination fluids will be characterized by investigation samples from the media they contacted or by direct sampling. Unless decontamination fluids are generated and managed within an Area of Contamination, representative samples (if sampling is required) will be collected within 10 days of generation and submitted for analysis with a 21 day turnaround time. Samples will be collected from the storage container in accordance with LANL SOP-06.15, *COLIWASA Sampler for Liquids and Slurries.* If the container does not permit COLIWASA or bailer sampling, the type of sampling equipment used will be appropriate for the waste container and properly operated in accordance with Chapter 7 and Appendix E of the RCRA Waste Sampling Draft Technical Guidance (EPA 530-D-02-002, August 2002,

http://www.epa.gov/osw/hazard/testmethods/sw846/pdfs/rwsdtg.pdf). Samples will be analyzed for VOCs, SVOCs, radionuclides, and total metals (see Table 3.1-1). HE will be analyzed only if the decontamination water is generated from potential release site for which the work plan requires HE analysis for investigation samples. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility. If wastes will be treated on-site at the Sanitary Waste Water System (SWWS) or the Radioactive Liquid Waste Treatment Facility (RLWTF), submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml for additional constituents identified in Table 3.1-1, footnote 1. If the fluids cannot be treated on-site, they may be solidified for disposal off-site. The Material Safety Data Sheet (MSDS) for any absorbent used for solidification will be used as AK for waste characterization.

Storage and Disposal Method: Decontamination fluids will be collected in appropriate containers at the point of generation and managed in secure, designated waste areas. Waste generated and managed within an Area of Contamination will initially be managed as non-hazardous. Wastes generated outside an Area of Contamination will initially be managed as hazardous or non-hazardous in accordance with Table 3.0-1. If analytical data changes the waste classification (e.g., PCB wastes) or hazardous wastes are moved outside the Area of Contamination boundaries, the waste will be stored in an area appropriate for the type of waste. It is expected that the decontamination fluids will be treated on-site at the TA-16 High Explosives Wastewater Treatment Facility (HEWTF), the TA-50 Radioactive Liquid Waste Treatment Facility (RLWTF), or the Sanitary Waste Water System (SWWS). Decontamination wastes not meeting the WAC for on-site facilities will be treated and/or disposed of in authorized off-site treatment/disposal facilities. If solidification of decontamination fluids is required for disposal, it may be solidified using an approved absorbent. Solidification activities must be reviewed by the ENV-RCRA before being conducted.

3.4 Waste #4: Excavated Environmental Media

Layback and overburden spoils (including environmental media mixed with buried debris after the debris is segregated from the media) will consist of soil and rock removed from within or next to (e.g., from benching to stabilize a trench) areas to be excavated. Excavated environmental media may be generated during excavation activities at SWMUs 15-007(a) and 15-010(a), 15-008(a), 36-001, 36-005, and 36-006. The amount of media removed is expected to be approximately 4,000 yd^3.

Anticipated Regulatory Status: Industrial, Hazardous, LLW, MLLW, NMSW, PCB, Fill

Characterization Approach: Where the amount of soil to be excavated is less than 5 yd^3, a minimum of one incremental sample of the spoils will be collected for each location as the spoils are excavated. For locations in which the amount of soil expected to be excavated is, at a minimum, approximately 500 yd^3, samples of the spoils will be collected as the spoils are excavated and composited, if appropriate (one composite sample for every 20 to 50 yd^3, depending on the homogeneity of spoils). More frequent samples will be collected if screening or visual observations indicate areas with potentially higher contamination. The incremental samples will be collected in accordance with SOP-06.09, *Spade and Scoop Method for Collection of Soil Samples*. Representative samples will be submitted for analysis with a 21 day turnaround time. Samples will be analyzed for VOCs, SVOCs, radionuclides, total metals, and TCLP metals, as needed (see Table 3.1-1). HE, perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation samples from the potential release site. If process knowledge, odors, or staining indicate the excavated media may be contaminated with petroleum products, the materials will also be analyzed for TPH and PCBs. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility.

Storage and Disposal Method: An Area of Contamination will be requested for each excavation area and materials generated and managed within the area will be managed as non-hazardous waste. If the

material is removed from the Area of Contamination, it will be managed as hazardous or non-hazardous in accordance with Table 3.0-1 or validated characterization data. This material will be field screened for radioactivity and VOCs during the excavation process. If contamination is not detected during screening, the spoils will be stored either in roll off bins, other suitable containers, or on the ground surface with appropriate best management practices. If field screening indicates the potential for contamination, the layback and overburden spoils will be placed in rolloff bins or other suitable containers. If analytical data changes the waste classification or hazardous waste is moved outside the boundaries of the Area of Contamination, the waste will be stored in an area appropriate for the type of waste. If the spoils are determined to be suitable for reuse (i.e., meets residential cleanup standards as determined using NMED's and DOE's soil screening guidance), the Laboratory will segregate any man-made debris from the soil, if practical, and use the soil to backfill the excavations. If the spoils do not meet residential cleanup standards, they will be treated and/or disposed of at an authorized facility appropriate for the waste regulatory classification.

3.5 Waste #5: Excavated Man-Made Debris

Excavated man-made debris may be generated during excavation activities at SWMUs 15-007(a) and 15-010(a), 15-008(a), 36-001, 36-005, and 36-006. The amount of debris removed is expected to be approximately 3,000 yd^3.

Anticipated Regulatory Status: Industrial, Hazardous, LLW, MLLW, PCB, Beryllium, NMSW, Recycle

Characterization Approach: Debris will be segregated as it is excavated, to the extent practical, based on factors such as the type and size of debris, field screening, process knowledge, and/or staining or odors. For debris that is difficult to characterize; acceptable knowledge (AK) will be used whenever possible, supplemented by sampling as needed. Sampling methods may be identified on a case-by-case basis by qualified sampling personnel. All decisions will be documented in the field activity notebook. Field personnel are responsible for using notebooks and logbooks in accordance with activities SOP 5181, *Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities*. If generated outside an Area of Contamination, samples must be collected within 10 days of waste generation and a 21-day analytical turnaround must be requested. Samples will be analyzed for asbestos for articles expected to be asbestos-containing, VOCs, SVOCs, radionuclides, total metals, and TCLP metals, if necessary (see Table 3.1-1). PCBs will be analyzed if oil staining on debris or PCB articles (e.g., capacitors) is unearthed. HE on the external portions of the debris generated at SWMU 20-001(c) will initially be analyzed by HE screening (DX HE Spot Test) or if the investigation samples indicate that HE is present. Waste configurations, process knowledge and additional HE analysis will be performed as needed to identify whether the debris is detonable. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility. Non-radioactive materials (no LANL-added radioactivity) or those that can be decontaminated will be recycled, if practicable. For non-porous debris with only surface, non-fixed contamination, smears will be used to detect the presence of radiation.

Storage and Disposal Method: Debris will be containerized at the point of generation in LANL approved 55-gallon steel drums or other appropriate containers or on the ground surface with appropriate best management practices. Any debris that leaks as it is excavated must immediately be placed in an area with secondary contamination. The debris will initially be managed in a secure, designated area within the Area of Contamination. If analytical data changes the waste classification (e.g., PCB wastes) or the waste is hazardous and is moved outside the Area of Contamination boundaries, the waste will be stored in an area appropriate for the type of waste. The waste will be treated and/or disposed of at an authorized off-site facility appropriate for the waste classification.

3.6 Waste #6: Municipal Solid Waste (MSW)

This waste stream primarily consists of non- contact trash including, but not limited to paper, cardboard, wood, plastic, food and beverage containers, empty solution containers, but may also include commercial solid wastes which are derived from project activities. It is estimated that less than 1 yd^3 of MSW will be generated, but may change if vegetation removal is required.

Anticipated Regulatory Status: MSW

Characterization Approach: MSW will be characterized based on acceptable knowledge (AK) of the waste materials (including MSDS) and methods of generation.

Management and Disposal Method: MSW will be segregated from all other waste streams and managed in approved containers. It is anticipated that the waste will be stored in plastic trash bags or other appropriate containers and disposed of at the County of Los Alamos Transfer Station or other authorized solid waste landfill.

3.7 Waste #7: Petroleum Contaminated Soils (PCS), (potential)

PCS may be generated from releases of products such as hydraulic fluid, motor oil, unleaded gasoline, or diesel fuel (e.g. from the rupture of hydraulic or fuel hoses, or spills during maintenance or filling equipment) onto soil. PCS created by legacy contamination may also be encountered during investigations. Absorbent padding, paper towels, spill pillows or other absorbent material used to contain the released material may be added to the PCS waste for storage and disposal. It is estimated that less than 1 yd^3 of PCS will be generated.

Anticipated Regulatory Status: NMSW, Industrial, Hazardous, LLW, MLLW, PCB

Characterization Approach: The contaminated soil may either be sampled in-place (by gridding the spill location and collecting and combining incremental samples into one sample) or after containerization in accordance with LANL SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler*. If the spill is shallow (in-place sampling) or containers are small, Spade and Scoop Method for Collection of Soil Samples (LANL SOP-06.09) may also be appropriate. If the spill is new, it must be immediately reported to ENV-RCRA and the contaminated material must be containerized the same day it is spilled unless permission is received from ENV-RCRA to leave it longer (generally only granted for large spills). Representative samples of containerized waste will be collected within 10 days of generation and submitted for analysis with a 21 day turnaround time. Samples will be analyzed at a minimum for VOCs, SVOCs, TPH (DRO/GRO), and total metals (see Table 3.1-1). HE, perchlorates, nitrate, and total cyanide will be analyzed only if screening indicates the presence of HE or if analysis of these constituents is required by the work plan for the contaminated area. If legacy petroleum contamination is present, the soils will also be analyzed for PCBs. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility.

Storage and Disposal Method: PCS will be stored in clearly marked and appropriately constructed waste accumulation areas. Waste accumulation area postings, regulated storage duration, and inspection requirements will be based on the most restrictive waste classification appropriate to the area where the spill occurred. If the PCS is suspect or known hazardous or MLLW, it will initially be managed in a registered hazardous waste accumulation area pending analysis. All PCS will be treated and/or disposed of, at an authorized off-site facility appropriate for the waste classification.

3.8 Waste #8: Returned or Excess Samples

This waste stream consists of soil and tuff samples returned from a laboratory or samples collected but not submitted to the analytical laboratory. It is estimated that less than approximately 0.5 yd^3 of material will be generated from this activity.

Anticipated Regulatory Status: Industrial, Hazardous, LLW, MLLW, NMSW

Characterization Approach: Waste characterization will be based upon analytical results obtained from the direct sampling of containerized waste or from investigation or characterization data from media associated with the returned/excess samples. Direct sampling will be conducted in accordance with LANL SOP-06.10, *Hand Auger and Thin-Wall Tube Sampler* or SOP-06.09, *Spade and Scoop Method for Collection of Soil Samples*. Representative samples will be collected within 10 days of the return of the samples and submitted for analysis with a 21 day turnaround time. Samples will be analyzed for VOCs, SVOCs, total metals, and TCLP metals, as needed (see Table 3.1-1). HE, perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation sample. If process knowledge, odors, or staining indicate the returned samples may be contaminated with petroleum products, the materials will also be analyzed for TPH and PCBs. Other constituents may be analyzed as necessary to meet the WAC for a receiving facility.

Storage and Disposal Method: These wastes will be containerized in 5 gallon buckets, 55 gallon drums, or placed into the same containers as the environmental media from which they were taken. They will initially be stored in secure, designated waste areas as hazardous or non-hazardous waste in accordance with Table 3.0-1. If analytical data changes the waste classification, the waste will be stored in an area appropriate for the type of waste. The wastes will be sent to an authorized on-site or off-site treatment or disposal facilities, as appropriate to their waste regulatory classification.

3.9 Waste #9: HE Test Kits

Test kits for HE sample screening includes a solvent (methanol and acetone). The approximate volume of waste generated is estimated to be less than 1 gallon.

Anticipated Regulatory Status: Hazardous, LLW, MLLW, Municipal, or Industrial

Characterization Approach: The waste will be characterized based upon acceptable knowledge of the type of solvent used and the analytical results for the environmental media that it contacted.

Storage and Disposal Method: Spent solvent will be containerized and stored in a satellite accumulation area (SAA). If the spent solvent is generated within an area of contamination, it will be managed as hazardous waste in an SAA upon removal from the area of contamination. After a waste determination is complete, which must be within 45 days of generation, the spent solvent will be sent to an off-site authorized hazardous waste treatment facility. The remainder of the kit is non-hazardous and will be disposed at an off-site municipal or industrial waste landfill.

4.0 References

LANL (Los Alamos National Laboratory) 2007. "Los Alamos National Laboratory Hazardous Waste Minimization Report," (LANL,2007).

LANL (Los Alamos National Laboratory), July 2009. "Potrillo and Fence Canyons Aggregate Area Investigation Work Plan, Revision 1," Los Alamos, New Mexico. (LANL 2009, 106657)

Table 3.0-1
Initial Waste Management

Potential Release Site	Initial Management	Comments
SWMU 15-002, Burn Pit	Non-hazardous	
SWMU 15-007(a), MDA N	Non-hazardous	
SWMU 15-003, PHERMEX Steel Firing Pad	Non-hazardous	
SWMU 15-006(a), PHERMEX Firing Site	Non-hazardous	
SWMU 15-004(b) and 15-004(c), Firing Sites A and B	Non-hazardous	15-004(b): Analyze IDW for toxicity characteristic metals
SWMU 15-004(f), E-F Firing Site	Non-hazardous	
SWMU 15-008(a), Two Surface Disposal Areas at E-F Firing Site	Non-hazardous	Analyze for PCBs (and TPH) if visible stain is observed
AOC 15-005(b), Storage Area	Non-hazardous	
AOC 15-006(e), Projective Test Area, Duplicate of AOC C-36-006(e)	Non-hazardous	Analyze for nitrates, perchlorates, and total cyanide in cuttings
AOC 15-008(f), Sand Mounds at I-J Firing Site (TA-36)	Non-hazardous	
SWMU 15-009(e), Septic Tank	Non-hazardous	
SWMU 15-010(a), Septic Tank	Non-hazardous	Analyze IDW for toxicity characteristic metals
AOC C-15-004, Former Transformer Station	Non-hazardous	Analyze for PCBs (and TPH) if visible stain is observed
AOC C-15-005, Potential Soil Contamination from Former Building	Non-hazardous	
AOC C-15-006, Potential Soil Contamination from Former Building	Non-hazardous	
SWMU 36-001, MDA AA	Non-hazardous	
SWMU 36-003(b), Septic System, I-J Firing Site	Non-hazardous	
AOC 36-004(a), Eenie Firing Site	Non-hazardous	
SWMU 36-006, Surface Disposal Site	Non-hazardous	Analyze IDW for toxicity characteristic metals
AOC 36-004(b), Meenie Firing Site	Non-hazardous	
AOC 36-004(c), Minie Firing Site	Non-hazardous	
SWMU 36-004(d), Skunk Works Firing Site, Lower Slobbovia Firing Site, and Burn Pits	Non-hazardous	
AOC 36-004(e), I-J Firing Site	Non-hazardous	
SWMU 36-005, Storage Area	Non-hazardous	
AOC C-36-001, Former Containment Vessel	Non-hazardous	
AOC C-36-006(e), Projectile Test Area	Non-hazardous	Analyze for nitrates, perchlorates, and total cyanide in cuttings

Table 3.1-1
Waste Characterization Table

Waste Description	Waste Stream #1 Drill Cuttings	Waste Stream #2 Contact Waste	Waste Stream #3 Decon. Fluids	Waste Stream #4 Excavated Media
Estimated Volume	20 CY	1 CY	< 55 gallons	4000 CY
Packaging	55-gallon steel drums or 1 yd^3 Wrangler Bags	55 gallon drums	30 or 55 gallon drums	Roll-offs, Wrangler Bags, or on ground
Regulatory Classification				
Radioactive Waste	X	X	X	X
Municipal Solid Waste (MSW)	—	—	—	—
Waste destined for LANL's SWWS or RLWTF or HEWTF[1]	—	—	X	—
Hazardous Waste	X	X	X	X
Mixed (hazardous and radioactive) Waste	X	X	X	X
Beryllium	—	—	—	—
Polychlorinated Biphenyls-Contaminated Waste (PCBs)	X	—	—	X
New Mexico Special Waste	X	—	—	X
Industrial Waste	X	X	X	X
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	—	X	X	X
AK: Site Characterization	—	X	X	X
Direct Sampling of Waste	X	—	X	X
Analytical Testing				
Volatile Organic Compounds (VOCs) (EPA 8260-B)	X	—	X	X
Semivolatile Organic Compounds (SVOCs) (EPA 8270-C)	X	—	X	X
Organic Pesticides (EPA 8081-A)	X[4]	—	—	X[4]
Organic Herbicides (EPA 8151-A)	X[4]	—	—	X[4]
PCBs (EPA 8082)	X[4]	—	—	X[4]
Total Metals (EPA 6010-B/7471-A or EPA 6020)	X	—	X	X
Total Cyanide (EPA 9012-A)	X[4]	—	X[4]	X[4]
High Explosives Constituents (EPA 8330/8321-A)	X[4]	—	X[4]	X[4]
Asbestos (EPA 600M4)	—	—	—	—
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)	X[4]	—	X[4]	X[4]
TPH-DRO (EPA 8015-M)	X[4]	—	X[4]	X[4]
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	X[4]	—	X[4]	X[4]

Table 3.1-1 (continued)

Waste Description	Waste Stream #1 Drill Cuttings	Waste Stream #2 Contact Waste	Waste Stream #3 Decon. Fluids	Waste Stream #4 Excavated Media
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	—	—	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	—	—	—
Gross Alpha (alpha counting) (EPA 900)	X[4]	—	X[4]	X[4]
Gross Beta (beta counting) (EPA 900)	X[4]	—	X[4]	X[4]
Tritium (liquid scintillation) (EPA 906.0)	X	—	X	X
Gamma spectroscopy (EPA 901.1)	X[4]	—	X[4]	X[4]
Isotopic plutonium (HASL-300)	X	—	X	X
Isotopic uranium (HASL-300)	X	—	X	X
Total uranium (EPA 6020)	X	—	X	X
Strontium-90 (EPA 905)	X	—	X	X
Americium-241 (HASL-300)	X	—	X	X
Perchlorates (EPA 6850)	X[4]	—	X[4]	X[4]
Nitrates/Nitrites (EPA 300.09-soil or 343.2-water)	X[4]	—	X[1,4]	X[4]
Oil / Grease (EPA 1665)	—	—	X[1]	—
Fluorine, Chorine, Sulfate (EPA 300)	—	—	X[1]	—
TTO (EPA 8260-B and EPA 8270-C)[2]	Request VOCs and SVOCs above			
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)	—	—	X[1]	—
Chemical Oxygen Demand (COD) (EPA 410.4)	—	—	X[1]	—
pH (EPA 904c)	—	—	X[1]	—
Microtox or Biological Oxygen Demand (BOD)[3]	—	—	X[1]	—

[1]in addition to other analytes needed to characterize the waste (e.g., VOC, SVOC, total metals), analyze for TSS, TDS, Oil and Grease, gross alpha, gross beta, tritium, and pH for liquids destined for the LANL sanitary waste water system (SWWS). For wastes destined for the RLWTF additional constituents include TTO,TSS, COD, pH, total nitrates/nitrites, and gross alpha, gross beta (not including tritium), and gross gamma or the sum of individual alpha-, beta-, and gamma-emitting nuclides. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[2]TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).

[3] If Microtox analysis is not available, request BOD. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[4] If needed. **Note:** High explosives (HE), perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation samples. The Investigation Work Plan does not require HE analysis for the following PRSs: C-15-004, AOC 36-004(e) (Deferred), and C-36-001 (Deferred).

--Continued on the next page

Table 3.1-1 (continued)

Waste Description	Waste Stream #5 Excavated Man Made Debris	Waste Stream #6 Municipal Solid Waste	Waste Stream #7 Petroleum Contam Soils	Waste Stream #8 Returned or Excess Samples
Estimated Volume	3,000 CY	< 1 CY	< 1 CY	0.5 CY
Packaging	55-gallon drums or other containers or on the ground surface	Plastic trash bags	30 or 55 gallon drums	Same containers as the environmental media from which they were taken or other drums.
Regulatory Classification				
Radioactive Waste	X	—	X	X
Municipal Solid Waste (MSW)	—	X	—	—
Waste destined for LANL's SWWS or RLWTF[1]	—	—	—	—
Hazardous Waste	X	—	X	X
Mixed (hazardous and radioactive) Waste	X	—	X	X
Beryllium	X	—	—	—
Polychlorinated Biphenyls-Contaminated Waste (PCBs)	X	—	X	—
New Mexico Special Waste	X	—	X	X
Industrial Waste	X	—	X	X
Characterization Method				
Acceptable knowledge (AK): Existing Data/Documentation	X	X	—	—
AK: Site Characterization	X	—	—	X
Direct Sampling of Waste	X	—	X	X
Analytical Testing				
Volatile Organic Compounds (VOCs) (EPA 8260-B)	X	—	X	X
Semivolatile Organic Compounds (SVOCs) (EPA 8270-C)	X	—	X	X
Organic Pesticides (EPA 8081-A)	—	—	—	—
Organic Herbicides (EPA 8151-A)	—	—	—	—
PCBs (EPA 8082)	X[4]	—	X[4]	X[4]
Total Metals (EPA 6010-B/7471-A or EPA 6020)	X[4]	—	X	X
Total Cyanide (EPA 9012-A)	X[4]	—	X[4]	X[4]
High Explosives Constituents (EPA 8330/8321-A)	X[4]	—	X[4]	X[4]
Asbestos (EPA 600M4)	X[4]	—	—	—
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)	X[4]	—	X	X[4]

Table 3.1-1 (continued)

Waste Description	Waste Stream # 5 Excavated Man Made Debris	Waste Stream #6 Municipal Solid Waste	Waste Stream #7 Petroleum Contaminated Soils	Waste Stream #8 Returned or Excess Samples
TPH-DRO (EPA 8015-M)	X[4]	—	X	X[4]
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	X[4]	—	X[4]	X[4]
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—	—	—	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—	—	—	—
Gross Alpha (alpha counting) (EPA 900)	X[4]	—	X[4]	X[4]
Gross Beta (beta counting) (EPA 900)	X[4]	—	X[4]	X[4]
Tritium (liquid scintillation) (EPA 906.0)	X	—	X	X
Gamma spectroscopy (EPA 901.1)	X[4]	—	X[4]	X[4]
Isotopic plutonium (HASL-300)	X	—	X	X
Isotopic uranium (HASL-300)	X	—	X	X
Total uranium (EPA 6020)	X	—	X	X
Strontium-90 (EPA 905)	X	—	X	X
Americium-241 (HASL-300)	X	—	X	X
Perchlorates (EPA 6850)	X[4]	—	X[4]	X[4]
Nitrates/Nitrites (EPA 300.09-soil or 343.2-water)	X[4]	—	X[4]	X[4]
Oil / Grease (EPA 1665)	—	—	—	—
Fluorine, Chorine, Sulfate (EPA 300)	—	—	—	—
TTO (EPA 8260-B and EPA 8270-C)[2]	**Request VOCs and SVOCs above**			
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)	—	—	—	—
Chemical Oxygen Demand (COD) (EPA 410.4)	—	—	—	—
pH (EPA 904c)	—	—	—	—
Microtox or Biological Oxygen Demand (BOD)[3]	—	—	—	—

[1]in addition to other analytes needed to characterize the waste (e.g., VOC, SVOC, total metals), analyze for TSS, TDS, Oil and Grease, gross alpha, gross beta, tritium, and pH for liquids destined for the LANL sanitary waste water system (SWWS). For wastes destined for the RLWTF additional constituents include TTO,TSS, COD, pH, total nitrates/nitrites, and gross alpha, gross beta (not including tritium), and gross gamma or the sum of individual alpha-, beta-, and gamma-emitting nuclides. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[2]TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).

[3] If Microtox analysis is not available, request BOD. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[4] If needed. **Note:** High explosives (HE), perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation samples. The Investigation Work Plan does not require HE analysis for the following PRSs: C-15-004, AOC 36-004(e) (Deferred), and C-36-001 (Deferred).

Table 3.1-1 (continued)

Waste Description	Waste Stream #9 HE Test Kits
Estimated Volume	<1 gallon
Packaging	Approved Containers
Regulatory Classification	
Radioactive Waste	X
Municipal Solid Waste (MSW)	X
Waste destined for LANL's SWWS or RLWTF[1]	
Hazardous Waste	X
Mixed (hazardous and radioactive) Waste	X
Beryllium	—
Polychlorinated Biphenyls-Contaminated Waste (PCBs)	—
New Mexico Special Waste	—
Industrial Waste	—
Characterization Method	
Acceptable knowledge (AK): Existing Data/Documentation	X
AK: Site Characterization	X
Direct Sampling of Waste	—
Analytical Testing	
Volatile Organic Compounds (VOCs) (EPA 8260-B)	—
Semivolatile Organic Compounds (SVOCs) (EPA 8270-C)	—
Organic Pesticides (EPA 8081-A)	—
Organic Herbicides (EPA 8151-A)	—
PCBs (EPA 8082)	—
Total Metals (EPA 6010-B/7471-A or EPA 6020)	—
Total Cyanide (EPA 9012-A)	—
High Explosives Constituents (EPA 8330/8321-A)	—
Asbestos (EPA 600M4)	—
Total petroleum hydrocarbon (TPH)-GRO (EPA 8015-M)	—

—Continued on the next page

Table 3.1-1 (continued)

Waste Description	Waste Stream # 9 HE Test Kits
TPH-DRO (EPA 8015-M)	—
Toxicity characteristic leaching procedure (TCLP) Metals (EPA 1311/6010-B)	—
TCLP Organics (EPA 1311/8260-B & 1311/8270-C)	—
TCLP Pest. & Herb. (EPA 1311/8081-A/1311/8151-A)	—
Gross Alpha (alpha counting) (EPA 900)	—
Gross Beta (beta counting) (EPA 900)	—
Tritium (liquid scintillation) (EPA 906.0)	—
Gamma spectroscopy (EPA 901.1)	—
Isotopic plutonium (HASL-300)	—
Isotopic uranium (HASL-300)	—
Total uranium (EPA 6020)	—
Strontium-90 (EPA 905)	—
Americium-241 (HASL-300)	—
Perchlorates (EPA 6850)	—
Nitrates/Nitrites (EPA 300.09-soil or 343.2-water)	—
Oil / Grease (EPA 1665)	—
Fluorine, Chorine, Sulfate (EPA 300)	—
TTO (EPA 8260-B and EPA 8270-C)[2]	**Request VOCs and SVOCs above**
Total Suspended & Dissolved Solids (TSS) and Total Dissolved Solids (TDS) (EPA 160.1 and 160.2)	—
Chemical Oxygen Demand (COD) (EPA 410.4)	—
pH (EPA 904c)	—
Microtox or Biological Oxygen Demand (BOD)[3]	—

[1]in addition to other analytes needed to characterize the waste (e.g., VOC, SVOC, total metals), analyze for TSS, TDS, Oil and Grease, gross alpha, gross beta, tritium, and pH for liquids destined for the LANL sanitary waste water system (SWWS). For wastes destined for the RLWTF additional constituents include TTO,TSS, COD, pH, total nitrates/nitrites, and gross alpha, gross beta (not including tritium), and gross gamma **or** the sum of individual alpha-, beta-, and gamma-emitting nuclides. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[2]TTO is the total of volatile organic and semi-volatile organic compound contaminants. Request methods EPA 8260-B (VOCs) and EPA 8270-C (SVOCs).

[3] If Microtox analysis is not available, request BOD. Submit a sampling request to http://esp-esh-as01-f5.lanl.gov/~esh19/database/rfa_form.shtml .

[4] If needed. **Note:** High explosives (HE), perchlorates, nitrate, and total cyanide will be analyzed only if the work plan requires HE analysis for investigation samples. The Investigation Work Plan does not require HE analysis for the following PRSs: C-15-004, AOC 36-004(e) (Deferred), and C-36-001 (Deferred).

--Continued on the next page

Signatures	Date
Project Manager: John McCann	9-9-10
Waste Management Coordinator: Michael Le Scouarnec	9.9.10
ENV-RCRA Representative: Jocelyn Buckley	9/9/10
Waste Acceptance Representative: Andy Elicio	09/09/2010
Waste Certification Program Representative: Michelle Coriz Clarissa Sisneros for Michelle Coriz	09/09/2010

Appendix D

Radiological Survey Report

GPS-Based Radiological Survey of SWMUs 15-004(f), 15-007(a), and 36-001 at the Los Alamos National Laboratory

Prepared for:

TerranearPMC
4200 W. Jemez Rd, Suite P-502
Los Alamos, NM 87544

Prepared by:

Environmental Restoration Group, Inc.
8809 Washington St. NE, Suite 150
Albuquerque, NM 87113

March, 2011

GPS-Based Radiological Survey of SWMUs 15-004(f), 15-007(a), and 36-001

1.0 Introduction

TerranearPMC (TPMC) retained Environmental Restoration Group, Inc. (ERG) to conduct a GPS-based walkover radiological survey of Los Alamos National Laboratory (LANL) Technical Area 15 (TA-15) Solid Waste Management Units (SWMU) 15-004(f) and 15-007(a) and Technical Area 36 (TA-36) SWMU 36-001. The surveys were performed over a three week period from October 25, 2010 to November 12, 2010.

SWMU 15-004(f), also known as the E-F Firing Site, is a former firing site area used in the early 1950s. Natural uranium and depleted uranium (DU) are known to be present on this site and are considered the primary contaminants. Because of this a low-energy photon emission survey was performed using a Field Instrument for Detecting Low Energy Radiation (FIDLER) detector.

SWMU 15-007(a) is an inactive landfill known as Material Disposal Area (MDA) N. The site was used for the disposal of debris from the demolition of laboratory, dark room and shop buildings in the mid 1960s. Natural thorium was known to be present in the buildings. Due to the thorium presence a high-energy gamma survey, using a 2-inch by 2-inch sodium iodide (NaI) detector, was performed. In addition, since the physical dimensions of MDA-N are relatively small, a FIDLER survey was also performed.

SWMU 36-001 MDA-AA is an inactive landfill which reportedly consists of two disposal trenches containing burned debris from test shots conducted at the Lower Slobbovia Firing Site. Previous investigations at MDA-AA had identified DU as present in greater than background concentration at one location. Due to the suspected presence of DU, a FIDLER survey was performed. In addition, since the physical dimensions of MDA-AA are relatively small, a NaI survey was also performed.

2.0 Method

Each GPS-based radiological survey system consisted of a radiation detector and Ludlum Model 2221 ratemeter/scaler coupled to a Trimble Pro XRS mapping grade GPS. The Ludlum Model 2221 and GPS units were carried in backpacks. For the low-energy photon survey, Alpha Spectra FIDLER detectors were used and held approximately 6 inches above the ground surface. For the high-energy gamma survey, Ludlum Model 44-10 2-inch by 2-inch NaI detectors were used and held approximately 18 inches above the ground surface. At the E-F Firing Site the FIDLER survey was conducted with a detector spacing of approximately 5 feet and a survey speed of 2.5 feet per second (ft/sec). At MDA-N and MDA-AA FIDLER surveys were conducted with a detector spacing of approximately 3 feet and a survey speed of 2.5 ft/sec, while the NaI surveys were conducted with a detector spacing of approximately 5 feet and a survey speed of approximately 2.5 ft/sec. At the end of each survey day, the data were downloaded into a laptop computer and processed using a combination of Trimble Pathfinder Office and ESRI ArcView GIS computer applications.

3.0 Results

The survey data for both FIDLER and NaI detector surveys are presented as Figures A.1 through A.5, located in Appendix A. The data within each figure is presented with varying colors depicting the gamma count range for each individual reading. Some areas of the sites were inaccessible due to vegetation, terrain, or other obstacles.

3.1 FIDLER Survey

The FIDLER detector survey data statistics for all three sites is shown below in Table 3.1.

Table 3.1 FIDLER Detector Survey Results

Site	Readings	Mean (cpm)	Standard Deviation	Maximum Reading (cpm)	Minimum Reading (cpm)
15-004(f) E-F Firing Site	310,599	29,670	24,251	845,520	9,659
15-007(a) MDA-N	4,594	17,213	1,076	42,624	13,788
36-001 MDA-AA	6,519	22,763	1,367	40,541	16,044

Figure A.1 shows the FIDLER survey data for the E-F Firing Site. The count rates generally decrease with distance away from the firing-site soil berms located in the middle of the survey area. There is a number of isolated point sources scattered throughout the entire site. The density of these point sources also decrease with distance away from the soil berms. The survey data mean identified in Table 3.1 is not representative of site background levels. For the purpose of delineating the gamma count ranges to be used in Figure A.1, data collected from the outer half of the E-F Firing Site were used. This data subset, comprised of over 170,000 records with a statistical mean of roughly 22,500 cpm, is believed to better represent background levels for the site due to the distance from the firing-site soil berms and the similarity to the FIDLER survey values observed at MDA-AA.

Figure A.2 shows the FIDLER survey results for MDA-N and a small area contiguous to the MDA-N north-west corner that appeared to have been previously disturbed. The data mean of 17,000 cpm is used to represent site background levels for this site. The survey data identify one small area near the middle of MDA-N, approximately 5-feet by 15-feet, with FIDLER readings between 1.5 to 2.5 times background.

Figure A.3 shows the FIDLER survey results for MDA-AA. A data mean of 22,500 cpm is used to represent site background levels for this site. The survey data identify four locations with values above background. They consist of one location with readings of approximately 1.75 times background, one location with readings between 1.5 and 1.75 times background, and two locations with readings between 1.25 and 1.5 times background.

3.2 NaI Survey

The survey data statistics for the two sites surveyed with a NaI detector is shown below in Table 3.2.

Table 3.2 NaI Detector Survey Results

Site	Readings	Mean (cpm)	Standard Deviation	Maximum Reading (cpm)	Minimum Reading (cpm)
15-007(a) MDA-N	2,773	13,332	799	18,233	10,387
36-001 MDA-AA	2,512	18,136	1,083	21,509	13,757

Figure A.4 shows the NaI detector survey for MDA-N. A data mean of 13,000 cpm is used to represent background levels for the site. The survey data identify two locations greater than 1.25 times background (16,250 cpm), with one location corresponding to the location identified in the FIDLER survey, discussed above, and the other location being a single record at 1.26 times background.

Figure A.5 shows the NaI detector survey data for MDA-AA. A data mean of 18,000 cpm is used to represent background levels for the site. The survey revealed no readings greater than 1.25 times the background value (22,500 cpm).

4.0 Quality Control

All radiological instrumentation was calibrated within six months prior to use using NIST traceable sources and pulser. The instrumentation was also function checked before and after use each day. Function check forms and calibration sheets are included in Appendix B.

Appendix A

Survey Figures

Figure A.1 E-F Firing Site FIDLER Detector Survey

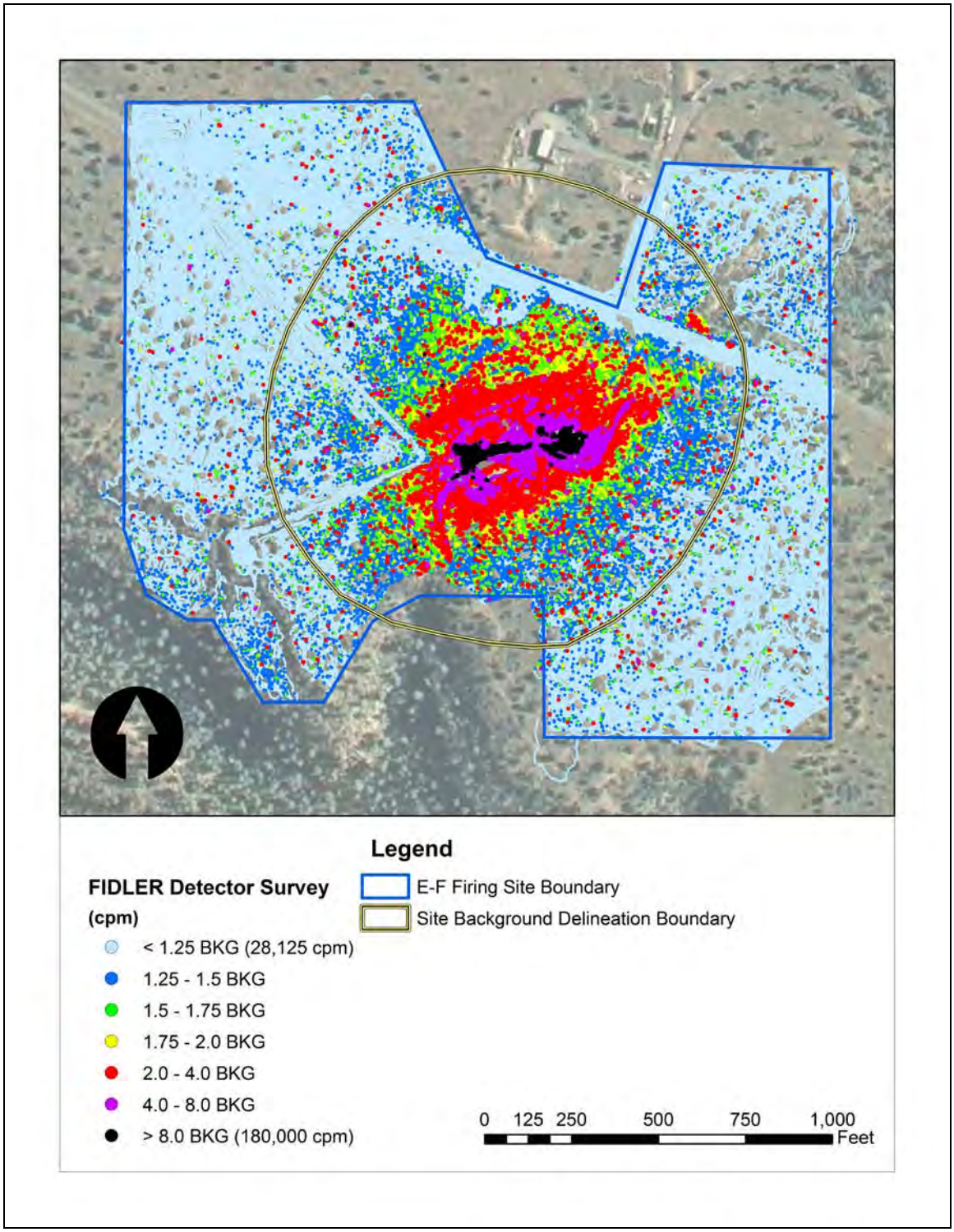


Figure A.2 MDA-N FIDLER Detector Survey



Figure A.3 MDA-AA FIDLER Detector Survey



Figure A.4 MDA-N NaI Detector Survey



Figure A.5 MDA-AA NaI Detector Survey



Appendix B

Calibration and Daily Function Check Forms

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
8809 Washington St NE, Suite 150
Albuquerque, NM 87113
(505) 298-4224
www.ERGoffice.com

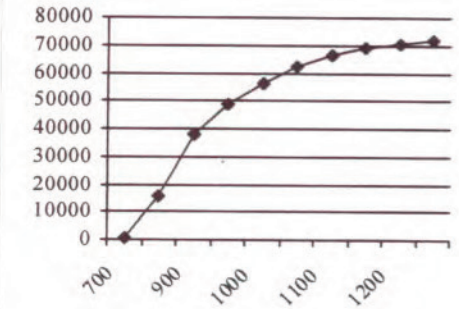
Meter:	Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	228808
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR150852

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☑ 6 inches ☐ Other: Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☑ Side ☐ Below ☐ Other: Temperature: 75 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398703	400
x 1000	100	100	100		100
x 100	40	400	400	39873	400
x 100	10	100	100		100
x 10	4	400	400	3980	400
x 10	1	100	100		100
x 1	400	400	400	398	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	451	
800	15297	
900	37725	
950	48518	
1000	56316	
1050	62674	
1100	66181	
1150	69304	
1200	70371	10384
1250	71921	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV =1200

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☑ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☐ Other Source:

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/12/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

Certificate of Calibration

Calibration and Voltage Plateau

Environmental Restoration Group, Inc.
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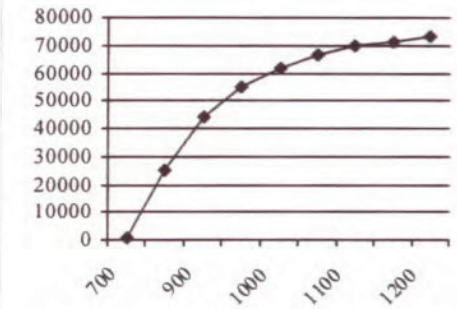
Meter:	Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	268647
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR121990

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☑ 6 inches ☐ Other: Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☑ Side ☐ Below ☐ Other: Temperature: 76 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399620	400
x 1000	100	100	100		100
x 100	40	400	400	39976	400
x 100	10	100	100		100
x 10	4	400	400	3998	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	733	
800	24767	
900	43898	
950	55077	
1000	61506	
1050	66247	
1100	69911	
1150	71265	9837
1200	73325	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV =1150

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☑ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☐ Other Source:

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

Certificate of Calibration

Calibration and Voltage Plateau

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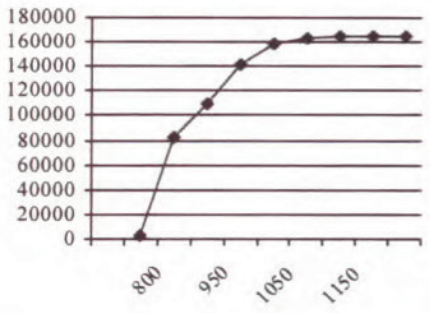
Meter:	Manufacturer: Ludlum	Model Number:	2221	Serial Number:	228808
Detector:	Manufacturer: Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807E

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☐ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 75 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398703	400
x 1000	100	100	100		100
x 100	40	400	400	39873	400
x 100	10	100	100		100
x 10	4	400	400	3980	400
x 10	1	100	100		100
x 1	400	400	400	398	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	2343	
800	82482	
900	110268	
950	142430	
1000	159367	
1050	163923	
1100	165400	5579
1150	165017	
1200	165020	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1100

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

Certificate of Calibration

Calibration and Voltage Plateau

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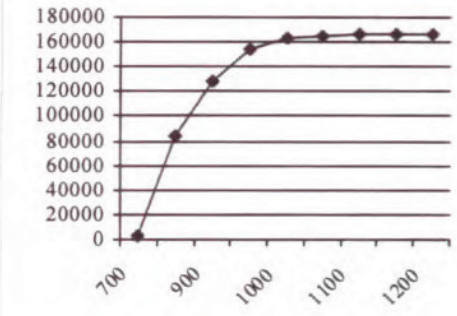
Meter:	Manufacturer: Ludlum	Model Number:	2221	Serial Number:	254783
Detector:	Manufacturer: Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807J

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 74 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.45 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398531	400
x 1000	100	100	100		100
x 100	40	400	400	39821	400
x 100	10	100	100		100
x 10	4	400	400	3992	400
x 10	1	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	3592	
800	84359	
900	127382	
950	153448	
1000	162879	
1050	165171	
1100	166250	5923
1150	166359	
1200	166395	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1100

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

Certificate of Calibration

Calibration and Voltage Plateau

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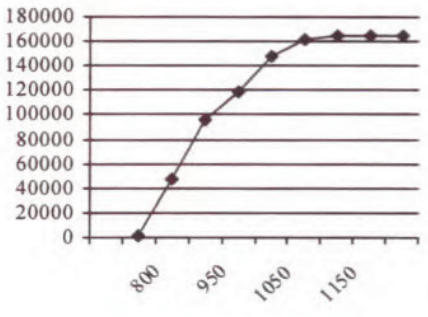
Meter:	Manufacturer: Ludlum	Model Number:	2221	Serial Number:	268647
Detector:	Manufacturer: Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807D

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 76 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399620	400
x 1000	100	100	100		100
x 100	40	400	400	39976	400
x 100	10	100	100		100
x 10	4	400	400	3998	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	1417	
800	46705	
900	96517	
950	119004	
1000	147880	
1050	161869	
1100	164538	
1150	164372	5650
1200	165214	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1150

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: LUDLUM 44-10 Serial No. PR150852 Cal. Due Date: 10/4/11

Source: Cs-137 Activity: 4.74 μCi (5/11/94) Serial No. 328-94
DATED: 3.24 μCi (10/22/10)

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:30	5.7	1200	99	50883	8817	42066	–	cf
10/25/10	18:45	5.3	1204	99	50097	8829	41268	–	cf
10/26/10	06:00	5.5	1205	99	49083	8494	40589	–	cf
10/29/10	06:15	5.6	1205	100	48473	8680	39793	–	cf
10/29/10	16:30	5.5	1202	99	49399	9374	40025	–	cf

ABQ *

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: LUDLUM 44-10 Serial No. PR121990 Cal. Due Date: 10/4/11

Source: Cs-137 Activity: 4.74 μCi (5/11/94) Serial No. 328-94
DATED: 3.24 μCi (10/24/10)

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:30	5.2	1155	102	50825	8819	42006	–	cf
10/25/10	18:45	5.1	1155	102	50567	8667	41900	–	cf
10/26/10	06:00	4.8	1156	101	50643	8422	42221	–	cf
10/29/10	06:15	5.1	1156	101	49297	8795	40502	–	cf
* 10/29/10	16:45	5.0	1153	101	49736	9697	40039	–	cf

ABQ

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.7	1200	99	171468	9991	161477	-	cf
10/25/10	18:45	5.3	1203	100	168639	9958	158681	-	cf
10/26/10	06:00	5.5	1204	99	168460	9554	158906	-	cf
10/27/10	07:00	5.7	1203	100	168780	9467	159313	-	cf
10/27/10	17:30	5.6	1204	99	168471	9538	158933	-	cf
10/28/10	06:00	5.7	1205	99	167746	9450	158296	-	cf
10/28/10	17:15	5.5	1202	99	168184	9404	158780	-	cf
10/29/10	06:15	5.6	1205	100	168591	9551	159040	-	cf
ABG * 10/29/10	16:30	5.5	1202	99	168723	10654	158069	-	cf
11/1/10	06:15	5.7	1205	99	168144	9870	158274	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/2/10	06:30	5.4	1205	99	168224	9760	158464	-	CF
11/2/10	17:15	5.5	1201	100	168244	8536	158708	-	cf
11/3/10	06:30	5.6	1204	99	168053	9602	158451	-	cf
11/3/10	17:15	5.4	1200	99	167952	9680	158272	-	cf
11/4/10	06:30	5.6	1204	100	168311	9714	158597	-	cf
11/4/10	17:38	5.3	1203	99	168265	9972	158293	-	cf
11/5/10	06:30	5.3	1204	100	167987	9771	158216	-	cf
ALQ * 10/5/10	15:40	5.3	1200	99	168747	10714	158033	-	cf
11/10/10	05:25	5.5	1204	100	168182	9460	158722	-	cf
11/10/10	16:25	5.2	1205	100	167928	9482	158446	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

(1)

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. ~~254783~~ 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 ~~5~~ E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	05:30	5.4	1204	100	169071	9630	159441	–	[signature]
11/11/10	19:00	5.2	1203	99	167397	9645	157752	–	[signature]
11/12/10	08:00	5.3	1205	100	168152	9862	158290	–	[signature]
* ABQ 11/12/10	17:15	5.2	1206	100	168755	10373	158382	–	[signature]

Reviewed By: [signature] Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 254783 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 J Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.2	1102	100	172320	9991	162329	-	cf
11/3/10	06:30	5.0	1105	100	169110	10091	159019	-	cf
11/3/10	17:15	4.8	1100	100	168508	10082	158426	-	cf
11/4/10	06:30	5.6	1104	101	168713	10140	158573	-	cf
11/4/10	17:15	5.3	1103	100	168975	10234	158741	-	cf
11/5/10	06:30	5.4	1105	100	168437	10342	158095	-	cf
ABQ * 11/5/10	15:40	5.3	1101	100	170644	10823	159821	-	cf
11/10/10	05:20	5.4	1105	100	169268	9717	159551	-	cf
11/10/10	16:30	5.1	1105	100	169684	10118	159566	-	cf
11/11/10	05:15	5.2	1104	100	169341	9900	159441	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 254783 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 J Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	19:05	5.0	1104	100	169307	10085	159222	–	cf
11/12/10	07:10	5.1	1105	100	168765	10197	159568	–	cf
* ABQ 11/12/10	17:10	5.1	1106	100	167648	10576	157072	–	cf

Reviewed By: JC Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.2	1152	101	172389	9650	162739	—	cf
10/25/10	18:45	5.1	1155	101	168423	9927	158496	—	cf
10/26/10	06:00	4.8	1156	101	168886	9784	159102	—	cf
10/27/10	07:00	5.2	1155	100	168512	9665	158847	—	cf
10/27/10	17:30	5.1	1154	101	169305	9398	159907	—	cf
10/28/10	06:00	5.2	1155	101	168912	9709	159203	—	cf
10/28/10	17:15	5.0	1153	101	169018	9672	159346	—	cf
10/29/10	06:15	5.1	1158	101	169015	9870	159145	—	cf
ABQ * 10/29/10	16:45	5.0	1153	101	169389	10945	158444	—	cf
11/1/10	06:15	5.2	1155	101	168650	10095	158555	—	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/2/10	06:30	5.2	1156	99	168698	9823	158875	-	cf
11/2/10	17:15	5.0	1153	100	169138	10152	158986	-	cf
11/3/10	06:30	5.1	1155	101	168056	10025	158031	-	cf
11/3/10	~~06~~ 17:30	5.0	1151	100	169537	9883	159654	-	cf
11/4/10	06:30	5.1	1155	101	168134	9836	158298	-	cf
11/4/10	17:15	5.0	1154	100	168537	9918	158619	-	cf
11/5/10	06:20	5.1	1156	101	168003	10077	157926	-	cf
ABQ * 11/5/10	15:50	4.9	1153	101	170070	10776	159294	-	cf
11/10/10	05:15	5.1	1156	101	168682	9817	158865	-	cf
11/10/10	16:35	4.9	1157	102	169283	9898	159385	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. N/A

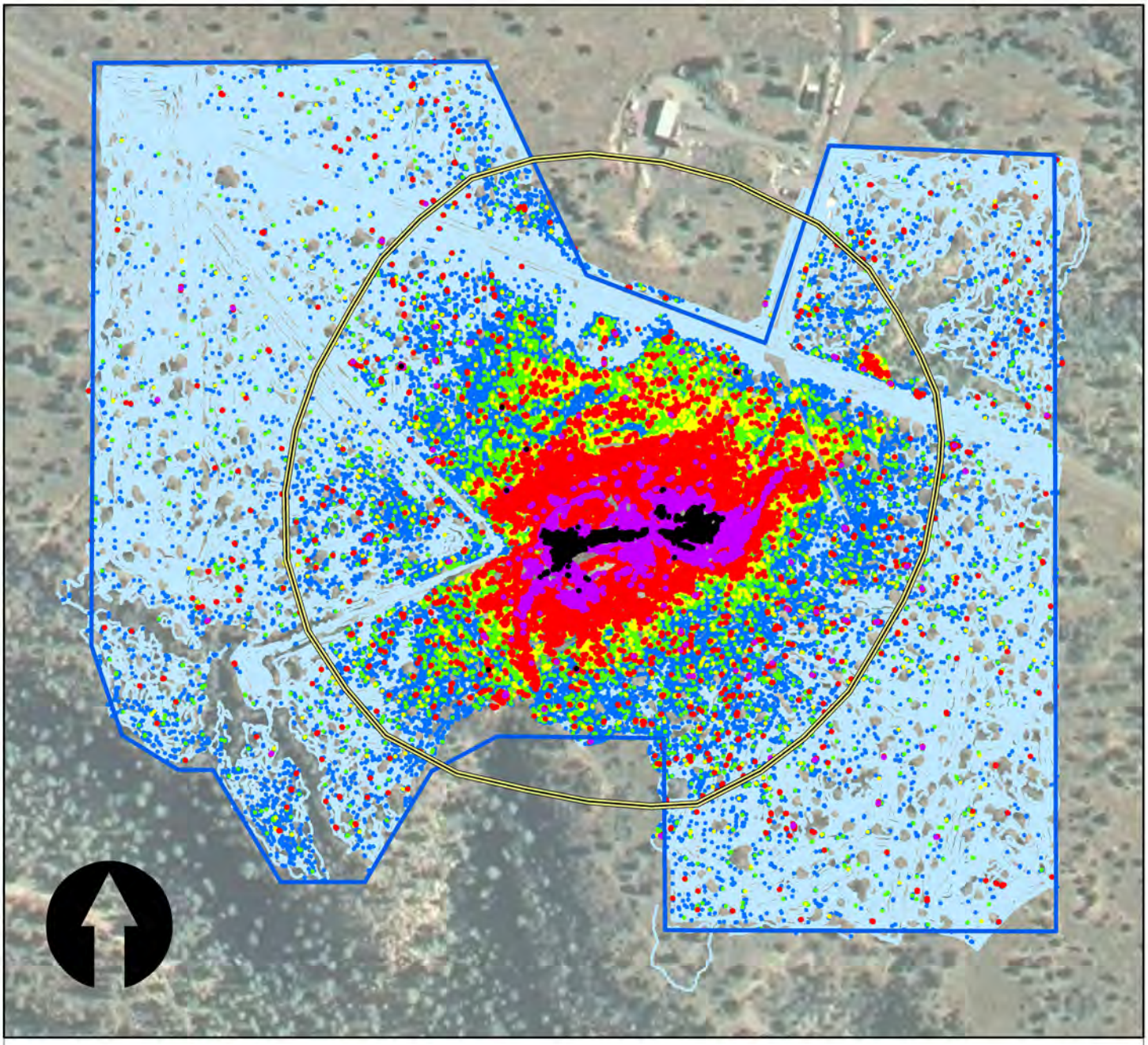
Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	05:10	5.0	1156	101	168923	9919	159004	-	cf
11/11/10	~~07~~:15	4.8	1155	101	169416	9813	159603	-	cf
11/12/10	07:50	5.0	1156	101	168792	9842	158950	-	cf
11/12/10	17:10	4.9	1157	101	169766	10413	159353	-	cf

* ABQ

Reviewed By: JC Date: 11/19/10

ERG Form 1.30A



Legend

FIDLER Survey

(cpm)

- < 1.25 BKG (28,125 cpm)
- 1.25 - 1.5 BKG
- 1.5 - 1.75 BKG
- 1.75 - 2.0 BKG
- 2.0 - 4.0 BKG
- 4.0 - 8.0 BKG
- > 8.0 BKG (180,000 cpm)

EF Firing Site Boundary

Site Background Delineation Boundry

0 125 250 500 750 1,000 Feet



Legend

FIDLER Survey

(cpm)

- < 1.25 BKG (21,250 cpm)
- 1.25 - 1.5 BKG
- 1.5 - 1.75 BKG
- 1.75 - 2.0 BKG
- > 2.0 BKG (34,000 cpm)

0 37.5 75 150 225 300

Feet



Legend

FIDLER Survey

(cpm)

- < 1.25 BKG (28,125 cpm)
- 1.25 - 1.5 BKG
- 1.5 - 1.75 BKG
- 1.75 - 2.0 BKG
- > 2.0 BKG (45,000 cpm)

0 37.5 75 150 225 300

Feet



Legend

Nal Detector Survey

(cpm)

- < 1.25 BKG (16,250 cpm)
- 1.25 - 1.5 BKG
- 1.5 - 1.75 BKG
- 1.75 - 2.0 BKG
- > 2.0 BKG (26,000 cpm)

0 37.5 75 150 225 300

Feet



Legend

NaI Detector Survey

(cpm)

- < 1.25 BKG (22,500 cpm)
- 1.25 - 1.5 BKG
- 1.5 - 1.75 BKG
- 1.75 - 2.0 BKG
- > 2.0 BKG (36,000 cpm)

0 37.5 75 150 225 300

Feet

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: LUDLUM 44-10 Serial No. PR150852 Cal. Due Date: 10/4/11

Source: Cs-137 Activity: 4.74 μCi (5/11/94) Serial No. 328-94
DATED: 3.24 μCi (10/22/10)

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:30	5.7	1200	99	50883	8817	42066	–	cf
10/25/10	18:45	5.3	1204	99	50097	8829	41268	–	cf
10/26/10	06:00	5.5	1205	99	49083	8494	40589	–	cf
10/29/10	06:15	5.6	1205	100	48473	8680	39793	–	cf
10/29/10	16:30	5.5	1202	99	49399	9374	40025	–	cf

ABQ *

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: LUDLUM 44-10 Serial No. PR121990 Cal. Due Date: 10/4/11

Source: Cs-137 Activity: 4.74 μCi (5/11/94) Serial No. 328-94
DATED: 3.24 μCi (10/24/10)

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:30	5.2	1155	102	50825	8819	42006	–	cf
10/25/10	18:45	5.1	1155	102	50567	8667	41900	–	cf
10/26/10	06:00	4.8	1156	101	50643	8422	42221	–	cf
10/29/10	06:15	5.1	1156	101	49297	8795	40502	–	cf
* 10/29/10	16:45	5.0	1153	101	49736	9697	40039	–	cf

ABQ

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.7	1200	99	171468	9991	161477	-	cf
10/25/10	18:45	5.3	1203	100	168639	9958	158681	-	cf
10/26/10	06:00	5.5	1204	99	168460	9554	158906	-	cf
10/27/10	07:00	5.7	1203	100	168780	9467	159313	-	cf
10/27/10	17:30	5.6	1204	99	168471	9538	158933	-	cf
10/28/10	06:00	5.7	1205	99	167746	9450	158296	-	cf
10/28/10	17:15	5.5	1202	99	168184	9404	158780	-	cf
10/29/10	06:15	5.6	1205	100	168591	9551	159040	-	cf
ABG * 10/29/10	16:30	5.5	1202	99	168723	10654	158069	-	cf
11/1/10	06:15	5.7	1205	99	168144	9870	158274	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/2/10	06:30	5.4	1205	99	168224	9760	158464	-	CF
11/2/10	17:15	5.5	1201	100	168244	8536	158708	-	cf
11/3/10	06:30	5.6	1204	99	168053	9602	158451	-	cf
11/3/10	17:15	5.4	1200	99	167952	9680	158272	-	cf
11/4/10	06:30	5.6	1204	100	168311	9714	158597	-	cf
11/4/10	17:38	5.3	1203	99	168265	9972	158293	-	cf
11/5/10	06:30	5.3	1204	100	167987	9771	158216	-	cf
ALQ * 10/5/10	15:40	5.3	1200	99	168747	10714	158033	-	cf
11/10/10	05:25	5.5	1204	100	168182	9460	158722	-	CF
11/10/10	16:25	5.2	1205	100	167928	9482	158446	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

(1)

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. ~~254783~~ 228808 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 ~~5~~ E Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	05:30	5.4	1204	100	169071	9630	159441	–	
11/11/10	19:00	5.2	1203	99	167397	9645	157752	–	
11/12/10	08:00	5.3	1205	100	168152	9862	158290	–	
* ABQ 11/12/10	17:15	5.2	1206	100	168755	10373	158382	–	

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 254783 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 J Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.2	1102	100	172320	9991	162329	-	cf
11/3/10	06:30	5.0	1105	100	169110	10091	159019	-	cf
11/3/10	17:15	4.8	1100	100	168508	10082	158426	-	cf
11/4/10	06:30	5.6	1104	101	168713	10140	158573	-	cf
11/4/10	17:15	5.3	1103	100	168975	10234	158741	-	cf
11/5/10	06:30	5.4	1105	100	168437	10342	158095	-	cf
ABQ * 11/5/10	15:40	5.3	1101	100	170644	10823	159821	-	cf
11/10/10	05:20	5.4	1105	100	169268	9717	159551	-	cf
11/10/10	16:30	5.1	1105	100	169684	10118	159566	-	cf
11/11/10	05:15	5.2	1104	100	169341	9900	159441	-	cf

Reviewed By: _____ Date: 11/19/10

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 254783 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 J Cal. Due Date: 10/4/11

Source: Am-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	19:05	5.0	1104	100	169307	10085	159222	–	cf
11/12/10	07:10	5.1	1105	100	168765	10197	159568	–	cf
* ABQ 11/12/10	17:10	5.1	1106	100	167648	10576	157072	–	cf

Reviewed By: JCQ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. _____

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
10/25/10	08:00	5.2	1152	101	172389	9650	162739	—	cf
10/25/10	18:45	5.1	1155	101	168423	9927	158496	—	cf
10/26/10	06:00	4.8	1156	101	168886	9784	159102	—	cf
10/27/10	07:00	5.2	1155	100	168512	9665	158847	—	cf
10/27/10	17:30	5.1	1154	101	169305	9398	159907	—	cf
10/28/10	06:00	5.2	1155	101	168912	9709	159203	—	cf
10/28/10	17:15	5.0	1153	101	169018	9672	159346	—	cf
10/29/10	06:15	5.1	1156	101	169015	9870	159145	—	cf
ABQ * 10/29/10	16:45	5.0	1153	101	169389	10945	158444	—	cf
11/1/10	06:15	5.2	1155	101	168650	10095	158555	—	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/2/10	06:30	5.2	1156	99	168698	9823	158875	-	cf
11/2/10	17:15	5.0	1153	100	169138	10152	158986	-	cf
11/3/10	06:30	5.1	1155	101	168056	10025	158031	-	cf
10/3/10	~~06~~ 17:30	5.0	1151	100	169537	9883	159654	-	cf
11/4/10	06:30	5.1	1155	101	168134	9836	158298	-	cf
11/4/10	17:15	5.0	1154	100	168537	9918	158619	-	cf
11/5/10	06:20	5.1	1156	101	168003	10077	157926	-	cf
ABCQ * 11/5/10	15:50	4.9	1153	101	170070	10776	159294	-	cf
11/10/10	05:15	5.1	1156	101	168682	9817	158865	-	cf
11/10/10	16:35	4.9	1157	102	169283	9898	159385	-	cf

Reviewed By: _____ Date: 11/19/10

ERG Form 1.30A

ERG

Function Check Form
Single Channel Detector

Ratemeter: LUDLUM 2221 Serial No. 268647 Cal. Due Date: 10/4/11

Detector: ALPHA SPECTRA FIDLER Serial No. 010807 D Cal. Due Date: 10/4/11

Source: AM-241 Activity: 1 μCi Serial No. N/A

Comments: _____

Date	Time	Battery	High Voltage	Threshold	Gross Counts	Background	Net Counts	Efficiency	Initial
11/11/10	05:10	5.0	1156	101	168923	9919	159004	-	cf
11/11/10	~~07~~:15	4.8	1155	101	169416	9813	159603	-	cf
11/12/10	07:50	5.0	1156	101	168792	9842	158950	-	cf
11/12/10	17:10	4.9	1157	101	169766	10413	159353	-	cf

* ABQ

Reviewed By: JC Date: 11/19/10

ERG Form 1.30A

Certificate of Calibration

Calibration and Voltage Plateau

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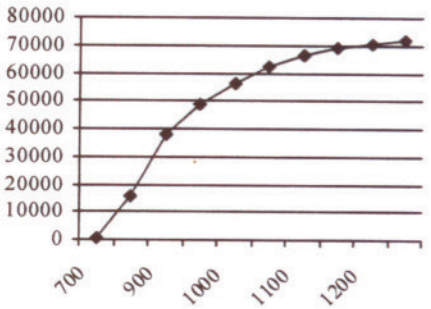
Meter: Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	228808
Detector: Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR150852

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☑ 6 inches ☐ Other: Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☑ Side ☐ Below ☐ Other: Temperature: 75 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	358703	400
x 1000	100	100	100		100
x 100	40	400	400	39873	400
x 100	10	100	100		100
x 10	4	400	400	3980	400
x 10	1	100	100		100
x 1	400	400	400	398	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	451	
800	15297	
900	37725	
950	48518	
1000	56316	
1050	62674	
1100	66181	
1150	69304	
1200	70371	10384
1250	71921	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV =1200

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☑ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☐ Other Source:

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/12/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

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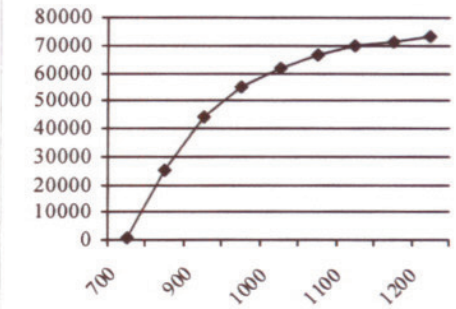
Meter:	Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	268647
Detector:	Manufacturer:	Ludlum	Model Number:	44-10	Serial Number:	PR121990

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☑ 6 inches ☐ Other: Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☑ Side ☐ Below ☐ Other: Temperature: 76 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399620	400
x 1000	100	100	100		100
x 100	40	400	400	39976	400
x 100	10	100	100		100
x 10	4	400	400	3998	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	733	
800	24767	
900	43898	
950	55077	
1000	61506	
1050	66247	
1100	69911	
1150	71265	9837
1200	73325	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 1-min. Recommended HV =1150

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☑ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☐ Other Source:

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

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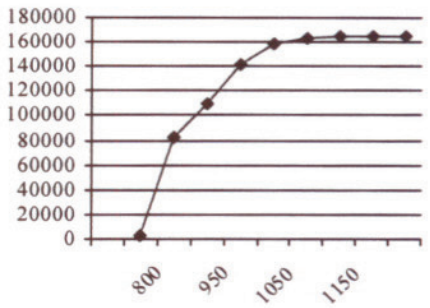
Meter: Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	228808
Detector: Manufacturer:	Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807E

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☐ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 75 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398703	400
x 1000	100	100	100		100
x 100	40	400	400	39873	400
x 100	10	100	100		100
x 10	4	400	400	3980	400
x 10	1	100	100		100
x 1	400	400	400	398	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	2343	
800	82482	
900	110268	
950	142430	
1000	159367	
1050	163923	
1100	165400	5579
1150	165017	
1200	165020	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1100

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
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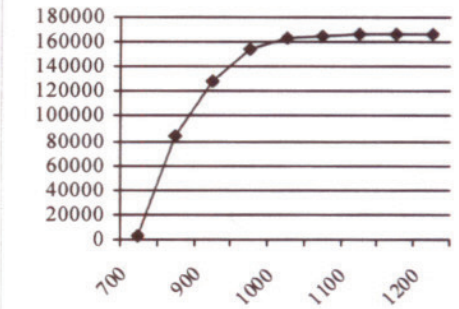
Meter: Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	254783
Detector: Manufacturer:	Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807J

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 74 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.45 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	398531	400
x 1000	100	100	100		100
x 100	40	400	400	39821	400
x 100	10	100	100		100
x 10	4	400	400	3992	400
x 10	1	100	100		100
x 1	400	400	400	399	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	3592	
800	84359	
900	127382	
950	153448	
1000	162879	
1050	165171	
1100	166250	5923
1150	166359	
1200	166395	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1100

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

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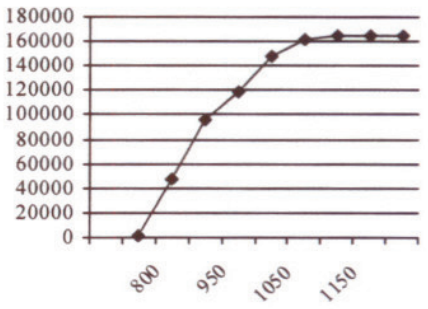
Meter: Manufacturer:	Ludlum	Model Number:	2221	Serial Number:	268647
Detector: Manufacturer:	Alpha Spectra	Model Number:	FIDLER	Serial Number:	010807D

☑ Mechanical Check ☑ Geotropism ☑ THR/WIN Operation ☑ Audio Check ☑ Battery Check (Min 4.4 VDC)
☑ F/S Response Check ☑ Meter Zeroed ☑ Reset Check HV Check (+/- 2.5%): ☑ 500 V ☑ 1000 V ☑ 1500 V
Source Distance: ☐ Contact ☐ 6 inches ☑ Other: 3/4" Cable Length: ☐ 39-inch ☑ 72-inch ☐ Other:
Source Geometry: ☐ Side ☑ Below ☐ Other: Temperature: 76 °F Relative Humidity 20 %
Threshold: 10 mV Window: Barometric Pressure: 24.51 inches Hg
Instrument found within tolerance: ☑ Yes ☐ No

Range/Multiplier	Reference Setting	"As Found Reading"	Meter Reading	Integrated 1-Min. Count	Log Scale Count
x 1000	400	400	400	399620	400
x 1000	100	100	100		100
x 100	40	400	400	39976	400
x 100	10	100	100		100
x 10	4	400	400	3998	400
x 10	1	100	100		100
x 1	400	400	400	400	400
x 1	100	100	100		100

High Voltage	Source Counts	Background
700	1417	
800	46705	
900	96517	
950	119004	
1000	147880	
1050	161869	
1100	164538	
1150	164372	5650
1200	165214	

Voltage Plateau



Comments: HV Plateau Scaler Count Time = 0.5-min. Recommended HV =1150

Reference Instruments and/or Sources:

Ludlum pulser serial number: ☐ 97743 ☑ 201932 Fluke multimeter serial number: ☐ 8749012
☐ Alpha Source: Th-230 @ 13,000 dpm (1/13/10) sn: 4098-03 ☐ Gamma Source Cs-137 @ 5.37 uCi (1/13/10) sn: 4097-03
☐ Beta Source: Tc-99 @ 17,700 dpm (1/13/10) sn: 4099-03 ☑ Other Source: Am-241 @ 1uCi

Calibrated By: Calibration Date: 10-4-10 Calibration Due: 10-4-11

Reviewed By: Review Date: 10/4/10

This calibration conforms to the requirements and acceptable calibration conditions of ANSI N323A - 1997.
NMRCB Registration No. 921-3 * Calibration of Radiation Detection Instrument Devices

Appendix E

Geophysical Survey Report

SUNBELT GEOPHYSICS P.O. Box 208 Socorro, New Mexico 87801 (575) 838-2941

Geophysical Investigations at SWMU 36-001 (MDA AA) and SWMU 15-007(a) (MDA N) Los Alamos National Laboratory Los Alamos, New Mexico

Prepared for:

TerranearPMC, LLC
4200 W. Jemez Road
4th Floor, Suite P-502
Los Alamos, New Mexico 87544

Prime Contract No: 85785-001-10
TPMC Project No.: 82100
Agreement No.: Sunbeltgeo82100
Task Order No.: 1

David A. Hyndman

December 2010

Introduction

Geophysical investigations have been conducted at two sites within the Los Alamos National Laboratory complex in Los Alamos, New Mexico. These site have been identified as SWMU-36-001, an inactive landfill known as MDA AA, and SWMU 15-007(a), an inactive landfill known as MDA N. The objectives of the geophysical investigation at each site were to delineate the landfill boundaries and to identify anomalous features within the landfills in order to enhance planning for subsequent intrusive characterization and remediation.

The field work for the geophysical investigations was conducted during the period 28 – 31 October, 2010, following required health and safety training. Geophysical methods employed included magnetometry, electromagnetic ground conductivity, ground penetrating radar and high-resolution electromagnetic metal detection.

Labor, instrumentation and technical expertise for the geophysical investigations were provided by Sunbelt Geophysics of Socorro, New Mexico. Coordination, preparation, and oversight were provided by TerranearPMC, LLC (TPMC) of Los Alamos, New Mexico.

Methods

Several geophysical instruments were mobilized for these investigations, including:

- Geometrics Inc. G-858 magnetometer
- Geonics Ltd. EM-31 ground conductivity meter
- Geonics Ltd. EM-61 high-resolution metal detector
- Sensors & Software Ltd. 250 MHz ground penetrating radar (GPR)
- Advanced Geosciences Inc. Sting earth resistivity/IP meter

A total of three (3) different instruments were selected for each site after an examination of local site conditions and brief tests of the instruments to select the methods likely to provide the most robust subsurface characterizations.

A spatial control and data acquisition grid was placed at each site using a transit and tape. The grids established parallel data acquisition traverses separated by 5 ft which were marked with wooden stakes and small dots of spray paint. The areas expected to contain buried wastes as described in ***Portillo and Fence Canyons Aggregate Area Investigation Work Plan, Revision 1, July 2009*** (hereafter the *Work Plan*) had been marked by TPMC prior to the geophysical investigations. The geophysical survey grids were positioned to overlap and extend the marked areas as seemed reasonable.

Data from the instruments were recorded with data loggers intrinsic to each system. These data were downloaded to a computer at the end of each day and examined for quality assurance, archiving and determination of any required re-surveying. The DAT61 (Geonics Ltd.), DAT31 (Geonics Ltd.), MagMapper (Geometrics Inc.), Ekko-View (Sensors & Software Inc.) and the Oasis montaj (Geosoft Ltd.) programs were used for processing and image preparation.

Results

SWMU-36-001, MDA AA

MDA AA is located in an open and relatively level area covering approximately one acre. It is described in the *Work Plan* as having two burial trenches containing burned debris that consisted of wood, sand, plastics, and HE. One trench was suspected to be approximately 80 feet long and 40 feet wide, the other to be 120 feet long and 20 feet wide. The debris was described as being covered with approximately 4 feet of soil. An east – west trending surface depression can be observed running near the southern boundary of the site. This depression appears to be either a partially filled and poorly compacted burial trench or part of erosion-control measures mentioned in the *Work Plan* to have been implemented in 1996. There is rip-rap stabilized by chain link fencing at the eastern end of this depression and at other small areas along the eastern edge of the site.

MDA AA was investigated by conducting surveys with a Geonics Ltd. EM-61 high-resolution metal detector, a Geometrics Inc. G-858 magnetometer, and a Sensors & Software Ltd. 250 MHz GPR system. The survey grid extended 200 feet north – south and 195 feet east – west.

An image of the EM-61 metal detection data is presented in Figure 1. These data have been processed to accentuate the major concentrations of buried metal at the expense of small and shallow metal ("Difference" response). Three distinct burial trenches are observed which have no surface expression. There is also a significant occurrence of buried metal at the western end of the surface depression, and minor buried metal along the run of the surface depression. Approximate depths of burial (soil cover) are annotated on the figure.

An image of the magnetometer data is provided in Figure 2. These data are consistent with the EM-61 data in delineating the three trenches containing buried metal and buried material in the western end of the surface depression. The response from rip-rap is noted near the southeast corner of the survey. The approximate boundaries of the burial trenches are indicated by a dashed line.

A mild magnetic feature is observed to the northeast of the three trenches containing buried metal. This feature is marked "?" and consists of two faint but linear and parallel magnetic ridges. This magnetic feature is approximately the same size and is oriented parallel to the burial trenches to the south. This feature suggests that a fourth trench may have been excavated but backfilled with soil. This is assumed to be an empty trench but there is a possibility this trench was filled with non-metallic material such as sand that was mentioned in the *Work Plan*.

The GPR survey was disappointing with effective penetration limited to approximately 4 feet. This was not deep enough to robustly image the buried metal in the trenches, estimated from the EM-61 data (Figure 1) to be in the range of 4 to 5 feet. North – south GPR profiles along 130E and 190E are given in Figure 3 as examples.

The profile along 130E (top – Figure 3) shows no subsurface features from the surface depression or the southern-most trench. The middle trench provides only some reflected signal. Reasonable reflected signal is obtained from the northern-most trench, some of which is probably from backfill above the wastes and the edges of the trench. This profile along 130E

does demonstrate that the northern-most trench is wider that suggested by the EM-61 and magnetometer data. No subsurface response is seen from the possible empty trench suggested by the magnetic data.

The profile along 190E (bottom – Figure 3) shows a compacted soil layer to the east of the surface depression and the three trenches containing buried metal. This helps to confirm the eastward extent of these features. No subsurface response is seen from the possible empty trench suggested by the magnetic data.

SWMU 15-007(a), MDA N

MDA N is located in a relatively level area with scattered clumps of mature trees and some knee-high vegetation. The *Work Plan* describes a single burial trench suspected to be approximately 300 feet long and 30 feet wide containing debris from the demolition of two buildings. Previous geophysical investigations at this site failed to locate or delineate the suspected trench.

MDA N was investigated by conducting surveys with a Geonics Ltd. EM-61 high-resolution metal detector, a Geometrics Inc. G-858 magnetometer, and a Geonics Ltd. EM-31 ground conductivity meter. The survey grid extended 365 feet north – south and 115 feet east – west.

An image of the EM-61 metal detection data is provided in Figure 4. These data have been processed to display the response from both the large, deep buried metal and the smaller, shallow buried metal ("Primary" response). Gaps are present in the image where mature trees blocked surveying. Approximate depths of burial (soil cover) are annotated on the figure, together with the response from a water line that was marked on site.

Figure 4 reveals a concentration of buried metal from approximately 150N to 265N, 50E to 90E. This area is roughly coincident with the suspected position of the burial trench as given in the *Work Plan*, but not extending as far to the south and significantly wider than expected to the north. Scattered metallic debris can be observed across the site.

An alternate image of the EM-61 data is given in Figure 5. This image is the "Difference" response accentuating the more significant (larger, deeper) buried metal objects. The more significant deposits of waste are seen to be confined to a short and narrow area from approximately 150N to 225N, 75E to 100E. This projection of the buried wastes is more consistent with the trench described in the *Work Plan*, but significantly shorter to both the north and south.

The depth of the buried metal is generally deeper by 1 – 3 feet for the waste in the narrow area identified on Figure 5 than the much broader and longer deposit seen on Figure 4. It is possible that the larger area containing buried metal as seen on Figure 4 is due to old scattered surface debris that was later covered by soil during landscaping and earthmoving after the building demolition mentioned in the *Work Plan*.

An image of the EM-31 ground conductivity data is provided in Figure 6. The response of this instrument can be of two different types. The intended response is a measurement of the apparent electrical conductivity of the soil, but there can also be a strong response when in the

presence of significant metal, either buried or at the surface. Both lateral changes in soil conductivity and the presence of metal are observed in Figure 6. A high response from the metal fence is seen at the southwest corner and a high – low – high response is seen when traversing over the water line in the northern portion of the survey. Of primary interest is the area of low ground conductivity observed from approximately 115N to 225N, 65E to105E.

This area of low ground conductivity is suggestive of disturbed soil. It is coincident with the suspected position of the burial trench as given in the *Work Plan* and is roughly coincident but extends farther to the south than the buried metal seen in Figure 4 and Figure 5. It is possible that the burial trench extends further to the south than indicated by the buried metal, but is filled with soil or non-metallic wastes.

An image of the magnetometer data is provided in Figure 7 with interpretations of the positions of disturbed ground (Figure 6), all buried metal (Figure 4) and the deep buried metal (Figure 5). The magnetic data do not appear to be well correlated to the results of the other instruments except for one isolated occurrence at approximately 225N, 30E. The magnetic data are dominated by northwest to southeast trends or "fabric" that is interpreted to be due to the remnant magnetic character of the underlying rock.

The relatively sparse EM-61 response seen in Figure 4 and Figure 5 and the lack of magnetic response seen in Figure 7 indicate that the waste in this trench is relatively poor in metal content.

Conclusions

The geophysical investigations at MDA AA and MDA N were generally successful in delineating the landfill boundaries and identifying anomalous features within the landfills, although some uncertainties remain.

SWMU-36-001, MDA AA

MDA AA is shown to have three (3) distinct landfill trenches containing significant buried wastes, all approximately 20 feet wide and ranging in length from approximately 70 feet to 130 feet. There is a shallow surface depression to the south of these three trenches that appears to be either a partially filled and poorly compacted burial trench or an erosion-control channel that subsequently received wastes. There may be an excavated trench to the north of the three primary trenches that was backfilled with soil or sand. These interpretations are provided on Figure 8.

SWMU 15-007(a), MDA N

MDA N is shown to contain buried wastes but different interpretations of the extent of the landfill are possible. If all buried metal is considered (Figure 4), the landfill is shorter but wider than anticipated based on the information provided in the *Work Plan*. If only the deeply buried waste (Figure 5) and the possible disturbed soil (Figure 6) is considered, the position of the landfill is coincident with expectations, but significantly shorter to the north and south. These different interpretations are given on Figure 9.

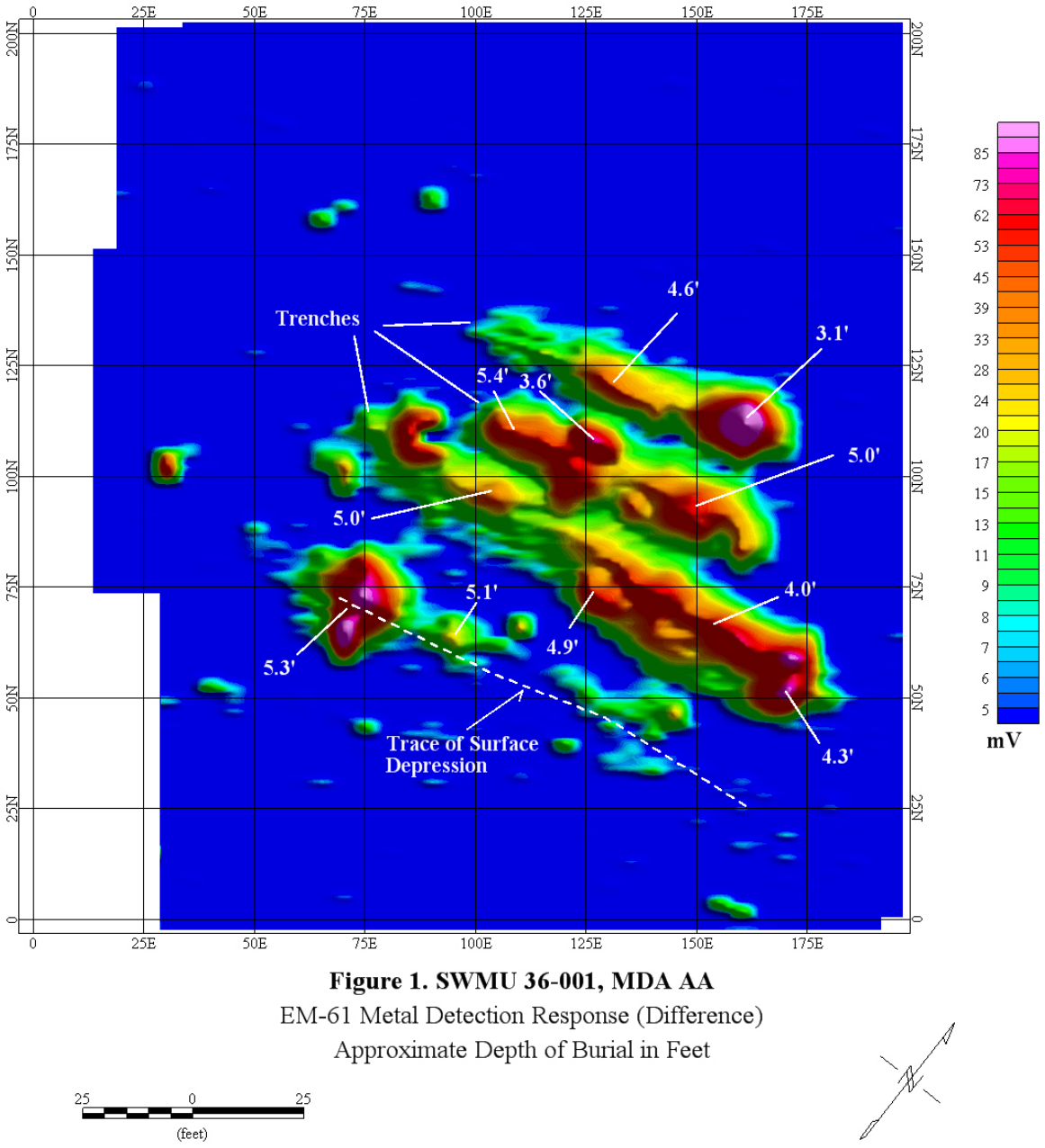


Figure 1. SWMU 36-001, MDA AA

EM-61 Metal Detection Response (Difference)

Approximate Depth of Burial in Feet

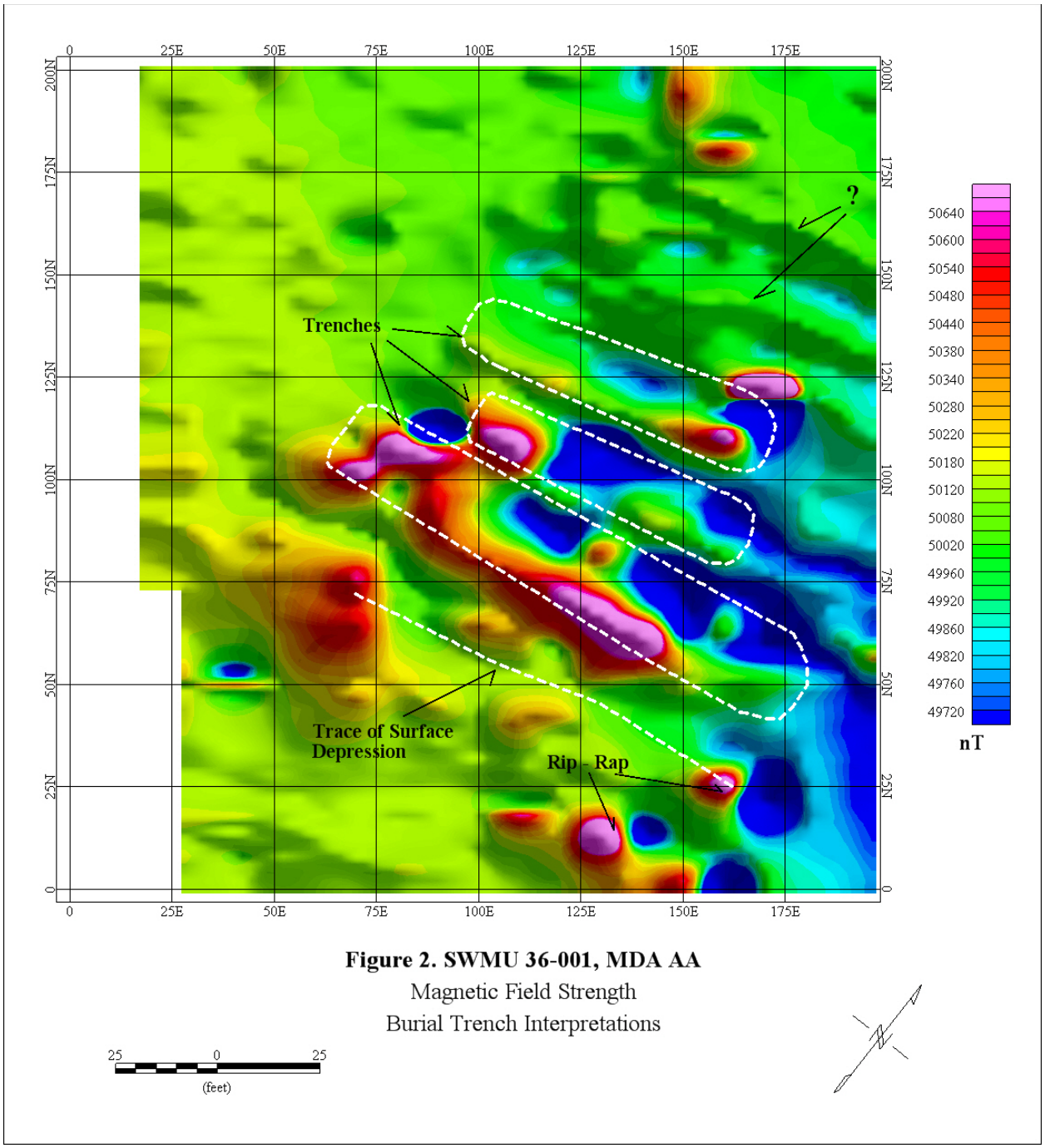


Figure 2. SWMU 36-001, MDA AA

Magnetic Field Strength

Burial Trench Interpretations

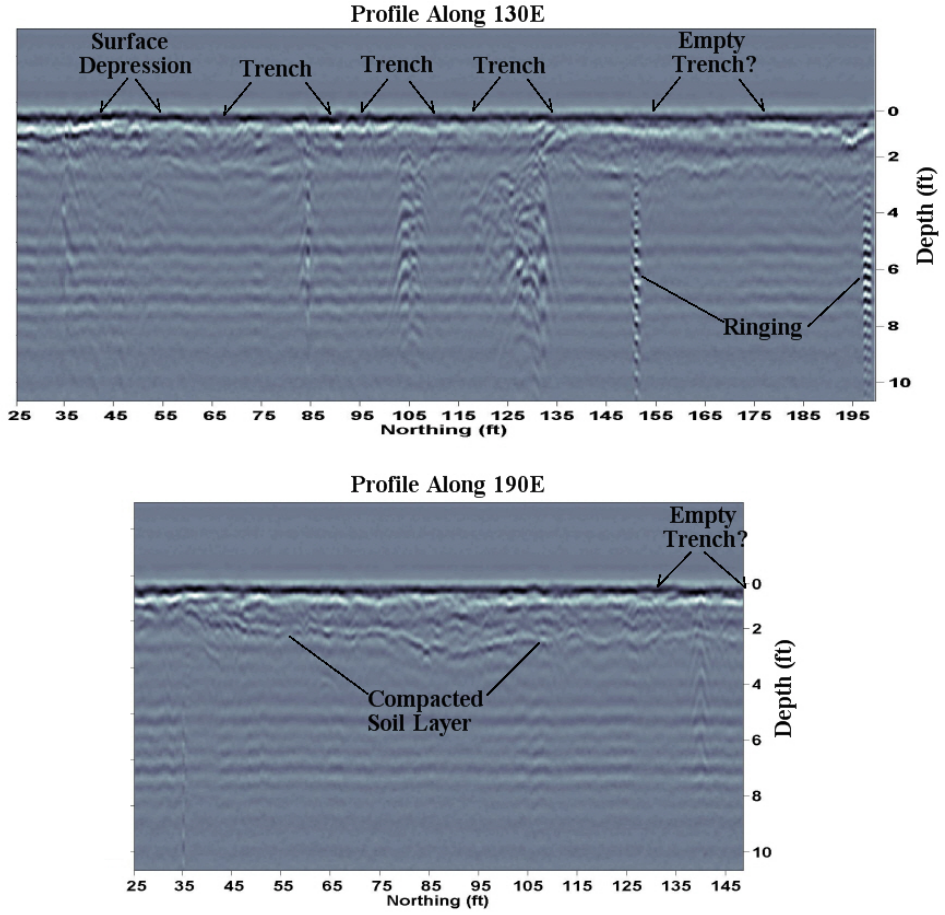


Figure 3. SWMU 36-001, MDA AA

Example GPR Profiles

25 0 25

(feet)

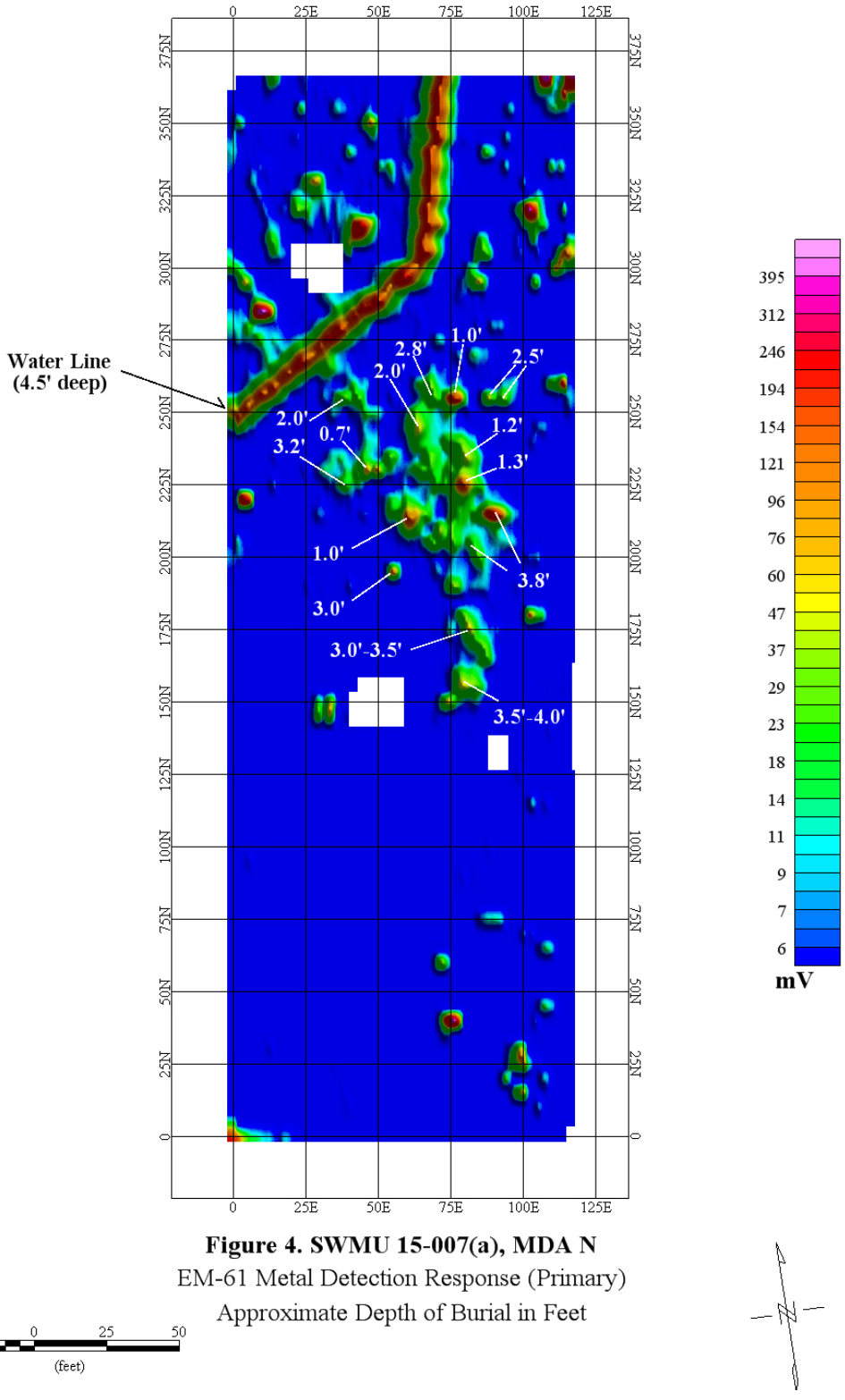


Figure 4. SWMU 15-007(a), MDA N

EM-61 Metal Detection Response (Primary)

Approximate Depth of Burial in Feet

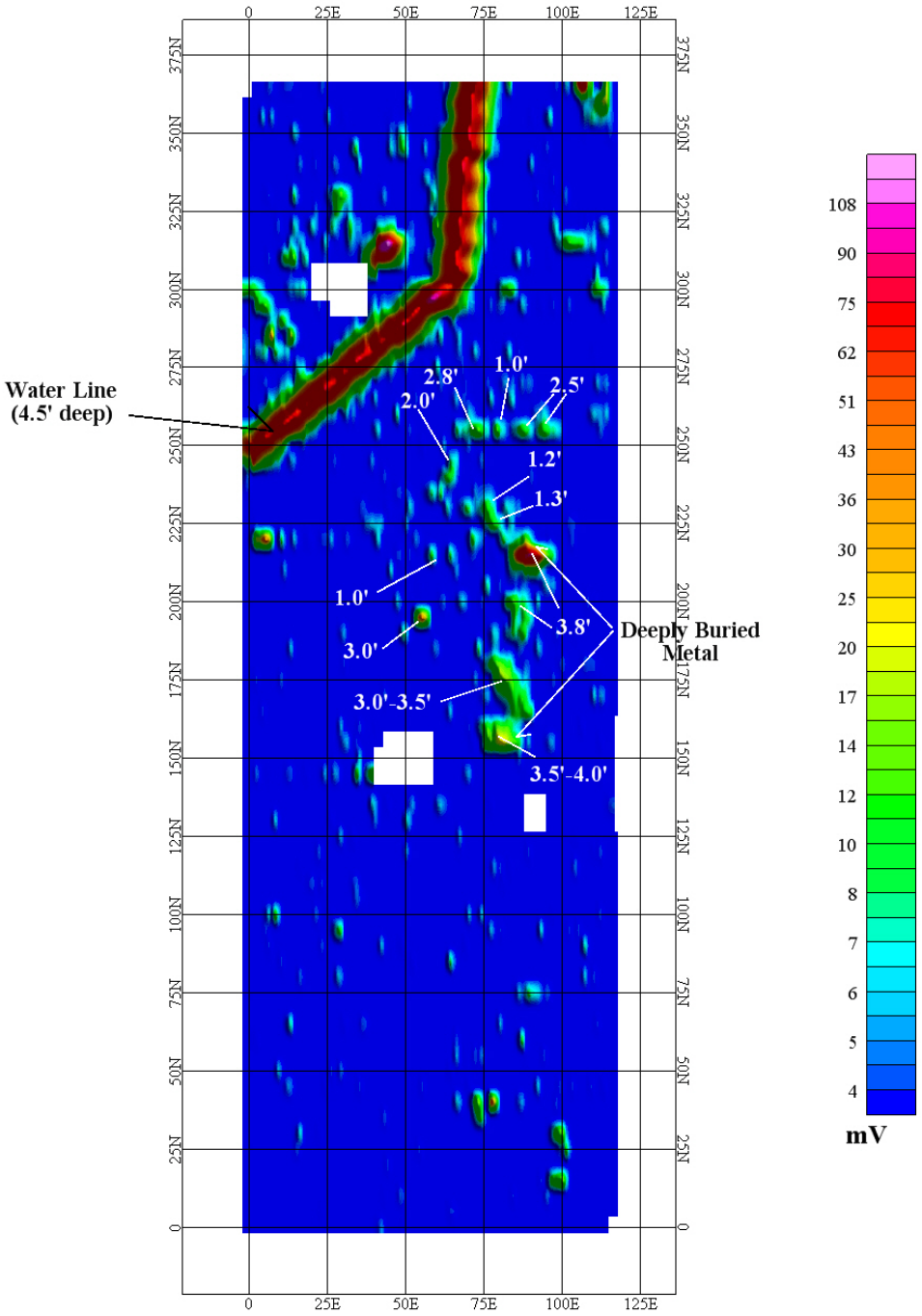


Figure 5. SWMU 15-007(a), MDA N

EM-61 Metal Detection Response (Difference)

Approximate Depth of Burial in Feet

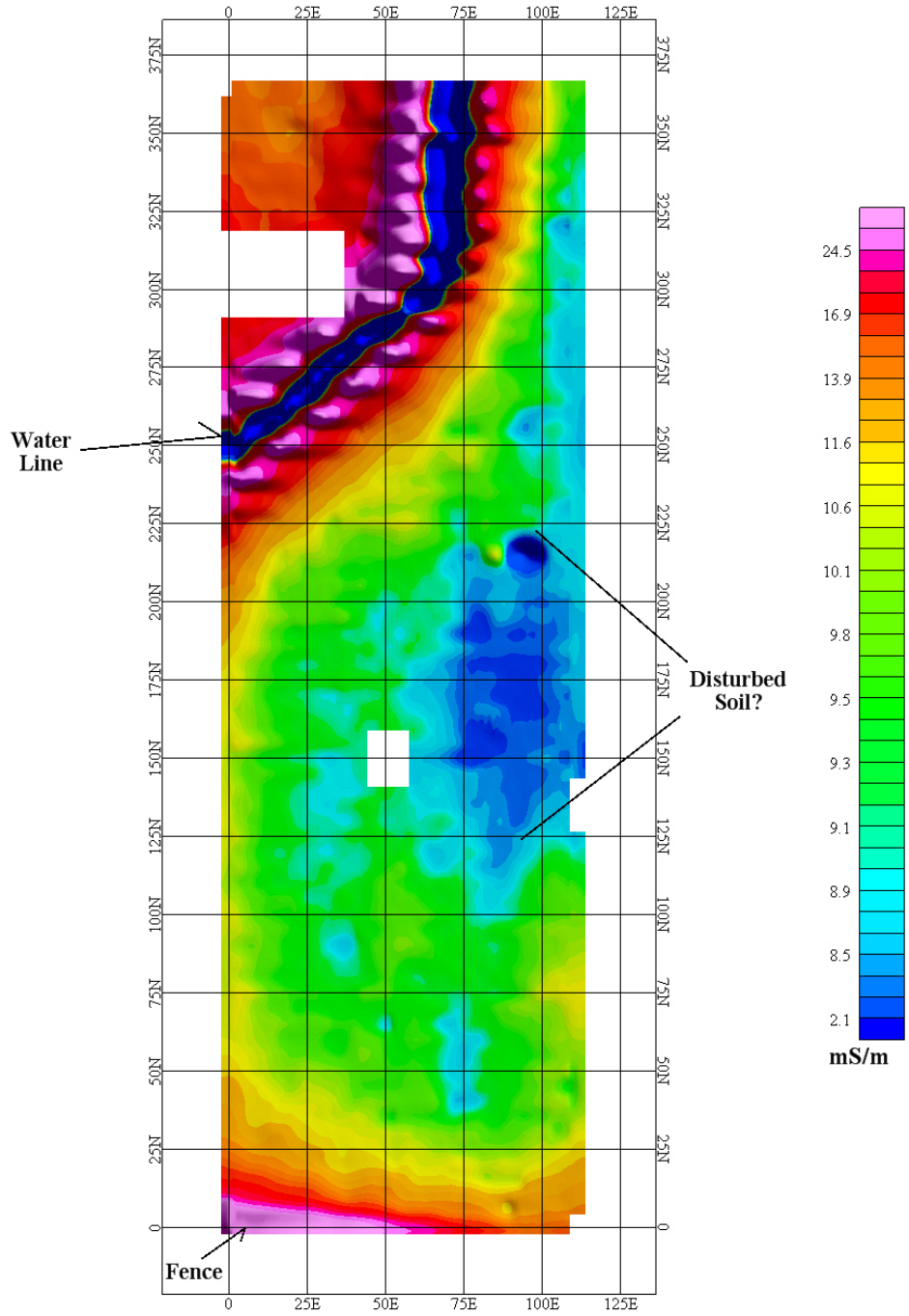


Figure 6. SWMU 15-007(a), MDA N

EM-31 Ground Conductivity

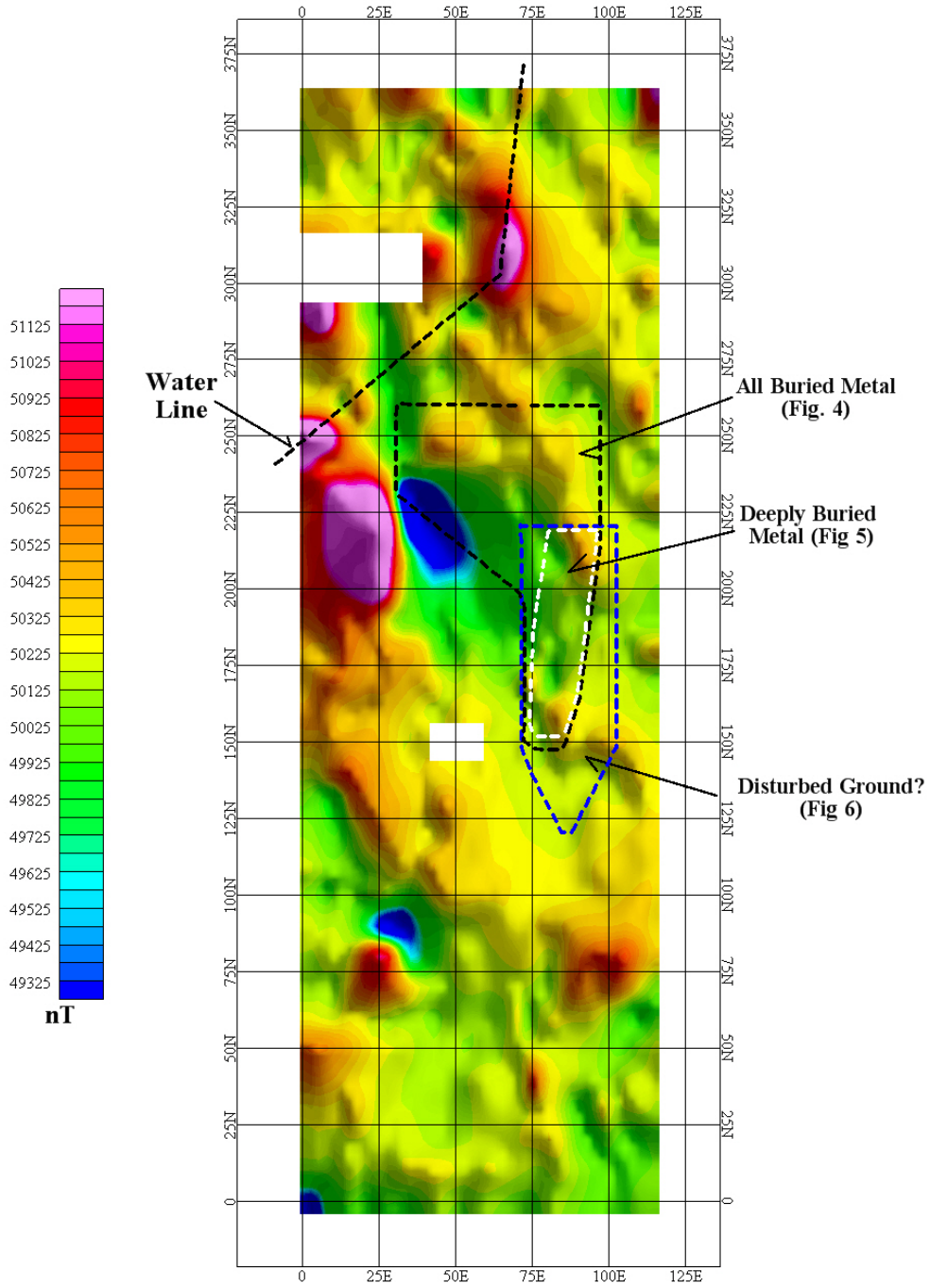


Figure 7. SWMU 15-007(a), MDA N

Magnetic Field Strength

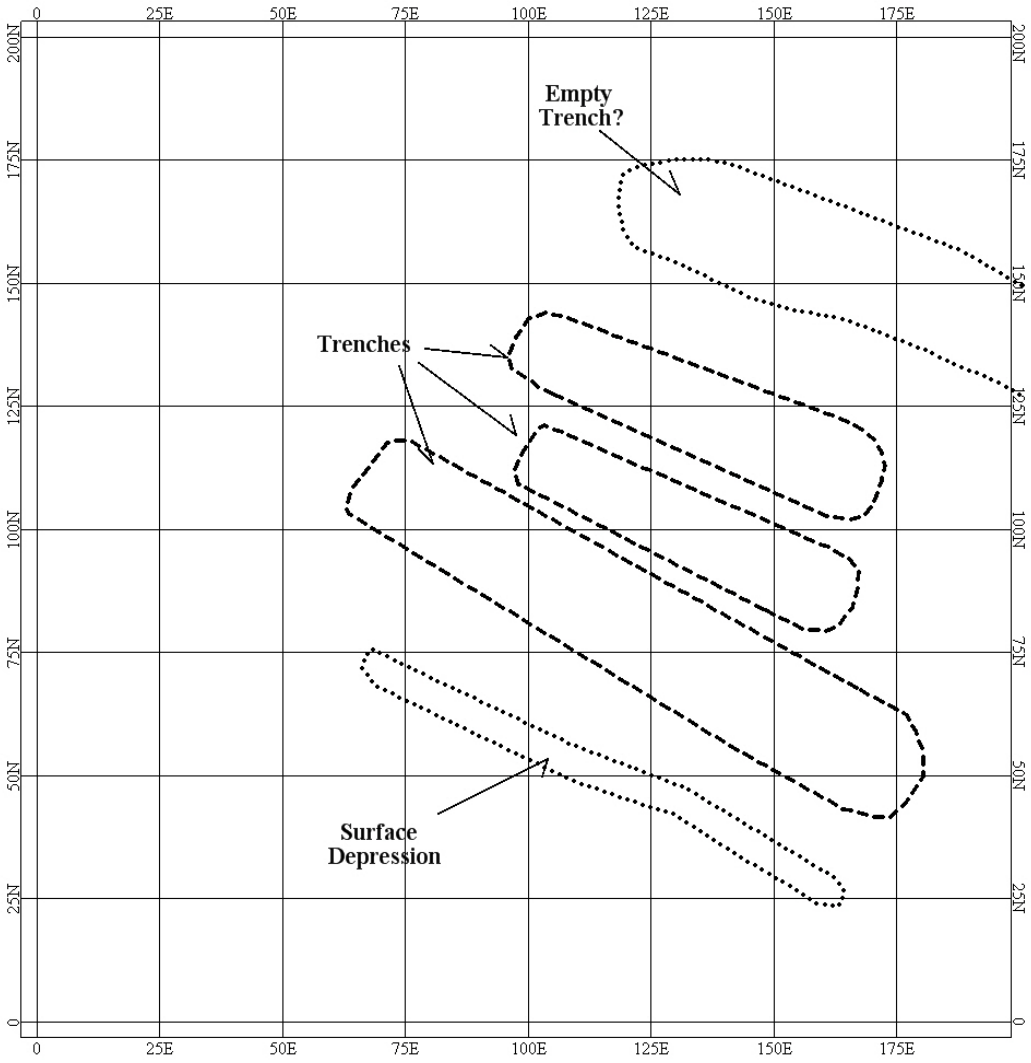


Figure 8. SWMU 36-001, MDA AA

Trench Interpretations

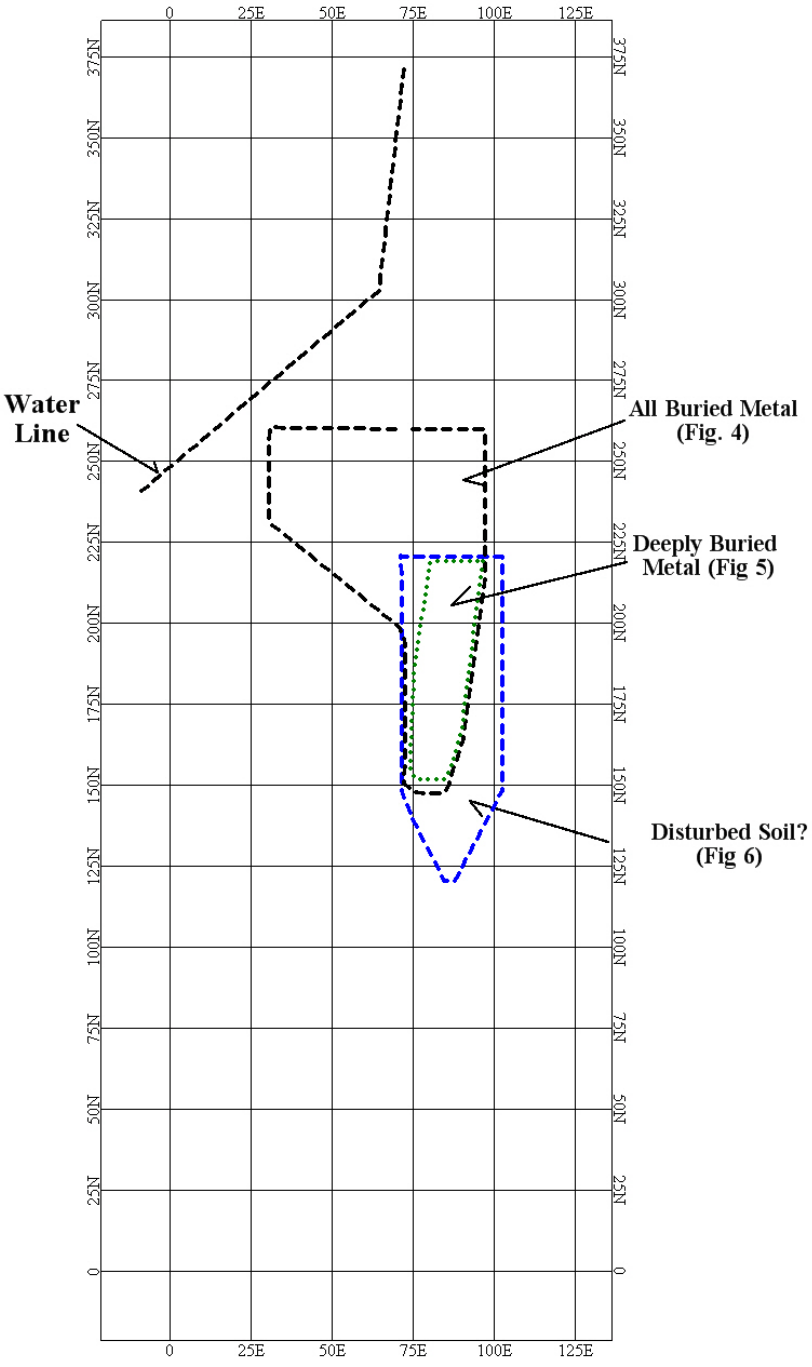
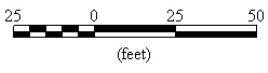
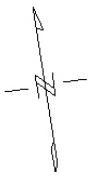


Figure 9. SWMU 15-007(a), MDA N
Interpretations





Appendix F

Analytical Program

F-1.0 INTRODUCTION

This appendix presents the analytical methods and discusses the data-assessment review for samples collected during investigations at the Potrillo and Fence Canyons Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Additionally, this appendix summarizes the effects of data-quality issues on the acceptability of the analytical data.

Quality assurance (QA), quality control (QC), and data validation procedures were implemented in accordance with the Quality Assurance Project Plan Requirements for Sampling and Analysis (LANL 1996, 054609), and LANL's statements of work (SOWs) for analytical laboratory services (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). The results of the QA/QC procedures were used to estimate the accuracy, bias, and precision of the analytical measurements. Samples for QC include method blanks, matrix spikes (MSs), laboratory control samples (LCSs), internal standards (ISs), initial calibration verifications (ICVs) and continuing calibration verifications (CCVs), surrogates, and tracers.

The type and frequency of laboratory QC analyses are described in the SOWs for analytical services (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in Standard Operating Procedure (SOP) 5056, Sample Containers and Preservation.

The following SOPs, available at http://www.lanl.gov/environment/all/qa/adep.shtml, were used for data validation:

- SOP-5161, Routine Validation of Volatile Organic Compound (VOC) Analytical Data
- SOP-5162, Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data
- SOP-5163, Routine Validation of Organochlorine Pesticides (PEST) and Polychlorinated Biphenyls (PCBs) Analytical Data
- SOP-5164, Routine Validation of High Explosives (HE) Analytical Data
- SOP-5165, Routine Validation of Metals Analytical Data
- SOP-5166, Routine Validation of Gamma Spectroscopy Data, Chemical Separation Alpha Spectrometry, Gas Proportional Counting, and Liquid Scintillation Analytical Data
- SOP-5168, Routine Validation of LC/MS/MS High Explosive Analytical Data
- SOP-5169, Routine Validation of Dioxin Furan Analytical Data (EPA Method 1618 and SW-846 EPA Method 8290)
- SOP-5171, Routine Validation of Total Petroleum Hydrocarbons Gasoline Range Organics/Diesel Range Organics Analytical Data (Method 8015B)
- SOP-5191, Routine Validation of LC/MS/MS Perchlorate Analytical Data (SW-846 EPA Method 6850)

Routine data validation was performed for each data package (also referred to as request number), and analytical data were reviewed and evaluated based on U.S. Environmental Protection Agency (EPA) National Functional Guidelines, where applicable (EPA 1994, 048639; EPA 1999, 066649). As a result of the data validation and assessment efforts, qualifiers are assigned to the analytical records as appropriate. The data-qualifier definitions are provided in Appendix A. Sample collection logs (SCLs) and chain-of-custody (COC) forms are provided in Appendix G. The analytical data, instrument printouts, and data validation reports are provided in Appendix G.

F-2.0 ANALYTICAL DATA ORGANIZATION

The investigation of the Potrillo and Fence Canyons Aggregate Area consisted of 27 solid waste management units (SWMUs) and areas of concern (AOCs) within Technical Area 15 (TA-15) and TA-36: SWMUs 15-002, 15-007(a), 15-003; 15-006(a), 15-004(b), 15-004(c), 15-004(f), 15-008(a), 15-009(e), and 15-010(a) and AOCs 15-005(b), 15-006(e), 15-008(f), C-15-004, C-15-005, and C-15-006 at TA-15; and SWMUs 36-001, 36-003(b), 36-006, 36-004(d), and 36-005 and AOCs 36-004(a), 36-004(b), 36-004(c), 36-004(e), C-36-001, and C-36-006(e) at TA-36.

Current and historical data evaluated in this report were collected during Resource Conservation and Recovery Act facility investigations, other corrective actions, and recent investigations. All historical investigation samples were submitted to and analyzed by approved off-site laboratories. These data are determined to be of sufficient quality for decision-making purposes, have been reviewed, and have been revalidated to current QA standards.

F-3.0 INORGANIC CHEMICAL ANALYSES

TA-15

A total of 380 samples (241 soil/fill, 25 sediment, and 114 tuff), plus 33 field duplicates, collected within the Potrillo and Fence Canyons Aggregate Area at TA-15 were analyzed for inorganic chemicals. All 380 samples, plus 33 field duplicates, were analyzed for target analyte list (TAL) metals; 207 samples, plus 21 field duplicates, were analyzed for nitrate, perchlorate, and total cyanide; and 19 samples were analyzed for uranium.

TA-36

A total of 152 samples (99 soil/fill, 40 sediment, and 13 tuff), plus 12 field duplicates, collected within the Potrillo and Fence Canyons Aggregate Area at TA-36 were analyzed for inorganic chemicals. All 152 samples, plus 12 field duplicates, were analyzed for TAL metals; 122 samples, plus 11 field duplicates, were analyzed for nitrate; and 131 samples, plus 12 field duplicates, were analyzed for perchlorate and total cyanide.

The analytical methods used for inorganic chemicals are listed in Table F-1.0-1.

Tables in the investigation report summarize the samples collected and the analyses requested for each site within the Potrillo and Fence Canyons Aggregate Area. All decision-level analytical results are presented in Appendix G (on DVD).

F-3.1 Inorganic Chemical QA/QC Samples

The use of QA/QC samples is designed to provide measures of the accuracy and precision of the data. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. To assess the accuracy and precision of inorganic chemical analyses, LCSs, preparation blanks, MSs, laboratory duplicate samples, interference check samples (ICSs), and serial dilution samples were analyzed as part of the investigation. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) and is described briefly in the sections below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals in soil or tuff, LCS percent recoveries (%R) should fall within the control limits of 75%–125% (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The preparation blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is extracted and analyzed in the same manner as the corresponding environmental samples. Preparation blanks are used to measure bias and potential cross-contamination. All inorganic chemical results should be below the method detection limit (MDL).

MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125%, inclusive, for all spiked analytes (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

Laboratory duplicate samples assess the precision of inorganic chemical analyses. All relative percent differences (RPDs) between the sample and laboratory duplicate should be ±35% for soil (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The ICSs assess the accuracy of the analytical laboratory's interelement and background correction factors used for inductively coupled plasma emission spectroscopy. The ICS %R should be within the acceptance range of 80%–120%. The QC acceptance limits are ±20%.

Serial dilution samples measure potential physical or chemical interferences and correspond to a sample dilution ratio of 1:5. The chemical concentration in the undiluted sample must be at least 50 times the MDL (100 times for inductively coupled plasma mass spectroscopy) for valid comparison. For sufficiently high concentrations, the RPD should be within 10%.

F-3.2 Data Quality Results for Inorganic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

F-3.2.1 Maintenance of COC

SCL/COC forms were properly maintained for all samples analyzed for inorganic chemicals (Appendix G).

F-3.2.2 Sample Documentation

All samples analyzed for inorganic chemicals were properly documented on SCL/COC forms in the field (Appendix G).

F-3.2.3 Sample Dilutions

Some samples were diluted for inorganic chemical analyses. No qualifiers were applied to any inorganic chemical sample results because of dilutions.

F-3.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.5 Holding Times

F-3.2.5.1 TA-15

Five perchlorate results were qualified as estimated not detected (UJ) because the extraction and/or analytical holding times were exceeded by less than 2 times the published method for holding times.

One perchlorate result was qualified as estimated and biased low (J-) because the extraction and/or analytical holding times were exceeded by less than 2 times the published method for holding times.

F-3.2.5.2 TA-36

One perchlorate result was qualified as estimated not detected (UJ) because the extraction and/or analytical holding times were exceeded by less than 2 times the published method for holding times.

Three perchlorate results were qualified as estimated and biased low (J-) because the extraction and/or analytical holding times were exceeded by less than 2 times the published method for holding times.

F-3.2.6 ICVs and CCVs

ICV and CCV criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.7 Interference Check Sample and/or Serial Dilutions

ICS and/or serial dilution criteria were met for all samples analyzed for inorganic chemicals.

F-3.2.8 Laboratory Duplicate Samples

F-3.2.8.1 TA-15

A total of 204 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the reporting limit (RL), and the duplicate RPD was greater than 35% for soil samples.

F-3.2.8.2 TA-36

A total of 67 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL, and the duplicate RPD was greater than 35% for soil samples.

One TAL metals result was qualified as estimated (J) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing.

F-3.2.9 Blanks

F-3.2.9.1 TA-15

A total of 227 TAL metals results and 5 total cyanide results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank.

A total of 148 TAL metals results and 2 total cyanide results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analytes in the initial calibration blank and/or continuing calibration blank.

A total of 128 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analytes in the equipment or rinsate blank.

A total of 110 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.9.2 TA-36

A total of 123 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to 5 times the concentration of the related analytes in the method blank.

A total of 73 TAL metals results were qualified as not detected (U) because the sample results were less than or equal to the concentration of the related analytes in the initial calibration blank and/or continuing calibration blank.

A total of 68 TAL metals results were qualified as not detected (U) because the sample result was less than or equal to 5 times the concentration of the related analytes in the equipment or rinsate blank.

A total of 45 TAL metals results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.10 MS Samples

F-3.2.10.1 TA-15

Four TAL metals results and seven total cyanide results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

Two TAL metals results and 16 total cyanide results were qualified as estimated not detected (UJ) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

A total of 181 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 699 TAL metals results and 7 total cyanide results were qualified as estimated and biased high (J+) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

F-3.2.10.2 TA-36

Two perchlorate results were qualified as estimated not detected (UJ) because the MS/MS duplicate (MSD) %R difference was greater than 20%.

Nine TAL metals results and eight perchlorate results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

Three TAL metals results and 31 total cyanide results were qualified as estimated not detected (UJ) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

A total of 63 TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

Two perchlorate results were qualified as estimated (J) because the MS/MSD %R difference was greater than 20%.

One perchlorate result was qualified as estimated (J) because a low recovery (%R <75%) was observed for this analyte in the associated spike sample.

A total of 402 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

F-3.2.11 LCS Recoveries

F-3.2.11.1 TA-15

Eight TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated LCS.

One total cyanide result was qualified as estimated and biased high (J+) because a high recovery (%R >125%) was observed for this analyte in the associated LCS.

F-3.2.11.2 TA-36

A total of 24 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated LCS.

Two TAL metals results were qualified as estimated and biased low (J-) because a low recovery (%R <75%) was observed for these analytes in the associated LCS.

Two TAL metals results and two total cyanide results were qualified as estimated and biased high (J+) because a high recovery (%R > 125%) was observed for these analytes in the associated LCS.

F-3.2.12 Detection Limits

F-3.2.12.1 TA-15

A total of 118 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the estimated detection limit (EDL) and the MDL.

A total of 608 TAL metals results, 71 nitrate results, 36 perchlorate results, and 8 total cyanide results were qualified as estimated (J) because the sample result was reported as detected between the practical quantitation limit (PQL) and the MDL.

F-3.2.12.2 TA-36

A total of 35 TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the EDL and the MDL.

A total of 221 TAL metals results, 18 nitrate results, eight perchlorate results, and six total cyanide results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-3.2.13 Rejected Results

F-3.2.13.1 TA-15

Eight perchlorate results were qualified as rejected (R) because ion abundance ratios did not meet specifications.

F-3.2.13.2 TA-36

One perchlorate result was qualified as rejected (R) because ion abundance ratios did not meet specifications.

One mercury result was qualified as rejected (R) because the extraction and/or analytical holding times were exceeded by greater than 2 times the published method for holding times.

The rejected data were not used to determine the nature and extent of contamination. However, sufficient data of good quality were available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-4.0 ORGANIC CHEMICAL ANALYSES

TA-15

A total of 361 samples (222 soil/fill, 25 sediment, and 114 tuff), plus 33 field duplicates, collected within the Potrillo and Fence Canyons Aggregate Area at TA-15 were analyzed for organic chemicals. A total of 357 samples, plus 32 field duplicates, were analyzed for high explosives (HE) or explosive compounds; 48 samples, plus 3 field duplicates, were analyzed for dioxin/furans; 46 samples, plus 3 field duplicates, were analyzed for polychlorinated biphenyls (PCBs); 205 samples, plus 21 field duplicates, were analyzed for semivolatile organic compounds (SVOCs); 30 samples, plus 3 field duplicates, were analyzed for total petroleum hydrocarbon (TPH) diesel range organics (DRO) and TPH-gasoline range organics (GRO); and 201 samples, plus 21 field duplicates, were analyzed for volatile organic compounds (VOCs). All QC procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

TA-36

A total of 152 samples (99 soil/fill, 40 sediment, and 13 tuff), plus 12 field duplicates, collected within the Potrillo and Fence Canyons Aggregate Area at TA-36 were analyzed for organic chemicals. A total of 148 samples, plus 12 field duplicates, were analyzed for HE or explosive compounds; 32 samples, plus 2 field duplicates, were analyzed for dioxin/furans; 34 samples, plus 2 field duplicates, were analyzed for PCBs; 146 samples, plus 11 field duplicates, were analyzed for SVOCs; and 146 samples, plus 11 field duplicates, were analyzed for VOCs. All QC procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The analytical methods used for organic chemicals are listed in Table F-1.0-1.

Tables within the investigation report summarize samples collected and the analyses requested from the Potrillo and Fence Canyons Aggregate Area sites. All decision-level analytical results are provided on DVD in Appendix G.

F-4.1 Organic Chemical QA/QC Samples

The use of QA/QC samples is designed to provide measures of the accuracy and precision of the data. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. Calibration verifications, LCSs, method blanks, MSs, surrogates, and ISs were analyzed to assess the accuracy and precision of organic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) and described briefly below.

Calibration verification is the establishment of a quantitative relationship between the response of the analytical procedure and the concentration of the target analyte. There are two aspects of calibration verification: initial and continuing. The initial calibration verifies the accuracy of the calibration curve as well as the individual calibration standards used to perform the calibration. The continuing calibration ensures that the initial calibration is still holding and correct as the instrument is used to process samples. The continuing calibration also serves to determine that analyte identification criteria such as retention times and spectral matching are being met (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The LCS is a sample of a known matrix that has been spiked with compounds that are representative of the target analytes, and it serves as a monitor of overall performance on a “controlled” sample. The LCS is the primary demonstration, on a daily basis, of the ability to analyze samples with good qualitative and quantitative accuracy. The LCS recoveries should within the method-specific acceptance criteria (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is extracted and analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during extraction and analysis. All target analytes should be below the contract-required detection limit in the method blank (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

MS samples are used to measure the ability to recover prescribed analytes from a native sample matrix and consist of aliquots of the submitted samples spiked with a known concentration of the target analyte(s). Spiking typically occurs before sample preparation and analysis. The spike sample recoveries should be between the lower acceptance limit (LAL) and upper acceptance limit (UAL) (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

A surrogate compound (surrogate) is an organic compound used in the analyses of target analytes that is similar in composition and behavior to the target analytes but not normally found in environmental samples. Surrogates are added to every blank, sample, and spike to evaluate the efficiency with which analytes are recovered during extraction and analysis. The recovery percentage of the surrogates must be within specified ranges or the sample may be rejected or assigned a qualifier (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

ISs are chemical compounds added to every blank, sample, and standard extract at a known concentration. They are used to compensate for (1) analyte concentration changes that might occur during storage of the extract and (2) quantitation variations that can occur during analysis. ISs are used as the basis for quantitation of target analytes. The %R for ISs should be within the range of 50%–200% (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

F-4.2 Data Quality Results for Organic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

TA-15

One SVOC result was qualified as not detected (U) because the mass spectra did not meet specifications.

A total of 12 dioxin/furan results were qualified as not detected (U) because the project chemist identified quality deficiencies in the reported data that require further qualification.

TA-36

One dioxin/furan result was qualified as not detected (U) because 2,3,7,8-tetraclorodibenzofuran was detected in a sample, and the result was not confirmed on a second column with successful analysis of the gas chromatography (GC) column performance mix.

A total of 24 dioxin/furan results were qualified as not detected (U) because the project chemist identified quality deficiencies in the reported data that require further qualification.

Two dioxin/furan results were qualified as estimated not detected (UJ) because the project chemist identified quality deficiencies in the reported data that require further qualification.

F-4.2.1 Maintenance of COC

SCL/COC forms were maintained properly for all samples analyzed for organic chemicals (Appendix G).

F-4.2.2 Sample Documentation

All samples analyzed for organic chemicals were properly documented on the SCL in the field (Appendix G).

F-4.2.3 Sample Dilutions

Some samples were diluted for organic chemical analyses. No qualifiers were applied to any organic chemical sample results because of dilutions.

F-4.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for organic chemicals.

F-4.2.5 Holding Times

F-4.2.5.1 TA-15

A total of 3017 SVOC results and 58 VOC results were qualified as estimated not detected (UJ) because the extraction holding time was exceeded by less than 2 times the published method for holding times.

A total of 19 SVOC results were qualified as estimated and biased low (J-) because the extraction holding time was exceeded by less than 2 times the published method for holding times.

F-4.2.5.2 TA-36

A total of 84 HE or explosive compounds results and 814 SVOC results were qualified as estimated not detected (UJ) because the extraction holding time was exceeded by less than 2 times the published method for holding times.

A total of 20 SVOC results were qualified as estimated and biased low (J-) because the extraction holding time was exceeded by less than 2 times the published method for holding times.

F-4.2.6 ICVs and CCVs

F-4.2.6.1 TA-15

A total of 10 HE or explosive compounds results, 31 PCB results, 6 SVOC results, and 125 VOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

A total of 1102 HE or explosive compounds results and 71 VOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a relative response factor (RRF) of less than 0.05 in the ICV and/or CCV.

A total of 185 SVOC results and 5 VOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with an initial calibration curve that exceeded the percent relative standard deviation (%RSD) criteria and/or the associated multipoint calibration correlation coefficient was less than 0.995.

Three SVOC results were qualified as estimated (J) because the affected analytes were analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient was less than 0.995.

One PCB result was qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

F-4.2.6.2 TA-36

A total of 407 HE or explosive compounds results and 51 VOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with a RRF of less than 0.05 in the ICV and/or CCV.

A total of 55 SVOC results and 38 VOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient was <0.995.

Three PCB results, 36 SVOC results, and 209 VOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

One SVOC result was qualified as estimated (J) because the affected analyte was analyzed with an initial calibration curve that exceeded the %RSD criteria and/or the associated multipoint calibration correlation coefficient was <0.995.

A total of nine HE or explosive compounds results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

One VOC result was qualified as estimated (J) because the affected analytes were analyzed with a RRF of less than 0.05 in the ICV and/or CCV.

F-4.2.7 Surrogate Recoveries

F-4.2.7.1 TA-15

Five VOC results were qualified as estimated and biased high (J+) because the surrogate %R value was greater than the UAL, indicating a potential for a high bias in the results and a potential for false positive results.

F-4.2.7.2 TA-36

A total of 13 VOC results were qualified as estimated and biased high (J+) because the surrogate %R value was greater than the UAL, indicating a potential for a high bias in the results and a potential for false positive results.

F-4.2.8 IS Responses

F-4.2.8.1 TA-15

IS response criteria were met for all samples analyzed for organic chemicals.

F-4.2.8.2 TA-36:

A total of 304 VOC results were qualified as estimated not detected (UJ) because the associated IS counts were less than 50% but greater than 10% of the previous calibration standard.

F-4.2.9 Method Blanks

F-4.2.9.1 TA-15

A total of 95 dioxin/furan results, 2 SVOC results, and 123 VOC results were qualified as not detected (U) because the associated sample concentration was less than 5 times (10 times for common laboratory contaminants) the concentration of the related analytes in the method blank.

A total of 110 VOC results were qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analytes in the trip, rinsate, or equipment blank.

A total of 10 dioxin/furan results were qualified as estimated (J) because the sample results were greater than 5 times (10 times for common laboratory contaminants) the concentration of the related analytes in the method blank.

F-4.2.9.2 TA-36

A total of 44 dioxin/furan results, 3 SVOC results, and 101 VOC results were qualified as not detected (U) because the associated sample concentration was less than 5 times (10 times for common laboratory contaminants) the concentration of the related analytes in the method blank.

A total of 43 VOC results were qualified as not detected (U) because the sample results were less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the trip, rinsate, or equipment blank.

Nine dioxin/furan results were qualified as estimated (J) because the sample results were greater than 5 times (10 times for common laboratory contaminants) the concentration of the related analytes in the method blank.

F-4.2.10 MS Samples

F-4.2.10.1 TA-15

A total of 214 HE or explosive compounds results were qualified as estimated not detected (UJ) because the MS/MSD %R difference was greater than 30%.

A total of 16 HE or explosive compounds results, 14 TPH-DRO results, and 15 TPH-GRO results were qualified as estimated not detected (UJ) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

Three HE or explosive compounds results and one TPH-DRO result were qualified as estimated (J) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

F-4.2.10.2 TA-36

A total of 54 HE or explosive compounds results were qualified as estimated not detected (UJ) because the MS/MSD %R difference was greater than 30%.

Three HE or explosive compounds results were qualified as estimated not detected (UJ) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

One dioxin/furan result was qualified as estimated (J) because a low recovery (%R <70%) was observed for this analyte in the associated spike sample.

Three dioxin/furan results and three HE or explosive compounds results were qualified as estimated and biased high (J+) because the MS/MSD %R was greater than 130%.

F-4.2.11 Laboratory Duplicate Samples

Laboratory duplicates collected for organic chemical analyses indicated acceptable precision for all samples.

F-4.2.12 LCS Recoveries

F-4.2.12.1 TA-15

Four HE or explosive compounds results and 22 VOC results were qualified as estimated not detected (UJ) because the LCS %R was less than the LAL but greater than 10%.

F-4.2.12.2 TA-36

LCS criteria were met for all samples analyzed for organic chemicals.

F-4.2.13 PQLs and MDLs

F-4.2.13.1 TA-15

A total of 143 dioxin/furan results, 21 HE or explosive compounds results, 1 PCB result, 118 SVOC results, 3 TPH-DRO results, and 40 VOC results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-4.2.13.2 TA-36

A total of 141 dioxin/furan results, 8 HE or explosive compounds results, 4 PCB results, 72 SVOC results, and 38 VOC results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-4.2.14 Rejected Data

F-4.2.14.1 TA-15

A total of 138 HE or explosive compounds results and 11 VOC results were qualified as rejected (R) because the IS retention time shifted by more than 30 s.

Nine HE or explosive compounds results were qualified as rejected (R) because the ICV and/or CCV were recovered outside the method limits.

F-4.2.14.2 TA-36

One dioxin/furan result and four HE or explosive compounds results were qualified as rejected (R) because the MS/MSD %R was less than 10%.

One VOC result was qualified as rejected (R) because the surrogate recovery was <10%, which indicates the potential for a severely low bias in the results.

Two VOC results were qualified as rejected (R) because the quantitating IS area count was <10% of the expected value.

Four HE or explosive compounds results were qualified as rejected (R) because the required method blank information was missing.

The rejected data were not used to characterize the nature and extent of contamination. However, sufficient data of good quality were available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-5.0 RADIONUCLIDE ANALYSES

TA-15

A total of 356 samples (223 soil/fill, 25 sediment, and 108 tuff), plus 30 field duplicates, collected within the Potrillo Fence Canyons Aggregate Area at TA-15 were analyzed for radionuclides. A total of 42 samples, plus 4 field duplicates, were analyzed for americium-241; 91 samples, plus 7 field duplicates, were analyzed for gamma-emitting radionuclides; 30 samples, plus 3 field duplicates, were analyzed for isotopic plutonium; 74 samples, plus 7 field duplicates, were analyzed for isotopic thorium; and 337 samples, plus 30 field duplicates, were analyzed for isotopic uranium.

TA-36

A total of 146 samples (93 soil/fill, 40 sediment, and 13 tuff), plus 12 field duplicates, collected within the Potrillo and Fence Canyons Aggregate Area at TA-36 were analyzed for radionuclides. A total of 22 samples, plus 2 field duplicates, were analyzed for americium-241; 86 samples, plus 8 field duplicates, were analyzed for gamma-emitting radionuclides; 22 samples, plus 2 field duplicates, were analyzed for gross alpha- and beta-emitting radionuclides; 22 samples, plus 2 field duplicates, were analyzed for strontium-90; 22 samples, plus 2 field duplicates, were analyzed for tritium; 22 samples, plus 2 field duplicates, were analyzed for isotopic plutonium; 22 samples, plus 2 field duplicates, were analyzed for isotopic thorium; and 142 samples, plus 12 field duplicates, were analyzed for isotopic uranium.

The analytical methods used for radionuclides are listed in Table F-1.0-1.

Tables in the investigation report summarize all samples collected and analyses requested from the Potrillo and Fence Canyons Aggregate Area sites. All decision-level analytical results are provided on DVD (Appendix G).

F-5.1 Radionuclide QA/QC Samples

All procedures were followed as required by the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to the minimum detectable concentration (MDC). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to 3 times the total propagated uncertainty (TPU). This data qualification is related to detection status only, not to the quality of the data.

To assess the accuracy and precision of radionuclide analyses, LCSs, method blanks, MS samples, laboratory duplicate samples, and tracers were analyzed as part of the investigations. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) and is described briefly below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For radionuclides in soil or tuff, LCS %R should fall between the control limits of 80%–120% (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

A method blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is analyzed in the same manner as the corresponding environmental samples. Method blanks are used to assess the potential for sample contamination during analysis. All radionuclide results should be below the MDC (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

MS samples assess the accuracy of radionuclide analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125% (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

Tracers are radioisotopes added to a sample for the purposes of monitoring losses of the target analyte. The tracer is assumed to behave in the same manner as the target analytes. The tracer recoveries should fall between the LAL and UAL (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

Laboratory duplicate samples assess the precision of radionuclide analyses. All RPDs between the sample and laboratory duplicate should be ±35% for soil (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

F-5.2 Data Quality Results for Radionuclides

TA-15

Six isotopic uranium results were qualified as estimated (J) because the project chemist identified quality deficiencies in the reported data that require further qualification.

F-5.2.1 Maintenance of COC

SCL/COC forms were maintained properly for all samples (Appendix G).

F-5.2.2 Sample Documentation

All samples were properly documented on the SCL/COC forms in the field (Appendix G).

F-5.2.3 Sample Dilutions

Some samples were diluted for radionuclide analyses. No qualifiers were applied to any radionuclide sample results because of dilutions.

F-5.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for radionuclides.

F-5.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for radionuclides.

F-5.2.6 Method Blanks

Results for samples analyzed for radionuclides were not qualified because of blank contamination.

F-5.2.7 MS Samples

F-5.2.7.1 TA-15

MS criteria were met for all samples analyzed for radionuclides.

F-5.2.7.2 TA-36

Ten gross alpha results were qualified as estimated and biased low (J-) because the associated MS recovery was less than 10%.

F-5.2.8 Tracer Recoveries

F-5.2.8.1 TA-15

Six isotopic uranium results were qualified as estimated and biased high (J+) because the tracer %R was greater than the UAL.

F-5.2.8.2 TA-36

Three isotopic uranium results were qualified as estimated and biased high (J+) because the tracer %R was greater than the UAL.

F-5.2.9 LCS Recoveries

LCS recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.10 Laboratory Duplicate Sample Recoveries

F-5.2.10.1 TA-15

A total of 53 isotopic uranium results were qualified as estimated (J) because the associated duplicate sample had a duplicate error ratio or a relative error ratio greater than the analytical laboratory's acceptance limits.

A total of 48 isotopic uranium results were qualified as estimated (J) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons and the duplicate information is missing.

F-5.2.10.2 TA-36

Laboratory duplicate sample recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.11 Rejected Data

F-5.2.11.1 TA-15

A total of 18 isotopic uranium results were qualified as rejected (R) because the MDC or TPU documentation was missing.

F-5.2.11.2 TA-36

Results for samples analyzed for radionuclides were not qualified as rejected (R).

The rejected data were not used to determine the nature and extent of contamination. However, sufficient data of good quality were available to characterize the site(s). The results of other qualified data were used as reported and do not affect the usability of the sampling results.

F-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information 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 New Mexico Environment Department 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.

EPA (U.S. Environmental Protection Agency), February 1994. "USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review," EPA-540/R-94/013, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1994, 048639)

EPA (U.S. Environmental Protection Agency), October 1999. "USEPA Contract Laboratory Program National Functional Guidelines for Organic Data Review," EPA540/R-99/008, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1999, 066649)

LANL (Los Alamos National Laboratory), July 1995. "Statement of Work (Formerly Called "Requirements Document") - Analytical Support, (RFP number 9-XS1-Q4257), (Revision 2 - July, 1995)," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1995, 049738)

LANL (Los Alamos National Laboratory), March 1996. "Quality Assurance Project Plan Requirements for Sampling and Analysis," Los Alamos National Laboratory document LA-UR-96-441, Los Alamos, New Mexico. (LANL 1996, 054609)

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LANL (Los Alamos National Laboratory), June 30, 2008. "Exhibit "D" Scope of Work and Technical Specifications, Analytical Laboratory Services for General Inorganic, Organic, Radiochemical, Asbestos, Low-Level Tritium, Particle Analysis, Bioassay, Dissolved Organic Carbon Fractionation, and PCB Congeners," Los Alamos National Laboratory document RFP No. 63639-RFP-08, Los Alamos, New Mexico. (LANL 2008, 109962)

Table F-1.0-1
Inorganic Chemical, Organic Chemical, and Radionuclide Analytical Methods for Samples Collected in the Potrillo and Fence Canyons Aggregate Area

Analytical Method	Analytical Description	Analytical Suite
EPA 300.0	Ion chromatography	Anions (nitrate)
EPA 905.0	Gas proportional counting	Strontium-90
EPA SW-846: 6010/1610A/6010B	Inductively coupled plasma emission spectroscopy—atomic emission spectroscopy	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, uranium, vanadium, and zinc (TAL metals)
EPA SW-846:6020	Inductively coupled plasma mass spectrometry	Aluminum, antimony, arsenic, barium, beryllium, calcium, cadmium, cobalt, chromium, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc (TAL metals)
EPA SW-846: 9012A	Automated colorimetric/offline distillation	Total cyanide
EPA SW-846:6850	Liquid chromatography–mass spectrometry	Perchlorate
EPA SW-846:7470A	Cold vapor atomic absorption (CVAA)	Mercury
EPA SW-846:7471	CVAA	Mercury
EPA SW-846:7471A	CVAA	Mercury
EPA SW-846 8015B	GC/flame ionization detection	TPH-DRO, TPH-GRO
EPA SW-846: 8082	GC	PCBs
EPA SW-846: 8260 and 8260B	GC-mass spectrometry (GC/MS)	VOCs
EPA SW-846: 8270 and 8270C	GC/MS	SVOCs
EPA SW-846: 8321A and 8330	High-performance liquid chromatography	Explosive compounds, nitroaromatics and nitramines
EPA Method 1618 and SW-846 EPA Method 8290	High-resolution gas chromatography/high-resolution mass spectrometry	Dioxins/furans
Generic: Gamma spectroscopy, EPA Methods 900.0, and 901.1	Gamma spectroscopy	Americium-241, cesium-134, cesium-137, cobalt-60, europium-152, ruthenium-106, sodium-22, uranium-235
Generic: KPA	Kinetic phosphorescence	Uranium
HASL Method 300	Chemical separation alpha spectrometry	Isotopic uranium, isotopic plutonium, americium-241

Appendix G

Analytical Suites and Results and Analytical Reports
(on DVDs included with this document)

Appendix H

Box Plots and Statistical Results

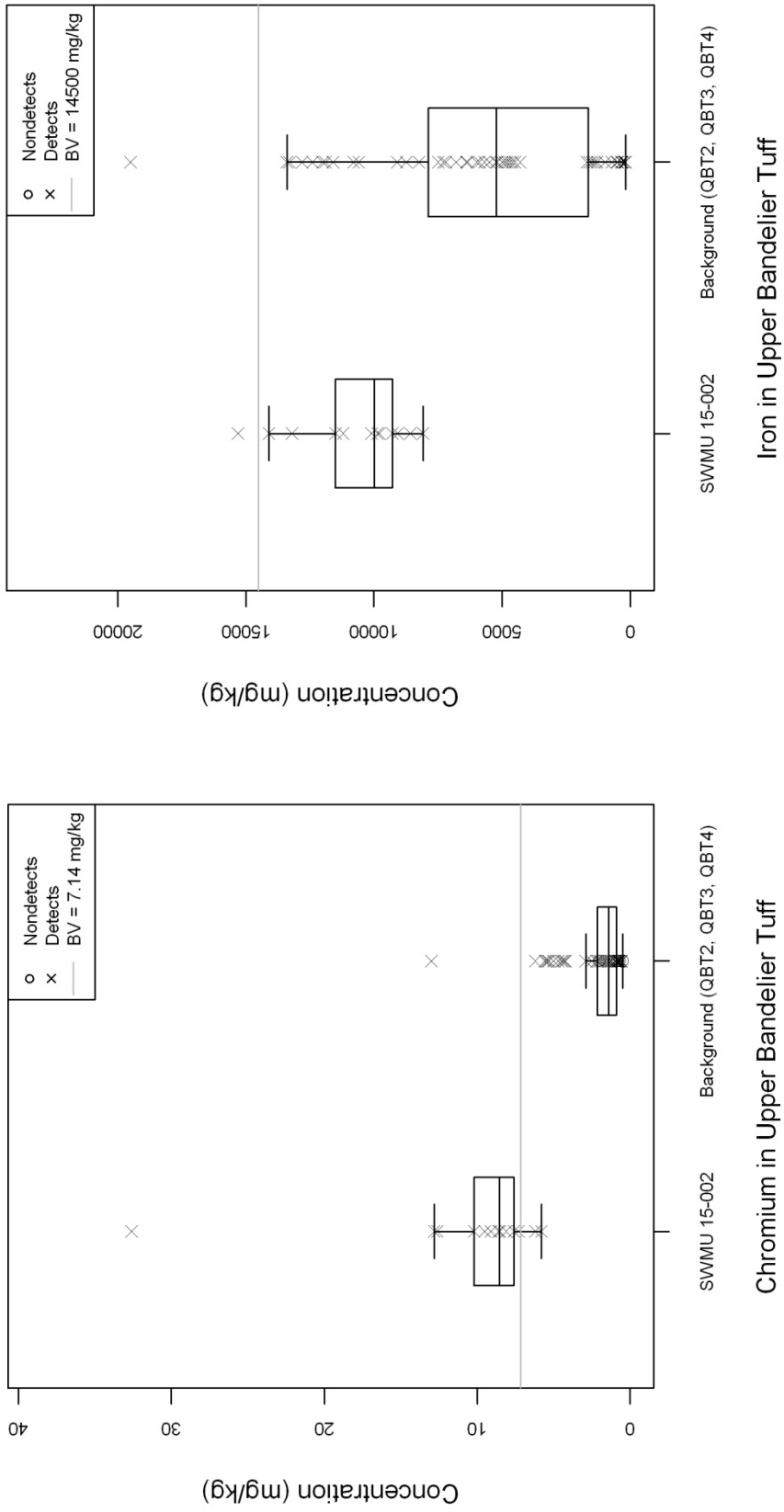
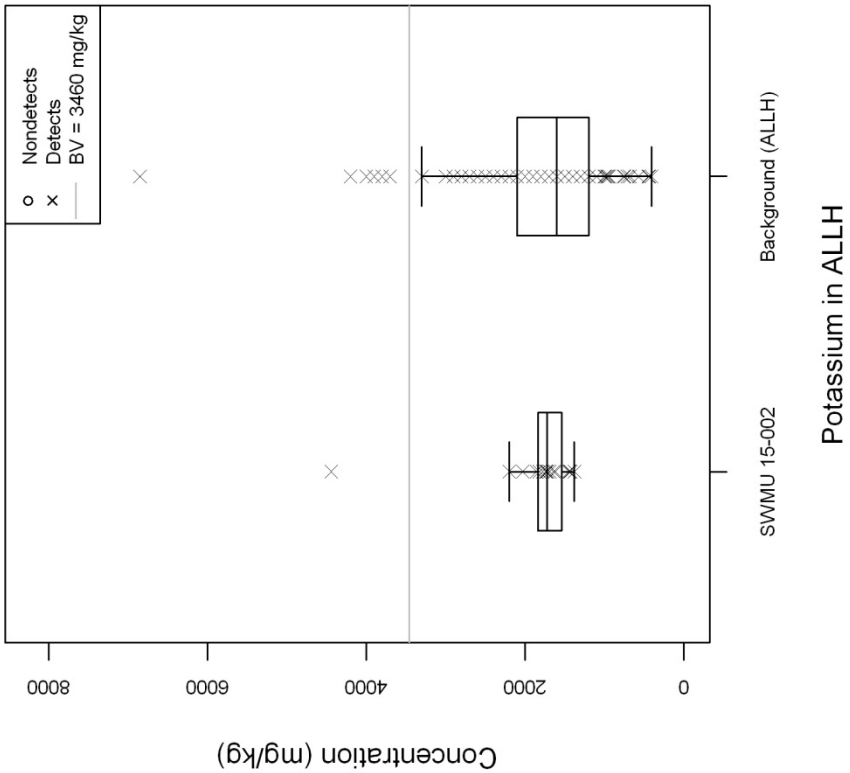


Figure H-1 Box plots for chromium and iron in tuff at SWMU 15-002



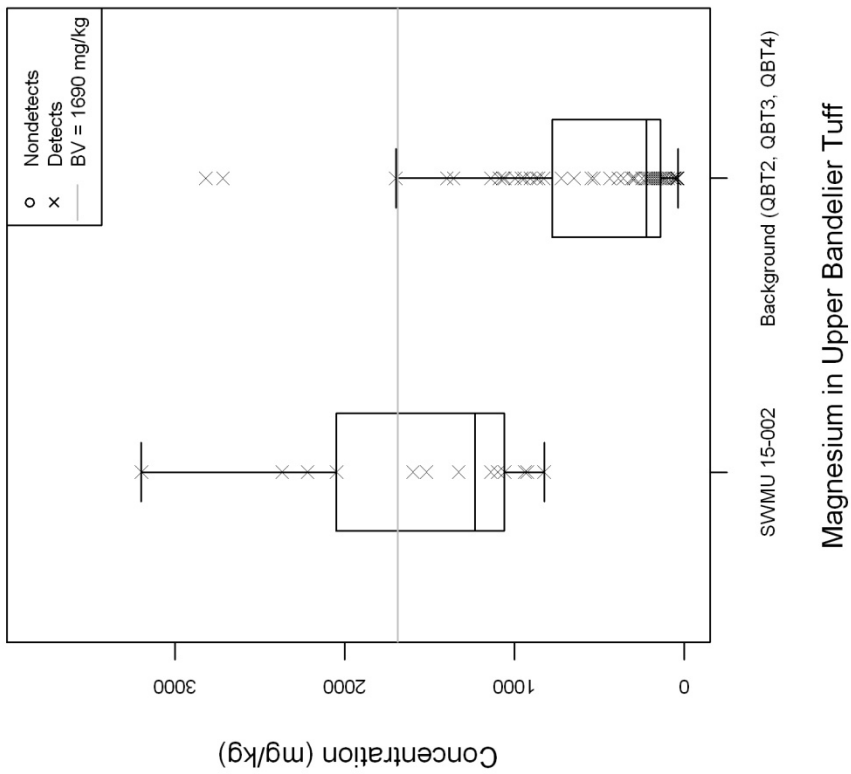


Figure H-2 Box plots for magnesium in tuff and potassium in soil at SWMU 15-002

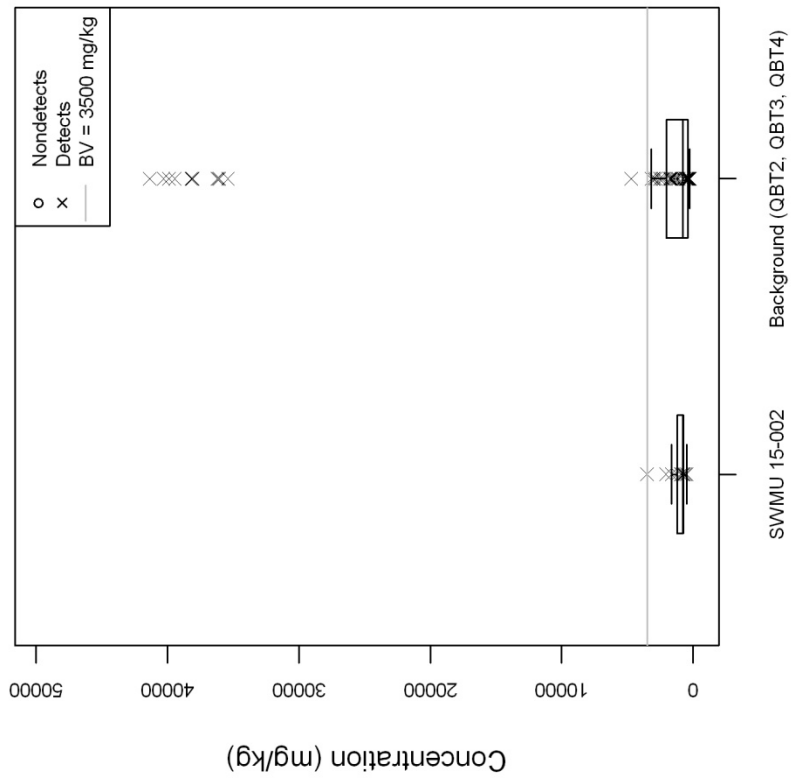


Figure H-3 Box plot for potassium in tuff at SWMU 15-002

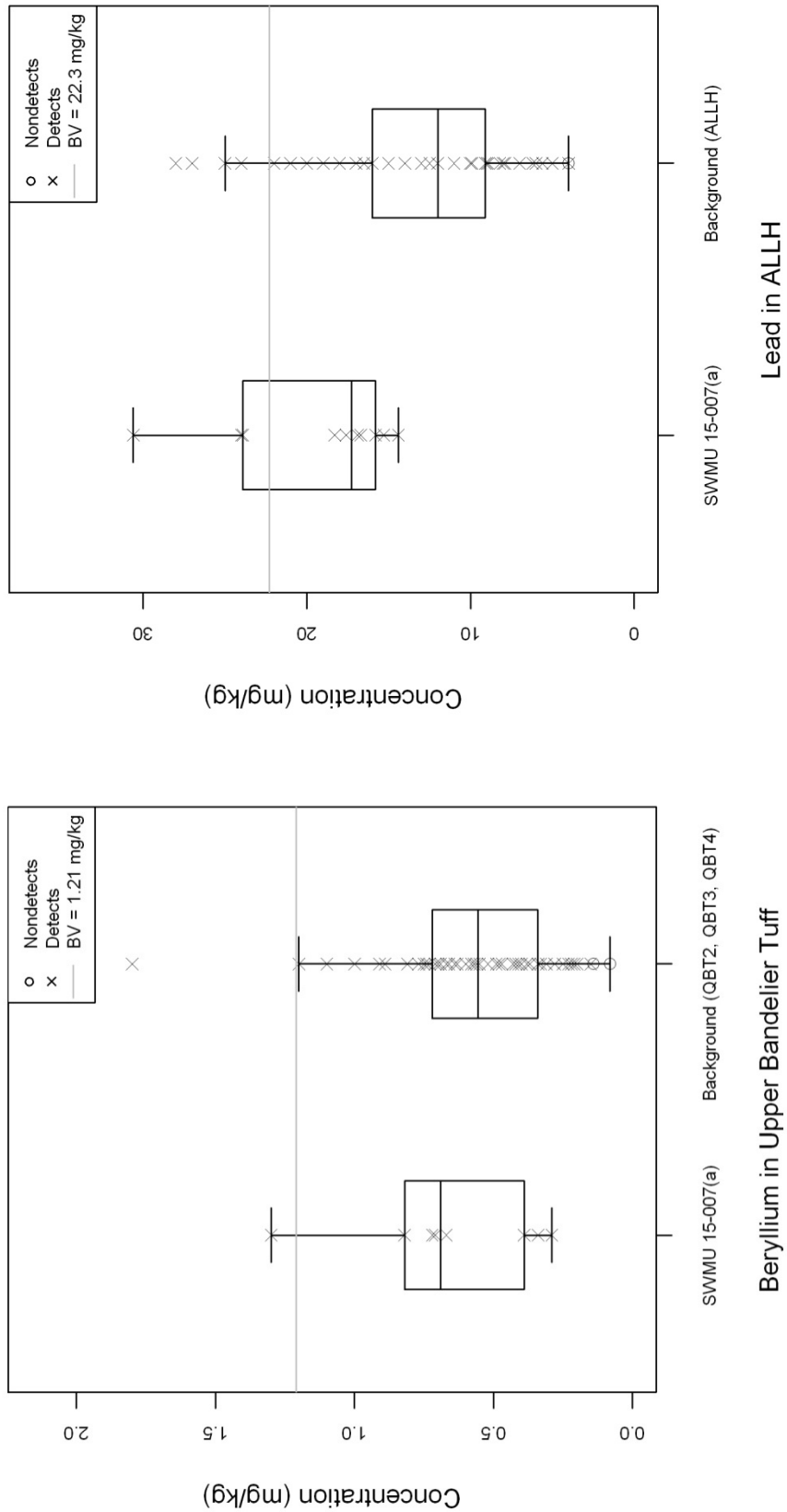


Figure H-4 Box plots for beryllium in tuff and lead in soil at SWMU 15-007(a)

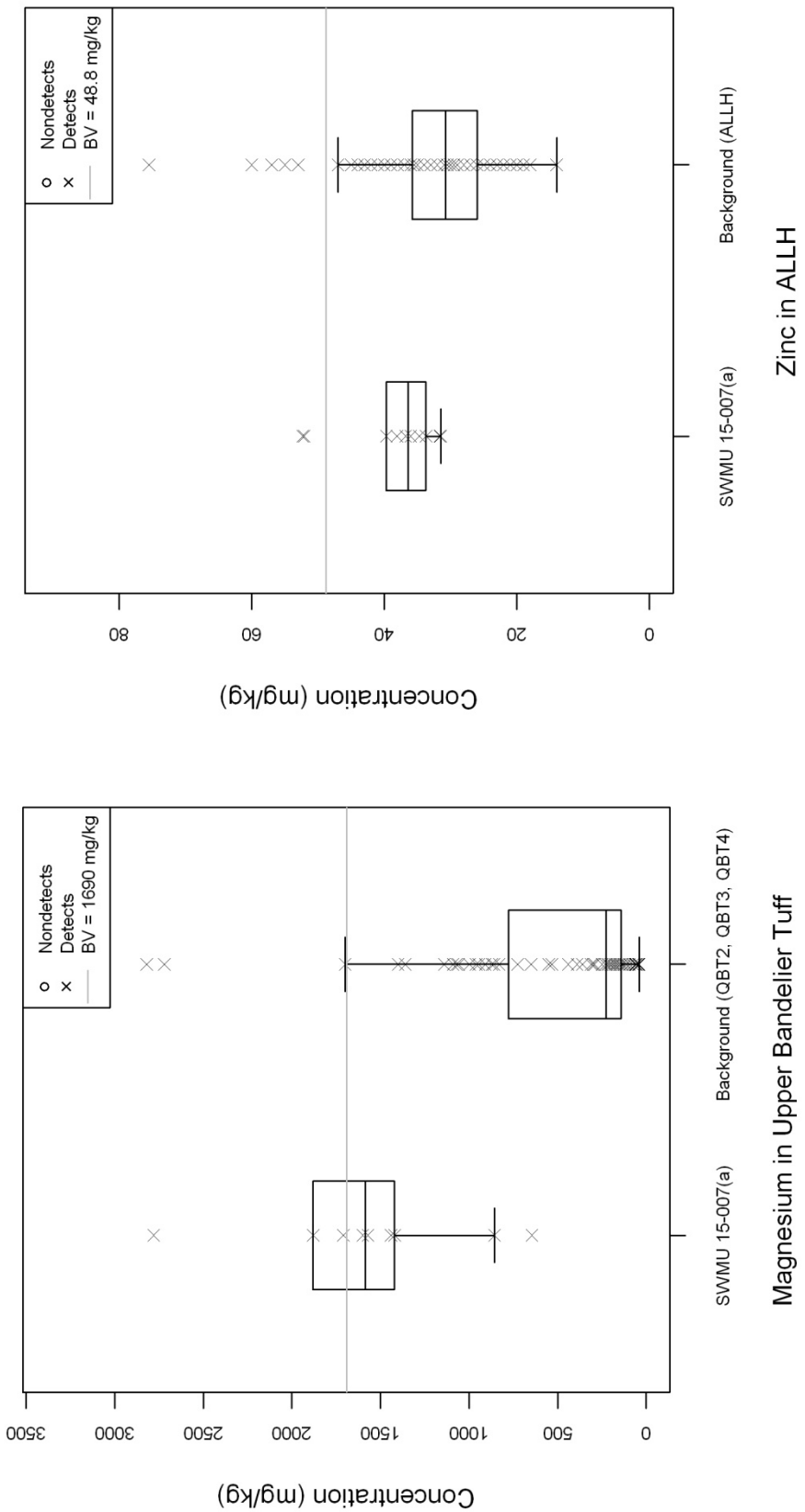


Figure H-5 Box plots for magnesium in tuff and zinc in soil at SWMU 15-007(a)

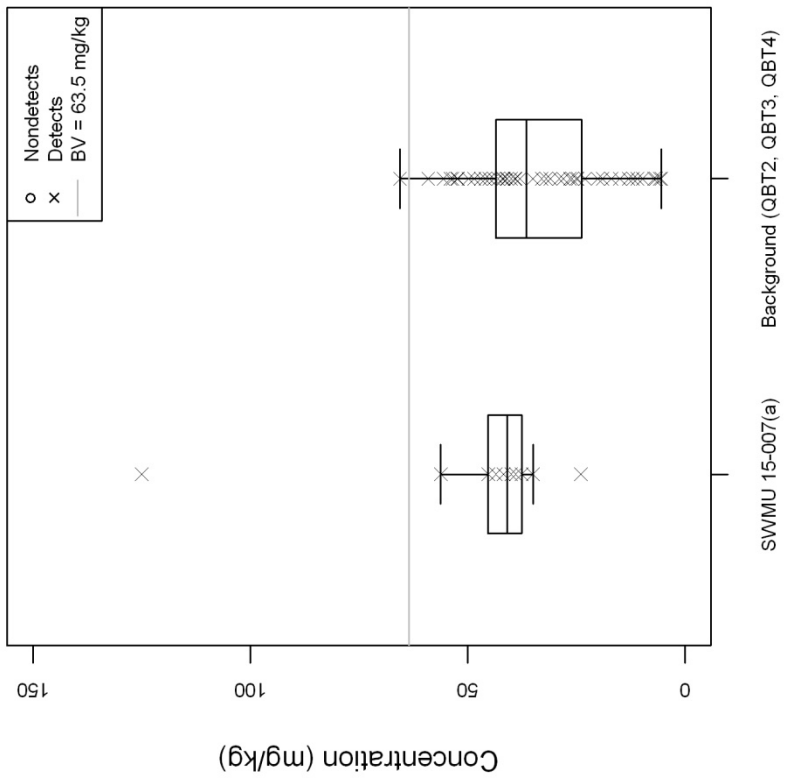


Figure H-6 Box plot for zinc in tuff at SWMU 15-007(a)

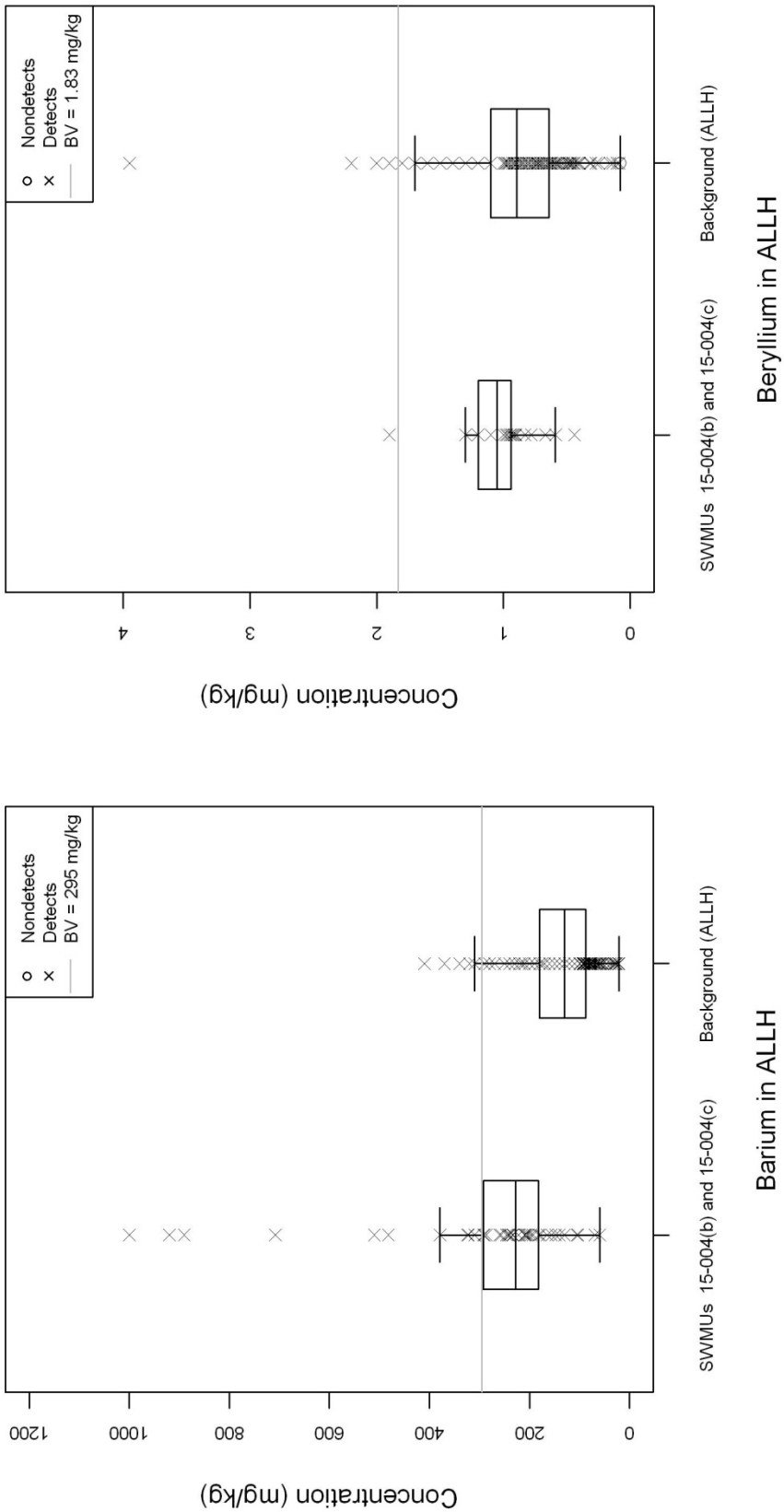


Figure H-7 Box plots for barium and beryllium in soil at SWMUs 15-004(b) and 15-004(c)

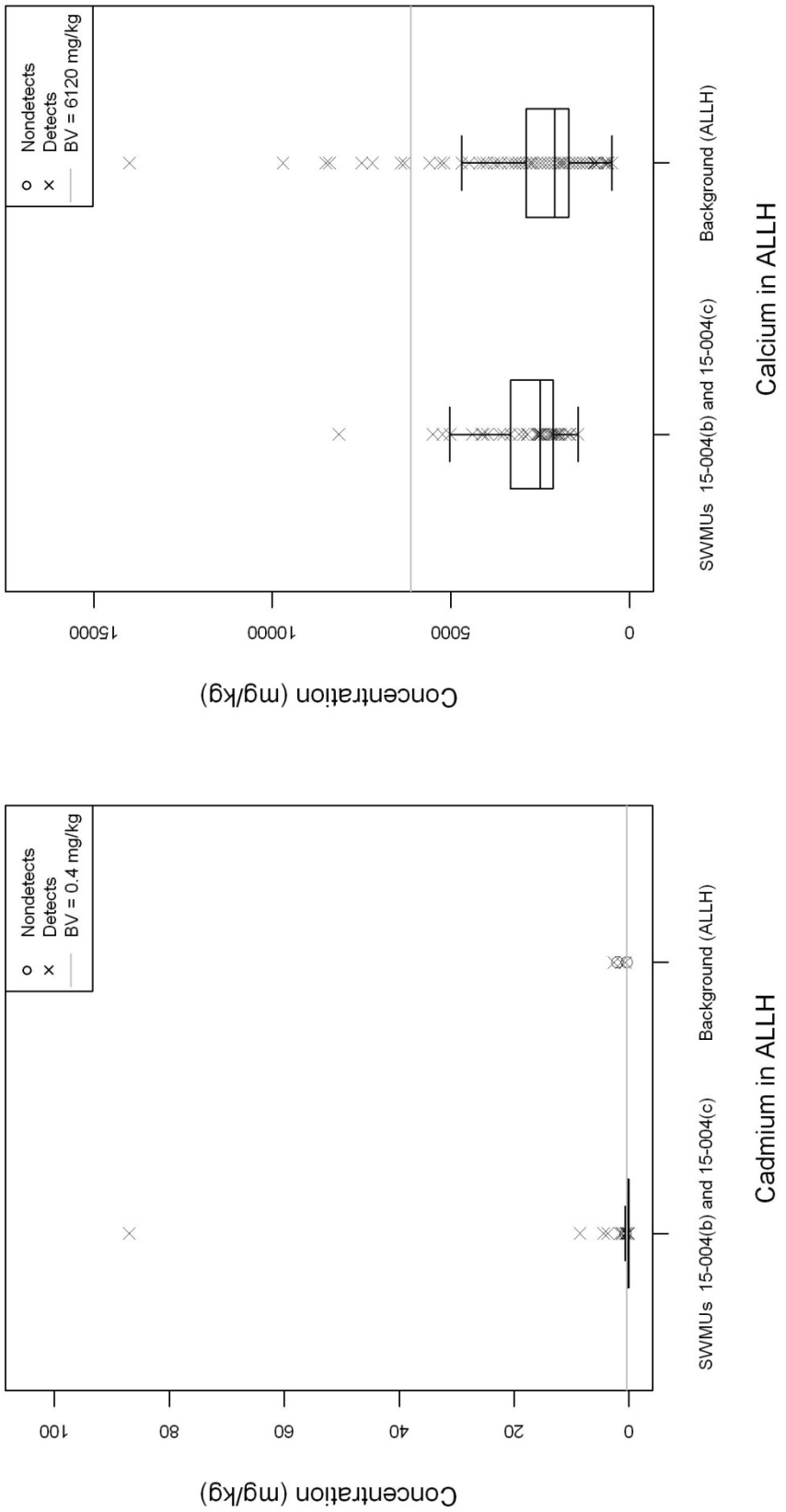


Figure H-8 Box plots for cadmium and calcium in soil at SWMUs 15-004(b) and 15-004(c)

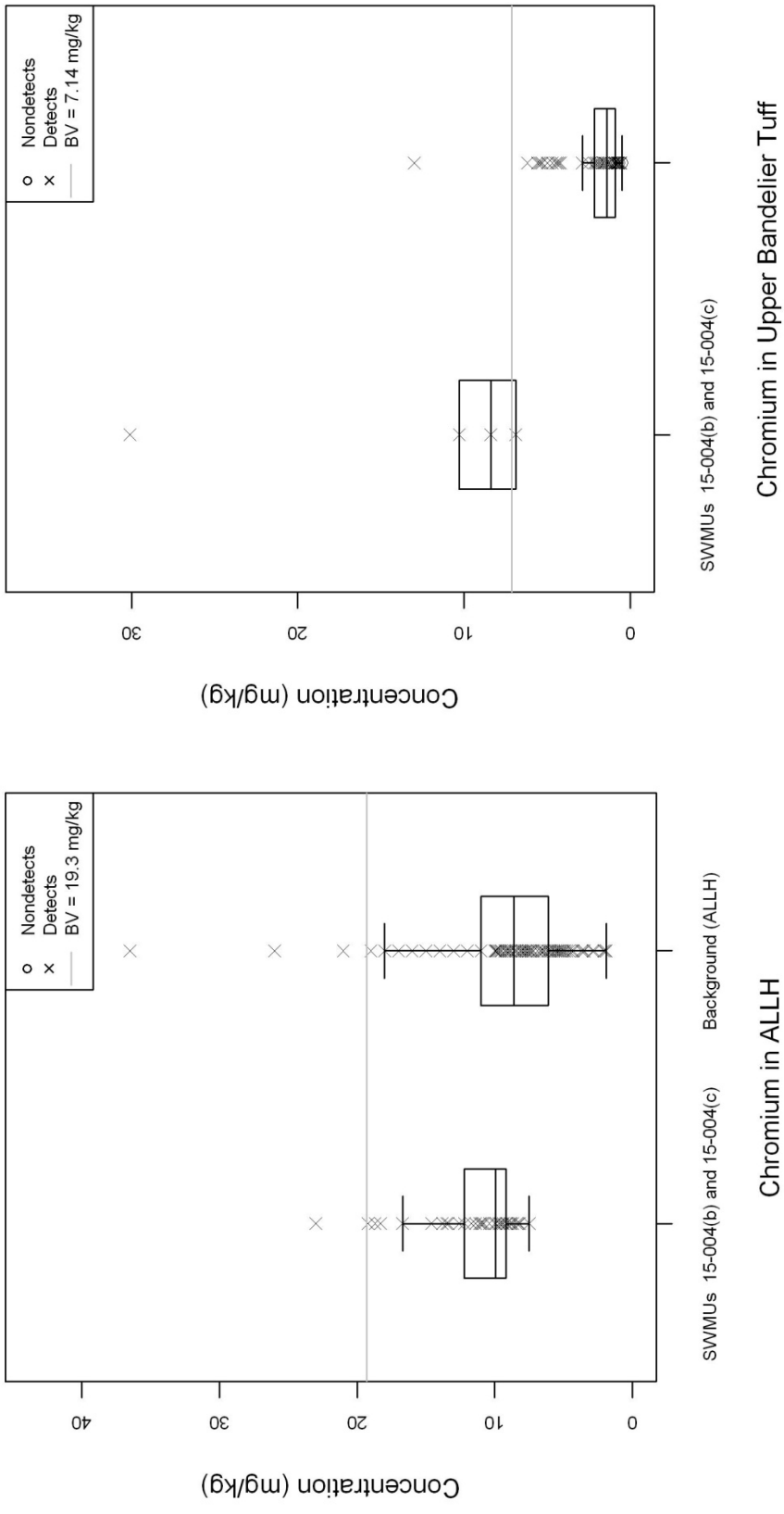


Figure H-9 Box plots for chromium in soil and tuff at SWMUs 15-004(b) and 15-004(c)

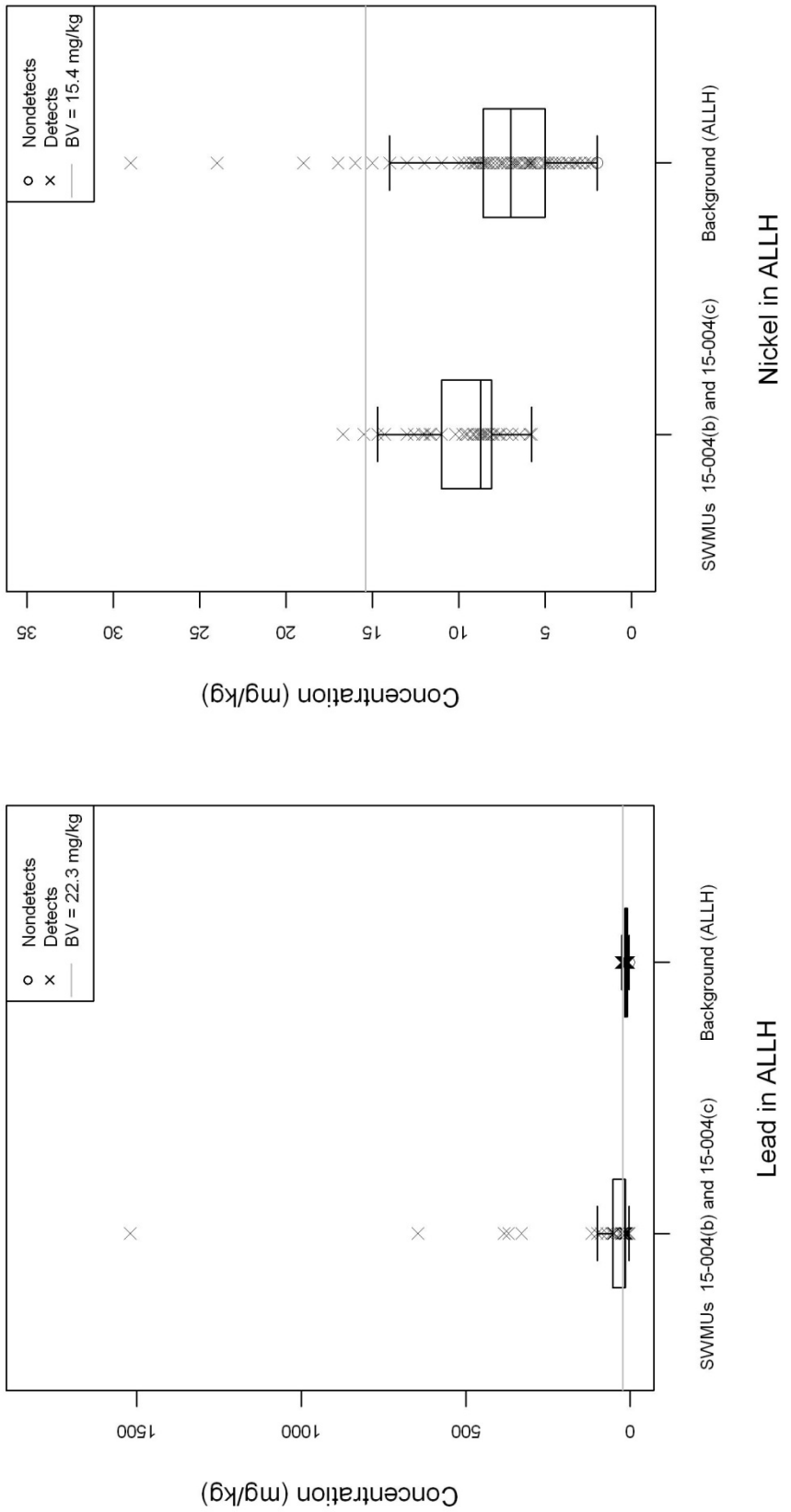


Figure H-10 Box plots for lead and nickel in soil at SWMUs 15-004(b) and 15-004(c)

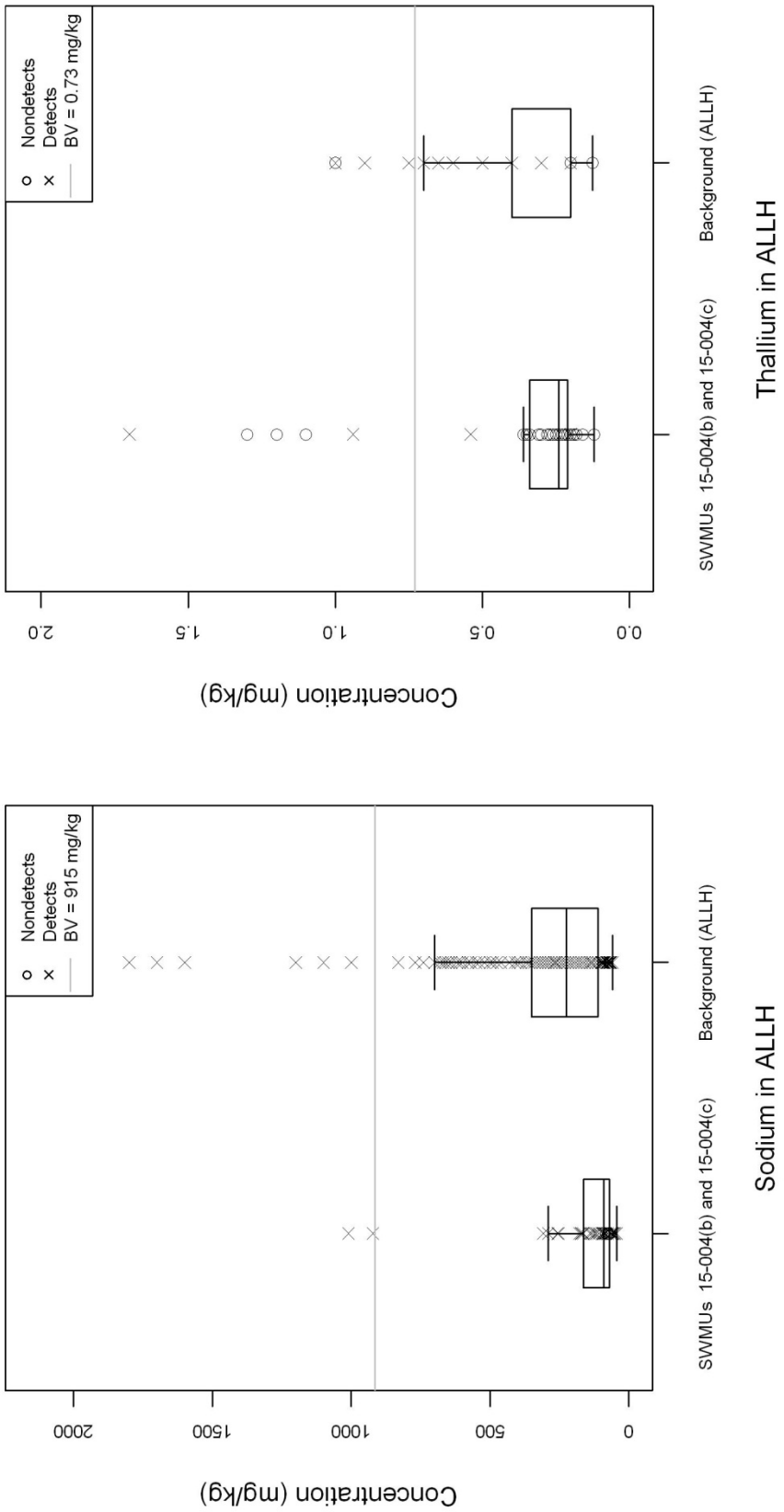


Figure H-11 Box plots for sodium and thallium in soil at SWMUs 15-004(b) and 15-004(c)

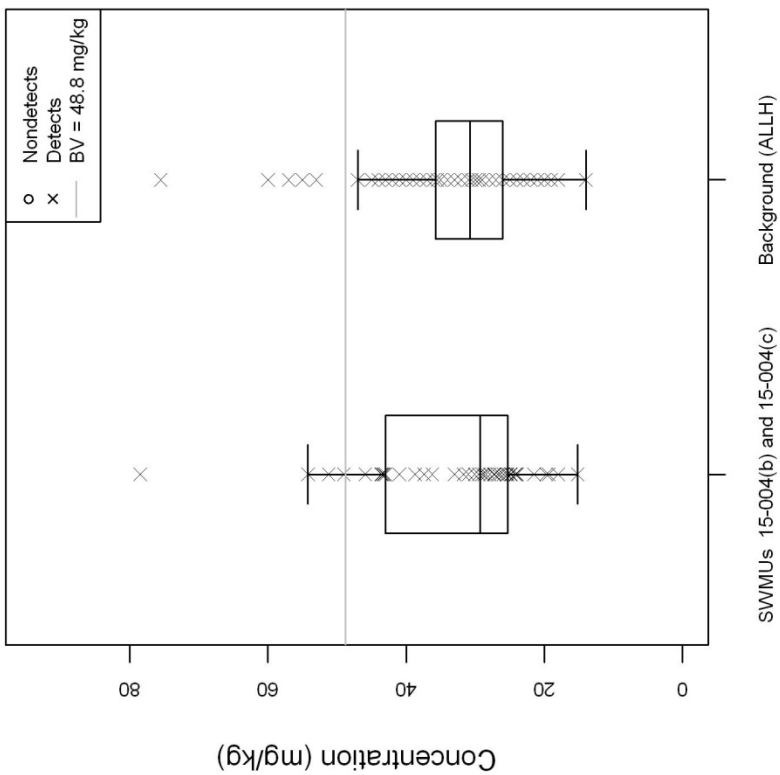


Figure H-12 Box plot for zinc in soil at SWMUs 15-004(b) and 15-004(c)

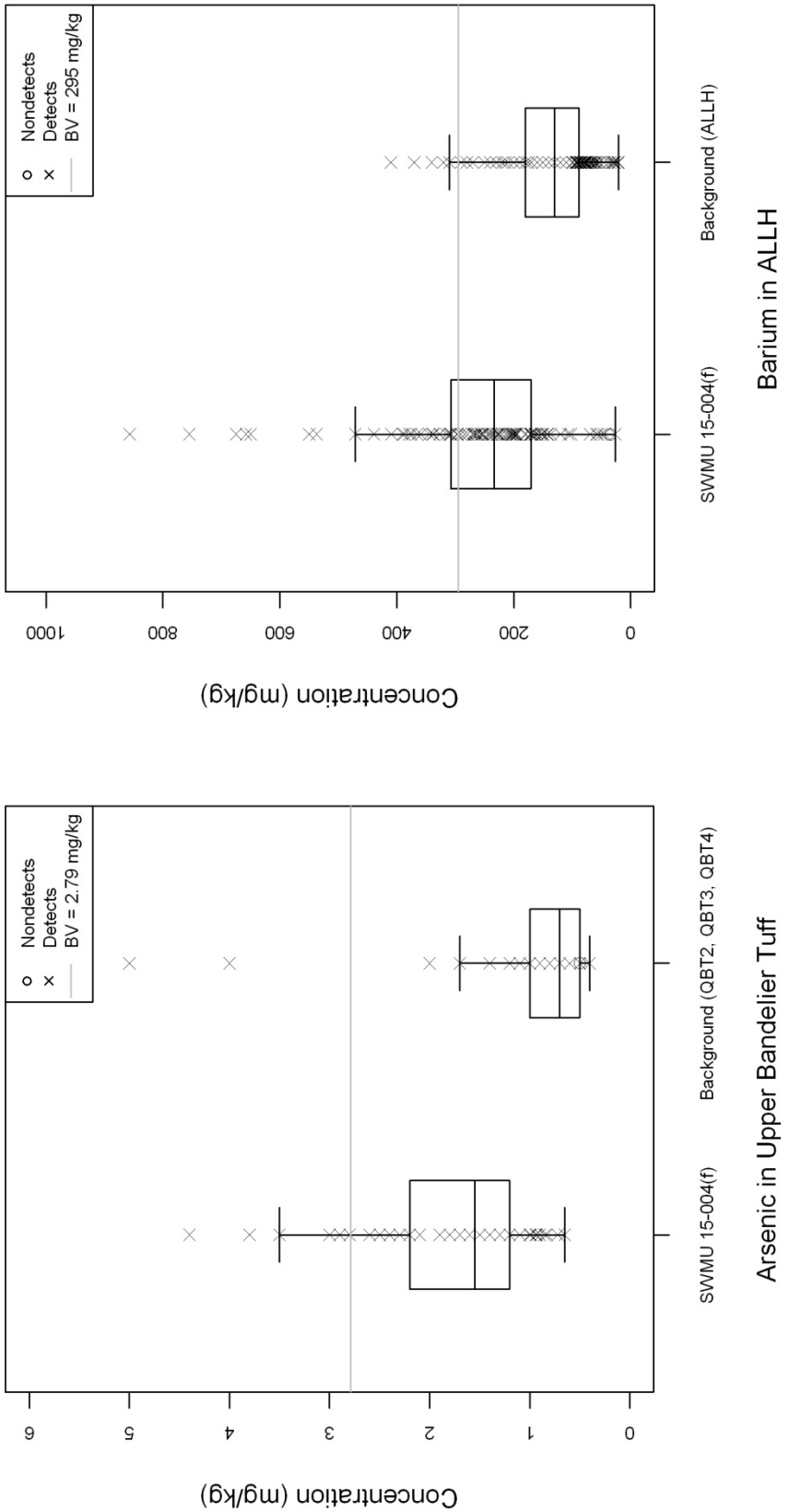
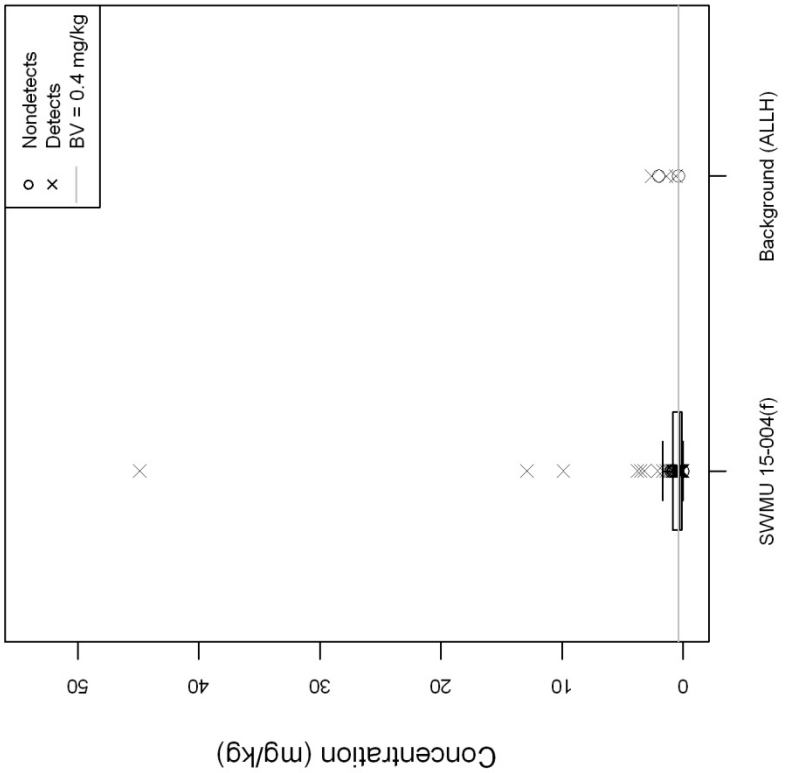


Figure H-13 Box plots for arsenic in tuff and barium in soil at SWMU 15-004(f)



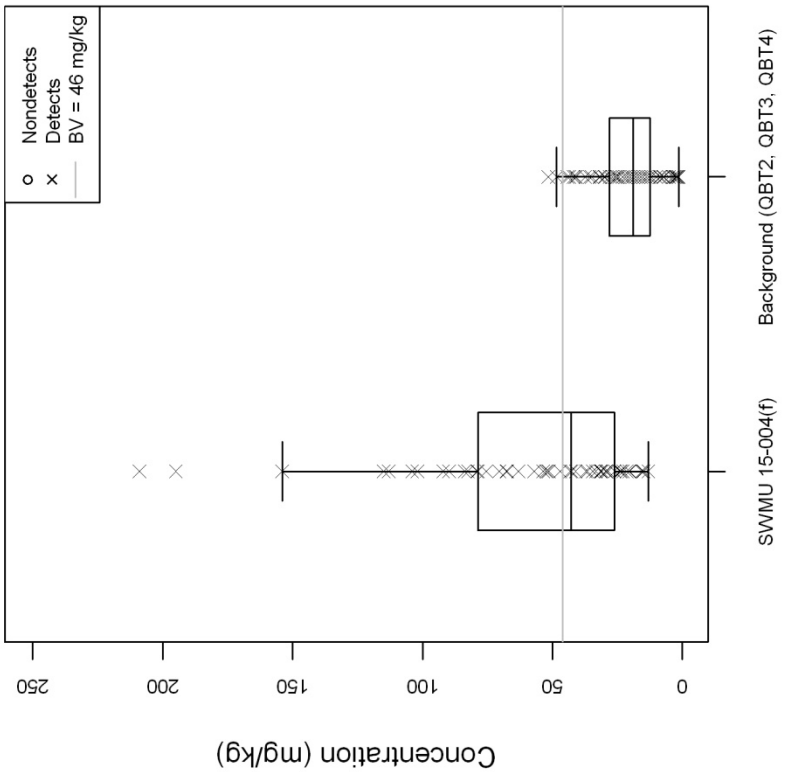


Figure H-14 Box plots for barium in tuff and cadmium in soil at SWMU 15-004(f)

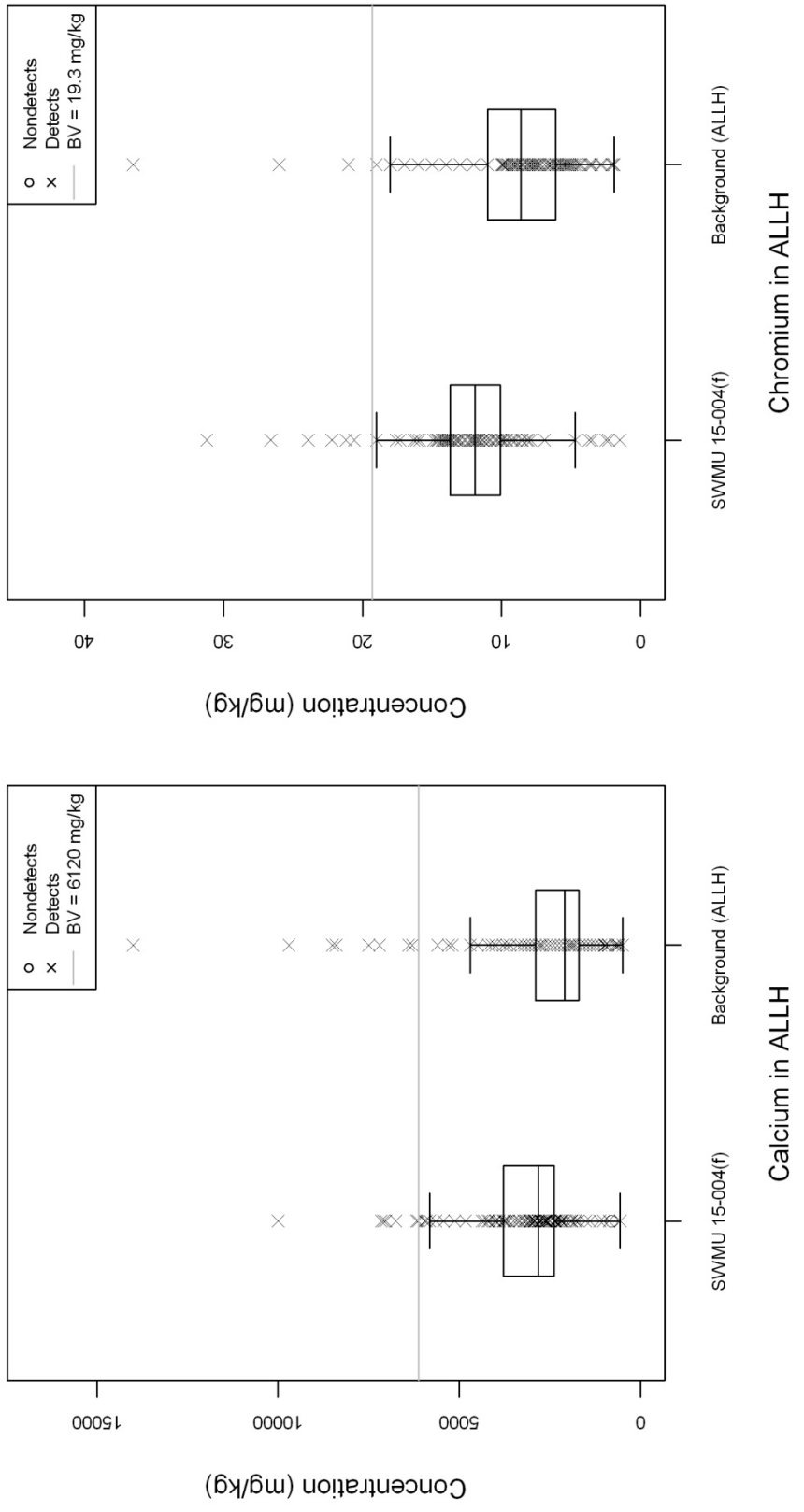


Figure H-15 Box plots for calcium and chromium in soil at SWMU 15-004(f)

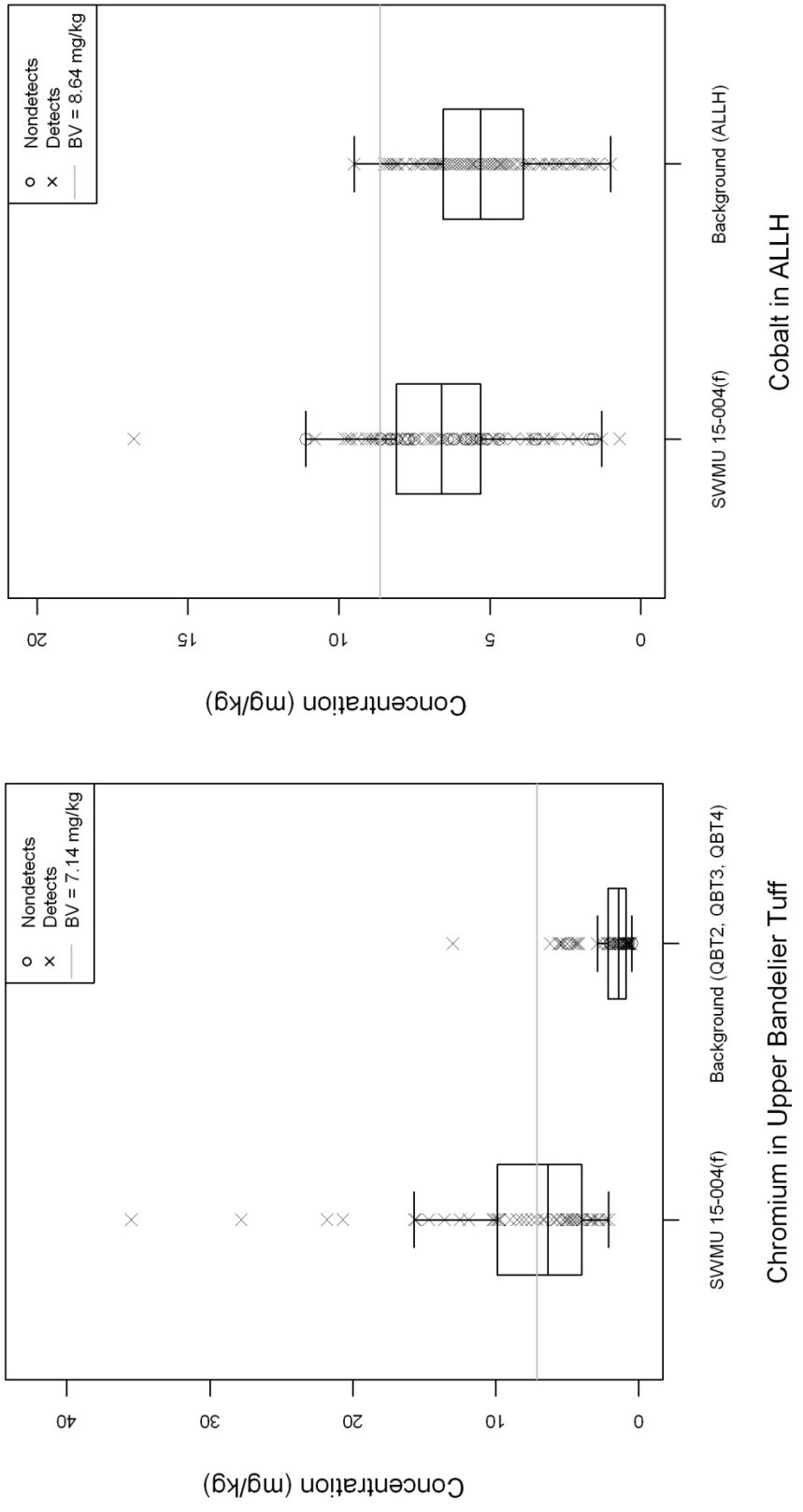


Figure H-16 Box plots for chromium in tuff and cobalt in soil at SWMU 15-004(f)

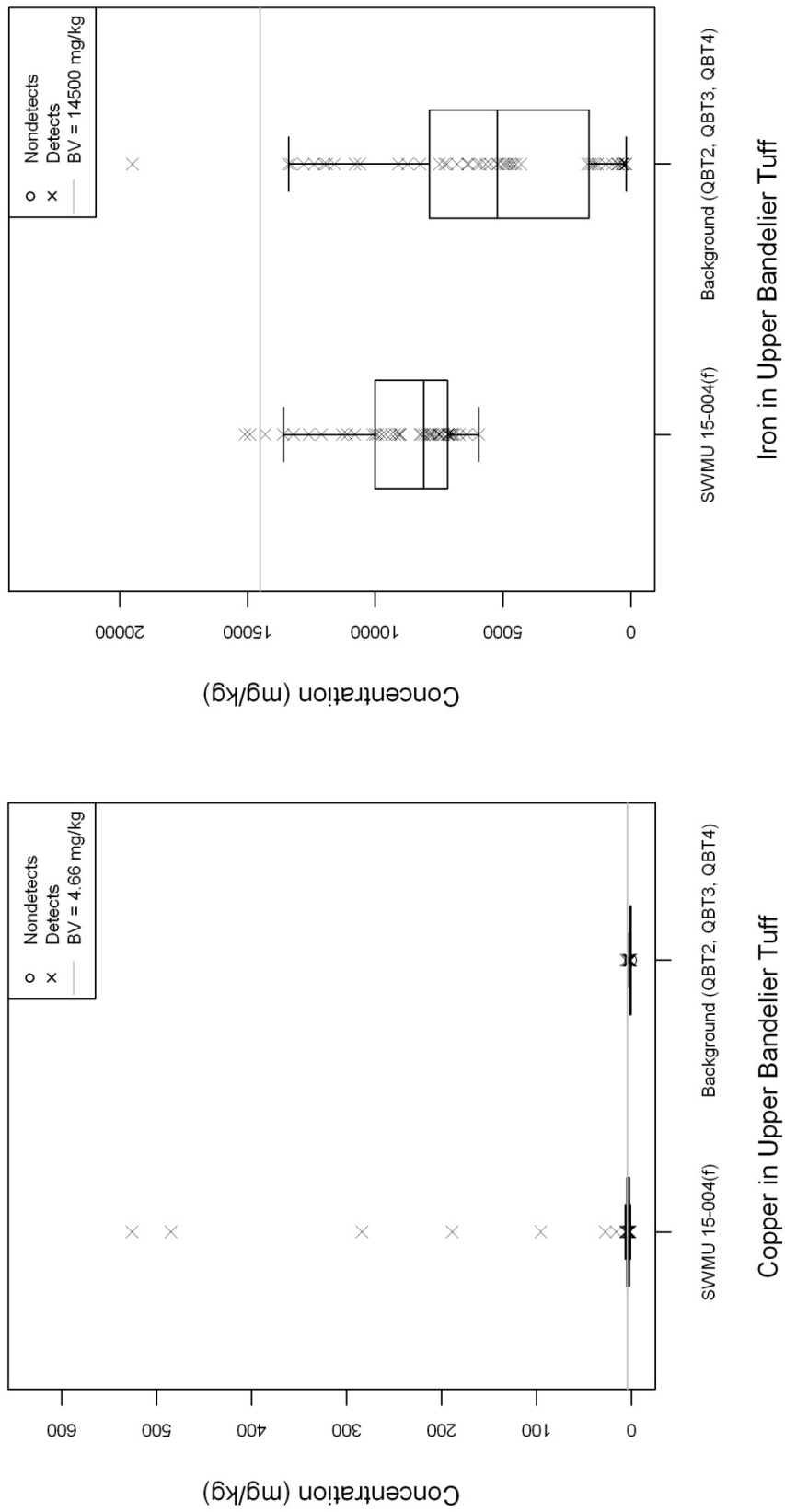


Figure H-17 Box plots for copper and iron in tuff at SWMU 15-004(f)

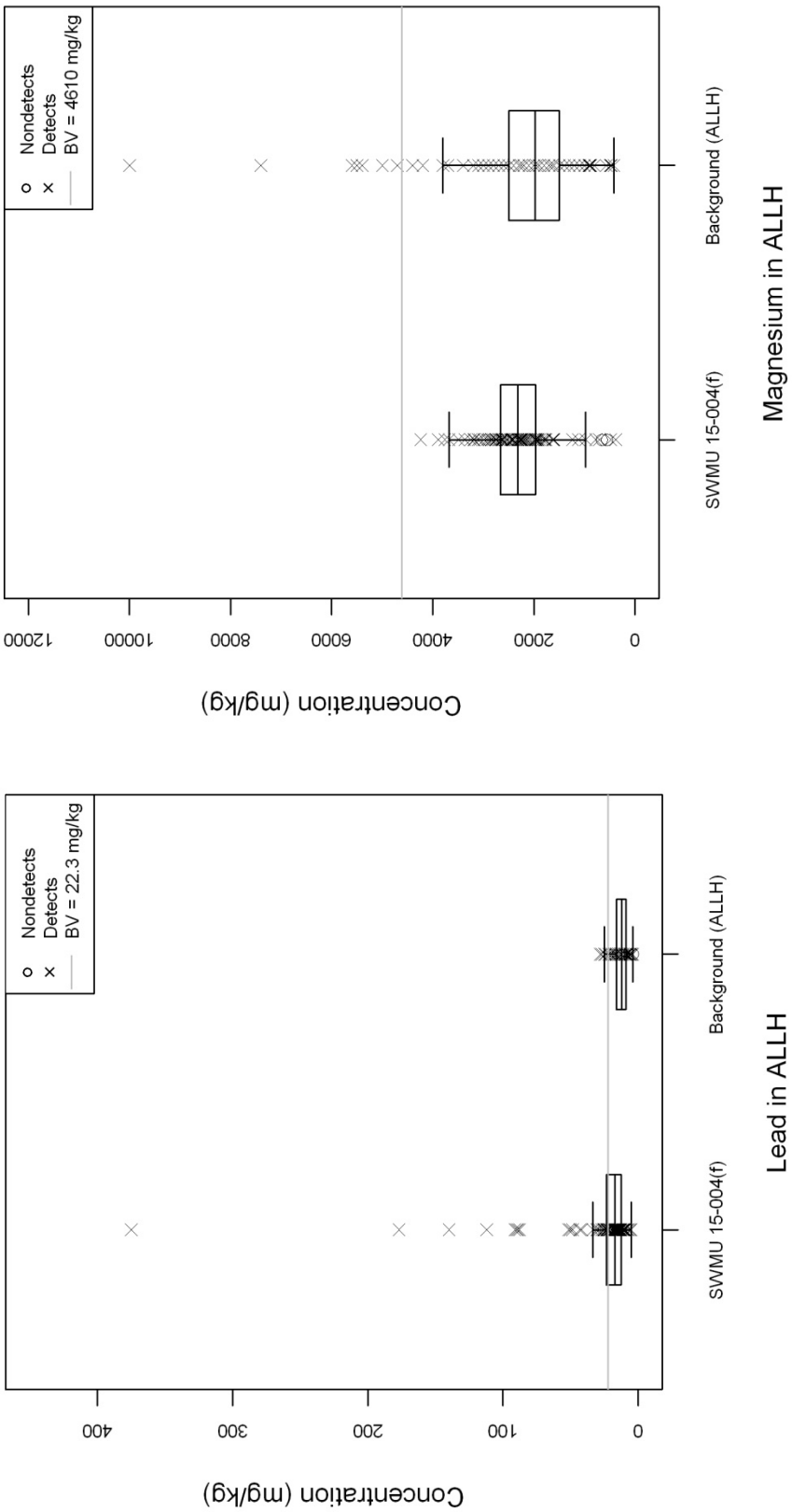


Figure H-18 Box plots for lead and magnesium in soil at SWMU 15-004(f)

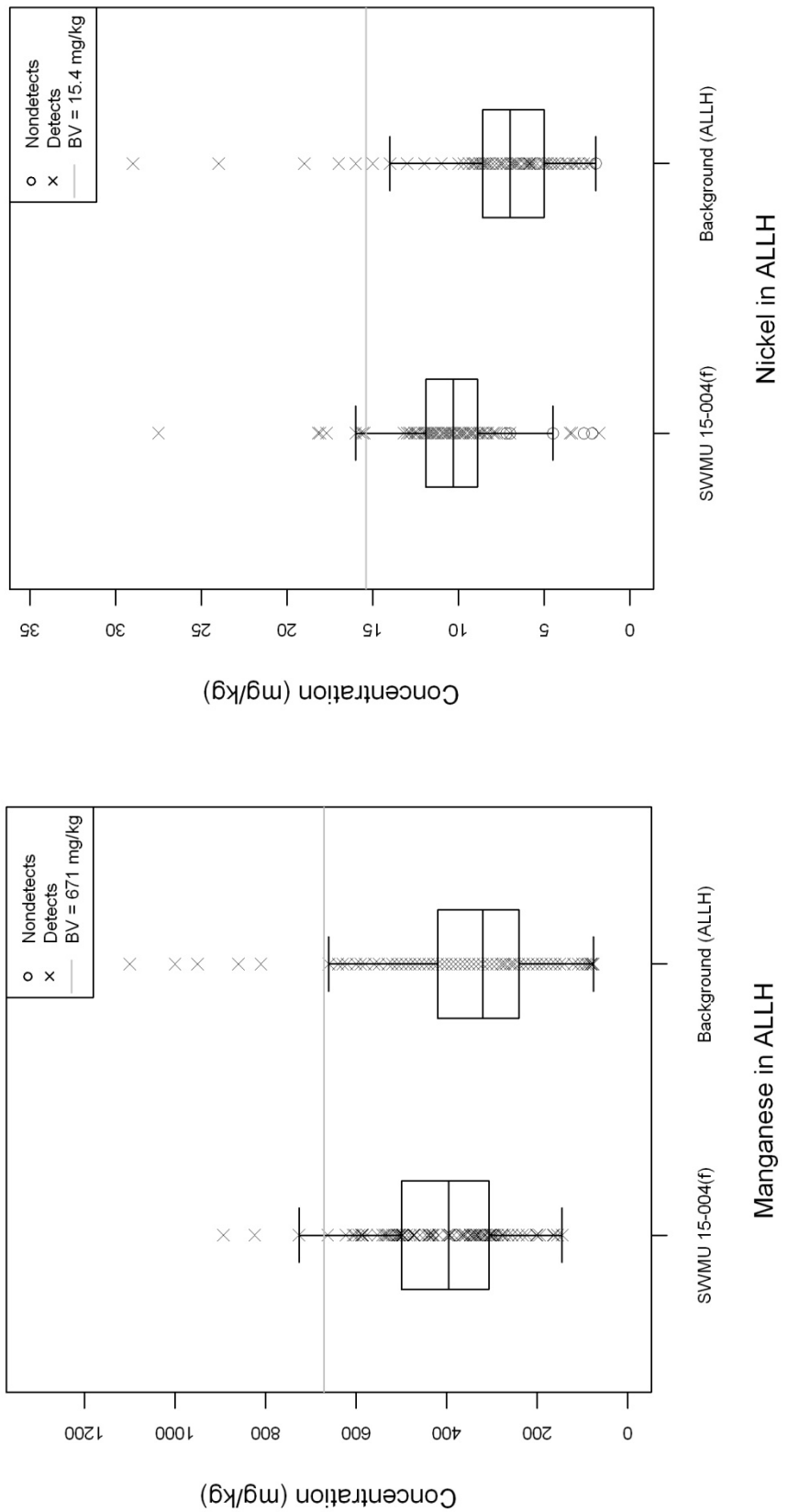
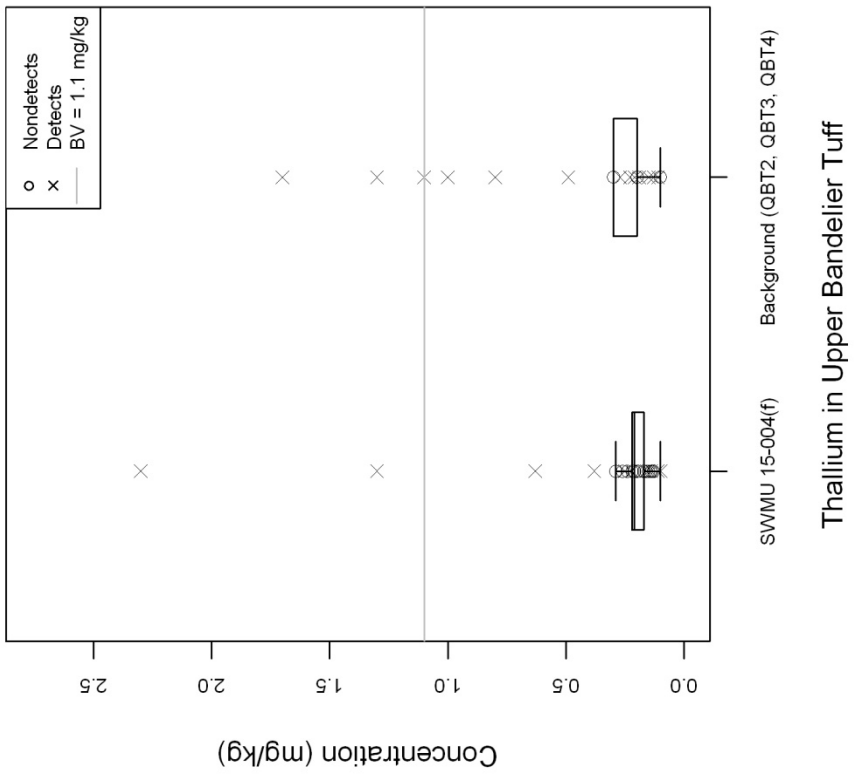


Figure H-19 Box plots for manganese and nickel in soil at SWMU 15-004(f)



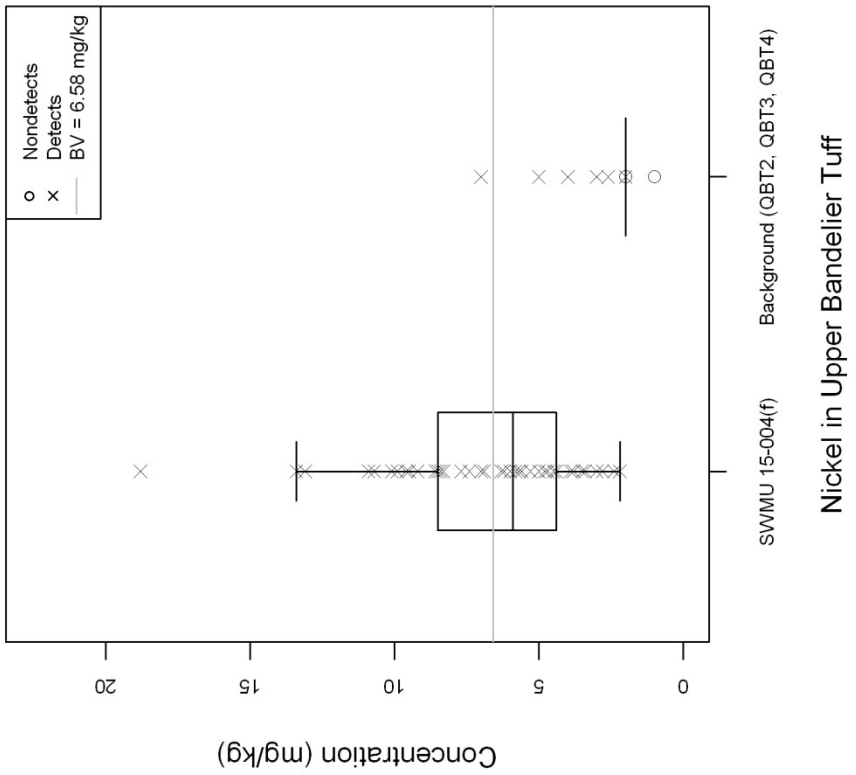


Figure H-20 Box plots for nickel and thallium in tuff at SWMU 15-004(f)

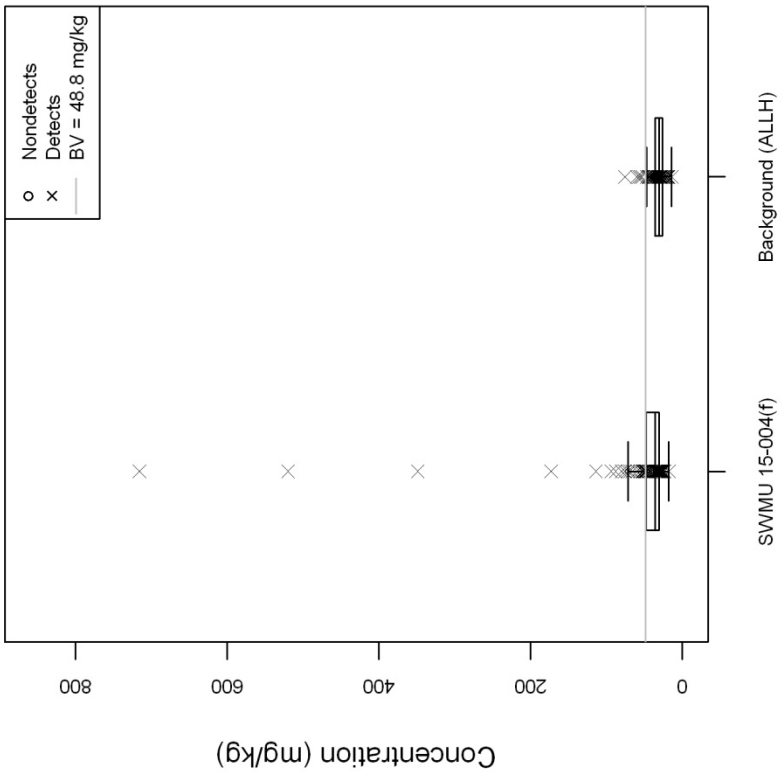


Figure H-21 Box plot for zinc in soil at SWMU 15-004(f)

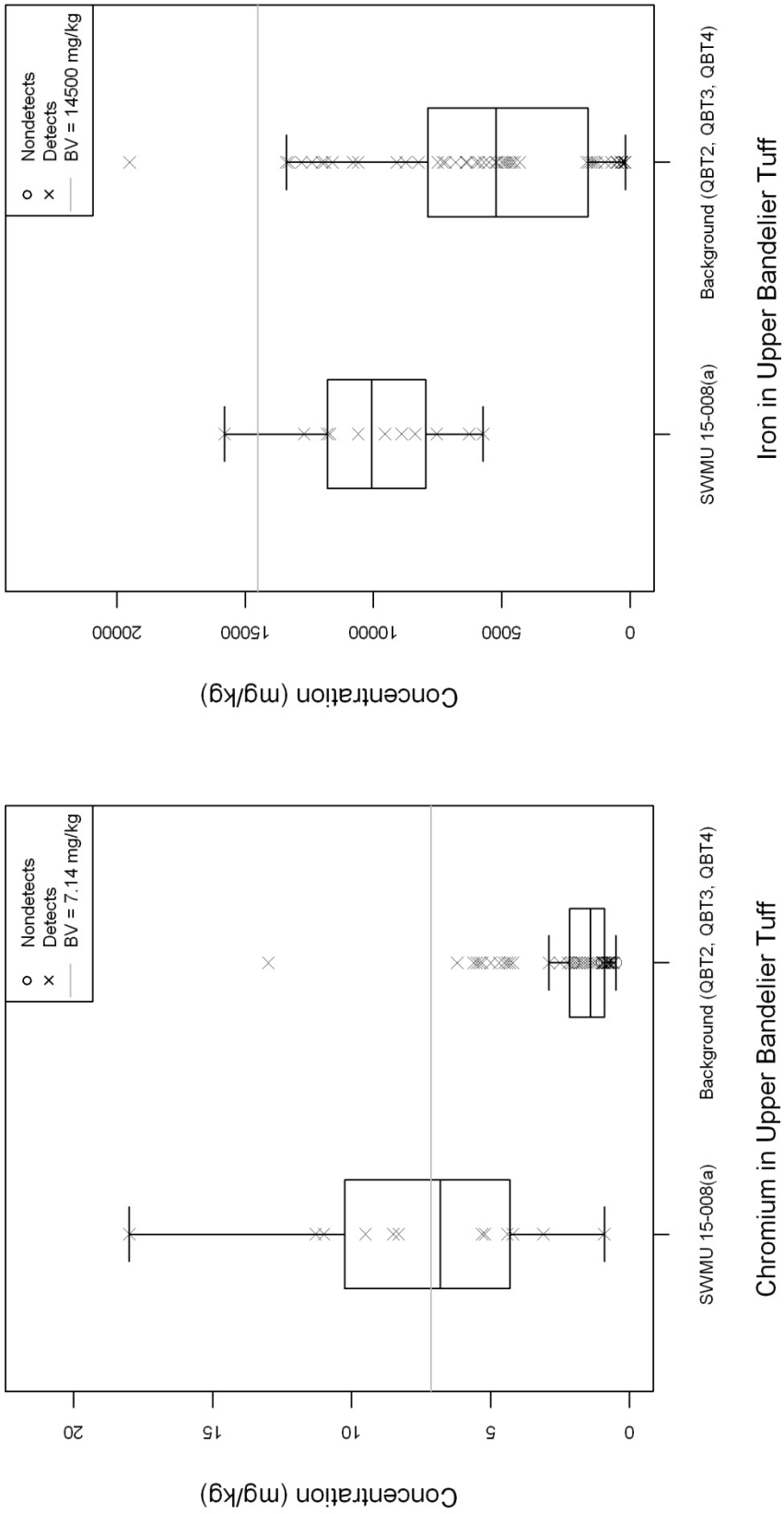


Figure H-22 Box plots for chromium and iron in tuff at SWMU 15-008(a)

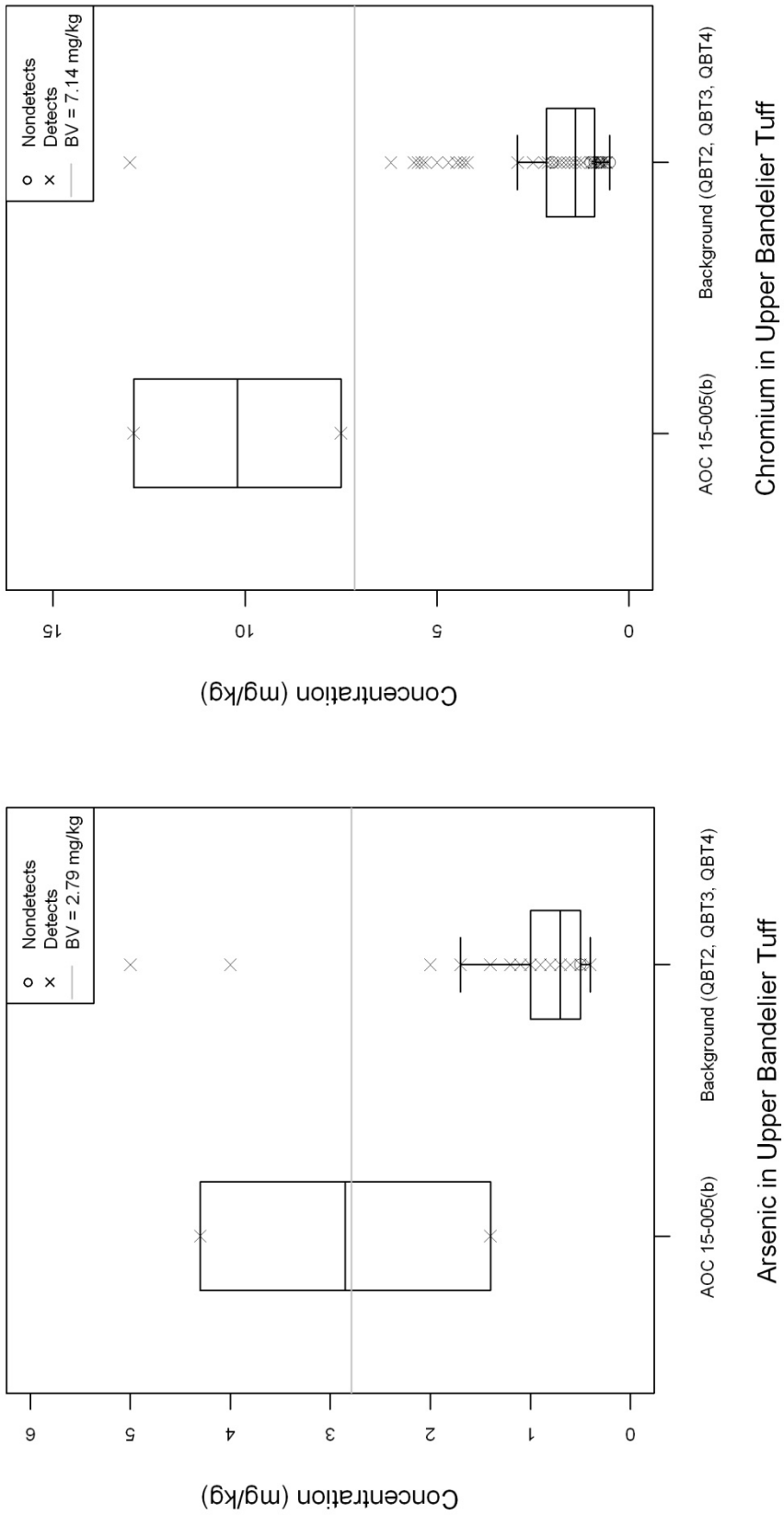


Figure H-23 Box plots for arsenic and chromium in tuff at AOC 15-005(b)

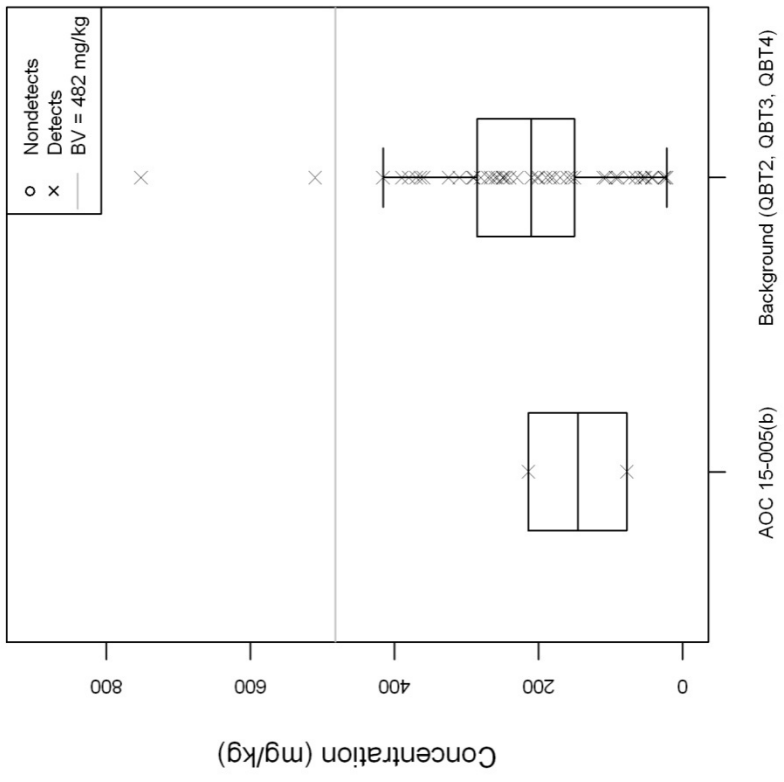
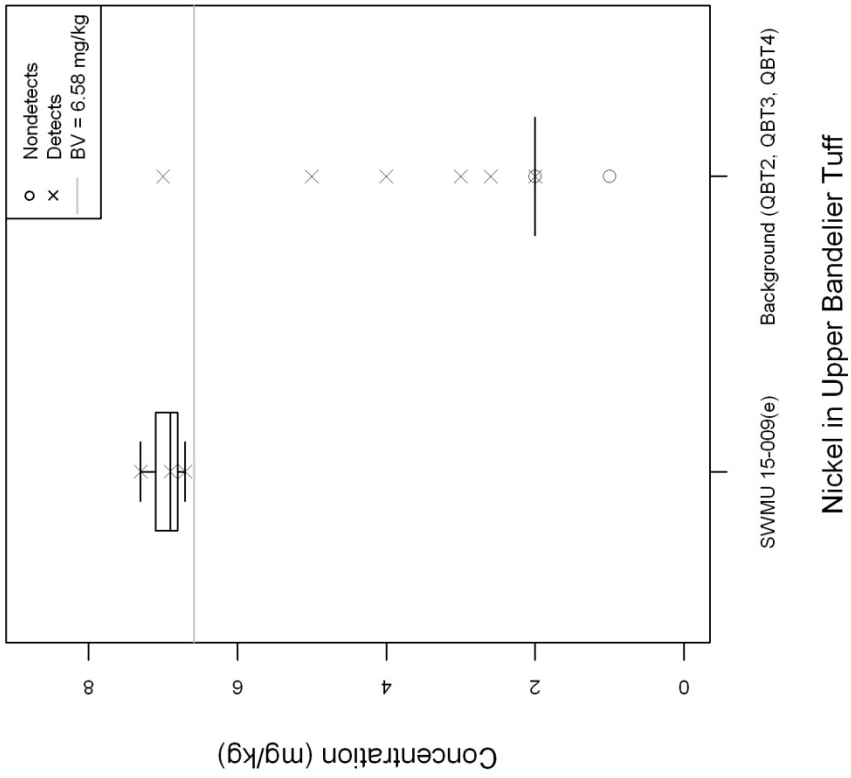


Figure H-24 Box plot for manganese in tuff at AOC 15-005(b)



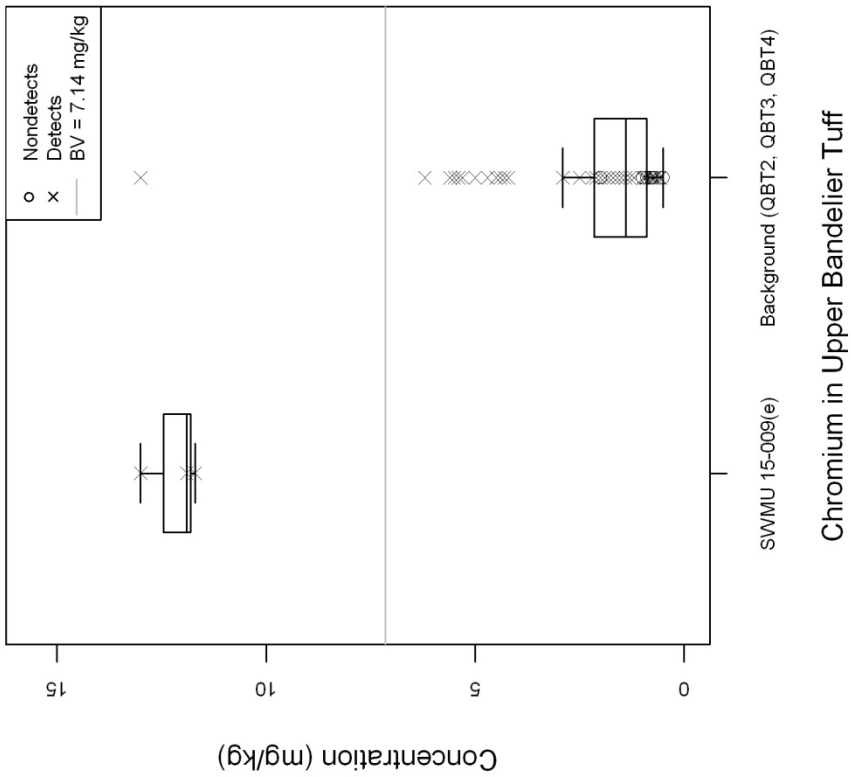


Figure H-25 Box plots for chromium and nickel in tuff SWMU 15-009(e)

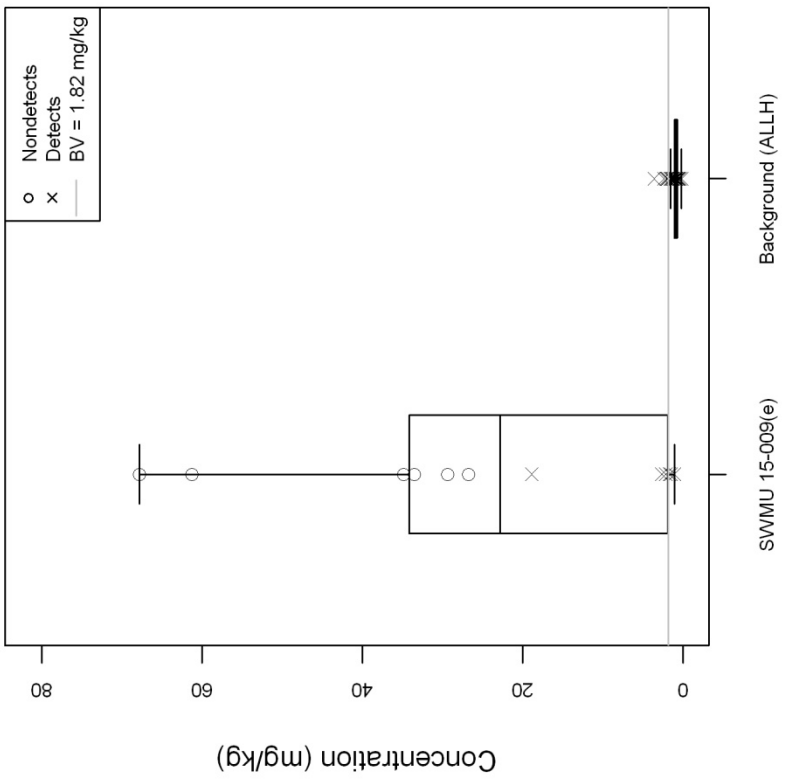
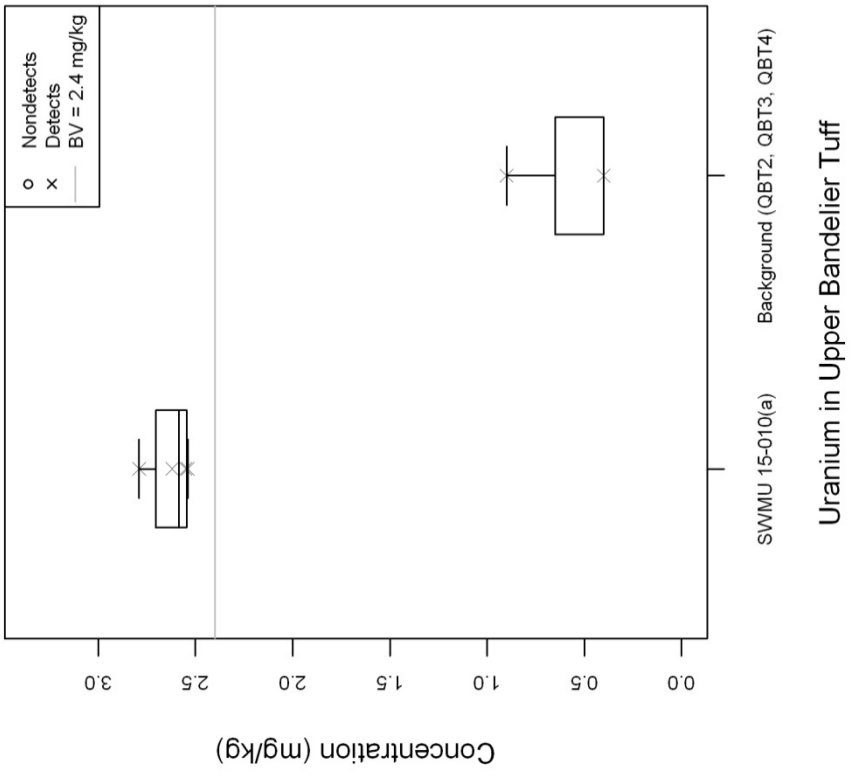


Figure H-26 Box plot uranium in soil at SWMU 15-009(e)



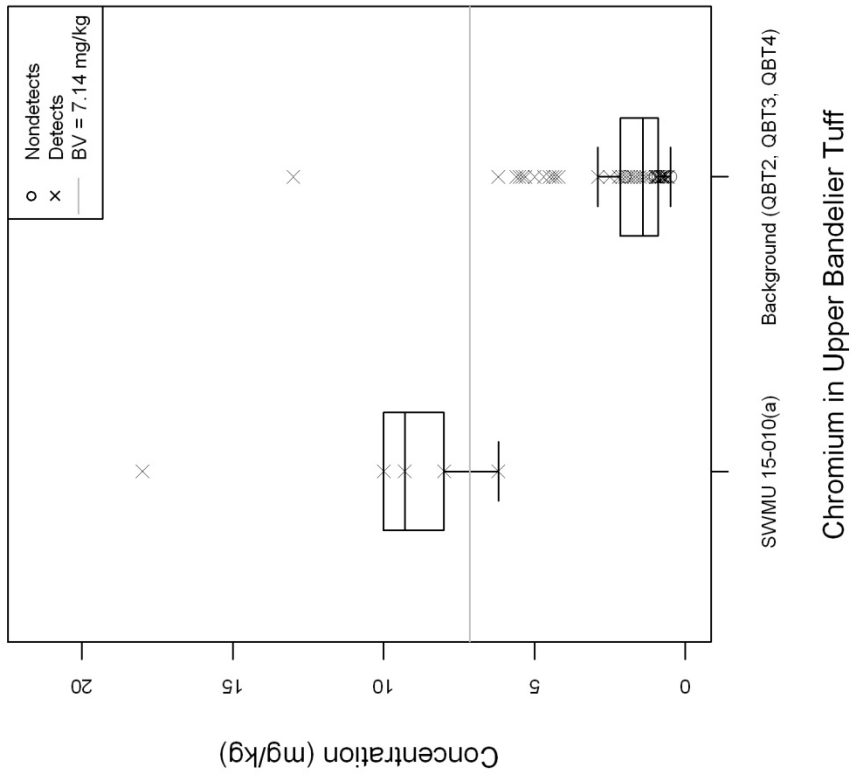


Figure H-27 Box plots for chromium and uranium in tuff at SWMU 15-010(a)

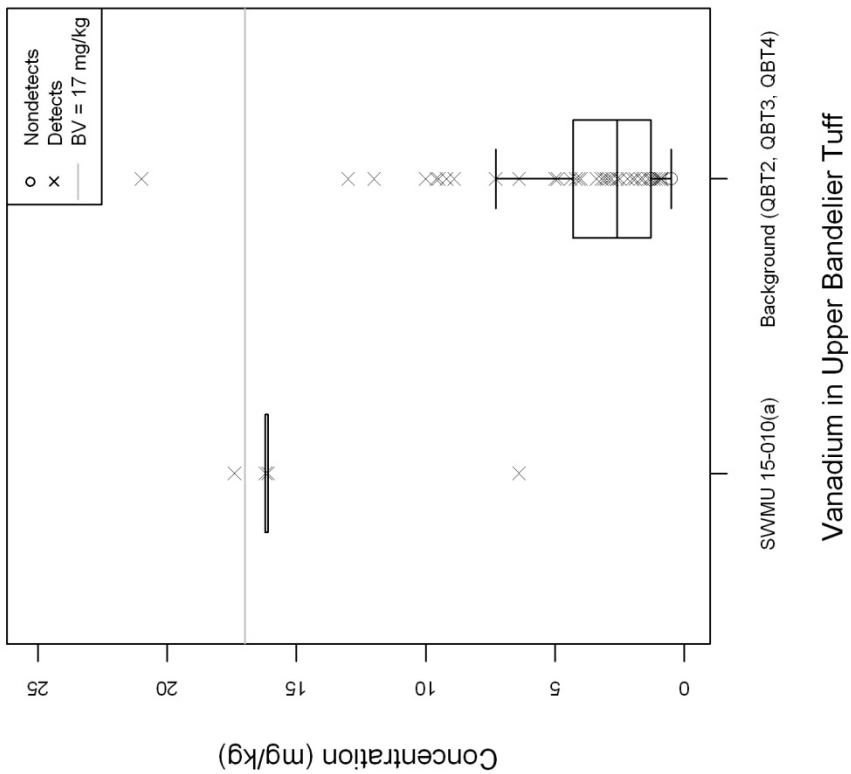


Figure H-28 Box plot for vanadium in tuff at SWMU 15-010(a)

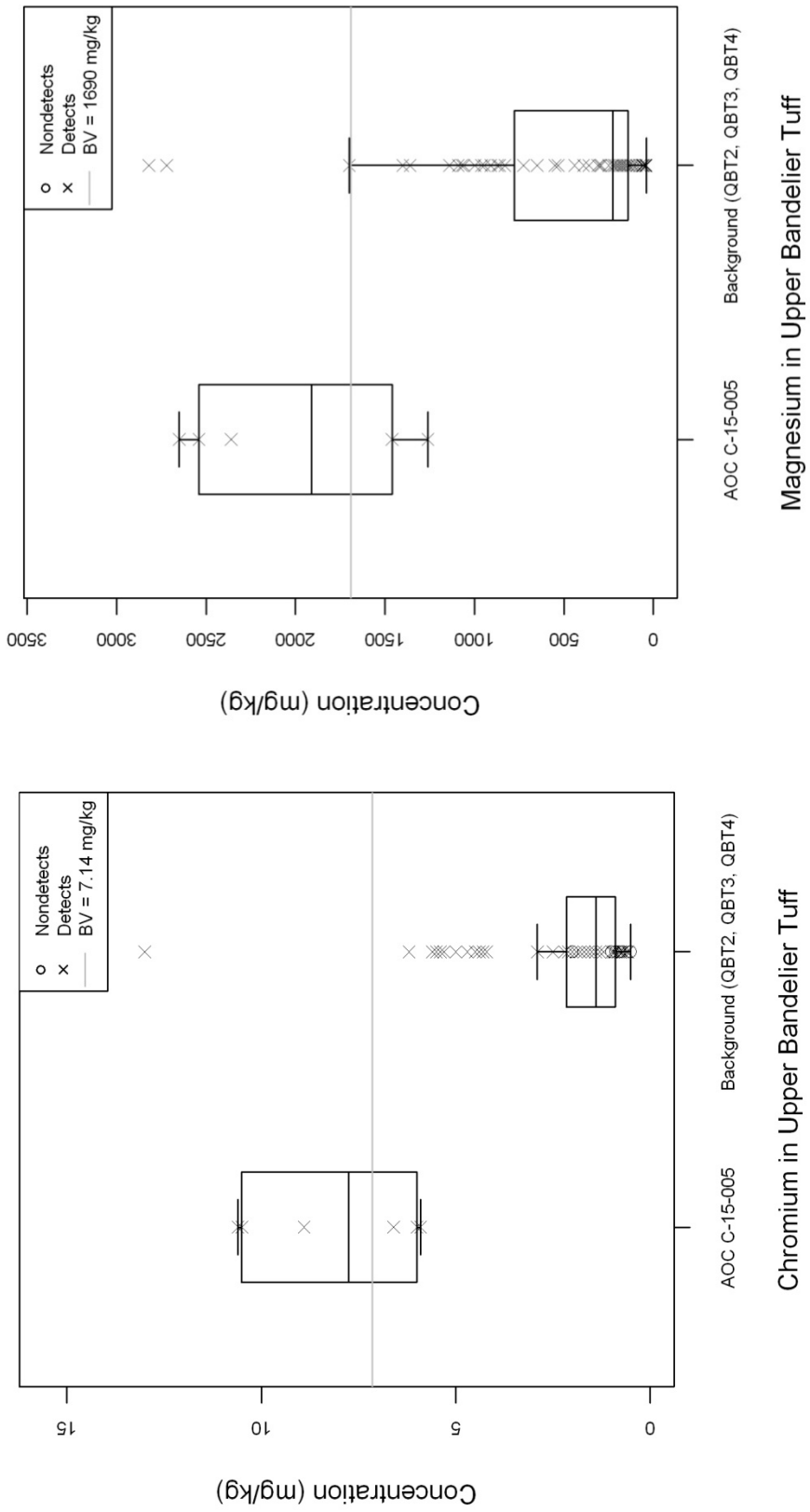
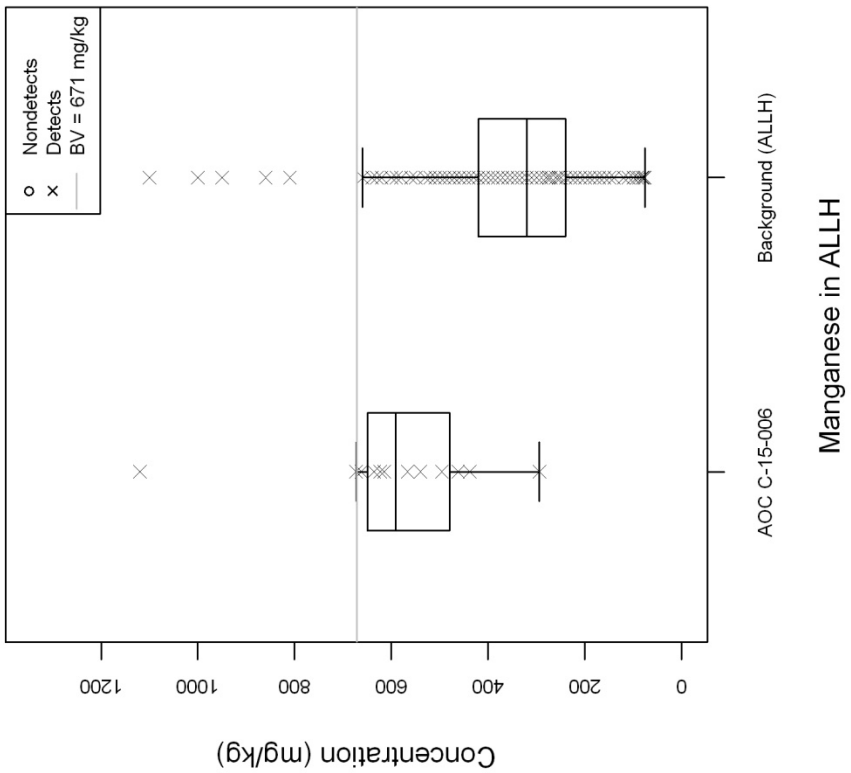


Figure H-29 Box plots for chromium and magnesium in tuff at AOC C-15-005



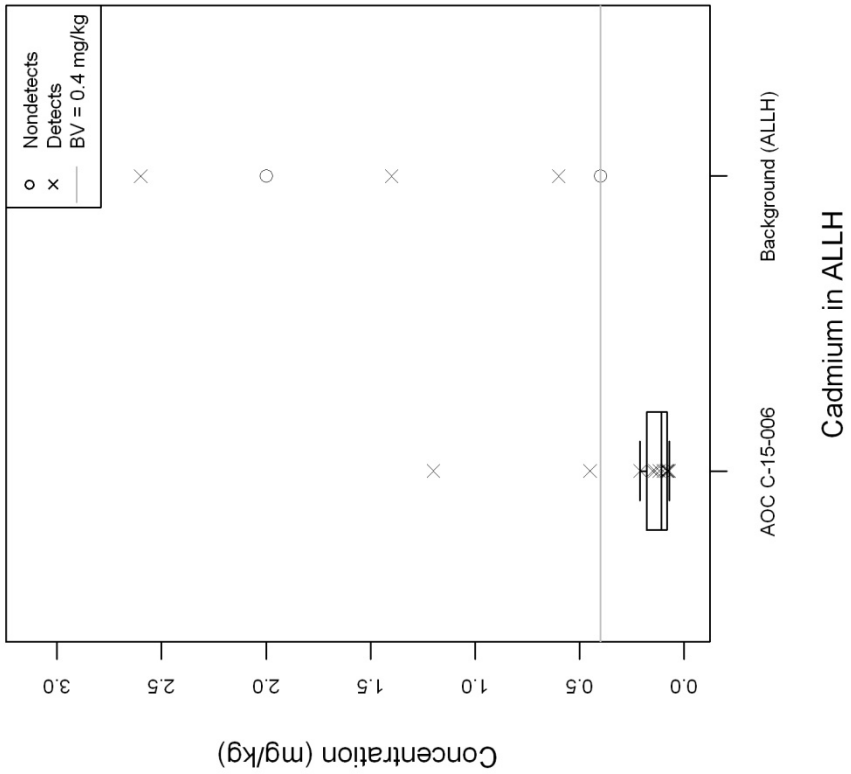


Figure H-30 Box plots for cadmium and manganese in soil at AOC C-15-006

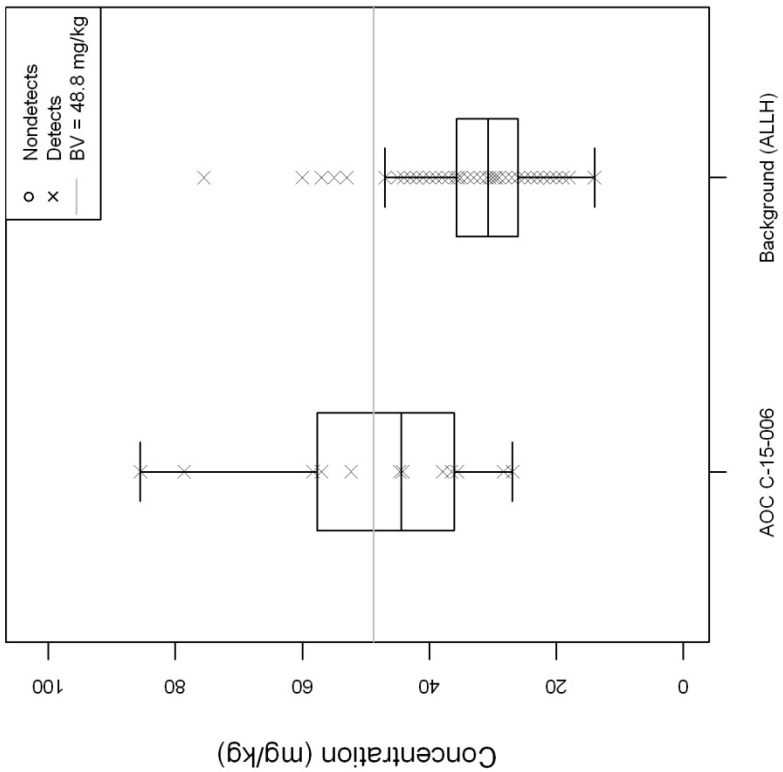


Figure H-31 Box plot for zinc in soil at AOC C-15-006

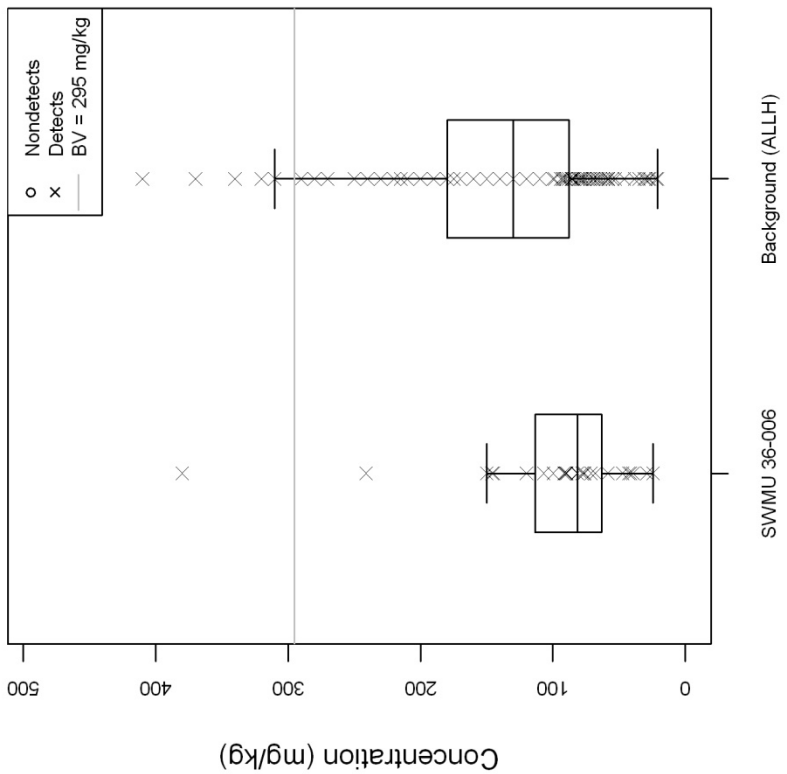


Figure H-32 Box plot for barium in soil at SWMU 36-006

Table H-1
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 15-002

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value
Potassium	0.17558	0.828	n/a*

* n/a = Not applicable.

Table H-2
Results of Statistical Tests for
Inorganic Chemicals in Tuff at SWMU 15-002

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value
Potassium	0.28653	0.92654	n/a*

* n/a = Not applicable.

Table H-3
Results of Statistical Tests for
Inorganic Chemicals in Tuff at SWMU 15-007(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value
Beryllium	0.1341	0.51148	n/a*
Zinc	0.05779	0.51148	n/a

* n/a = Not applicable.

Table H-4
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMUs 15-004(b) and 15-004(c)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value
Sodium	1	0.17104	n/a*

* n/a = Not applicable.