LA-UR-10-3256
May 2010
EP2010-0132

# Investigation Report for Upper Sandia Canyon Aggregate Area

Los Alamos
NATIONAL LABORATORY
EST.1943

Prepared by the Environmental Programs Directorate

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Responsible project manager:

| Printed Name | Signature | Title | Organization | Date |
|---|---|---|---|---|
| Kent Rich | | Project Manager | Environmental Programs | 5/27/10 |

Responsible LANS representative:

| Printed Name | Signature | Title | Organization | Date |
|---|---|---|---|---|
| Michael J. Graham | | Associate Director | Environmental Programs | 6/1/10 |

Responsible DOE representative:

| Printed Name | Signature | Title | Organization | Date |
|---|---|---|---|---|
| David R. Gregory | | Project Director | DOE-LASO | 6/01/10 |

## EXECUTIVE SUMMARY

This investigation report presents the investigation activities at 89 solid waste management units (SWMUs) and areas of concern (AOCs) in the Upper Sandia Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). The SWMUs and AOCs are located in Technical Area 03 (TA-03), TA-60, and TA-61. Of the 89 sites, 22 are proposed for delayed characterization and investigation pending the decommissioning and demolition of certain buildings and structures within the Upper Sandia Canyon Aggregate Area.

The objective of this investigation is to define the nature and extent of contamination and, if defined, to determine whether the sites pose a potential unacceptable risk to human health or the environment. This report presents the results of site characterization activities conducted during the 2009 investigation, as directed by the approved investigation work plan for Upper Sandia Canyon Aggregate Area.

The 2009 investigation activities included collecting soil, sediment, and rock samples from the surface to a maximum depth of 65 ft below ground surface. Data from samples collected during the 2009 investigation were evaluated with data collected during previous investigations that meet current Laboratory data-quality requirements.

The sampling data presented in this report indicated the extent of contamination has been defined at 25 sites. Human health and ecological risk assessments were performed for the 20 sites that have not been removed or previously remediated and reported in other documents. The 20 sites do not pose a potential unacceptable risk to human health and the environment under the current or reasonably foreseeable future land use and are recommended for corrective action complete. Five sites were recommended for no further action during previous investigations and remediation. Two other sites are currently addressed under other regulatory programs, and no futher actions are recommended.

The extent of contamination has not been defined at 40 sites. Additional sampling is needed to define the vertical and/or lateral extent at each of these sites. 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.

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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 that are 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's Environmental Programs (EP) Directorate is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of EP is to ensure past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, EP 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 Upper Sandia Canyon Aggregate Area at the Laboratory. These sites are potentially contaminated with hazardous chemicals and radionuclides. Corrective actions at the Laboratory are subject to a Compliance Order on Consent (the Consent Order). Information on radioactive materials and radionuclides, including the results of sampling and analysis of radioactive constituents, is voluntarily provided to the New Mexico Environment Department (NMED) in accordance with DOE policy.

## 1.1 General Site Information

The Upper Sandia Canyon Aggregate Area is located in Technical Area 03 (TA-03), TA-60, and TA-61 at the Laboratory (Figure 1.1-1) and consists of 180 SWMUs and AOCs, 91 of which have been previously investigated and/or remediated and have been approved for no further action. The remaining 89 SWMUs or AOCs were addressed in the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721). Historical details of previous investigations and data for all 180 sites are provided in the historical investigation report (HIR) for the Upper Sandia Canyon Aggregate Area (LANL 2008, 100693). This investigation report describes the investigation status or results from sampling activities conducted to date for the 89 sites. Table 1.1-1 lists the 89 sites, with a brief description, summary of previous investigations, and investigation activities conducted in 2009 for each site.

## 1.2 Purpose of Investigation

Eighty-nine SWMUs and AOCs within the Upper Sandia Canyon Aggregate Area were addressed by the 2009 investigation because these sites are potentially contaminated with hazardous chemicals and radionuclides, and final assessments of site contamination, associated risks, and recommendations for additional corrective actions remained incomplete. For each site, the objectives of the 2009 investigation were to (1) establish the nature and extent of contamination; (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 2009 investigation at 59 of the 89 SWMUs and AOCs per the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721). Thirty sites within the Upper Sandia Canyon Aggregate Area were not sampled in 2009 for one of the following conditions.

- Nature and extent were previously defined.
- The site is active or is part of a structure and cannot be safely investigated at this time; investigation of these sites is delayed until after decontamination and decommissioning (D&D) of the active facilities or associate structures.
- The site has been investigated during a voluntary corrective action (VCA) or an accelerated corrective action (ACA) and the results were presented and evaluated in a separate Laboratory report.
- The site was sampled as part of the Upper Mortandad Canyon Aggregate Area investigation (LANL 2010, 109206).
- If no sampling was conducted at a SWMU or AOC, the specific rationale for that site is included in the section for that site in sections 6, 7, and 8 of this document and summarized in Table 1.1-1.

All analytical data collected from the 2009 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 in 11 sections, including this introduction, with multiple supporting appendices. Section 2 provides details on the aggregate area site conditions (surface and subsurface). 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 for evaluating potential risk to ecological and human receptors. Section 5 describes the data review methods. Sections 6 through 8 present an overview of the operational history of each site, historical releases, summaries of previous investigations, results of the field activities performed during the 2009 investigation, site contamination, evaluation of the nature and extent of contamination, and summaries of human health risk-screening and ecological risk-screening assessments for TA-03, TA-60, and TA-61, respectively. Section 9 presents the conclusions of the nature and extent of contamination and risk assessments for each technical area. Section 10 discusses recommendations based on applicable data and the risk-screening assessments. Section 11 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); borehole logs (Appendix C); investigation-derived waste (IDW) management (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); box plots and statistical comparisons (Appendix H); and risk-screening assessments (Appendix I).

# 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 generally are 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 on the mesa top in the Upper Sandia Canyon Aggregate Area belongs generally to the Hackroy series and the Carjo series (Nyhan et al. 1978, 005702). Hackroy soil consists of very shallow to shallow, well-drained, and moderately developed soil with an A-B horizon sequence. Soil textures can range from sandy loams to clay loams. The Carjo series consists of moderately deep, well-drained, and moderately developed soil with an A-B-C horizon sequence. The soil textures of the Carjo series can be very fine sandy loams. The parent material of the soil may range from Bandelier Tuff to sequences of alluvium/colluvium interstratified with moderately developed to well-developed buried soil.

Most of the natural mesa-top surface soil has been altered by anthropogenic activities. Excavation and fill, paved roads, parking lots, landscaped areas, and buildings have changed the natural soil landscape considerably.

### 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.

The mesa-top portion of the Upper Sandia Canyon Aggregate Area is currently an industrially developed area. Perennial stream flow and saturated alluvial aquifer conditions occur in the upper and middle portions of the canyon system. A wetland of approximately 7 acres has developed as a result of effluent discharge. The only known perennial spring in the watershed, Sandia Spring, is located in lower Sandia Canyon near the Rio Grande (LANL 2007, 096665).

### 2.1.3 Land Use

Currently, land use of the Upper Sandia Canyon Aggregate Area is industrial. The TAs make up the core operational and administrative complex of the Laboratory. The area is highly developed with numerous office and Laboratory buildings, utilities, parking facilities, roads, and other paved areas. Most of TA-03 is located on the mesa top west of Sandia Canyon and most of TA-60 and TA-61 are located on the mesa top east of Sandia Canyon (Figure 2.1-1).

## 2.2 Subsurface Conditions

### 2.2.1 Stratigraphic Units of the Bandelier Tuff

This section summarizes the stratigraphy of the Upper Sandia Canyon Aggregate Area. Additional information on the geologic setting of the area and on the Pajarito Plateau can be found in the Laboratory's 2009 Interim Facility-Wide Groundwater Monitoring Plan (IFGMP) (LANL 2009, 106115).

The bedrock at or near the surface of the mesa top is the Bandelier Tuff. There are approximately 1250 ft of volcanic and sedimentary materials between any potential contaminant-bearing units at the mesa surface and the regional aquifer. The descriptions begin with the oldest (deepest) and proceed to the youngest (topmost). The stratigraphic units that were encountered during investigation of the Upper Sandia Canyon Aggregate Area are described briefly in the following sections and are shown in Figure 2.2-1.

The Bandelier Tuff consists of the Otowi and Tshirege Members, which are stratigraphically separated in many places by the tephras and volcaniclastic sediment of the Cerro Toledo interval. The Bandelier Tuff was emplaced during cataclysmic eruptions of the Valles Caldera between 1.61 and 1.22 million yr ago. The tuff is composed of pumice, minor rock fragments, and crystals supported in an ashy matrix. It is a prominent cliff-forming unit because of its generally strong consolidation (Broxton and Reneau 1995, 049726).

#### 2.2.1.1 Otowi Member

Griggs and Hem (1964, 092516), Smith and Bailey (1966, 021584), Bailey et al (1969, 021498), and Smith et al. (1970, 009752) describe 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, and crystal fragments, and fragments of perlite.

#### 2.2.1.2 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 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.

#### 2.2.1.3 Tephras 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). Outcrops of the Cerro Toledo interval generally occur wherever the top of the Otowi Member appears in Sandia Canyon and in canyons to the north. 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 and 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 equivalents of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate that 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 (Qbt) and is 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 yr 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 display 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.

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 that is readily visible in canyon walls in parts of Sandia Canyon. 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 have 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 in Mortandad Canyon. 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 unit 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).

### 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 400 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 2009, 106115) 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 IFGMP (LANL 2009, 106115) 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 of 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 location of wells and the generalized water-level contours on top of the regional aquifer are described in the IFGMP (LANL 2009, 106115). The regional aquifer is typically separated from the alluvial groundwater and intermediate-perched zone groundwater by 350 to 620 ft of tuff, basalt, and sediments (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).

#### 2.2.2.4 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 Upper Sandia Canyon Aggregate Area approved investigation work plan; the field investigation results and observations are presented in detail in sections 6 through 8 and in the appendices. The scope of activities for the 2009 Upper Sandia Canyon Aggregate Area investigation included site access and premobilization activities; geodetic, geophysical, and radiological surveys; surface and shallow subsurface sampling; borehole drilling, sampling, and abandonment; health and safety monitoring; and waste management activities.

All activities were conducted in accordance with the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721). 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, 7, and 8 and are described in detail in Appendix B.

### 3.1 Site Access and Premobilization Activities

The area encompassing the Upper Sandia Canyon Aggregate Area is currently used for LANL 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 subsections describe the field activities conducted during the 2009 investigation, including surface surveys, field screening, surface and shallow subsurface sampling, and borehole drilling, sampling, and abandonment. 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 Upper Sandia Canyon 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 at the completion of the sampling campaign to establish the spatial coordinates for all sampling locations. 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. 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 Geophysical Surveys

A geophysical survey was performed at SWMU 03-029, a former landfill, to locate anomalies that could potentially represent areas of buried asphalt. Multiple geophysical methods were used to optimize the survey, including multianalysis of shear waves (MASW) method, and ground-penetrating radar (GPR). The survey consisted of six MASW profiles, and 16 GPR traverses within the survey area. Appendix E presents the geophysics report with individual profile results.

### 3.2.3 Field Screening

Environmental samples were analyzed for volatile organic compounds (VOCs) with a MiniRAE 2000 photoionization detector (PID) equipped with an 11.7 electron-volt (eV), or 10.6 eV 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 collection, the sample was placed in a sealed plastic bag and warmed for approximately five minutes. Screening measurements were recorded in the field sample collection logs (SCLs), chain of custody (COC) forms, and the field logbook. The SCLs and COC forms are provided on DVD in Appendix G. The VOC screening results are presented in Table 3.2-2.

All samples collected were field screened for radioactivity before they were submitted to the 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 radioactivity were recorded in disintegrations per minute (dpm) on the field SCL/COCs. The SCLs and COC forms are provided on DVD in Appendix G. The radiological screening results are presented in Table 3.2-2.

### 3.2.4 Surface and Shallow Subsurface Soil Investigation

Samples were collected according to the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721). Table 3.2-3 lists the proposed sampling locations, crosswalked to actual location identifiers. 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.

All surface and shallow subsurface samples were placed in appropriate sample containers and submitted to the laboratory for the analyses specified by the approved work plan. Standard quality assurance (QA)/quality control (QC) 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).

### 3.2.5 Borehole Drilling and Subsurface Sampling

At locations where the required sampling depths could not be reached by hand augers, a hollow-stem auger (HSA) drilling rig was used to collect subsurface samples. Samples were collected using stainless-steel core-barrel samplers. The samples were extracted from the core barrels and immediately put in a sample collection bottles.

Samples were collected from depth intervals based on criteria established in the approved work plan (LANL 2008, 103404; NMED 2008, 102721). All sampled core material was placed in the appropriate sampling containers, labeled, documented, and preserved (as appropriate) for transport to the SMO. Samples were submitted for laboratory analyses as specified by the approved work plan.

### 3.2.6 Borehole Abandonment

Boreholes were abandoned in accordance with SOP-5034, Monitoring Well and Borehole Abandonment. All boreholes were abandoned with 3/8-in. bentonite chips hydrated in 2-ft lifts from total depth (TD) to 2.0 ft bgs. The top 2.0 ft of each borehole was then capped with Portland type I/II cement to surface grade.

### 3.2.7 Test Pit Excavation

Four test pits were excavated at SWMU 03-009(i), an inactive surface disposal site consisting of construction debris, crushed tuff, pieces of concrete, rock, and fill. Two samples from each test pit were collected from 5.0 ft and 10.0 ft bgs to characterize the material. Test pits were excavated using a backhoe. During excavation activities, a PID was used to monitor the workers breathing zone to ensure worker safety. Excavated material was placed back in each test pit and contact waste was managed according to the approved waste characterization strategy form (WCSF).

### 3.2.8 Swipe Sampling for Polychlorinated Biphenyls

Swipe sampling was performed in accordance with American Standard for Testing and Materials D6661-01(2006), Standard Practice for Collection of Organic Compounds from Surfaces Using Wipe Sampling, and analyzed for polychlorinated biphenyls (PCBs). To collect swipe samples, a 100 × 100 cm stencil was placed on the surface to be sampled. A hexane-soaked 2-in.-square cotton gauze pad was used to wipe the concrete inside the stencil. Once the entire area inside the stencil was wiped, the gauze pad was placed inside a 125 mL wide-mouth jar. Samples 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).

### 3.2.9 Septic Tank Removal

During the 2009 investigation, the SWMU 60-006(a) septic tank was excavated and removed in accordance with the approved work plan (LANL 2008, 100693; NMED 2008, 102721). An excavator was used to remove the 1000-gal. concrete septic tank that was buried next to the canyon rim approximately 7 to 10 ft bgs. Plastic sheeting was placed at the bottom of the excavated pit as a marker before the overburden was replaced, and the excavation backfilled with clean fill to original grade. The 6-in. inlet drainline to the septic tank was plugged with concrete and the outlet drainline to the seepage pit was removed. Following the backfilling of the septic tank excavation, confirmation samples were collected in accordance with the approved work plan from three locations below the bottom of the septic tank

excavation: at the former septic tank inlet, from the center of the tank footprint, and at the former septic tank outlet (LANL 2008, 100693; NMED 2008, 102721). Management of waste generated from the excavation and removal of the SWMU 60-006(a) septic tank, outlet drainline, and associated IDW is described in Appendix D.

The associated seepage pit was not removed as proposed in the investigation work plan because of site conditions (Appendix B, section B-10.0, Deviations).

### 3.2.10 Equipment Decontamination

All field equipment that had the potential to contact sample material (e.g., hand augers, sampling scoops, bowls, core-barrel sections) were decontaminated between sample collections 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 on sampling equipment were collected to check the effectiveness of decontamination. The dry decontamination methods used are described in Appendix B.

### 3.2.11 Chemical and Radiological Sample Analyses

All investigation samples were shipped by the SMO to off-site contract analytical laboratories for the requested analyses. The analyses requested were as specified by the approved work plan (LANL 2008, 103404; NMED 2008, 102721). The samples were analyzed for all or a subset of the following: target analyte list (TAL) metals, total cyanide, nitrate, perchlorate, chromium hexavalent ion, PCBs, semivolatile organic compounds (SVOCs), VOCs, total petroleum hydrocarbons (TPH) diesel range organics (DRO), TPH–gasoline range organics (GRO), pesticides, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, strontium-90, and tritium.

Five inorganic chemicals were incorrectly added to the TAL metals analytical suite in Table 4.0-2 of the approved work plan (LANL 2008, 103404, p. 210; NMED 2008, 102721): boron, lithium, silicon dioxide, titanium, and uranium. These five inorganic chemicals are not related to any site or associated with processes in the Upper Sandia Canyon Aggregate Area. They were never previously investigated for, nor do they appear as chemicals of potential concern (COPCs) in any report. The sampling results for boron, lithium, silicon dioxide, titanium, and uranium are presented with the all analyses data on DVD in Appendix G but are not evaluated in this report.

### 3.2.12 Health and Safety Measures

All 2009 investigation activities were conducted in accordance with a site-specific health and safety plan 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 (PPE) in areas where elevated radiation was expected and field monitoring for VOCs, gross-alpha and gross-beta radiation, and dust-particulate matter using both portable and personnel air-monitoring systems.

### 3.2.13 IDW Storage and Disposal

All IDW generated during the Upper Sandia Canyon Aggregate Area field investigation was managed in accordance with EP-ERSS-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 WCSF. Details of IDW management for the Upper Sandia Canyon Aggregate Area investigation are presented in Appendix D.

The waste streams associated with the investigation included drill cuttings, contact waste, returned samples, concrete and asphalt debris, and solid waste. Each waste stream was containerized and placed in an accumulation area appropriate for the regulatory classification of the waste, in accordance with the approved WSCF.

### 3.3 Deviations

Deviations occurred while conducting field activities as defined in the approved work plan (LANL 2008, 103404; NMED 2008, 102721). The deviations did not adversely affect the completion or results of the investigation. Specific deviations are summarized in sections 6, 7, and 8 and described in Appendix B, section B-10.0.

## 4.0 REGULATORY CRITERIA

This section describes the criteria used for evaluating potential risk to ecological and human receptors. Regulatory criteria identified by medium in the Consent Order include cleanup standards, risk-based screening levels, and risk-based cleanup goals.

Human health risk-screening evaluations were conducted for the Upper Sandia Canyon Aggregate Area using NMED guidance (NMED 2009, 118070). Ecological risk-screening assessments were 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 Upper Sandia Canyon Aggregate Area is currently industrial and is expected to remain industrial for the reasonably foreseeable future. A construction worker scenario is 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. Although the residential scenario is typically evaluated for comparison purposes per the Consent Order, it is the decision scenario for sites that do not require future controls.

### 4.2 Screening Levels

Human health and ecological risk-screening evaluations were conducted for the solid media at the Upper Sandia Canyon Aggregate Area. The human health screening assessments (Appendix I) were performed on inorganic and organic COPCs using NMED soil screening levels (SSLs) for the construction worker and residential scenarios. Radionuclides were assessed using the Laboratory screening action levels (SALs). When an NMED SSL was not available for a COPC, construction worker SSLs were calculated based on EPA regional screening levels (adjusted to a risk level of $10^{-5}$ for carcinogens). If an SSL was not available and if sufficient toxicity information was available, a SSL was calculated. A surrogate SSL was used for some COPCs based on structural similarity or breakdown products.

### 4.3 Ecological Screening Levels

Ecological screening levels (ESLs) were obtained from the ECORISK Database, Version 2.4 (LANL 2009, 107524), as presented in Appendix I. The ESLs are based on similar species and are derived from experimentally determined no-observed-adverse-effect levels (NOAELs), lowest-observed-adverse-effect levels (LOAELs), or doses determined lethal to 50% of the test population. Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and toxicity reference values are presented in the ECORISK Database, Version 2.4 (LANL 2009, 107524).

### 4.4 Cleanup Standards

As specified in the Consent Order, screening levels will be 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 assessments compared COPC concentrations for each site with industrial, residential, and construction worker SSLs, depending on the current and reasonably foreseeable future land use for the sites.

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

## 5.0 DATA REVIEW METHODOLOGY

The purpose of the data review is to identify COPCs for each SWMU or AOC in the Upper Sandia Canyon 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 background values (BVs) or fallout values (FVs) and by detection alone for organic chemicals. For the former, detections above background may occur in investigation datasets that are not different than the appropriate background dataset; therefore, statistical comparisons are performed, as described in section 5.2, to determine if concentrations are comparable to background and to aid in defining extent. Inorganic chemicals and radionuclides whose concentrations across a site are below BV/FV or are not significantly different than background are considered to have extent defined. In addition, low detected concentrations of certain naturally occurring inorganic chemicals (e.g., nitrate) that do not have an established BV are most likely reflect naturally occurring concentrations and not a contaminant release.

Organic chemicals detected at or near the estimated quantitation limit (EQL) for the analytical method are considered present at “trace” concentrations, and extent is defined.

Evaluations of the nature and extent of contamination for all inorganic chemicals detected above BV or detected that do not have an established BV are presented in sections 6, 7, and 8.

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 a single analyte, COPCs are not identified for that site and further investigation, including Phase II sampling, is recommended.

### 5.1 Inorganic Chemical and Radionuclide Background Comparisons

The COPCs are identified for inorganic chemicals and radionuclides following SOP-5245, Background Value Comparisons—Inorganic Chemicals and SOP-5246, Background Value Comparisons—Radionuclides. Inorganic COPCs are identified by comparing site data with BVs and maximum concentrations in a background dataset and using statistical comparisons, as applicable (LANL 1998, 059730). Organic chemicals are identified as COPCs based on detection status. Radionuclides are identified as COPCs based on background comparisons and statistical methods if BVs or FVs are available, or based on detection status if BVs or FVs have not been established.

Background data are generally available for inorganic chemicals in 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 dataset (upper tolerance limit [UTL] 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 dataset for that analyte/media combination.

For inorganic chemicals, data are evaluated by sample media to facilitate the comparison with media-specific background data. To identify inorganic COPCs, the first step is to compare the sampling result with BVs. If the sampling results are above BV and the sufficient data are available (10 or more sampling results), statistical tests are used to compare the site sample data with the background dataset for the appropriate media. If statistical tests cannot be performed because of not sufficient data or a high percentage of nondetections, the sampling results are compared with the BV and the maximum background concentration in the appropriate media. If any sampling result is above the BV and the maximum background concentration, the inorganic chemical is identified as a COPC. The same evaluation is performed using DLs when an inorganic chemical is not detected but has a DL 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, uranium-234, uranium-235/236, and uranium-238 are naturally occurring radionuclides. Americium-241, cesium-137, plutonium-238, plutonium-239/240, strontium-90, and tritium are fallout radionuclides.

Naturally occurring radionuclides detected at activities above their respective BVs are identified as COPCs. These radionuclides background have no datasets. If there is no associated BV or FV and the radionuclide is detected, it is retained as a COPC.

The FVs for the fallout radionuclides apply to the top 0.0–1.0 ft of soil and fill only. If a fallout radionuclide is detected in site samples collected below 1.0 ft, the radionuclide is identified as a COPC. For samples from 1.0 ft bgs or less, if the activity of a fallout radionuclide is greater than the FV, comparisons of the top 0.0–1.0 ft sample data are made with the fallout dataset and the radionuclide is eliminated as a COPC if activities are similar to fallout activities is based on statistical comparisons or comparisons to the maximum fallout concentration.

The FV for tritium in surface soil (LANL 1998, 059730) is in units of pCi/mL. This FV requires using sample percent moisture to convert sample tritium data from pCi/g (as provided by analytical laboratories) to the corresponding values in units of pCi/mL. Because sample percent moisture historically has been determined using a variety of methods, often undocumented, the Laboratory has adopted the conservative approach of identifying tritium in soil as a COPC based on detection status.

Sample media encountered during investigations at Upper Sandia Canyon Aggregate Area include soil (all soil horizons, designated by the media code ALLH or SOIL); fill material (media code FILL); alluvial

sediment (media code SED), Bandelier Tuff (media codes Qbt1g, Qbt2, Qbt3, and Qbt4); and other (asphalt, swipe samples). Because no separate BVs are available for fill material, fill samples are evaluated by comparison to soil BVs (LANL 1998, 059730). In this report, the discussions of site contamination in soil include fill samples with soil samples in sample counts and comparisons to background. Fill samples are not discussed separately from soil. The units of the Upper Bandelier Tuff (Qbt2, Qbt3, and Qbt4) are likewise evaluated together with respect to background (LANL 1998, 059730).

## 5.2 Statistical Methods Overview

A variety of statistical methods may be applied to each of the datasets. The use of any of these methods depends on how appropriate the method is for the available data.

### 5.2.1 Distributional Comparisons

Comparisons between site-specific data and Laboratory background data are performed using a variety of statistical methods. These methods begin with a simple comparison of site data with an UTL estimated from the background data (UTL or the 95% upper confidence bound on the 95th quantile). The UTLs are used to represent the upper end of concentration distribution and are referred to as BVs. The UTL comparisons are then 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 elevated above background levels). Nonparametric tests most commonly performed include the Gehan test (modification of the Wilcoxon Rank Sum test) and the quantile test (Gehan 1965, 055611; Gilbert and Simpson 1990, 055612).

The Gehan test is recommended when between 10% and 50% of the datasets are nondetections. It handles datasets with nondetections reported at multiple DLs in a statistically robust manner (Gehan 1965, 055611; Millard and Deverel 1988, 054953). The Gehan test is not recommended if either of the two datasets has more than 50% nondetections. If there are no nondetected concentrations in the data, the Gehan test is equivalent to the Wilcoxon Rank Sum test. The Gehan test is the preferred test because of its applicability to a majority of environmental datasets, and its recognition and recommendation in EPA sponsored workshops and publications.

The quantile test is better suited to assessing shifts in a subset of the data. The quantile test determines whether more of the observations in the top chosen quantile of the combined dataset come from the site dataset than would be expected by chance, given the relative sizes of the site and background datasets. If the relative proportion of the two populations being tested is different in the top chosen quantile of the data than in the remainder of the data, the distributions may be partially shifted because of a subset of site data. This test is capable of detecting a statistical difference when only a small number of concentrations are elevated (Gilbert and Simpson 1992, 054952). The quantile test is the most useful distribution shift test where samples from a release represent a small fraction of the overall data collected. The quantile test is applied at a prespecified quantile or threshold, usually the 80th percentile. The test cannot be performed if more than 80% (or, in general, more than the chosen percentile) of the combined data are nondetected values. It can be used when the frequency of nondetections is approximately the same as the quantile being tested. For example, in a case with 75% nondetections in the combined background and site dataset, application of a quantile test comparing 80th percentiles is appropriate. However, the test cannot be performed if nondetections occur in the top chosen quantile. The threshold percentage can be adjusted to accommodate the detection rate of an analyte, or to look for differences further into the distribution tails. The quantile test is more powerful than the Gehan test for detecting differences when only a small percentage of the site concentrations are elevated.

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 dataset if, in fact, the site data and background data came from the same distribution. This test is based on the maximum concentration in the background dataset and the number ("n") of site concentrations that exceed the maximum concentration in the background set (Gilbert and Simpson 1990, 055612, pp. 5-8). The result (p-value) of the slippage test is the probability that "n" site samples (or more) exceed the maximum background concentration by chance alone. The test accounts for the number of samples in each dataset (number of samples from the site and number of samples from background) and determines the probability of "n" (or more) exceedances if the two datasets came from identical distributions. This test is similar to the BV comparison in that it evaluates the largest site measurements but is more useful than the BV comparison because it is based on a statistical hypothesis test, not simply on a statistic calculated from the background distribution.

For all statistical tests, a p-value less than 0.05 was the criterion for accepting the null hypothesis that site sampling results are not different than background.

### 5.2.2 Graphical Presentation

Box plots are provided for a visual representation of the data and to help illustrate the presence of outliers or other anomalous data that might affect statistical results and interpretations. The plots allow a visual comparison among data distributions. The differences of interest may include an overall shift in concentration (shift of central location) or, when the centers are nearly equal, a difference between the upper tails of the two distributions (elevated concentrations in a small fraction of one distribution). The plots may be used in conjunction with the statistical tests (distributional comparisons) described above. Unless otherwise noted, the nondetected concentrations are included in the plots at their reported DL.

The box plots produced in Appendix H of this report consist 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, 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 extend to the most extreme point that is not considered an outlier, with a maximum whisker length of 1.5 times the interquartile range, outside of which data may be evaluated for their potential to be outliers. The concentrations are plotted as points overlying the box plot. When a dataset contains both detected concentrations and nondetected concentrations reported as DLs, the detected concentrations are plotted as Xs, and the nondetected concentrations are plotted as Os.

## 6.0 TA-03 BACKGROUND AND FIELD-INVESTIGATION RESULTS

Seventy-eight sites (29 AOCs and 49 SWMUs) located in TA-03 are addressed in this investigation report (Table 1.1-1). Each site is described separately in sections 6.2 through 6.45, including the site's description and operational history; relationship to other SWMUs and AOCs; previous investigations; site contamination results based on qualified data (decision-level data from the current and previous investigations); and summaries of human health and ecological risk screening.

Plates 1 through 20 present inorganic and organic chemical and radionuclide concentrations detected at TA-03.

## 6.1 Background of TA-03

### 6.1.1 Operational History

TA-03 occupies a large area located near the western end of South Mesa between Los Alamos Canyon to the north and Mortandad Canyon to the south (Figure 2.1-1). Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two-thirds of the area into fingerlike projections. The middle mesa where most of TA-03 is located is called Sigma Mesa (LANL 1999, 064617, p.2-11). The core operational facilities for the Laboratory are located at TA-03, including the principal administration buildings, library, the Chemistry and Metallurgy Research (CMR) Building, Beryllium Technology Facility, a gas-fired electrical generating plant, and a former sanitary wastewater treatment plant (WWTP) and supporting structures.

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

In the early 1950s, operational facilities from TA-01 (located in the Los Alamos townsite) were relocated to TA-03. Early TA-03 facilities included the Van de Graaff accelerator building, a laboratory and support structures, the communications building, the CMR Building, the general and chemical warehouses, the cryogenics laboratory, the administration building, the Sigma Building, a fire house, and the physics building. Additional new construction continued through the 1960s and 1970s, when storage areas, shops, office buildings, a WWTP, a cement batch plant, and other transportable structures were added.

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

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

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

The Syllac Building (building 03-287) underwent D&D from 2003 to 2004, and the Sherwood Complex (building 03-105) underwent D&D in 2001 to make way for the construction of the National Security Science Building (NSSB) (03-1400). D&D activities included the removal of buildings 03-105, 03-287, all

existing storm drains, all existing asphalt paving, and fill directly beneath the asphalt. The entire area was graded and leveled, and approximately 10 ft of clean fill was placed over the entire site to accommodate the NSSB and associated infrastructure. The TA-03 service garage (former building 03-36) was removed in 1999 to prepare for the construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the demolition of the garage, the structure and all associated infrastructure including drainlines, hydraulic lift wells, and underground storage tanks were removed. Soil below the footprint of the garage was excavated and removed to a depth of approximately 15 ft below grade to accommodate the foundation of building 03-2327.

The Upper Sandia Canyon Aggregate Area includes only part of TA-03. The SWMUs and AOCs that drain to Los Alamos Canyon are discussed in the approved work plan for Upper Los Alamos Canyon Aggregate Area (LANL 2006, 091916). The SWMUs and AOCs that drain to Mortandad Canyon are discussed in the approved work plan for Upper Mortandad Canyon Aggregate Area (LANL 2008, 100750). The SWMUs and AOCs that drain to Twomile Canyon are discussed in the work plan for Twomile Canyon Aggregate Area (LANL 2010, 108329).

### 6.1.2 Summary of Releases

Potential contaminants at TA-03 may have been released into the environment through drainages, outfalls, firing sites, liquid spills, leaks, or operational releases.

### 6.1.3 Current Site Usage and Status

TA-03 is almost completely developed. Roads and large paved parking areas surround the buildings. Unpaved areas are usually landscaped. Several building complexes are fenced for controlled access.

## 6.2 SWMU 03-002(c), Former Storage Area

### 6.2.1 Site Description and Operational History

SWMU 03-002(c) is the site of a former 19-ft × 15-ft wooden storage shed (former structure 03-1494) that was located 100 ft west of the former Johnson Controls, Inc., administrative office (former building 03-70) (Figure 6.2-1). From the early 1960s to 1984, the shed was used to store containers of liquid and powdered pesticides and herbicides. The shed was removed in 1989 and the floor was disposed of as hazardous waste (LANL 1993, 020947). Between 1994 and 1996, the original concrete pad beneath the shed was surrounded by a new concrete pad that covered the site (LANL 1996, 052930, p. 41). The eastern portion of the concrete pad was paved over with asphalt in 2003 as part of the construction of an access road and parking lot (LANL 2008, 099214).

### 6.2.2 Relationship to Other SWMUs and AOCs

SWMU 03-002(c) is located approximately 100 ft west of former building 03-70 and 50 ft north of the former asphalt batch plant, Consolidated Unit 03-009(a)-00.

### 6.2.3 Summary of Previous Investigations

During the 1994 Phase I Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) conducted at SWMU 03-002(c), four soil samples were collected from four locations beneath the concrete pad from a depth of 0.0 to 0.5 ft below ground surface (bgs) (LANL 1996, 052930, p. 41). At the fifth

location, downgradient of the concrete pad, a surface soil sample was collected from a depth of 0.0–0.25 ft bgs. All samples were submitted for laboratory analyses of TAL metals; SVOCs; PCBs; pesticides; herbicides; gross-alpha, -beta, and -gamma radiation; and tritium. One sample collected from the 0.0–0.5 ft depth interval was also submitted for laboratory analysis of VOCs (LANL 1996, 052930, p. 44). Data from the 1994 RFI are screening-level data and are summarized below. Section 2.1 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium, manganese, mercury, and silver were each detected above BVs in one sample; zinc and calcium were each detected above BVs in two and three samples, respectively. Organic chemicals and radionuclides were not detected.

### 6.2.4 Site Contamination

#### 6.2.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-002(c). As a result, the following activities were completed as part of the 2009 investigation.

- Eight samples were collected from four locations to confirm the results of the previous investigation. At each location, samples were collected from 0.0–1.0 ft bgs and at the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, pesticides, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-002(c) are shown in Figure 6.2-1. Table 6.2-1 presents the samples collected and analyses requested for SWMU 03-002(c). 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 03-002(c), a maximum concentration of 2.3 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-002(c) consist of eight soil samples collected from four locations.

**Inorganic Chemicals**

Eight soil samples were analyzed for TAL metals and cyanide. Table 6.2-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-002(c); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Eight soil samples were analyzed for SVOCs, VOCs, pesticides, and PCBs. Table 6.2-3 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-002(c); therefore, organic COPCs are not identified for the site.

#### 6.2.4.4 Nature and Extent of Contamination

The nature and extent of all organic chemicals at SWMU 03-002(c) are defined; however, the nature and extent of inorganic chemicals have not been characterized, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at SWMU 03-002(c) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, beryllium, cadmium, chromium, lead, sodium, and thallium.

Antimony was not detected above BV (0.83 mg/kg) in soil, but had DLs (1.1 to 1.3 mg/kg) above BV in seven out of eight soil samples. Because antimony was not detected above BV at SWMU 03-002(c), the lateral and vertical extent of antimony are defined.

Beryllium was detected above BV (1.83 mg/kg) in one sample in soil at SWMU 03-002(c).The maximum concentration of 1.96 mg/kg was in a sample collected from 4.5-5 ft bgs at location 03-608148. Because there were less than 10 samples, statistical tests could not be performed; however, sampling results were less than the maximum background concentration of beryllium in soil (3.95 mg/kg) (Figure H-1). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil but had DLs (0.533 to 0.652 mg/kg) above BV in eight soil samples. Because cadmium was not detected above BV at SWMU 03-002(c), the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV (19.3 mg/kg) in three samples in soil at SWMU 03-002(c). The maximum concentration of 36.2 mg/kg was in a sample collected from 0.0–1.0 ft bgs at location 03-608147, and its concentrations decreased with depth. Because there were less than 10 samples, statistical tests could not be performed; however, sampling results were less than the maximum background concentration of chromium in soil (36.5 mg/kg) (Figure H-1). The lateral and vertical extent of chromium are defined.

Lead was detected above BV (22.3 mg/kg) in one soil sample at SWMU 03-002(c). The maximum concentration of 37.7 mg/kg was in the deepest sampling interval (4.5–5.0 ft bgs) at location 03-608148. This location is at the northern perimeter of SWMU 03-002(c). Lead was not detected above BV at locations to the west, east, or south of SWMU 03-002(c). The lateral and vertical extent of lead are not defined at SWMU 03-002(c).

Sodium was detected above BV (915 mg/kg) in four samples in soil at SWMU 03-002(c). The maximum concentration of 2730 mg/kg was in the deepest sample at location 03-608146 (1.5–2.0 ft bgs). Concentrations increased with depth at locations 03-608148 and 03-608146. The lateral and vertical extent of sodium are not defined at SWMU 03-002(c).

Thallium was detected above BV (0.73 mg/kg) in one soil sample at SWMU 03-002(c). The maximum concentration of 0.931 mg/kg was in a sample collected from 4.5–5 ft bgs at location 03-608148. Because there were less than 10 samples, statistical tests could not be performed; however, no sampling results exceeded the maximum background concentration of thallium in soil (1 mg/kg) (Figure H-2). The lateral and vertical extent of thallium are defined.

**Organic Chemicals**

Organic chemicals detected in soil at SWMU 03-002(c) are benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 4,4'-DDT (dichlorophenyltrichloroethylene), fluoranthene, gamma-chlordane, phenanthrene, and pyrene.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 4,4'-DDT, fluoranthene, phenanthrene, and pyrene were detected at a depth of 0.0–1.0 ft bgs at location 03-608145. Gamma-chlordane was detected at a depth of 0.0–1.0 ft bgs at location 03-608147. Concentrations decreased with depth and were below EQLs. The lateral and vertical extent are defined.

### 6.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-002(c) 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 03-002(c) because extent is not defined for the site.

## 6.3 SWMU 03-003(c), Equipment Storage Area—PCB Site

### 6.3.1 Site Description and Operational History

SWMU 03-003(c) is the former location of a temporary equipment storage area for used dielectric fluids and capacitors adjacent to the southeast corner of former building 03-287 (LANL 1993, 020947, p. 6-24) (Figure 6.3-1). Building 03-287 was constructed between 1966 and 1968 to house a magnetic confinement experiment for the heating and confinement of hot plasmas. The experiment, known as the Scyllac Project, operated from 1972 to 1978. The experiment was energized by a capacitor bank housing 3300 sealed non-PCB capacitors. The sealed capacitors contained a non-PCB dielectric oil, and each of the associated spark-gap switches required approximately 2 qt of non-PCB mineral oil for electrical insulation. Before the Scyllac Project was decommissioned in the mid-1980s, oil samples from spark gap switches and swipe samples from numerous surfaces within the room where the equipment was housed were analyzed for PCBs. Results showed PCB concentrations of less than 2 ppm. During the decommissioning of the experiment, some of the capacitors were temporarily stored outside the southeast corner of former building 03-287 on asphalt paving later designated as SWMU 03-003(c). Swipe samples collected from the pavement were found to be free of PCBs (LANL 1995, 051878, p. 2-15). Before the remodeling of building 03-287 in late 1992 and early 1993, a single surface soil sample was collected from the south side of building 03-287 to supplement the previous PCB survey of the building's interior. No PCBs were detected (LANL 1993, 020947, p. 6-24).

In 2003 and 2004, building 03-287 underwent D&D to make way for the NSSB (03-1400). D&D activities included the removal of building 03-287, all the asphalt paving and fill directly beneath the asphalt,

including the location of SWMU 03-003(c). The entire area was graded and leveled, and approximately 10 ft of clean fill was placed over the entire site to accommodate the NSSB and associated infrastructure (LANL 2008, 099214).

### 6.3.2 Relationship to Other SWMUs and AOCs

AOC 03-003(o) is the location of a former 60-kilo volt amperes (kVA) capacitor bank in former building 03-287. When the Scyllac Project in former building 03-287 was decommissioned in the mid-1980s, some of the non-PCB (<50 mg/kg) capacitors were temporarily stored outside the building at SWMU 03-003(c). Both sites were removed when building 03-287 underwent D&D in 2003/2004.

### 6.3.3 Summary of Previous Investigations

NMED requested further investigation of SWMU 03-003(c) in the notice of disapproval for Addendum 1 of the Operable Unit (OU) 1114 RFI Work Plan. During a 1999 site visit, NMED requested that three samples be collected from the asphalt and fill directly beneath the asphalt at SWMU 03-003(c). In 2001 (before D&D of building 03-287), three asphalt samples were collected from three locations at SWMU 03-003(c), and three fill samples were collected from beneath the asphalt at a depth of 0.0–0.5 ft bgs (LANL 2001–2002, 100703, p. 13). Observations recorded by field personnel during sample collection activities indicated no staining or odors. Samples were submitted for laboratory analysis of PCBs (LANL 2005, 100704, p. 3). Decision-level data from the 2001 investigation are included in this report.

Aroclor-1254 was detected at 14 mg/kg in asphalt sample RC03-01-0013 (location 03-14455) and 0.043 mg/kg in fill sample RC03-01-0016 (location 03-14458) directly beneath asphalt sample RC03-01-0013. Aroclor-1254 was detected at 0.64 mg/kg in asphalt sample RC03-01-0016 (location 03-14456) and was not detected in fill sample RC03-01-0017 (location 03-14459) directly beneath asphalt sample RC03-01-0014. At sampling location 03-14454, Aroclor-1254 was not detected in asphalt sample RC-3-01-0012 but was detected at 0.054 mg/kg in fill sample RC03-01-0015 directly beneath the asphalt.

Table 6.3-1 presents the samples collected and analyses requested at SWMU 03-003(c). Table 6.3-2 summarizes the analytical results.

### 6.3.4 Site Contamination

As proposed in the approved investigation work plan, no sampling was conducted in 2009 because data collected during the 2001 investigation determined the nature and extent of contamination (LANL 2008, 103404; NMED 2008, 102721). Asphalt and fill directly beneath the asphalt at SWMU 03-003(c) were removed during D&D of former building 03-287 and the area was subsequently leveled and buried under 10 ft of fill to prepare for the construction of the NSSB.

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

### 6.4.1 Site Description and Operational History

AOC 03-003(d) is a concrete pad located east of building 03-141 where two former PCB-containing transformers, structures 03-146 and 03-176, were located (Figure 6.4-1). These transformers (PCB identification numbers 5008 and 5009) contained dielectric fluid with PCB concentrations greater than 500 ppm and were removed in 1991 and 1992, respectively, in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995,

057590). Because no stains were visible on the concrete pad after the transformers were removed, the area was considered free of contamination, and new non-PCB transformers were relocated on the same concrete pad. Additional concrete was added to extend the existing pad in 1993 (LANL 1995, 057590, p. 6-63).

### 6.4.2 Relationship to Other SWMUs and AOCs

AOC 03-003(d) is located approximately 60 ft south of SWMU 03-056(l), a former storage area, and AOC 03-051(c), a former area of stained asphalt attributed to operational leaks of vacuum pump oil. Neither of these sites is associated with AOC 03-003(d).

### 6.4.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-003(d).

### 6.4.4 Site Contamination

#### 6.4.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC 03-003(d):

- One concrete chip sample (made up of five concrete chips) was collected from the pad and analyzed at an off-site fixed laboratory to determine if PCBs are present.
- Ten soil samples were collected from five locations to determine if PCBs have migrated from the concrete pad. Samples were collected from beneath the concrete pad and from around the concrete pad at 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for PCBs. All soil samples were field screened for VOCs and for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-003(d) are shown in Figure 6.4-1. Table 6.4-1 presents the samples collected and analyses requested at AOC 03-003(d). 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 AOC 03-003(d), a maximum concentration of 8.4 ppm was detected at a depth of 1.0–2.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.4.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-003(d) consist of 10 soil samples collected from five locations and one concrete chip sample.

**Organic Chemicals**

Eleven samples were analyzed for PCBs. Table 6.4-2 summarizes the analytical results. Plate 4 shows the spatial distribution of PCBs detected. The existing site data are not sufficient to characterize the extent of PCB contamination at AOC 03-003(d); therefore, COPCs are not identified for the site.

#### 6.4.4.4 Nature and Extent of Contamination

The extent of PCB contamination at AOC 03-003(d) is not defined.

**Organic Chemicals**

Aroclor-1254 was detected at 0.19 mg/kg in one sample at AOC 03-003(d). The maximum concentration was detected at location 03-608150 in a soil sample collected from 0.0–1.0 ft bgs. Aroclor-1254 was not detected in the deepest soil sample collected from 1.0–2.0 ft bgs at that location or at any other location in AOC 03-003(d). The lateral and vertical extent for Aroclor-1254 are defined.

Aroclor-1260 was detected in one concrete chip sample and 10 soil samples in AOC 03-003(d). The maximum concentration of 0.965 mg/kg was detected at location 03-608161 in a soil sample collected from a depth of 1.0–2.0 ft bgs. Aroclor-1260 was detected at a concentration of 0.0048 mg/kg in the concrete chip sample collected from the surface of the transformer pad. Concentrations decreased with depth, except at location 03-608161, and decreased laterally from beneath the pad. The lateral extent of Aroclor-1260 contamination is defined, and the vertical extent is not defined at one location.

### 6.4.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-003(d) because extent is not defined for the site.

### 6.4.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-003(d) because extent is not defined for the site.

## 6.5 AOC 03-003(f), Transformer Area—PCB Only Site

### 6.5.1 Site Description and Operational History

AOC 03-003(f) is the former location of nine PCB-containing transformers in the basement of the Sigma Building (building 03-66) (Figure 6.5-1). The transformers were removed in 1991 in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Under this plan, any evidence of a release was sampled and cleaned up in accordance with Toxic Substances Control Act (TSCA) requirements (40 Code of Federal Regulations [CFR] 761). Leaks were observed under the transformers; the stained areas were double-washed and rinsed, and postcleanup sampling was conducted to verify cleanup as required by TSCA PCB spill cleanup requirements (40 CFR 761.130). For all but one of the PCB-containing transformers, samples collected following removal showed PCB concentrations less than 10 ppm, the EPA TSCA cleanup standard.

During removal of the transformers, approximately 3 gal. of PCB-containing dielectric fluid spilled from a 1500-kV transformer located in the J-3 wing of the building 03-66 basement. When the transformer was placed on its side for removal from the building, fluid leaked onto the plastic liner inside a containment basin. Approximately 1 qt of fluid leaked from the containment basin onto the concrete basement floor and was subsequently cleaned up in accordance with TSCA PCB spill cleanup requirements. After several double-wash/double-rinse efforts, a pigmented epoxy sealer “Plasite” was applied to the spill area (LANL 1995, 057590, pp. 6-65–6-66).

### 6.5.2 Relationship to Other SWMUs and AOCs

AOC 03-003(f) is not related to any other SWMUs or AOCs.

### 6.5.3 Summary of Previous Investigations

On March 17, 1995, confirmatory swipe samples were collected from four locations on the concrete basement floor of building 03-66 and analyzed for PCBs. Data from the 1995 confirmation samples are screening-level data and are summarized below. Section 2.4 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Detected PCB concentrations in all four samples were below 2.5 µg/100 $cm^2$, which is less than the EPA TSCA cleanup standard of 10 µg/100 $cm^2$ (LANL 1995, 057590, p. 6-66).

### 6.5.4 Delayed Site Investigation Rationale

AOC 03-003(f) is located within a basement of a building that is currently an active nuclear facility. The approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721) proposed that site characterization and investigation be delayed until D&D of building 03-66 has been completed.

## 6.6 AOC 03-003(g), Transformer Area—PCB Only Site

### 6.6.1 Site Description and Operational History

AOC 03-003(g) is the former location of a PCB-containing transformer in the basement of building 03-35 at TA-03 (Figure 6.5-1). The transformer contained dielectric fluid with PCB concentrations greater than 500 mg/kg. In 1984, the transformer was removed and replaced with a non-PCB transformer in accordance with the DOE/Albuquerque Operations Office Environmental Restoration and Waste Management Five-Year Plan (LANL 1995, 057590). Oil staining was not present on the concrete upon removal of the transformer. Archival research revealed no record of releases from the transformer (LANL 1995, 057590, p. 6-65).

### 6.6.2 Relationship to Other SWMUs and AOCs

AOC 03-003(g) is located in the basement of building 03-35, approximately 15 ft from AOC 03-014(y), a floor drain in the basement of building 03-35.

### 6.6.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-003(g).

### 6.6.4 Site Contamination

#### 6.6.4.1 Swipe Sampling

During the 2009 investigation, three swipe samples were collected from a 100-$cm^2$ area on the surface of the concrete pad where the former PCB-containing transformer was located in the basement of building 03-35. All three swipe samples were analyzed for PCBs. Table 6.6-1 summarizes the samples collected and the requested analyses for each sample. Figure 6.5-1 shows the sampling location at AOC 03-003(g).

#### 6.6.4.2 Soil, Rock, and Sediment Field-Screening Results

Because only swipe samples were collected at AOC 03-003(g), field screening was not performed.

#### 6.6.4.3 Swipe Sampling Analytical Results

**Organic Chemicals**

Table 6.6-2 summarizes the analytical results for organic chemicals detected at AOC 03-003(g). Plate 7 shows the spatial distribution of detected PCBs.

- Aroclor-1260 was detected on the swipe samples from AOC 03-003(g). The maximum concentration was 39.2 μg/100 $cm^2$.

#### 6.6.4.4 Nature and Extent of Contamination

Although Aroclor-1260 was detected on swipe samples, the extent was not evaluated. The nature of the swipe samples does not make an evaluation of the extent of contamination possible, but the former PCB-transformer was located in the basement of building 03-35 such that any leaks would be contained. The lateral and vertical extent of PCB contamination are not defined by the swipe sampling results.

### 6.6.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-003(g) because extent is not defined by the swipe samples.

### 6.6.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-003(g) because extent is not defined by the swipe samples.

### 6.6.7 Delayed Site Investigation Rationale

Delayed investigation is proposed for AOC 03-003(g) because characterizing this site, which is located in the basement of an active secured facility, is not feasible. Site access for equipment needed for subsurface investigations is extremely limited. Available information, including the design features of the site, and swipe sampling data indicate a very low likelihood of releases to the environment. Even if a release had occurred, any residual contamination would be located beneath buildings or paved areas, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation that could cause migration of contaminants. For these reasons, it is proposed that site characterization and investigation be delayed until building 03-35 undergoes D&D.

## 6.7 AOC 03-003(o), Former Non-PCB Capacitor Bank

### 6.7.1 Site Description and Operational History

AOC 03-003(o) is the location of a former 60-kVA capacitor bank that was used in former building 03-287 (Figure 6.3-1) as part of an experiment for the Scyllac Project (LANL 1995, 057590, p. 6-69). The Scyllac Project experiment was energized by a capacitor bank housing 3300 sealed non-PCB capacitors. The sealed capacitors contained a non-PCB dielectric fluid oil and each of the associated spark-gap switches

required approximately 2 qt of non-PCB mineral oil for electrical insulation (LANL 1995, 057590, p. 6-69). The experiment was decommissioned in the mid-1980s when all of the capacitors were removed from former building 03-287.

### 6.7.2 Relationship to Other SWMUs and AOCs

When the Scyllac Project in former building 03-287 was decommissioned in the mid-1980s, non-PCB (<50 mg/kg) capacitors from AOC 03-003(o) were temporarily stored outside the building at SWMU 03-003(c). Both sites were removed when building 03-287 underwent D&D in 2003–2004.

### 6.7.3 Summary of Previous Investigations

No RFI activities have been conducted at this AOC. Before the Scyllac Project experiment was decommissioned in the mid-1980s, oil samples from spark gap switches and swipe samples from numerous surfaces within the room where the equipment was housed were analyzed for PCBs. The results showed PCB concentrations of less than 2 ppm (LANL 1995, 057590, p. 6-69).

### 6.7.4 Site Contamination

As proposed in the approved investigation work plan, no sampling was conducted at AOC 03-003(o) during the 2009 investigation because data from swipe samples collected at AOC 03-003(o) and from SWMU 03-003(c) (section 6.3) confirm that nature and extent have been defined at this site (LANL 2008, 100693; NMED 2008, 102721). Former building 03-287 underwent D&D in 2003 and 2004 to make way for the NSSB. Following the removal of former building 03-287 [including AOC 03-003(o)], the area was subsequently leveled and buried under 10 ft of fill to prepare for the construction of the NSSB.

## 6.8 Consolidated Unit 03-009(a)-00

Consolidated Unit 03-009(a)-00 includes SWMUs 03-009(a), 03-028, 03-029, 03-036(a), 03-036(c), 03-036(d), and 03-045(g), and AOCs 03-043(b), 03-043(d), and 03-043(h) (Figure 6.2-1). All these sites are associated with the former asphalt batch plant operations. AOCs 03-043(d) and 03-043(h) are duplicates of SWMU 03-036(a) [SWMU 03-036(a) consists of two former asphalt emulsion tanks; the structure numbers of each duplicate AOC tank corresponds to the structure numbers of the SWMU 03-036(a) tanks] (LANL 1995, 057590, p. 6-19).

The disposal sites within this consolidated unit contained items such as concrete, cured asphalt, and soil. Components of these materials include asphalt, petroleum hydrocarbons, water, and light distillates (LANL 1995, 057590, p. 6-15).

### 6.8.1 SWMU 03-009(a), Surface Disposal

#### 6.8.1.1 Site Description and Operational History

SWMU 03-009(a) is a 30-ft × 300-ft fill area located on the rim of a small tributary of Sandia Canyon south of the former TA-03 asphalt batch plant (LANL 1993, 020947, p. 6-16) (Figure 6.2-1). The fill was generated by asphalt plant operations and contained small amounts of concrete, crushed tuff, and asphalt road-construction debris. A 20-ft section of asbestos pipe was observed at SWMU 03-009(a) in 1990; however, the pipe was not found during a 1992 site visit (LANL 1993, 020947, p. 6-17).

#### 6.8.1.2 Relationship to Other SWMUs and AOCs

This surface disposal site contains concrete and asphalt debris from the batch plant, and is therefore related to all the SWMUs and AOCs in Consolidated Unit 03-009(a)-00. SWMU 03-009(a) is located about 100 ft east of AOC 03-036(b), the former site of two 25- to 50-gal. aboveground storage tanks containing No. 2 diesel fuel. It is about 200 ft southeast of the former asphalt batch plant structure 03-73 and other SWMUs/AOCs in Consolidated Unit 03-009(a)-00, including SWMU 03-028, and the former sites of aboveground storage tanks at SWMUs 03-036(a,c,d).

#### 6.8.1.3 Summary of Previous Investigations

During the 2003 RFI conducted at SWMU 03-009(a), three boreholes were advanced to a depth of 20 ft bgs and every 5-ft length of core was field screened for TPH-DRO to guide sample collection (LANL 2003, 079747). Borehole logs confirm fill material to be present to a depth of approximately 16 ft bgs at the south end of the site and to a depth of approximately 4 ft bgs at the north end of the site. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO.

Selenium was detected above BV in two tuff samples, methylene chloride was detected in the fill sample and two tuff samples, and tetrachloroethene (PCE) was detected in the fill sample. SVOCs, TPH-DRO, and TPH-GRO were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.1.4. Table 6.8-1 presents the samples collected and analyses requested at SWMU 03-009(a).

#### 6.8.1.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-009(a). As a result, the following activities were completed as part of the 2009 investigation.

- Eleven samples were collected from three boreholes to define the vertical extent of contamination. At each location, samples were collected from the soil-tuff interface, 9.0–10.0 ft, 14.0–15.0 ft, and 19.0–20.0 ft bgs. At location 03-608180, only three of the four proposed samples were collected as the soil-tuff interface corresponded to the 9.0–10.0 ft bgs interval (see discussion of deviations in Appendix B). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- Four samples were collected from two locations downgradient of the site to define the lateral extent of contamination. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-009(a) are shown in Figure 6.2-1. Table 6.8-1 presents the samples collected and analyses requested at SWMU 03-009(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-009(a), a maximum concentration of 35.6 ppm was detected at a depth of 9.0–10.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-009(a) consist of 21 samples (8 soil and 13 tuff) collected from eight locations.

#### *Inorganic Chemicals*

Twenty-one samples were analyzed for TAL metals, and 15 samples were analyzed for cyanide (7 soil and 8 tuff). Table 6.8-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-009(a); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Twenty-one samples were analyzed for SVOCs, VOCs and TPH-DRO. Fifteen samples were analyzed for PCBs (seven soil and eight tuff). Six samples were analyzed for TPH-GRO (one soil and five tuff). Table 6.8-3 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-009(a); therefore, organic COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals are not defined at SWMU 03-009(a), as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at SWMU 03-009(a) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, calcium, chromium, lead, manganese, selenium, and sodium.

Antimony was not detected above the soil or tuff BVs (0.83 mg/kg and 0.5 mg/kg, respectively) at SWMU 03-009(a), but 15 results had DLs (0.742 to 1.78 mg/kg) above BVs. Because antimony was not detected above BVs at SWMU 03-009(a), the lateral and vertical and extent of antimony are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 03-009(a) but had DLs (0.503 to 0.584 mg/kg) above BV in six soil samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in one soil sample at SWMU 03-009(a). The maximum concentration of 13,400 mg/kg was detected at location 03-608180 in a sample collected from a depth of

9.0–10.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration for calcium in soil (14,000 mg/kg) (Figure H-3). Because the current site data at SWMU 03-009(a) for calcium in soil are not different than background, the lateral and vertical extent of calcium are defined.

Chromium was detected above BV (7.14 mg/kg) in six tuff samples at SWMU 03-009(a). The maximum concentration of 65.8 mg/kg was detected at location 03-608179 in the deepest sample at that location (19.0–20.0 ft bgs). Chromium concentrations increased with depth at locations 03-608178 and 03-608179. The vertical extent of chromium in the western and central portions of SWMU 03-009(a) is not defined. Chromium was not detected above BV in samples from locations 03-608182, 03-22538, 03-608181, and 03-608180 around the northern, eastern, and western perimeter of the site; however, chromium concentrations increased (from 14.1 mg/kg to 21.5 mg/kg) to the west. The lateral extent of chromium is not defined.

Lead was detected above BV (11.2 mg/kg) in two tuff samples at SWMU 03-009(a). The maximum concentration of 58.2 mg/kg was detected at location 03-608178 in the deepest sample at that location (19.0–20.0 ft bgs). The vertical extent of lead is not defined. Lead was not detected downgradient at locations 03-608182, 03-22538, 03-608181, and 03-608180 along the perimeter of the site to the south and west; however, the lateral extend of lead is not defined in the western area of SWMU 03-009(a).

Manganese was detected above BV (482 mg/kg) in one tuff sample at SWMU 03-009(a), at a concentration of 530 mg/kg at location 03-608178 in the deepest sample at that location (19.0–20.0 ft bgs). The concentration is less than the maximum background concentration for manganese in tuff (752 mg/kg) (Figure H-3). The lateral and vertical extent of manganese are defined.

Selenium was detected above BV (0.3 mg/kg) in two tuff samples at SWMU 03-009(a). The maximum concentration of 0.48 mg/kg was detected at location 03-22538 in the deepest sample at that location (19.5–20.0 ft bgs). Concentrations decreased with depth at location 03-22539. The lateral and vertical extent of selenium are not defined.

Sodium was detected above BV (915 mg/kg) in one soil sample at SWMU 03-009(a). The maximum concentration of 1160 mg/kg was detected at location 03-608180 at a depth of 9.0–10.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of sodium in soil (1800 mg/kg) (Figure H-4). The lateral and vertical extent of sodium are defined.

### *Organic Chemicals*

Organic chemicals detected in soil and tuff at SWMU 03-009(a) are acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, sec-butylbenzene, chrysene, ethylbenzene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, isopropylbenzene, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, 1-propylbenzene, pyrene, TPH-DRO, tetrachloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene.

Acenaphthene was detected in four samples at three locations at SWMU 03-009(a). The maximum concentration of 0.108 mg/kg was detected at location 03-608178 at a depth of 9.0–10.0 ft bgs near the western perimeter. The other three concentrations are below the EQL. Acenaphthene concentrations decreased with depth at location 03-608178 and to the east and south. The vertical extent of acenaphthene is defined; however, the lateral extent to the west is not defined.

Anthracene was detected in seven samples at three locations at SWMU 03-009(a). The maximum concentration of 0.293 mg/kg was detected at location 03-608178 at a depth of 9.0–10.0 ft bgs in the western portion of SWMU 03-009(a). Anthracene concentrations decreased with depth at this location and at location 03-608179. Anthracene was detected at location 03-608182, a southwestern perimeter location, at a concentration of 0.0639 mg/kg in the deepest sample collected from that location (1.0–2.0 ft bgs). Anthracene decreased laterally at all locations except location 03-608178. The lateral and vertical extent of anthracene are not defined.

Aroclor-1254 was detected in one sample at SWMU 03-009(a). The maximum concentration of 0.0396 mg/kg was detected at location 03-608178 in a sample collected from a depth of 9.0–10.0 ft bgs. Aroclor-1254 concentrations decreased with depth. The vertical extent of Aroclor-1254 is defined. The lateral extent of Aroclor-1254 is not defined near the western perimeter of SWMU 03-009(a).

Aroclor-1260 was detected in three samples at three locations at SWMU 03-009(a). The maximum concentration of 0.0382 mg/kg was detected at a depth of 9.0–10.0 ft bgs at location 03-608178 Aroclor-1260 concentrations decreased with depth at this location and at location 03-608181 and vertical extent is defined. Concentrations decreased laterally to the south from location 03-608178 but lateral extent is not defined near the western perimeter of SWMU 03-009(a).

Benzo(a)anthracene was detected in eight samples at four locations at SWMU 03-009(a). The maximum concentration of 0.857 mg/kg was detected at location 03-608178 in a soil sample collected from a depth of 9.0–10.0 ft bgs. Concentrations decreased with depth at locations along the western perimeter and increased with depth at location 03-608182. The lateral and vertical extent of benzo(a)anthracene are not defined to the west and to the south of SWMU 03-009(a).

Benzo(a)pyrene was detected in eight samples at three locations at SWMU 03-009(a). The maximum concentration of 0.944 mg/kg was detected at location 03-608178 in a soil sample collected from a depth of 9.0–10.0 ft bgs. Concentrations decreased with depth at this location and at location 03-608180. Benzo(a)pyrene was also detected at location 03-608182, a southwestern perimeter location, with concentrations increasing with depth (0.0511 mg/kg at 0.0–1.0 ft bgs to 0.166 mg/kg at 1.0– 2.0 ft bgs) but decreasing laterally to the south. The lateral and vertical extent of benzo(a)pyrene are not defined.

Benzo(b)fluoranthene was detected in 10 samples at five locations at SWMU 03-009(a). The maximum concentration of 1.62 mg/kg was detected at location 03-608178 in a soil sample collected from a depth of 9.0–10.0 ft bgs. Concentrations decreased with depth at locations 03-608178, 03-608179, and 03-608180. Benzo(b)fluoranthene was also detected at locations 03-608181 and 03-608182, and concentrations increased with depth. The lateral and vertical extent of benzo(b)fluoranthene are not defined.

Benzo(g,h,i)perylene was detected in eight samples at four locations at SWMU 03-009(a), with a maximum concentration of 0.469 mg/kg in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at this location and at location 03-608180. Benzo(g,h,i)perylene was also detected at locations 03-608181 and 03-608182, with concentrations increasing with depth but decreasing laterally. The lateral and vertical extent of benzo(g,h,i)perylene are not defined.

Benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, sec-butylbenzene, ethylbenzene, isopropylbenzene, 1-propylbenzene, tetrachloroethene, 1,2-xylene, and 1,3-xylene+1,4-xylene were only detected at SWMU 03-009(a) at concentrations below the EQL. The lateral and vertical extent of benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzene(sec-)ethylbenzene, isopropylbenzene, 1-propylbenzene, and tetrachloroethene are defined.

Chrysene was detected in eight samples at four locations at SWMU 03-009(a). The maximum concentration of 0.894 mg/kg was detected at location 03-608178 in a soil sample collected from 9.0–10.0 ft bgs. Concentrations decreased with depth at this location and at locations 03-608179 and 03-608180. Chrysene was also detected at location 03-608182, a southwestern perimeter location, with concentrations increasing with depth but decreasing laterally. The lateral and vertical extent of chrysene are not defined.

Fluoranthene was detected in 10 samples at five locations at SWMU 03-009(a). The maximum concentration of 1.83 mg/kg was detected at location 03-608178 in a soil sample collected from 9.0–10.0 ft bgs. Concentrations decreased with depth at this location and at locations 03-608179 and 03-608180. Fluoranthene is also detected at other locations including 03-608181 and 03-608182 where concentrations increased with depth but decreased laterally. The lateral and vertical extent of fluoranthene are not defined.

Fluorene was detected in four samples at two locations at SWMU 03-009(a). The maximum concentration of 0.0329 mg/kg was detected in a sample collected in soil from 1.0–2.0 ft bgs at location 03-608182. Although concentrations increased with depth at location 03-608182, all concentrations of fluorene are less than the EQLs. The lateral and vertical extent of fluorene are defined.

Indeno(1,2,3-cd)pyrene was detected in seven samples at three locations at SWMU 03-009(a). The maximum concentration of 0.408 mg/kg was in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at this location and at location 03-608180. However, indeno(1,2,3-cd)pyrene was detected in the deepest sampling interval (1.0–2.0 ft bgs) at location 03-608182. The lateral and vertical extent of indeno(1,2,3-cd)pyrene are not defined.

Isopropyltoluene(4-) was detected in two samples at two locations at SWMU 03-009(a). The maximum concentration of 0.00183 mg/kg was in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at location 03-608178 and are below the EQL at location 03-608181. The lateral and vertical extent of 4-isopropyltoluene are defined.

Methylene chloride was detected in four samples at three locations at SWMU 03-009(a). The maximum concentration of 0.031 mg/kg was in the sample collected from 14.5–15.5 ft bgs at location 03-22538. Methyl chloride was not detected in the deepest sample at this location. Methylene chloride is also detected at location 03-22539 approximately 50 ft to the north and upgradient of SWMU 03-009(a). Methylene chloride is detected below the EQL at location 03-608180. The lateral and vertical extent of methylene chloride are defined.

Methylnaphthalene(2-) was detected in three samples at one location at SWMU 03-009(a), with a maximum concentration of 0.915 mg/kg in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth. The vertical extent of 2-methylnaphthalene is defined at SWMU 03-009(a); however, the lateral extent to the west is not defined.

Naphthalene was detected in two samples at one location at SWMU 03-009(a), with a maximum concentration of 0.24 mg/kg in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth. The vertical extent of naphthalene is defined; however, the lateral extent to the west is not defined.

Phenanthrene was detected in nine samples at five locations at SWMU 03-009(a), with a maximum concentration of 0.941 mg/kg in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at this location and at locations 03-608179 and 03-608180. However, concentrations increased with depth at location 03-608182 and at location 03-608181, although

the concentrations were below the EQL at location 03-608181. Concentrations decreased laterally to the south. The lateral and vertical extent of phenanthrene are not defined.

Pyrene was detected in 10 samples at five locations at SWMU 03-009(a). The maximum concentration of 1.86 mg/kg was in a sample collected in soil from 9.0–10.0 ft bgs at locations 03-608178. Concentrations decreased with depth at this location and at location 03-608179 and 03-608180. However, pyrene concentrations at locations 03-608182 and 03-608181 increased with depth and decreased laterally to the south. The lateral and vertical extent of pyrene are not defined.

TPH-DRO was detected in nine samples at four locations at SWMU 03-009(a). The maximum concentration of 226 mg/kg was in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. TPH-DRO concentrations decreased with depth at this location and at location 03-608179 and 03-608180. At southern perimeter locations 03-608182 and 03-608181, TPH-DRO concentrations increased with depth. The reported TPH-DRO concentrations decreased laterally to the south from location 03-608178. The lateral and vertical extent of TPH-DRO are not defined.

Trimethylbenzene(1,2,4-) was detected in two samples at two locations at SWMU 03-009(a). The maximum concentration of 0.00206 mg/kg was detected in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at this location. Trimethylbenzene(1,2,4-) was detected below the EQL at location 03-608181. The vertical extent of 1,2,4-trimethylbenzene is defined; however, the lateral extent to the west is not defined.

Trimethylbenzene(1,3,5-) was detected in two samples at two locations at SWMU 03-009(a). The maximum concentration of 0.00111 mg/kg was in a sample collected in soil from 9.0–10.0 ft bgs at location 03-608178. Concentrations decreased with depth at this location. Trimethylbenzene(1,3,5-) was detected below the EQL at both locations. The lateral and vertical extent of 1,3,5-trimethylbenzene are defined.

#### 6.8.1.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-009(a) because extent is not defined for the site.

#### 6.8.1.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-009(a) because extent is not defined for the site.

### 6.8.2 SWMU 03-028, Surface Impoundment

#### 6.8.2.1 Site Description and Operational History

SWMU 03-028 is a former 12-ft × 15-ft × 6-ft-deep concrete holding pond that was located at the northeast corner of the former asphalt batch plant (Figure 6.2-1). The site was used as a settling pond for mineral dust and particulates from gravel captured by scrubber water from the asphalt batch plant (former structure 03-73). The pond had an overflow pipe that discharged scrubber water directly onto the ground surface. The surface drainage flowed to a culvert inlet pipe connected to the SWMU 03-045(g) outfall. Water from the pond was recycled to the scrubber system and was replenished with potable water.

Sediment from the gravel used in the asphalt batch plant was periodically removed from the bottom of the holding pond and disposed of in the former landfill area located southeast of the plant [SWMU 03-009(a)].

The operating group, Laboratory Roads and Grounds, removed all sediment and water from the pond in early August 2003 during decommissioning of the asphalt batch plant. The empty pond was photographed and surveyed on August 19, 2003, and the pond was filled with clean soil and gravel on August 20, 2003, to allow a crane to be placed on the site to dismantle the batch plant (former structure 03-73). After the dismantlement of the asphalt batch plant was completed, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

#### 6.8.2.2 Relationship to Other SWMUs and AOCs

Scrubber water from the former asphalt batch plant (structure 03-73) was collected in a holding pond on the northeast corner of the plant. The former surface impoundment (SWMU 03-028) discharged water through a permitted outfall [SWMU 03-045(g)] until 1990. SWMU 03-028 is located less than 50 ft southeast of AOC 03-043(b), the site of a former aboveground storage tank that is another part of the Consolidated Unit 03-009(a)-00.

#### 6.8.2.3 Summary of Previous Investigations

During the 2003 RFI conducted at SWMU 03-028, one soil and three tuff samples were collected from two boreholes (sampling locations 03-22523 and 03-22524) drilled next to the south and west (downgradient) sides of the former holding pond (LANL 2003, 079741). The soil sample and one tuff sample were collected from one borehole at depths of 5.0–5.5 ft and 19.0–19.5 ft bgs; the remaining two tuff samples were collected from the second borehole at depths of 7.5–8.0 ft and 19.5–20.0 ft bgs. Samples were submitted for laboratory analyses of TAL metals, SVOCs, VOCs, and TPH (Shaw Environmental Inc. 2003, 085517, pp. 10, 26).

Aluminum, arsenic, barium, calcium, copper, lead, magnesium, and nickel were detected above BVs in one tuff sample. Selenium was detected above BV in all three tuff samples. Acetone and methylene chloride were detected in two tuff samples; bis(2-ethylhexyl)phthalate was detected in the soil sample; and benzoic acid was detected in one soil and one tuff sample. TPH was not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.2.4. Table 6.8-4 presents the samples collected and analyses requested at SWMU 03-028.

#### 6.8.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

No sampling was conducted at this site during the 2009 investigation because the nature and extent of contamination were defined during previous investigations.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-028 consist of four samples (one soil and three tuff) collected from two locations.

***Inorganic Chemicals***

Four samples (one soil and three tuff) were analyzed for TAL metals. Table 6.8-5 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial

distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 03-028; inorganic COPCs are identified below.

No inorganic chemicals were identified as COPCs in soil at SWMU 03-028. The inorganic chemicals identified as COPCs in tuff at SWMU 03-028 are aluminum, barium, calcium, nickel, and selenium.

Aluminum was detected above BV (7340 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 10,500 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration exceeded the maximum background concentration of aluminum in tuff (8370 mg/kg). The box plot for aluminum in tuff is presented in Figure H-5. Aluminum is identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 3.2 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of arsenic in tuff (5 mg/kg) (Figure H-5). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 148 mg/kg. The box plot for barium in tuff is presented in Figure H-6. The maximum concentration was above the maximum background concentration. Barium is identified as a COPC in tuff.

Calcium was detected above BV (2200 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 5020 mg/kg. The box plot for calcium in tuff is presented in Figure H-6. The maximum concentration was above the maximum background concentration. Calcium is identified as a COPC in tuff.

Copper was detected above BV (4.66 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 5.4 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of copper in tuff (6.2 mg/kg) (Figure H-7). Copper is not identified as a COPC in tuff.

Lead was detected above BV (11.2 mg/kg) in one tuff sample at SWMU 03-028 at a maximum concentration of 13 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of lead in tuff (15.5 mg/kg) (Figure H-7). Lead is not identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in one tuff sample at SWMU 03-028, at a maximum concentration of 2460 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of magnesium in tuff (2820 mg/kg) (Figure H-8). Magnesium is not identified as a COPC in tuff.

Nickel was detected above BV (6.58 mg/kg) in one tuff sample at SWMU 03-028, at a maximum concentration of 7.7 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The maximum concentration exceeded the maximum background concentration of nickel in tuff (7 mg/kg) (Figure H-8). Nickel is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in three tuff samples at SWMU 03-028, at a maximum concentration of 0.68 mg/kg. The box plot for selenium in tuff is presented in Figure H-9. The maximum concentration was above the maximum background concentration. Selenium is identified as a COPC in tuff.

***Organic Chemicals***

Four samples (one soil and three tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Table 6.8-6 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 03-028; organic COPCs are identified below.

The following organic chemicals were detected in soil at SWMU 03-028 and are identified as COPCs: benzoic acid and bis(2-ethylhexyl)phthalate.

The following organic chemicals were detected in tuff at SWMU 03-028 and are identified as COPCs: acetone, benzoic acid, and methylene chloride.

**Nature and Extent of Contamination**

Results for arsenic, copper, lead, and manganese are not different than background, and extent is defined for these chemicals.

Aluminum, barium, calcium, and nickel concentrations decreased with depth and decreased laterally. Selenium concentrations decreased with depth at location 03-22524 and decreased laterally. Selenium was detected in the deepest sample collected from location 03-22523 (19.0–19.5 ft bgs) at slightly above BV. The lateral and vertical extent of inorganic chemicals are defined.

Concentrations of organic COPCs are below EQLs and decrease with depth, except for acetone at location 03-22524. The lateral and vertical extent of organic chemicals are defined.

### 6.8.2.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for SWMU 03-028 is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-028. Carcinogenic COPCs were not identified for the construction worker scenario and the HI is 0.3, which is less than the NMED target HI of 1.0 (NMED 2009, 108070). For the residential scenario, the HI is 0.2, which is less than the NMED target HI of 1.0 (NMED 2009, 108070). The total excess cancer risk is $2 \times 10^{-9}$, which is less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

### 6.8.2.6 Summary of Ecological Risk Screening

The potential contamination associated with SWMU 03-028 is at 5.0 ft bgs or deeper and the site is covered with asphalt pavement. Therefore, no complete exposure pathways to receptors are present at SWMU 03-028, and an ecological risk-screening assessment was not conducted.

### 6.8.3 SWMU 03-029, Landfill

#### 6.8.3.1 Site Description and Operational History

SWMU 03-029 is a 30-ft × 70-ft former landfill located approximately 300 ft south of building 03-271 near the rim of Sandia Canyon (Figure 6.8-1) This landfill reportedly received excess asphalt from the batch plant and was subsequently covered with sand. The fill raised and leveled the surface areas at the mesa rim (LANL 1999, 064617, p. 2-17). NMED issued a notice of violation to the Laboratory in November 1990 concerning pieces of asphalt and an oily sheen found in the Sandia Canyon watercourse below building 03-73 (LANL 1995, 057590, p. 6-23). In early 1993, the Laboratory completed a corrective action at SWMU 03-029 to remove the asphalt within the drainage and on the associated slope, regrade the watercourse and slope to support vegetation, extend the drainage, and construct a concrete berm to prevent additional exposure of asphalt buried in the fill. Dense grass cover was seeded and maintained on all fill slopes and disturbed areas (LANL 1995, 057590, p. 6-24). Water samples collected from the storm drain indicated that oil, grease, or other chemicals typically associated with asphalt-plant operations were not present (LANL 1995, 057590 p. 6-24).

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

#### 6.8.3.2 Relationship to Other SWMUs and AOCs

SWMU 03-029 reportedly received excess asphalt from the batch plant, and is therefore related to the other SWMUs and AOCs in Consolidated Unit 03-009(a)-00. SWMU 03-029 is located approximately 200 ft east of SWMU 03-009(a). SWMU 03-029 is approximately 100 ft south of SWMU 03-059 and receives drainage from the former salvage yard. Both SWMUs 03-029 and 03-059 are located south of building 03-271.

#### 6.8.3.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-029.

#### 6.8.3.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-029 to assess potential contamination.

- A geophysical survey was conducted to locate potential buried waste (Appendix E).
- Six samples were collected from two locations to define the nature and extent of contamination potentially associated with the landfill. At each location, samples were collected from the soil-tuff

interface, 4.0–5.0 ft and 9.0–10.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.

- Four samples were collected from two locations between the canyon edge and canyon bottom on the slope below SWMU 03-029. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All investigation samples were field screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-029 are shown in Figure 6.8-1. Table 6.8-7 presents the samples collected and analyses requested at SWMU 03-029. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-029, no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-029 consist of 10 samples (8 soil and 2 tuff) collected from four locations.

#### *Inorganic Chemicals*

Ten samples were analyzed for TAL metals (eight soil and two tuff), and nine samples were analyzed for cyanide (seven soil and two tuff). Table 6.8-8 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 9 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-029; therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Ten samples were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.8-9 summarizes the analytical results for detected organic chemicals. Plate 10 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-029; therefore, organic COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-029 are not defined, as discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff at SWMU 03-029 were detected at concentrations above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, arsenic, cadmium, calcium, chromium, copper, iron, and selenium.

Antimony was not detected in soil and tuff at SWMU 03-029 but had DLs (1.06 to 1.11 mg/kg) above BVs (0.83 mg/kg and 0.5 mg/kg, respectively) in eight soil and two tuff samples. Because antimony was not detected at SWMU 03-029, the lateral and vertical extent of antimony are defined.

Arsenic was detected above BV (8.17 mg/kg) in one soil sample at SWMU 03-029. The maximum concentration of 8.7 mg/kg was detected at location 03-608185 in a sample collected from 0.0–1.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of arsenic in soil (9.3 mg/kg) (Figure H-10). The lateral and vertical extent of arsenic are defined.

Cadmium was not detected in soil at SWMU 03-029, but had DLs (0.53 to 0.556 mg/kg) above BV (0.4 mg/kg) in eight soil samples. Because cadmium was not detected at SWMU 03-029, the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in one soil sample at SWMU 03-029. The maximum concentration of 12200 mg/kg was detected at location 03-608185 in a sample collected from 0.0–1.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of calcium in soil (14,000 mg/kg) (Figure H-10). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (19.3 mg/kg) in one soil sample at SWMU 03-029. The maximum concentration of 19.6 mg/kg was detected at location 03-608183 in a sample collected from 9.0–10.0 ft bgs. Chromium was detected above BV (7.14 mg/kg) in two tuff samples at SWMU 03-029. The maximum concentration of 22 mg/kg was detected at location 03-608186 in a sample collected from 1.0–2.0 ft bgs. The maximum concentrations were detected in the deeper samples at both locations. Chromium was detected below the maximum background concentration (36.5 mg/kg) in the soil sample at location 03-608183. The lateral extent of chromium is not defined because the concentrations in the mesa top samples associated with SWMU 03-059 increased toward drainage location 03-608186. The vertical extent of chromium is not defined at location 03-608186.

Copper was detected above BV (14.7 mg/kg) in two soil samples at SWMU 03-029. The maximum concentration of 40.5 mg/kg was detected at location 03-608185 in a sample collected from 1.0–2.0 ft bgs. Concentrations increased with depth. Copper was not detected at the downgradient location 03-608186. The lateral extent of copper is defined but vertical extent is not defined at location 03-608185.

Iron was detected above BV (21,500 mg/kg) in one soil sample at SWMU 03-029. The maximum concentration of 34,900 mg/kg was detected at location 03-22536 in a sample collected from 1.5–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in soil (36,000 mg/kg) (Figure H-11). The lateral and vertical extent of iron are defined.

Selenium was not detected in tuff at SWMU 03-029 but had DLs (1.09 to 1.12 mg/kg) above BV (0.3 mg/kg) in two tuff samples. Because selenium was not detected at SWMU 03-029, the nature and extent of selenium are defined.

***Organic Chemicals***

Organic chemicals detected in soil at SWMU 03-029 are Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluorenthene, phenanthrene, pyrene, and TPH-DRO.

Aroclor-1254 was detected in six samples at four locations at SWMU 03-029. The maximum concentration of 0.0296 mg/kg was detected at location 03-608185 in a soil sample collected from 1.0–2.0 ft bgs. Concentrations decreased with depth or were below EQLs at three locations and increased slightly at location 03-608185. Aroclor-1254 concentrations decreased laterally to the south toward the downgradient location 03-608186. The lateral extent of Aroclor-1254 is defined. The vertical extent of Aroclor-1254 is not defined at location 03-608185.

Aroclor-1260 was detected in five samples at four locations at SWMU 03-029. The maximum concentration of 0.0261 mg/kg was detected at location 03-608185 in a soil sample collected from 1.0–2.0 ft bgs. Concentrations decreased with depth at three locations and increased slightly at location 03-608185. Aroclor-1260 concentrations decreased laterally to the south toward the downgradient location 03-608186. The lateral extent of Aroclor-1260 is defined. The vertical extent of Aroclor-1260 is not defined at location 03-608185.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluorenthene, phenanthrene, and pyrene were detected only at a depth of 0.6–1.0 ft bgs at location 03-608183. Concentrations decreased laterally and with depth. The lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluorenthene, phenanthrene, and pyrene are defined.

TPH-DRO was detected in five samples at four locations at SWMU 03-029. The maximum concentration of 5 mg/kg was detected at location 03-608183 in a soil sample collected from 0.6–1.0 ft bgs. Concentrations decreased with depth at all locations and decreased down the drainage; all concentrations were below the EQL. The lateral and vertical extent of TPH-DRO are defined.

#### 6.8.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-029 because extent is not defined for the site.

#### 6.8.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-029 because extent is not defined for the site.

### 6.8.4 SWMU 03-036(a), Potential Soil Contamination Associated with Aboveground Tanks

#### 6.8.4.1 Site Description and Operational History

SWMU 03-036(a) is the former location of two asphalt emulsion product tanks (former structures 03-75 and 03-76) at the former TA-03 asphalt batch plant (Figure 6.2-1). The tanks were approximately 25 to 30 ft in diameter and 8 to 12 ft high, with a capacity of 30,000 to 50,000 gal. (LANL 1993, 020947, p. 6-30). The tanks were located within a soil-bermed secondary containment area approximately 225 ft southwest of former building 03-70 (LANL 1995, 057590, p. 6-19). Plant operations resulted in some small spills that were contained within the berms. In 1987, structure 03-75 ruptured near its base and released 1500 gal. of asphalt emulsion. The spill was contained within the berm, mixed with sand, and

disposed of at the Los Alamos County landfill. Between October 1988 and April 1989, both tanks were removed, cut up, and disposed of in the Los Alamos County landfill. All soil around and beneath the tanks was also removed, mixed with sand, hardened, and deposited at the Los Alamos County landfill (LANL 1993, 020947, p. 6-30). The area was then used to store and prepare crack-sealing machines until batch plant operations ceased in 2002. The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

#### 6.8.4.2 Relationship to Other SWMUs and AOCs

The two former tanks that made up SWMU 03-036(a) stored asphalt emulsion and were located 50 ft and 100 ft northeast of the former asphalt batch plant (former structure 03-73). SWMU 03-036(a) is directly south of SWMUs 03-036(c) and 03-036(d).

#### 6.8.4.3 Summary of Previous Investigations

Before SWMU 03-036(a) and the surrounding area were paved for a new parking lot in 2003, samples were collected to characterize the site (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(a); two tuff samples were collected from depths of 8–8.5 ft and 19.5–20 ft bgs. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26).

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.4.4. Table 6.8-10 presents the samples collected and analyses requested at SWMU 03-036(a).

#### 6.8.4.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

No sampling was conducted at this site during the 2009 investigation because the nature and extent of contamination were defined during previous investigations.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-036(a) consist of two tuff samples collected from one location.

***Inorganic Chemicals***

Two tuff samples were analyzed for TAL metals. Table 6.8-11 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 03-036(a); inorganic COPCs are identified below.

Selenium was detected above BV (0.3 mg/kg) in one tuff sample at SWMU 03-036(a), at a concentration of 0.67 mg/kg. The maximum concentration of selenium in tuff was above background (Figure H-11). Selenium is identified as a COPC in tuff.

### *Organic Chemicals*

Two tuff samples were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Table 6.8-12 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 03-036(a); organic COPCs are identified below.

The following organic chemicals were detected in tuff at SWMU 03-036(a) and are identified as COPCs: acetone, benzoic acid, and tetrachloroethene.

#### Nature and Extent of Contamination

The nature and extent of contamination at SWMU 03-036(a) are defined (LANL 2003, 080912). Selenium concentrations decreased with depth. Organic chemicals were detected at concentrations below the EQLs. SWMU 03-036(a) is now overlain with an asphalt parking lot.

### 6.8.4.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for SWMU 03-036(a) is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(a). The total excess cancer risks for the construction worker and residential scenarios are $2 \times 10^{-11}$ and $8 \times 10^{-10}$, respectively, which are less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). For the construction worker and residential scenarios, the HIs are 0.0004 and 0.002, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

### 6.8.4.6 Summary of Ecological Risk Screening

The potential contamination associated with SWMU 03-036(a) is at 8.0 ft bgs or deeper, and the site is covered with asphalt pavement. Therefore, no complete exposure pathways to receptors are present at SWMU 03-036(a), and an ecological risk-screening assessment was not conducted.

## 6.8.5 SWMU 03-036(c), Potential Soil Contamination Associated with Aboveground Tanks

### 6.8.5.1 Site Description and Operational History

SWMU 03-036(c) is the former location of two asphalt emulsion storage tanks at the former TA-03 asphalt batch plant (Figure 6.2-1). The tanks were located approximately 140 ft northeast of former structure 03-73. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL 1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

#### 6.8.5.2 Relationship to Other SWMUs and AOCs

SWMU 03-036(c) is located next to the site of another former tank, SWMU 03-036(d). Asphalt emulsion from this tank supplied the former batch plant and is a component of Consolidated Unit 03-009(a)-00. The SWMU location is north of the SWMU 03-036(a) tanks and about 140 ft northeast of the former asphalt plant structure 03-73. The former storage shed site, SWMU 03-002(c), is about 25 ft north of this SWMU.

#### 6.8.5.3 Summary of Previous Investigations

Before SWMU 03-036(c) and the surrounding area were paved for a new parking lot in 2003, samples were collected to characterize the site (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(c), and two tuff samples were collected from depths of 3 to 4 ft and 19.5 to 20 ft bgs. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26).

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.5.4. Table 6.8-13 presents the samples collected and analyses requested at SWMU 03-036(c).

#### 6.8.5.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

No sampling was conducted at this site during the 2009 investigation because the nature and extent of contamination were defined during previous investigations.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-036(c) consist of two tuff samples collected from one location.

***Inorganic Chemicals***

Two tuff samples were analyzed for TAL metals. Table 6.8-14 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 03-036(c); inorganic COPCs are identified below.

The inorganic chemicals identified as COPCs in tuff at SWMU 03-036(c) are arsenic and selenium.

Arsenic was detected above BV (2.79 mg/kg) in one sample at SWMU 03-036(c) at a concentration of 5.7 mg/kg. The maximum concentration exceeded the maximum background concentration (5 mg/kg). The box plot for arsenic is presented in Figure H-12. Arsenic is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in one sample at SWMU 03-036(c) at a concentration of 0.43 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The box plot for selenium in tuff is presented in Figure H-12. Selenium is identified as a COPC in tuff.

***Organic Chemicals***

Two tuff samples were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Table 6.8-15 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected

organic chemicals. The nature and extent of contamination are defined at SWMU 03-036(c); organic COPCs are identified below.

The following organic chemical was detected in tuff at SWMU 03-036(c) and is identified as a COPC in tuff: acetone.

**Nature and Extent of Contamination**

The 2003 investigation analytical results showed detected arsenic and selenium concentrations decreased in concentration with depth (LANL 2003, 080912). The only organic chemical detected was acetone at 20.0 ft at a concentration below EQL. Acetone was not detected in shallower samples. The nature and extent of all inorganic chemicals and organic chemicals are defined.

#### 6.8.5.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for SWMU 03-036(c) is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(c). No carcinogenic COPCs were identified for the construction worker scenario. The total excess cancer risk for the residential scenario is $1 \times 10^{-5}$, which is equivalent to the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). For the construction worker and residential scenarios, the HIs are 0.09 and 0.001, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

#### 6.8.5.6 Summary of Ecological Risk Screening

SWMU 03-036(c) is covered with asphalt pavement. Therefore, an ecological risk-screening assessment was not conducted because no complete exposure pathways to ecological receptors exist.

### 6.8.6 SWMU 03-036(d), Potential Soil Contamination Associated with Aboveground Tanks

#### 6.8.6.1 Site Description and Operational History

SWMU 03-036(d) is the former location of two asphalt emulsion storage tanks at the former TA-03 asphalt batch plant (Figure 6.2-1). The tanks were located approximately 140 ft northeast of former structure 03-73. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL 1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

#### 6.8.6.2 Relationship to Other SWMUs and AOCs

This former tank site is located next to SWMU 03-036(c), another former tank. Asphalt emulsion from this tank supplied the former batch plant and is a component of Consolidated Unit 03-009(a)-00. The SWMU

is directly north of SWMU 03-036(a) and about 140 ft northeast of former asphalt plant structure 03-73. The former storage shed site, SWMU 03-002(c), is about 25 ft north of this SWMU.

#### 6.8.6.3 Summary of Previous Investigations

Before SWMU 03-036(d) and the surrounding area were paved for a new parking lot in 2003, samples were collected to characterize the site (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at SWMU 03-036(d), and one tuff sample was collected from a depth of 4.5 to 5 ft bgs. The sample was submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26).

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.6.4. Table 6.8-16 presents the samples collected and analyses requested at SWMU 03-036(d).

#### 6.8.6.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

No sampling was conducted at this site during the 2009 investigation because the nature and extent of contamination were defined during previous investigations.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-036(d) consist of one tuff sample.

***Inorganic Chemicals***

One tuff sample was analyzed for TAL metals. Table 6.8-17 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 03-036(d). The inorganic COPC is identified below.

The only inorganic chemical identified as a COPC in tuff at SWMU 03-036(d) is selenium.

Lead was detected above BV (11.2 mg/kg) in one sample at SWMU 03-036(d) at a concentration of 13.8 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of lead in tuff (15.5 mg/kg) (Figure H-13). Lead is not identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in one sample at SWMU 03-036(d) at a concentration of 0.51 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. Selenium is identified as a COPC in tuff (Figure H-13).

***Organic Chemicals***

One tuff sample was analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Table 6.8-18 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 03-036(d). The organic COPCs are identified below.

The following organic chemicals were detected in tuff at SWMU 03-036(d) and are identified as COPCs in tuff: tetrachloroethene and TPH-GRO.

**Nature and Extent of Contamination**

Selenium and lead were detected at concentrations slightly above their respective BVs during previous sampling; however, their concentrations were below their respective maximum background concentrations. Tetrachloroethene and TPH-GRO were detected at a concentration below EQLs. Based on the analytical results, the nature and extent of contamination are defined at this site.

#### 6.8.6.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for SWMU 03-036(d) is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(d). The total excess cancer risks for the construction worker and residential scenarios are $7 \times 10^{-12}$ and $4 \times 10^{-10}$, respectively, which are less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). For the construction worker and residential scenarios, the HIs are 0.0003 and 0.001, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-GRO was identified as a COPC. NMED screening guidelines do not provide screening levels for gasoline-range organics. If gasoline is present, risk is based on constituents like benzene, toluene, ethylbenzene, and xylene (BTEX) and polycyclic aromatic hydrocarbons (PAHs). These constituents were not detected at this site, and the exposure point concentration (EPC) was low (0.86 mg/kg); therefore, the risk associated with TPH-GRO is very low.

#### 6.8.6.6 Summary of Ecological Risk Screening

SWMU 03-036(d) is covered with asphalt pavement. Therefore, an ecological risk-screening assessment was not conducted because no complete exposure pathways to ecological receptors exist.

### 6.8.7 AOC 03-043(b), Aboveground Tank

#### 6.8.7.1 Site Description and Operational History

AOC 03-043(b) is the former location of a 10,000-gal. aboveground asphalt emulsion storage tank, former structure 03-77, installed in 1948 at the former TA-03 asphalt batch plant (Figure 6.2-1). Sand and gravel were packed around the base of the tank for insulation and stability. In 1980, the tank was cleaned out, removed, cut up, and disposed of at the Los Alamos County landfill. Stained soil beneath and around the tank was excavated and taken to the landfill (LANL 1995, 057590, p. 6-18). The former tank was used to store aggregate and to mix feed for the asphalt batch plant until it was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt to use as a parking lot (LANL 2008, 099214).

#### 6.8.7.2 Relationship to Other SWMUs and AOCs

This former tank site is located directly southeast of another former tank location, SWMU 03-036(a), that supplied emulsion to the former asphalt batch plant. It is located about 25 ft east of the former asphalt plant structure 03-73.

#### 6.8.7.3 Summary of Previous Investigations

Before AOC 03-043(b) and the surrounding areas were paved for a new parking lot in 2003, samples were collected to characterize the site (LANL 2003, 080912, p. 1). During the investigation, one shallow borehole was drilled at AOC 03-043(b). Two tuff samples were collected from depths of 9.5–10 ft bgs and 19.5–20 ft bgs. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26).

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.7.4. Table 6.8-19 presents the samples collected and analyses requested at AOC 03-043(b).

#### 6.8.7.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

No sampling was conducted at this site during the 2009 investigation because the nature and extent of contamination were defined during previous investigations.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at AOC 03-043(b) consist of two tuff samples collected from one location.

***Inorganic Chemicals***

Two tuff samples were analyzed for TAL metals. Table 6.8-20 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at AOC 03-043(b). The inorganic COPCs are identified below.

The inorganic chemicals identified as COPCs in tuff at AOC 03-043(b) are barium, lead, selenium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 7480 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of aluminum in tuff (8370 mg/kg) (Figure H-14). Aluminum is not identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 4.3 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of arsenic in tuff (5 mg/kg) (Figure H-14). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 67.5 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The barium concentration was above the maximum background concentration of barium in tuff (51.6 mg/kg). The box plot for barium in tuff is presented in Figure H-15. Barium is identified as a COPC in tuff.

Chromium was detected above BV (7.14 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 10 mg/kg. Because there were less than 10 samples, statistical tests could not be

performed. No sampling results exceeded the maximum background concentration of chromium in tuff (13 mg/kg) (Figure H-15). Chromium is not identified as a COPC in tuff.

Iron was detected above BV (14500 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 18400 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in tuff (19500 mg/kg) (Figure H-16). Iron is not identified as a COPC in tuff.

Lead was detected above BV (11.2 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 31.7 mg/kg. The maximum concentration was above BV (Figure H-16). Lead is identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 2190 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of magnesium in tuff (2820 mg/kg) (Figure H-17). Magnesium is not identified as a COPC in tuff.

Nickel was detected above BV (6.58 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 6.6 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of nickel in tuff (7 mg/kg) (Figure H-17). Nickel is not identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in two tuff samples at AOC 03-043(b), with a maximum concentration of 0.66 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. Selenium is identified as a COPC in tuff (Figure H-18).

Zinc was detected above BV (63.5 mg/kg) in one tuff sample at AOC 03-043(b), with a maximum concentration of 115 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. The zinc concentration was above the maximum background concentration of zinc in tuff (65.6 mg/kg) (Figure H-18). Zinc is identified as a COPC in tuff.

#### *Organic Chemicals*

Two tuff samples were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Table 6.8-21 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals.

The following organic chemical was detected in tuff at AOC 03-043(b) and is identified as a COPC in tuff: acetone.

#### Nature and Extent of Contamination

Inorganic chemical concentrations decreased with depth (LANL 2003, 080912). Acetone was detected below the EQL. In addition, the tank was removed and is now overlain with an asphalt parking lot. The nature and extent of contamination are defined at AOC 03-043(b).

### 6.8.7.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-043(b) is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for AOC 03-043(b). No carcinogenic COPCs were identified for the construction worker or residential scenarios. For the construction worker and residential scenarios, the HIs are 0.06 and 0.09, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

#### 6.8.7.6 Summary of Ecological Risk Screening

The potential contamination associated with AOC 03-043(b) is at 9.5 ft bgs or deeper, and the site is covered in asphalt pavement. Therefore, no complete exposure pathways to receptors are present at AOC 03-043(b) and an ecological risk-screening assessment was not conducted.

### 6.8.8 AOC 03-043(d), Aboveground Tank

AOC 03-043(d) is a former aboveground asphalt storage tank (structure 03-76) that was located at the former TA-03 asphalt batch plant (Figure 6.2-1). This AOC is a duplicate of SWMU 03-036(a) (section 6.8-4).

The 1990 SWMU report (LANL 1990, 007511) lists SWMU 03-036(a) as an area of potential soil contamination from two former aboveground asphalt storage tanks (structures 03-75 and 03-76) located at the former asphalt batch plant. The 1990 SWMU report also lists these same two tanks under the heading of decommissioned product tanks, designating one of the tanks (structure 03-76) as AOC 03-043(d). Tank 03-76 was cleaned out, removed, and disposed of at the Los Alamos County landfill. Because the tank was removed, the AOC is no longer the tank itself but rather is the area of potential soil contamination associated with the tank. However, SWMU 03-036(a) has already been designated as the area of potential soil contamination from tank 03-76. Therefore, AOC 03-043(d) is a duplicate of SWMU 03-036(a).

Sections 6.8.4.2 through 6.8.4.6 summarize the investigation of SWMU 03-036(a).

### 6.8.9 AOC 03-043(h), Aboveground Tank

AOC 03-043(h) is a former aboveground asphalt storage tank (structure 03-75) that was located at the former TA-03 asphalt batch plant (Figure 6.2-1). This AOC is a duplicate of SWMU 03-036(a) (section 6.8-4).

The 1990 SWMU report (LANL 1990, 007511) lists SWMU 03-036(a) as an area of potential soil contamination from two former aboveground asphalt storage tanks (structures 03-75 and 03-76), located at the former asphalt batch plant. The 1990 SWMU report also lists these same two tanks under the heading of decommissioned product tanks, designating one of the tanks (structure 03-75) as AOC 03-043(h). Tank 03-75 has been cleaned out, removed, and disposed of at the Los Alamos County landfill. Because the tank was removed, the AOC is no longer the tank itself but rather is the area of potential soil contamination associated with the former tank. However, SWMU 03-036(a) has already been designated as the area of potential soil contamination from tank 03-75. Therefore, AOC 03-043(h) is a duplicate of SWMU 03-036(a).

Sections 6.8.4.2 through 6.8.4.6 summarize the investigation of SWMU 03-036(a).

### 6.8.10 SWMU 03-045(g), Storm Drain

#### 6.8.10.1 Site Description and Operational History

SWMU 03-045(g) consists of a closed and locked storm drain at the former TA-03 asphalt batch plant that is connected to an outfall, formerly permitted under the EPA National Pollutant Discharge Elimination System (NPDES) as outfall EPA 04A109 (LANL 1993, 020947, p. 6-12) (Figure 6.2-1). The outfall discharged to a tributary of Sandia Canyon directly south of the former asphalt batch plant. The storm drain has been closed and locked since late 1990. Outfall 04A109 had been permitted for the discharge of noncontact cooling water and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 2-7). Since 1987, the only discharges from the asphalt plant to the outfall were scrubber water used to collect dust from batching operations (SWMU 03-028) diverted to wash vehicles and equipment and from stormwater from the western portion of the batch plant area. Stormwater from parking lots, roads, and roof drains located west of the former asphalt batch plant also discharged to the outfall.

#### 6.8.10.2 Relationship to Other SWMUs and AOCs

This former outfall discharged scrubber water from the surface impoundment, SWMU 03-028, and stormwater from the SWMUs, AOCs, and surrounding paved and unpaved areas associated with the former asphalt batch plant; these are all part of Consolidated Unit 03-009(a)-00. The SWMU is located about 200 ft south of the former asphalt plant structure 03-73.

#### 6.8.10.3 Summary of Previous Investigations

In 2003, four sediment samples were collected within the catch basin of the closed storm drain (located approximately 150 ft north of the outfall). The four samples were collected from two locations at depths of 0–0.5 ft bgs and 1.5–2 ft bgs and submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 10, 26).

Arsenic and lead were detected above BVs in one sample. Cadmium, cobalt, iron, manganese, potassium, and sodium were detected above BVs in two samples. Barium, copper, vanadium, and zinc were detected above BVs in three samples. Calcium, chromium, magnesium, and nickel were detected above BVs in all four samples. Butylbenzene(n-), 4-isopropyltoluene, trichloroethene (TCE), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and TPH-GRO were detected in one sample. Benzo(g,h,i)perylene was detected in two samples. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in three samples. Methylene chloride, bis(2-ethylhexyl)phthalate, fluoranthene, and pyrene were detected in all four samples. TPH-DRO was not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.8.10.4. Table 6.8-22 presents the samples collected and analyses requested at SWMU 03-045(g).

#### 6.8.10.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-045(g). As a result, the following activities were completed as part of the 2009 investigation.

- Four samples were collected from location 03-22536 and one location above the inlet. At each location, samples were collected from 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, and cyanide.
- Four samples were collected from two locations downgradient of the outfall within the drainage to determine the lateral extent of contamination. At each location, samples were collected from 0.0–1.0 and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-045(g) are shown in Figure 6.2-1. Table 6.8-22 presents the samples collected and analyses requested at SWMU 03-045(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-045(g), a maximum concentration of 109 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-045(g) consist of 12 samples (6 soil, 2 tuff, and 4 sediment) collected from five locations.

***Inorganic Chemicals***

Twelve samples were analyzed for TAL metals (six in soil, two in tuff, four in sediment). Eight samples were analyzed for cyanide (six in soil and two in tuff). Table 6.8-23 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(g); therefore, inorganic COPCs are not identified for the site.

***Organic Chemicals***

Twelve samples were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO (six in soil, two in tuff, four in sediment). Eight samples were analyzed for PCBs (six in soil and two in tuff). Table 6.8-24 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected

organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(g); therefore, organic COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-045(g) are not defined, as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil, tuff, and sediment samples at SWMU 03-045(g) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are antimony, arsenic, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, potassium, selenium, sodium, thallium, vanadium, and zinc.

Antimony was not detected above BVs at SWMU 03-045(g) but had DLs (1.01 to 1.09 mg/kg) above BVs for soil and tuff (0.83 mg/kg and 0.5 mg/kg, respectively) in six soil and two tuff samples. Because antimony was not detected above BV at SWMU 03-045(g), the lateral and vertical extent of antimony are defined.

Arsenic was detected above the sediment BV (3.98 mg/kg) in one sample at SWMU 03-045(g). The maximum concentration of 4.2 mg/kg was detected in a sample collected from 0.0–0.5 ft bgs at location 03-22535. Arsenic is not detected from1.5–2.0 ft bgs, the TD, at this same location. Arsenic was not detected above BV at any other location. The lateral and vertical extent of arsenic are defined.

Barium was detected above the sediment BV (127 mg/kg) in three samples at SWMU 03-045(g). The maximum concentration of 262 mg/kg was detected at location 03-22535 in a sample collected from 0–0.5 ft bgs. Barium concentrations decreased with depth at this location. Barium was not detected above BV downgradient of sampling locations 03-608188 and 03-608189. The lateral and vertical extent of barium are defined.

Cadmium was detected above the sediment BV (0.4 mg/kg) in two samples at SWMU 03-045(g), with a maximum concentration of 0.93 mg/kg. Concentrations increased with depth at location 03-22535. Cadmium was not detected above BVs at any other locations. The lateral extent of cadmium is defined, and the vertical extent is not defined.

Calcium was detected above the sediment BV (4420 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 66,000 mg/kg was detected at location 03-22536 in a sample collected from 1.0–2.0 ft bgs. Calcium was not detected at the TD (4.0–5.0 ft bgs) at this location. Concentrations decreased with depth at location 03-608187. The vertical extent of calcium is defined. Calcium was not detected at location 03-608188 (the outfall location) and 03-608189 (downgradient of the outfall). The lateral extent of calcium is defined.

Chromium was detected above the sediment BV (10.5 mg/kg) in four samples and above the soil BV (19.3 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 58.7 mg/kg was detected at location 03-22536 in a sample collected from 1.0–2.0 ft bgs. Concentrations decreased with depth at locations 03-22535 and 03-22536. However, chromium concentrations increased with depth at location 03-608187, upgradient of the storm drain. Chromium was not detected above BVs at location 03-608188 (the outfall) or location 03-608189 (downgradient of the outfall). The lateral extent of chromium is defined, and the vertical extent is not defined.

Cobalt was detected above the sediment BV (4.73 mg/kg) in two samples at SWMU 03-045(g). The maximum concentration of 7.9 mg/kg was detected at location 03-22535 in a sample collected from 0.0–0.5 ft bgs. Concentrations decreased with depth at locations 03-22535 and 03-22536. Cobalt was not detected above BV at any other location. The lateral and vertical extent of cobalt are defined.

Copper was detected above BVs for sediment (11.2 mg/kg) and soil (14.7 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 39.2 mg/kg was detected at location 03-22536 in a sediment sample collected from 0.0–0.5 ft bgs. Concentrations decreased with depth at locations 03-22535 and 03-22536. Copper was not detected above BV at any other location. The lateral and vertical extent of copper are defined.

Iron was detected above the sediment BV (13,800 mg/kg) in two samples at SWMU 03-045(g). The maximum concentration of 19,900 mg/kg was detected at location 03-22536 in a sample collected from 0.0–0.5 ft bgs. Iron concentrations decreased with depth at locations 03-22535 and 03-22536. Iron was not detected above BV at any other location. The lateral and vertical extent of iron are defined.

Lead was detected above the sediment BV (19.7 mg/kg) in one sample at SWMU 03-045(g). The maximum concentration of 27.3 mg/kg was detected at location 03-22536 in a sample collected from 0.0–0.5 ft bgs. Lead concentrations decreased with depth and lead was not detected above BV at any other location. The lateral and vertical extent of lead are defined.

Magnesium was detected above the sediment BV (2370 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 6310 mg/kg was detected at location 03-22535 in a sample collected from 0.0–0.5 ft bgs. Magnesium concentrations decreased with depth at this location and at location 03-22536. Magnesium was not detected above BV at any other location. The lateral and vertical extent of magnesium are defined.

Manganese was detected above the sediment BV (543 mg/kg) in two samples at SWMU 03-045(g). The maximum concentration of 654 mg/kg was detected at location 03-22536 in a sample collected from 1.5–2.0 ft bgs, the TD. Manganese concentrations decreased with depth at locations 03-22535 and 03-22536. Manganese was not detected above BV at any other location. The lateral and vertical extent of manganese are defined.

Nickel was detected above the sediment BV (9.38 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 19.3 mg/kg was detected at location 03-22536 in a sample collected from 0.0–0.5 ft bgs. Nickel concentrations decreased with depth at this location and at location 03-22535. Nickel was not detected above BV at any other location. The lateral and vertical extent of nickel are defined.

Potassium was detected above the sediment BV (2690 mg/kg) in two samples at SWMU 03-045(g). The maximum concentration of 2870 mg/kg was detected at location 03-22536 in a sample collected from 0.0–0.5 ft bgs. Potassium concentrations decreased with depth at locations 03-22535 and 03-22536. Potassium was not detected above BV at any other location. The lateral and vertical extent of potassium are defined.

Selenium was not detected above BVs at SWMU 03-045(g) but had DLs (0.983 to 0.997 mg/kg) above BV (0.3 mg/kg) in two tuff samples. Because selenium was not detected at SWMU 03-045(g), the lateral and vertical extent of selenium are defined.

Sodium was detected above the sediment BV (1470 mg/kg) in two samples at SWMU 03-045(g). The maximum concentration of 2190 mg/kg was detected at location 03-22535 in a sample collected from

0.0–0.5 ft bgs. Concentrations decreased with depth at locations 03-22535 and 22536. Sodium was not detected above BV at any other location. The lateral and vertical extent of sodium are defined.

Thallium was not detected above BVs at SWMU 03-045(g) but had DLs (1.04 mg/kg) above the soil BV (0.73 mg/kg) in one sample. Because thallium was not detected at SWMU 03-045(g), the lateral and vertical extent of thallium are defined.

Vanadium was detected above the sediment BV (19.7 mg/kg) in three samples at SWMU 03-045(g). The maximum concentration of 32 mg/kg was detected at location 03-22535 in a sample collected from 0.0–0.5 ft bgs. The concentration of vanadium decreased with depth at this location and at location 03-22536. Vanadium was not detected above BV at any other location. The lateral and vertical extent of vanadium are defined.

Zinc was detected above BVs for soil (48.8 mg/kg) and sediment (60.2 mg/kg) in four samples at SWMU 03-045(g). The maximum concentration of 141 mg/kg was detected at location 03-22536 in a sample collected from 0.0–0.5 ft bgs. Concentrations decreased with depth at this location. Zinc was also detected above BV at location 03-22535 at 61.1 mg/kg in the sampling interval from 0.0–0.5 ft bgs and 65.1 mg/kg at 1.5–2.0 ft bgs. Zinc was not detected above BVs at any other location. The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals detected at SWMU 03-045(g) are Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, methylene chloride, phenanthrene, pyrene, TPH-GRO, TPH-DRO, TCE, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.

Aroclor-1254 was detected in two samples at two locations at SWMU 03-045(g). The maximum concentration of 0.0052 mg/kg was detected in a sample collected from 0.0–1.0 ft bgs at location 03-608188 at the storm drain outfall. Concentrations decreased with depth at both locations. Aroclor-1254 was also detected at downgradient location 03-608189. Concentrations decreased with depth at both locations and decreased laterally from locations 03-608188 to 03-608189. Aroclor-1254 was not detected at any other location. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in two samples at two locations at SWMU 03-045(g). The maximum concentration of 0.0153 mg/kg was detected in a sample collected in soil from 0.0–1.0 ft bgs at location 03-608188 at the storm drain outfall. Concentrations decreased with depth at both locations. Aroclor-1260 was detected at downgradient location 03-608189. Concentrations decreased with depth at both locations and decreased laterally from 03-608188 to 03-608189. Aroclor-1260 was not detected at any other location. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, n-butylbenzene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, methylene chloride, phenanthrene, pyrene, TCE, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected in one to seven samples at SWMU 03-045(g). Concentrations decreased with depth at all locations and downgradient. The lateral and vertical extent of these organic chemicals are defined.

Benzoic acid was detected in one tuff sample at SWMU 03-045(g) at a concentration of 0.174 mg/kg at location 03-608188 in the deepest sample collected from this location (1.0–2.0 ft bgs). The concentration is below the EQL. The lateral and vertical extent of benzoic acid are defined.

TPH-DRO was detected in five samples at four locations at SWMU 03-045(g). The maximum concentration of 48.5 mg/kg was detected in a sample collected in soil from 0.0–1.0 ft bgs at location 03-608188 (at the outfall). TPH-DRO concentrations decreased with depth at all locations. TPH-DRO also decreased laterally at location 03-608189. The lateral and vertical extent of TPH-DRO are defined.

TPH-GRO was detected in eight samples at four locations at SWMU 03-045(g). The maximum concentration of 0.95 mg/kg was detected in a sample collected in sediment from 1.5–2.0 ft bgs at location 03-22536. Concentrations decreased with depth at all locations, except 03-608187 and 03-608189. Concentrations decreased laterally from the outfall location 03-608188 to location 03-608189. The lateral and vertical extent of TPH-GRO are defined.

#### 6.8.10.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(g) because extent is not defined for the site.

#### 6.8.10.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(g) because extent is not defined for the site.

### 6.9 SWMU 03-009(i), Surface Disposal Site

#### 6.9.1 Site Description and Operational History

SWMU 03-009(i) is an inactive surface disposal site located east of the liquid and compressed gas facility (building 03-170) (Figure 6.9-1). This site consists of construction debris, including crushed tuff, pieces of concrete, rock, and piles of fill. This surface disposal site ceased to be used in 1980 (LANL 1995, 057590, p. 6-4).

#### 6.9.2 Relationship to Other SWMUs and AOCs

There is no documented relationship between this inactive surface disposal site and any other SWMUs or AOCs.

#### 6.9.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-009(i).

### 6.9.4 Site Contamination

#### 6.9.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-009(i) to assess potential contamination:

- Four samples were collected from two locations downgradient of the disposal site. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- Eight samples were collected from four test pits at depths of 4.0–5.0 ft and 9.0–10.0 ft bgs to characterize the material. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-009(i) are shown in Figure 6.9-1. Table 6.9-1 presents the samples collected and analyses requested at SWMU 03-009(i). 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 SWMU 03-009(i), a maximum concentration of 450 ppm was detected at a depth of 4.0–5.0 ft bgs. This sample (RE03-09-13467) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.9.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-009(i) consist of 12 samples (3 soil and 9 tuff) collected from six locations.

**Inorganic Chemicals**

Twelve samples (three soil and nine tuff) were analyzed for TAL metals and cyanide. Table 6.9-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 12 shows the spatial distribution of inorganic chemicals detected or detected above BV. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-009(i); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twelve samples (three soil and nine tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.9-3 summarizes the analytical results for detected organic chemicals. Plate 13 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-009(i); therefore, organic COPCs are not identified for the site.

#### 6.9.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-009(i) are not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at SWMU 03-009(i) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are aluminum, antimony, arsenic, barium, calcium, chromium, cobalt, copper, cyanide, iron, lead, manganese, nickel, selenium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in one tuff sample at SWMU 03-009(i). The maximum concentration of 8110 mg/kg was detected at location 03-608194 in a sample collected from a depth of 4.0–5.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of aluminum in tuff (8370 mg/kg) (Figure H-19). The lateral and vertical extent of aluminum are defined.

Antimony was detected above BVs for soil (0.83 mg/kg) and tuff (0.5 mg/kg) in five samples at SWMU 03-009(i). The maximum concentration of 2.44 mg/kg was detected at location 03-608190 in a soil sample collected from 0.0–1.0 ft bgs. Samples have not been collected to the east and south of this location; the lateral extent of antimony is not defined. Concentrations decreased with depth at most locations; however, concentrations increased slightly at location 03-608195 but were similar to the tuff BV. The vertical extent of antimony is defined.

Arsenic was detected above BV for tuff (2.79 mg/kg) in one sample at SWMU 03-009(i). The maximum concentration of 4.34 mg/kg was at location 03-608192 in a sample collected from a depth of 9.0–10.0 ft bgs. Because there were fewer than 10 samples, statistical tests could not be performed. No sample results exceeded the maximum background concentration of arsenic in tuff (5 mg/kg) (Figure H-19). The lateral and vertical extent of arsenic are defined.

Barium was detected above BV for tuff (46 mg/kg) in two samples at SWMU 03-009(i). The maximum concentration of 136 mg/kg was detected in a sample collected from 4.0–5.0 ft bgs at location 03-608194. Concentrations decreased with depth at this location and laterally. Barium was also detected at a concentration of 74.4 mg/kg in a sample collected from 1.0–2.0 ft bgs at location 03-608191. Barium concentrations decreased with depth at location 03-608191. The lateral and vertical extent of barium are defined.

Calcium was detected above BVs for soil (6120 mg/kg) and tuff (2200 mg/kg) in three samples at SWMU 03-009(i). The maximum concentration of 9350 mg/kg was detected at perimeter location 03-608191 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The lateral extent of calcium is not defined. Concentrations of calcium decreased with depth at all locations; the vertical extent of calcium is defined.

Chromium, cobalt, copper, and vanadium were detected above BVs in two samples at SWMU 03-009(i). The maximum concentrations (14 mg/kg, 6.06 mg/kg, 10.2 mg/kg, and 24.6 mg/kg, respectively) were detected at location 03-608191 in a sample collected from a depth of 4.0–5.0 ft bgs. Concentrations increased with depth at location 03-608191 and decreased with depth at location 03-608194. Laterally, concentrations increased slightly from 03-608194 to 03-608191. The lateral and vertical extent of chromium, cobalt, copper, and vanadium are not defined at SWMU 03-009(i).

Cyanide was detected above BV for tuff (0.5 mg/kg) in one sample at SWMU 03-009(i) at a concentration of 0.631 mg/kg at location 03-608191 in the deepest sample collected from a depth of 1.0–2.0 ft bgs. The vertical extent of cyanide is not defined. Samples have not been collected to the north and east of this location; the lateral extent of cyanide is not defined.

Iron was detected above BV for tuff (14,500 mg/kg) in two samples at SWMU 03-009(i). The maximum concentration of 19,300 mg/kg was detected at location 03-608192 in a sample collected from a depth of 9.0–10.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in tuff (19,500 mg/kg) (Figure H-20). The lateral and vertical extent of iron are defined.

Lead was detected above BV for tuff (11.2 mg/kg) in two samples at SWMU 03-009(i). The maximum concentration of 17 mg/kg was detected at location 03-608193 in a sample collected from a depth of 9.0–10.0 ft bgs. Concentrations decreased laterally in samples collected from locations 03-608194, 03-608192, and 03-608190. Concentrations increased with depth at location 03-608193 and decreased at location 03-608194. The lateral extent of lead is defined at SWMU 03-009(i). The vertical extent of lead is not defined.

Manganese was detected above BV for tuff (482 mg/kg) in one sample at SWMU 03-009(i) at a concentration of 565 mg/kg at location 03-608191 in a sample collected from a depth of 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of manganese in tuff (752 mg/kg) (Figure H-20). The lateral and vertical extent of manganese are defined.

Nickel was detected above BV for tuff (6.58 mg/kg) in two samples at SWMU 03-009(i). The maximum concentration of 9.55 mg/kg was detected at location 03-608191 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations increased with depth at this location and increased downgradient from location 03-608195. The lateral and vertical extent of nickel are not defined.

Selenium was not detected above BVs at SWMU 03-009(i) but had DLs (1 to 1.09 mg/kg) above the tuff BV. Because selenium was not detected at SWMU 03-009(i), the lateral and vertical extent of selenium are defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 03-009(i) are anthracene, Aroclor-1254, Aroclor-1260, fluoranthene, 2-hexanone, methylene chloride, pyrene, and TPH-DRO.

Anthracene was detected in two samples at location 03-608190 at concentrations below the EQL. The lateral and vertical extent of anthracene are defined.

Aroclor-1254 was detected at location 03-608190 at a concentration of 0.0297 mg/kg in one soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth. Aroclor-1254 was not detected at location 03-608192, approximately 40 ft to the west. Samples have not been collected to the east of this location. The lateral extent of Aroclor-1254 is not defined. The vertical extent of Aroclor-1254 is defined.

Aroclor-1260 was detected at location 03-608190 in two samples, with a maximum concentration of 0.0589 mg/kg in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth at this location. Aroclor-1260 was not detected at location 03-608192, approximately 40 ft to the

west. Samples have not been collected to the east of this location. The lateral extent of Aroclor-1260 is not defined. The vertical extent of Aroclor-1260 is defined.

Fluoranthene was detected in three samples at two locations at SWMU 03-009(i) at concentrations below the EQL. Concentrations decreased with depth. The lateral and vertical extent of fluoranthene are defined.

Hexanone(2-) was detected in one tuff sample at SWMU 03-009(i) at concentrations below the EQL. Concentrations decreased with depth. The lateral and vertical extent of 2-hexanone are defined.

Methylene chloride was detected in four tuff samples at two locations at SWMU 03-009(i) at concentrations below the EQL. Concentrations decreased with depth. The lateral and vertical extent of methylene chloride are defined.

Pyrene was detected in one soil and one tuff sample at two locations at SWMU 03-009(i) at concentrations below the EQL. Concentrations decreased with depth. The lateral and vertical extent of pyrene are defined.

TPH-DRO was detected in eight samples at five locations at SWMU 03-009(i). The maximum concentration of 36.4 mg/kg was detected at location 03-608191 in a soil sample collected from a depth of 0.0–1.0 ft bgs. TPH-DRO was also detected at a concentration of 28.6 mg/kg at location 03-608190 at a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth. Samples have not been collected to the east or south of these locations; TPH-DRO was not detected in drainage samples collected to the north as part of the investigation of SWMU 03-021. At locations 03-608194, 03-608193, and 03-608192 to the west, TPH-DRO was detected at concentrations below their respective EQLs. The lateral extent of TPH-DRO is not defined to the east and the south. The vertical extent of TPH-DRO is defined.

#### 6.9.4.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-009(i) because extent is not defined for the site.

#### 6.9.4.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-009(i) because extent is not defined for the site.

### 6.10 Consolidated Unit 03-012(b)-00, Power Plant

Consolidated Unit 03-012(b)-00 consists of soil contamination from operational releases [SWMU 03-012(b)], a holding tank [SWMUs 03-014(q)], and two permitted outfalls [SWMUs 03-045(b) and 03-045(c)] (Figure 6.10-1). The SWMUs within this consolidated unit are associated with the TA-03 power plant (building 03-22) operations. SWMU 03-012(b) is soil contamination from operational releases, including cooling tower drift; SWMU 03-014(q) is a cooling-water holding tank; and SWMUs 03-045(b) and 03-045(c) are outfalls that discharge into a small tributary of Sandia Canyon directly south of the steam power (LANL 1990, 007511; LANL 1996, 052930, p. 57). Each SWMU is discussed individually in sections 6.10.1 to 6.10.4.

The distinction between SWMUs 03-012(b) and 03-045(b) is often not clear in historical documents. The 1990 SWMU report identifies SWMU 03-012(b) as operational releases, including cooling tower drift loss and cooling water discharges, and SMWU 03-045(b) as the NPDES outfall for cooling towers 03-25 and

03-58 (LANL 1990, 007511). The RFI work plan for OU 1114 identifies SWMU 03-012(b) as the power plant outfall (LANL 1993, 020947, p. 5-46), and the RFI work plan addendum for OU 1114 identifies SWMU 03-045(b) as the outfall for the power plant cooling towers and notes this discharge point is identical to SWMU 03-012(b) (LANL 1995, 057590, p. 5-27-1). Similar descriptions are provided in the 1996 Phase I RFI report for TA-03 (LANL 1996, 052930, p. 56). From these descriptions, it is not clear whether these outfalls are identical or whether SWMU 03-045(b) is the cooling tower outfall and SWMU 03-012(b) is the outfall for other discharges from the power plant. For the purposes of the Upper Sandia Canyon Aggregate Area investigation, SWMU 03-012(b) is considered to be operational releases from the power plant and power plant cooling towers and SMWU 03-045(b) is considered to be NPDES-permitted Outfall 001, which currently receives treated sanitary effluent from the TA-46 Sanitary Wastewater Systems Consolidation (SWSC) plant. Presently NPDES-permitted Outfall 001 only occasionally receives cooling tower and other discharges from the power plant, which is infrequently used only for backup power (LANL 2009, 107453).

### 6.10.1 SWMU 03-012(b), Operational Release and Outfall

#### 6.10.1.1 Site Description and Operational History

SWMU 03-012(b) is soil contamination associated with operational releases from the TA-03 power plant, building 03-22, and associated cooling towers, including cooling tower drift (Figure 6.10-1). A gas turbine generator, along with supporting utilities, were installed east of the power plant within the eastern portion of SWMU 03-012(b) in 2007 (LANL 2008, 099214).

#### 6.10.1.2 Relationship to Other SWMUs and AOCs

Before 1985, effluent from the former TA-03 WWTP, Consolidated Unit 03-014(a)-99, was used as cooling tower water for the TA-03 power plant (building 03-22). The effluent was stored in a holding tank, SWMU 03-014(q), before being used in the cooling towers and eventually discharged to an outfall, [SWMU 03-045(b)] located within the same drainage that receives surface water runoff from SWMU 03-012(b). SWMU 03-045(c) is an NPDES-permitted outfall located about 55 ft east of SWMU 03-012(b). The holding tank and both outfalls, along with SWMU 03-012(b), make up Consolidated Unit 03-012(b)-00. Surface water runoff from SWMU 03-012(b) along with discharges from the SWMU 03-045(b) and SWMU 03-045(c) outfalls end up in the tributary to Upper Sandia Canyon that runs along the southern edge of the TA-03 power plant facility.

#### 6.10.1.3 Summary of Previous Investigations

During the 1994 RFI conducted at SWMU 03-012(b), 11 soil and sediment samples were collected from five locations at a depth of 0 to 0.5 ft bgs. Four of the samples were collected from two locations (three from one location and one from another) near the SWMU 03-045(b) outfall. Seven samples were collected from three downstream locations (three samples each from two locations and one from a third) to characterize the sediment in the outfall channel. All samples were submitted for laboratory analyses of PCBs, gross-alpha, -beta, and -gamma radiation, and tritium; eight samples were submitted for laboratory analysis of herbicides; five samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, and pesticides and by gamma spectroscopy; one sample was submitted for laboratory analyses of isotopic plutonium, uranium, and strontium-90 (LANL 1996, 052930, pp. 57–60).

Arsenic, cadmium, lead, and nickel were detected in one sample above BVs. Chromium and silver were detected in two samples above BVs. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene,

indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and total PCBs were detected in one sample. Fluoranthene was detected in two samples. Aroclor-1260 was detected in three samples. Plutonium-238, plutonium-239/240, uranium-234, uranium-235, and uranium-236 were detected above BVs/FVs in one sample. Tritium was detected in three samples.

The RFI report presented a Phase II sampling plan for SWMU 03-012(b) that included sampling in the vicinity of the cooling towers (LANL 1996, 052930). A modified version of this sampling plan was implemented in 2002 in anticipation of construction activities near the cooling towers that might limit future access for sampling. Twenty-eight fill samples were collected from 14 locations at depths of 0.0–0.5 ft and 0.5–1 ft bgs; four fill samples were collected from 4 locations from a depth of 0.5–1 ft bgs. The samples were analyzed for metals and hexavalent chromium (Caporuscio 2003, 088444).

Mercury was detected above BV in one fill sample; copper was detected above BV in two fill samples; cadmium was detected above BV in three samples; chromium, silver, and zinc were detected above BVs in 6, 5, and 10 fill samples, respectively. Hexavalent chromium was detected in 17 fill samples.

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

Zinc was detected above BV in three samples. Chromium and silver were detected above BVs in four and five samples, respectively. Hexavalent chromium was detected in five samples. Aroclor-1254 and Aroclor-1260 were detected in three and four samples, respectively.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.10.1.4. Table 6.10-1 presents the samples collected and analyses requested at SWMU 03-012(b).

#### 6.10.1.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-012(b). As a result, the following activities were completed as part of the 2009 investigation.

- Four soil samples were collected at two locations at the outfalls for SWMUs 03-045(b) and 03-045(c) to identify if any contaminants are present below the outfall. Sampling locations were biased towards areas of sediment accumulation. Samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All soil samples were field screened for VOCs, and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations associated with SWMU 03-012(b) are shown in Figure 6.10-1. Table 6.10-1 presents the samples collected and analyses requested at SWMU 03-012(b). The geodetic coordinates of

sampling locations associated with SWMU 03-012(b) at SWMUs 03-045(b) and 03-045(c) are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMUs 03-045(b) and 03-045(c), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-012(b) consist of 54 soil samples collected from 29 locations.

#### *Inorganic Chemicals*

A total of 54 samples were analyzed for TAL metals. Fifty soil samples were analyzed for hexavalent chromium. Four soil samples were analyzed for cyanide. Table 6.10-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-012(b); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Four soil samples were analyzed for SVOCs and VOCs, nine soil samples were analyzed for PCBs, and four samples were analyzed for TPH-DRO. Table 6.10-3 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-012(b); therefore, organic COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-012(b) are not defined, as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil at SWMU 03-012(b) were detected at concentrations above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, calcium, chromium, hexavalent chromium, copper, magnesium, mercury, silver, sodium, thallium, and zinc.

Antimony was not detected in soil at SWMU 03-012(b) but had DLs (1.06 to 5.6 mg/kg) above BV (0.83 mg/kg) in five soil samples. Because antimony was not detected at SWMU 03-012(b), the lateral and vertical extent of antimony are defined.

Cadmium was detected above BV (0.4 mg/kg) in two soil samples at SWMU 03-012(b). The maximum concentration of 0.69 mg/kg was detected at location 03-02-21036 in a sample collected from 0.0–0.5 ft bgs. Additionally, 12 DLs were above BV, with a maximum DL of 2.8 mg/kg, which is slightly above

the maximum background concentration (2.6 mg/kg). The maximum concentration was detected at the northernmost location, and samples were collected from only one depth. The lateral and vertical extent of cadmium are not defined.

Calcium was detected above BV (6120 mg/kg) in two soil samples from location 03-608196 at SWMU 03-012(b). The maximum concentration of 22,800 mg/kg was in a sample collected from 0.0–1.0 ft bgs, and concentrations decreased with depth at the location. The lateral extent of calcium is not defined, and the vertical extent is defined.

Chromium was detected above BV (19.3 mg/kg) in 10 soil samples at SWMU 03-012(b). The maximum concentration of 156.6 mg/kg was detected at the northernmost location 03-02-21036 in a sample collected from 0.0–0.5 ft bgs. Samples were not collected from a deeper depth at this location or other locations with elevated concentrations of chromium. The lateral and vertical extent of chromium are not defined.

Hexavalent chromium was detected in 22 soil samples at SWMU 03-012(b). The maximum concentration of 9.5 mg/kg was detected at location 03-02-21047 in a sample collected from 0.0–0.5 ft bgs. Elevated concentrations were detected in the northern and western locations, and samples in these areas were collected from only one depth. The lateral and vertical extent of hexavalent chromium are not defined.

Copper was detected above BV (14.7 mg/kg) in two soil samples at SWMU 03-012(b). The maximum concentration of 26.1 mg/kg was detected at location 03-02-21036 in a sample collected from 0.0–0.5 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of copper are not different than background (Table H-1 and Figure H-21). The lateral and vertical extent of copper are defined.

Magnesium was detected above BV (4610 mg/kg) in one soil sample at SWMU 03-012(b). The maximum concentration of 5240 mg/kg was detected at location 03-608196 in a sample collected from 0.0–1.0 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of magnesium are not different than background (Table H-1 and Figure H-21). The lateral and vertical extent of magnesium are defined.

Mercury was detected above BV (0.1 mg/kg) in two soil samples at SWMU 03-012(b). The maximum concentration of 0.159 mg/kg was detected at location 03-608197 in a sample collected from 0.0–1.0 ft bgs, and mercury was not detected at the bottom depth at the location. The lateral extent of mercury is not defined at location 03-608197, and the vertical extent is defined.

Silver was detected above BV (1 mg/kg) in 10 soil samples at SWMU 03-012(b). The maximum concentration of 6.4 mg/kg was detected at location 03-02-21036 in a sample collected from 0.0–0.5 ft bgs. Additionally, one DL was above BV (2.8 mg/kg). The maximum concentration was detected at the northernmost location, and samples were collected only from one depth. The lateral and vertical extent of silver are not defined.

Sodium was detected above BV (915 mg/kg) in one soil sample at SWMU 03-012(b). The maximum concentration of 1450 mg/kg was detected at location 03-608196 in a sample collected from 0.0–1.0 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of sodium are not different than background (Table H-1 and Figure H-22). The lateral and vertical extent of sodium are defined.

Thallium was not detected above BV (0.73 mg/kg) in soil at SWMU 03-012(b), but had a DL (2.8 mg/kg) above BV in one soil sample. Because thallium was not detected at SWMU 03-012(b), the lateral and vertical extent of thallium are defined.

Zinc was detected above BV (48.8 mg/kg) in 15 soil samples at SWMU 03-012(b). The maximum concentration of 145.2 mg/kg was detected at location 03-02-21044 in a sample collected from 0.0–0.5 ft bgs. Elevated concentrations were detected in lateral locations, and samples in most of these areas were only collected from one depth. The lateral and vertical extent of zinc are not defined.

***Organic Chemicals***

Organic chemicals detected in soil at SWMU 03-012(b) are acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

Aroclor-1254 was detected in seven soil samples at SWMU 03-012(b). The maximum concentration of 0.812 mg/kg was detected at location 03-608196 in a sample collected from the deepest interval (1.0–2.0 ft bgs). The lateral and vertical extent of Aroclor-1254 are not defined.

Aroclor-1260 was detected in eight soil samples at SWMU 03-012(b). The maximum concentration of 3.19 mg/kg was detected at location 03-608196 in a sample collected from the deepest interval (1.0–2.0 ft bgs). The lateral and vertical extent of Aroclor-1260 are not defined.

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO were not analyzed for in the historical samples at SWMU 03-012(b). These organic chemicals were analyzed for and detected in the 2009 samples at outfall locations 03-608196 and 03-608197 at SWMU 03-012(b). Sections 6.10.3.4 and 6.10.4.4 discuss the nature and extent of these organic chemicals at the two outfall locations.

#### 6.10.1.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-012(b) because extent is not defined for the site.

#### 6.10.1.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-012(b) because extent is not defined for the site.

### 6.10.2 SWMU 03-014(q), Holding Tank

#### 6.10.2.1 Site Description and Operational History

SWMU 03-014(q) (Figure 6.10-1) is the treated effluent storage tank (structure 03-336) located at the TA-03 power plant (building 03-22) (LANL 1990, 007511, p. 3-014). Between 1951 and 1985, the tank received and stored treated effluent from the former TA-03 WWTP for use as cooling water for the power plant cooling towers (structures 03-25 and 03-58). The tank currently receives treated effluent from the TA-46 SWSC Plant for use at the power plant. The effluent is treated in a wastewater neutralization tank to adjust pH before use and subsequent discharge to the SWMU 03-045(b) outfall.

#### 6.10.2.2 Relationship to Other SWMUs and AOCs

Treated effluent from the SWMU 03-014(q) storage tank is still used at the TA-03 power plant and is eventually discharged at the SWMU 03-045(b) outfall. The holding tank, the SWMU 03-045(b) outfall, the SWMU 03-045(c) outfall, and SWMU 03-012(b) are all components of Consolidated Unit 03-012(b)-00. All effluent discharged to SWMU 03-045(b) is treated in a wastewater neutralization tank at the TA-03 power plant to adjust the pH to ensure compliance with NPDES permit requirements.

#### 6.10.2.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(q).

#### 6.10.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-014(q) to assess potential contamination.

- Six samples were collected from three locations upgradient and downgradient of the holding tank to characterize the site. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals and PCBs.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(q) are shown in Figure 6.10-1. Table 6.10-4 presents the samples collected and analyses requested at SWMU 03-014(q). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(q), a maximum concentration of 24.1 ppm was detected at a depth of 1.0–2.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(q) consist of six samples (four soil and two tuff) collected from three locations.

***Inorganic Chemicals***

Four soil and two tuff samples were analyzed for TAL metals. Table 6.10-5 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 03-014(q); inorganic COPCs are identified below.

Lead is identified as a COPC in soil at SWMU 03-014(q). Antimony and selenium are identified as COPCs in tuff at SWMU 03-014(q).

Antimony was not detected in soil at SWMU 03-014(q) but had DLs (1.02 mg/kg) above BV (0.83 mg/kg) in one soil sample. The maximum DL was similar to the maximum background concentration. Antimony is not identified as a COPC in soil.

Antimony was not detected in tuff at SWMU 03-014(q) but had DLs (0.567 mg/kg) above BV (0.5 mg/kg) in one tuff sample. Antimony is identified as a COPC in tuff.

Cadmium was not detected in soil at SWMU 03-014(q) but had DLs (0.501 to 0.527 mg/kg) above BV (0.4 mg/kg) in four soil samples. The maximum DL was less than the maximum background concentration (2.6 mg/kg). Cadmium is not identified as a COPC in soil.

Chromium was detected above BV (7.14 mg/kg) in one sample in tuff at SWMU 03-014(q), with a maximum concentration of 11.7 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of chromium in tuff (13 mg/kg) (Figure H-23). Chromium is not identified as a COPC in tuff.

Lead was detected above BV (22.3 mg/kg) in four soil samples at SWMU 03-014(q), with a maximum concentration of 69.4 mg/kg. The maximum concentration was above BV (Figure H-23). Therefore, lead is identified as a COPC in soil.

Selenium was not detected in tuff at SWMU 03-014(q) but had DLs (0.959 to 1.06 mg/kg) above BV (0.3 mg/kg) in two tuff samples. Selenium is identified as a COPC in tuff.

Zinc was detected above BV (48.8 mg/kg) in four soil samples at SWMU 03-014(q), with a maximum concentration of 70 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-24). Zinc is not identified as a COPC in soil.

#### *Organic Chemicals*

Four soil and two tuff samples were analyzed for PCBs. Table 6.10-6 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 03-014(q); organic COPCs are identified below.

The following organic chemicals were detected in soil at SWMU 03-014(q) and are identified as COPCs in soil: Aroclor-1254 and Aroclor-1260.

The following organic chemical was detected in tuff at SWMU 03-014(q) and is identified as a COPC in tuff: Aroclor-1260.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-014(q) are defined, as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff were detected at concentrations above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, chromium, lead, selenium, and zinc.

Antimony was not detected in soil at SWMU 03-014(q) but had DLs above BVs. Antimony was not detected in tuff at SWMU 03-014(q), but had a DL (0.567 mg/kg) above BV (0.5 mg/kg) in one sample. Because antimony was not detected at SWMU 03-014(q), the lateral and vertical extent of antimony are defined.

Cadmium was not detected in soil at SWMU 03-014(q) but had DLs above BV. Because cadmium was not detected at SWMU 03-014(q), the lateral and vertical extent of cadmium are defined.

Concentrations of chromium are not different than background at SWMU 03-014(q). Lateral and vertical extent of chromium are defined.

Lead was detected in soil above BV (22.3 mg/kg) in four samples at SWMU 03-014(q). The maximum concentration of 69.4 mg/kg was detected at location 03-608198 in a sample collected from a depth of 0.0–1.0 ft bgs. Lead concentrations decreased from location 03-608198 to the downgradient locations 03-608199 and 03-608200. Concentrations decreased with depth. The lateral and vertical extent of lead are defined.

Selenium was not detected at SWMU 03-014(q) but had DLs above BV in two tuff samples. Because selenium was not detected at SWMU 03-014(q), the lateral and vertical extent of selenium are defined.

Concentrations of zinc are not different than background at SWMU 03-014(q). Lateral and vertical extent of zinc are defined.

***Organic Chemicals***

Organic chemicals detected in soil at SWMU 03-014(q) are Aroclor-1254 and Aroclor-1260.

Aroclor-1254 was detected in four samples at three locations at SWMU 03-014(q). The maximum concentration of 0.0256 mg/kg was detected at location 03-608198 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased from location 03-608198 to the downgradient locations 03-608199 and 03-608200. Concentrations decreased with depth. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in six samples at three locations at SWMU 03-014(q). The maximum concentration of 0.123 mg/kg was detected at location 03-608198 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased from location 03-608198 to the downgradient locations 03-608199 and 03-608200. Concentrations decreased with depth. The lateral and vertical extent of Aroclor-1260 are defined.

#### 6.10.2.5 Summary of Human Health Risk Screening

**Summary of Human Health Risk Screening**

The human health risk-screening assessment for SWMU 03-014(q) is discussed in Appendix I, sections I-4.2 and I-4.4.

There are no noncarcinogenic COPCs for the industrial scenario. The total excess cancer risks for the industrial, construction worker, and residential scenarios are $1 \times 10^{-7}$, $8 \times 10^{-9}$, and $3 \times 10^{-7}$, respectively, which are less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HIs for the industrial, construction worker, and residential scenarios are 0.09, 0.09, and 0.2, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

#### 6.10.2.6 Summary of Ecological Risk Screening

The ecological risk-screening assessment is presented in Appendix I, section I-5.4. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, potential effects to populations (individuals for T&E species), and previous canyon studies.

### 6.10.3 SWMU 03-045(b), Outfall

SWMU 03-045(b) is the NPDES-permitted outfall (Outfall 001) that receives treated sanitary effluent from the TA-46 SWSC Plant, wastewater from makeup water production and boiler blowdown water from the co-generation plant, and occasional releases of cooling tower blowdown and other discharges from the TA-03 power plant, building 03-22 (Figure 6.10-1). All wastewater discharged from the TA-03 power plant to SWMU 03-045(b) is treated in a neutralization tank (structure 03-1381); the function of the tank is to adjust the pH of wastewater before discharge to meet NPDES requirements. Sulfuric acid and soda ash were used to adjust the pH of wastewater before discharge to the SWMU 03-045(b) outfall. The NPDES permit number for the outfall was previously identified as EPA 01A001 but is currently permitted as 001 on the 2007 NPDES authorization permit (EPA 2007, 099009). The outfall is currently authorized to discharge power plant wastewater from cooling towers, boiler blowdown drains, demineralizer backwash, floor and sink drains, and treated sanitary reuse to Sandia Canyon (EPA 2007, 099009, p. 1). The outfall discharges onto sand and gravel southeast of building 03-22 and into a small tributary of Sandia Canyon. Discharge from another permitted outfall (13S) at the TA-46 SWSC Plant is pumped to the holding tank 03-336 [SWMU 03-014(q)] for potential reuse and eventually discharges to SWMU 03-045(b). The outfall received effluent from two power plant cooling towers (structures 03-25 and 03-58) and the chlorine building (structure 03-24). Cooling tower (structure 03-25) was demolished in 1990, and a new cooling tower (structure 03-592) was constructed at the same location in 1998 (LANL 2008, 099214); the concrete foundation of structure 03-25 collected stormwater that discharged to the outfall (LANL 1996, 052930, p. 56). The two cooling tower structures (03-58 and 03-592) are currently in operation and continue to discharge to SWMU 03-045(b) (LANL 2008, 099214).

A sulfuric acid release to the SWMU 03-045(b) outfall from the power plant neutralization tank, structure 03-1381, occurred in May 1990 (LANL 1995, 057590, p. 5-27-1). Low pH values were reported in a 2.5-mi section of the watercourse below the outfall. Soda ash was added along the watercourse to raise the pH. A subsequent survey detected no measurements below pH 6.9 (LANL 1996, 052930, p. 56).

#### 6.10.3.2 Relationship to Other SWMUs and AOCs

Before 1985, treated effluent from the former TA-03 WWTP, Consolidated Unit 03-014(a)-99, was used as cooling tower makeup water for the TA-03 power plant (building 03-22). The effluent was stored in a holding tank, SWMU 03-014(q), before it was used in the cooling towers and eventually discharged to this outfall, SWMU 03-045(b). SWMU 03-045(c) is an NPDES-permitted outfall located about 55 ft east of SWMU 03-045(b). The holding tank and both outfalls are components of Consolidated Unit 03-012(b)-00. A wastewater neutralization tank (structure 03-1381) at the TA-03 power plant is used to adjust the pH of wastewater before discharge to SWMU 03-045(b).

#### 6.10.3.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-045(b).

#### 6.10.3.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-045(b) to assess potential contamination.

- Two soil samples were collected from depths of 0.0–1.0 ft and 1.0–2.0 ft bgs at one location (03-608197). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at SWMU 03-045(b) is shown in Figure 6.10-1. Table 6.10-7 presents the samples collected and analyses requested at SWMU 03-045(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening at SWMU 03-045(b), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-045(b) consist of two soil samples collected from one location.

***Inorganic Chemicals***

Two soil samples were analyzed for TAL metals and cyanide. Table 6.10-8 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(b); therefore, inorganic COPCs are not identified for the site.

***Organic Chemicals***

Two soil samples were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.10-9 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(b); therefore, organic COPCs are not identified for the site.

**Nature and Extent of Contamination**

The nature and extent of inorganic and organic chemicals at SWMU 03-045(b) are not defined, as discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in two soil samples at SWMU 03-045(b) at one location (03-608197) were detected at concentrations above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, mercury, silver, and zinc.

Antimony was not detected above BV for soil (0.83 mg/kg) at SWMU 03-045(b) but had DLs (1.06 to1.07 mg/kg) above BV in two samples. Because antimony was not detected at SWMU 03-045(b), the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV for soil (0.4 mg/kg) at SWMU 03-045(b) but had DLs (0.528 to 0.536 mg/kg) in two samples. The DLs were less than the maximum background concentration (2.6 mg/kg). Because cadmium was not detected at SWMU 03-045(b), the lateral and vertical extent of cadmium are defined.

Mercury was detected above BV for soil (0.1 mg/kg) in one sample at SWMU 03-045(b) at a concentration of 0.159 mg/kg at location 03-608197 in a sample collected from a depth of 0.0–1.0 ft bgs. Mercury was not detected in the deepest sample collected, and therefore, the vertical extent is defined. The lateral extent of mercury is not defined because only one location at the outfall was sampled.

Silver was detected above BV for soil (1 mg/kg) in one sample at SWMU 03-045(b) at a concentration of 1.17 mg/kg at location 03-608197 in a sample collected from a depth of 0.0–1.0 ft bgs. Silver was not detected in the deepest sample collected, and therefore the vertical extent is defined. The lateral extent of silver is not defined because only one location at the outfall was sampled.

Zinc was detected above BV for soil (48.8 mg/kg) in one sample at SWMU 03-045(b) at a concentration of 53.4 mg/kg at location 03-608197 in a sample collected from a depth of 0.0–1.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-25). The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals detected at SWMU 03-045(b) in two soil samples at the one outfall location (03-608197) are anthracene, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, pyrene, and TPH-DRO.

Anthracene, benzo(a)pyrene, chrysene, and phenanthrene were detected at location 03-608197 in one soil sample from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth, and therefore vertical extent is defined. The lateral extent of these organic chemicals is not defined because only one location at the outfall was sampled.

Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, pyrene, and TPH-DRO were detected at location 03-608197 in one soil sample collected from a depth of 0.0–1.0 ft bgs. These organic chemicals were detected at decreasing concentrations in the deepest sample collected from a depth of 1.0–2.0 ft bgs, and therefore, the vertical extent of these organic chemicals is defined. The lateral extent is not defined because only one location at the outfall was sampled.

Methylene chloride was detected at a concentration below the EQL in the deepest sample collected from a depth of 1.0–2.0 ft bgs. The lateral and vertical extent of methylene chloride are defined.

#### 6.10.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(b) because extent is not defined for the site.

#### 6.10.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(b) because extent is not defined for the site.

### 6.10.4 SWMU 03-045(c), Outfall

#### 6.10.4.1 Site Description and Operational History

SWMU 03-045(c) is an NPDES-permitted outfall (EPA 03A027), located approximately 55 ft east of SWMU 03-045(b) (LANL 1996, 052930, p. 56) (Figure 6.10-1). SWMU 03-045(c) formerly received effluent from a cooling tower (structure 03-285) that served the generators powering a Laboratory computer system. Cooling tower 03-285 was taken out of service several years ago, and SWMU 03-045(c) now receives blowdown from the cooling towers at the Strategic Computing Complex (building 03-2327) (Figure 6.3-1), which became operational in 2002. SWMU 03-045(c) may have historically received chromate-treated water (LANL 1996, 052930, pp. 56–57). Outfall 03A027 is currently permitted for the discharge of cooling tower blowdown water and other wastewater from structures 03-285 and 03-2327 (EPA 2007, 099009).

#### 6.10.4.2 Relationship to Other SWMUs and AOCs

SWMU 03-045(c) is located about 55 ft east of the power plant outfall, SWMU 03-045(b), in a small tributary to Sandia Canyon. The SWMU 03-014(q) holding tank, the SWMU 03-045(b) and SWMU 03-045(c) outfalls, and SWMU 03-012(b) are all components of Consolidated Unit 03-012(b)-00.

#### 6.10.4.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-045(c).

#### 6.10.4.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-045(c) to assess potential contamination.

- Two soil samples were collected from depths of 0.0–1.0 ft and 1.0–2.0 ft bgs at one location (03-608196). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at SWMU 03-045(c) is shown in Figure 6.10-1. Table 6.10-10 presents the samples collected and analyses requested at SWMU 03-045(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-045(c), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-045(c) consist of two soil samples collected from one location.

#### *Inorganic Chemicals*

Two soil samples were analyzed for TAL metals and cyanide. Table 6.10-11 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(c); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Two soil samples were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.10-12 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(c); therefore, organic COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-045(c) are not defined, as discussed below.

### Inorganic Chemicals

Inorganic chemicals in two soil samples at SWMU 03-045(c) at one location (03-608196) were detected above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, calcium, magnesium, sodium, and zinc.

Antimony was not detected above BV for soil (0.83 mg/kg) at SWMU 03-045(c) but had DLs (1.12 and 1.14 mg/kg) above BV. Because antimony was not detected at SWMU 03-045(c), the lateral and vertical extent of antimony are defined.

Calcium was detected above BV for soil (6120 mg/kg) in two samples at SWMU 03-045(c). The maximum concentration of 22800 mg/kg was detected at location 03-608196 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth. The vertical extent is defined, but the lateral extent of calcium is not defined because only one location at the outfall was sampled.

Magnesium was detected above BV for soil (4610 mg/kg) in one sample at SWMU 03-045(c) at a concentration of 5240 mg/kg at 0.0–1.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of magnesium in soil (10,000 mg/kg) (Figure H-26). The lateral and vertical extent of magnesium are defined

Sodium was detected above BV for soil (915 mg/kg) in one sample at SWMU 03-045(c) at a concentration of 1450 mg/kg at 0.0–1.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of sodium in soil (1800 mg/kg) (Figure H-26). The lateral and vertical extent of sodium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in one sample at SWMU 03-045(c) at a maximum concentration of 50.3 mg/kg at 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-27). The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in two soil samples at the one outfall location (03-608196) at SWMU 03-045(c) are acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

The concentrations of fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and TPH-DRO increased with depth. Therefore, the vertical extent is not defined. The lateral extent is not defined because only one location at the outfall was sampled.

Concentrations of Aroclor-1254, Aroclor-1260, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, and chrysene decreased with depth. Concentrations of 2-methylnaphthalene and naphthalene were below the EQL. Therefore, the vertical extent is defined. The lateral extent is not defined because only one location at the outfall was sampled.

Methylene chloride was detected at concentrations below the EQL. The lateral and vertical extent of methylene chloride are defined.

#### 6.10.4.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(c) because extent is not defined for the site.

#### 6.10.4.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(c) because extent is not defined for the site.

### 6.11 Consolidated Unit 03-013(a)-00

Consolidated Unit 03-013(a)-00 consists of SWMUs 03-013(a) and 03-052(f) (Figures 6.3-1 and 6.11-1). SWMU 03-013(a) is a storm drain that served building 03-38 (Figure 6.3-1); SWMU 03-052(f) (Figure 6.11-1) is the associated outfall located northeast of building 03-207 that ultimately discharges into Sandia Canyon (LANL 1996, 052930, p. 73).

### 6.11.1 SWMU 03-013(a), Storm Drain

#### 6.11.1.1 Site Description and Operational History

SWMU 03-013(a) is a 1500-ft-long corrugated metal pipe storm drain that served building 03-38 (Figure 6.3-1) (LANL 1996, 052930, p. 73). The storm drain ran underground around building 03-38, east along the south side of the Otowi Building (building 03-261), and connected to four other storm drains before daylighting 100 ft east of the Otowi Building where it became an open concrete and rock-lined ditch (LANL 1993, 020947, p. 5 92). The open drain continued past transportable office buildings (buildings 03-1616 and 03-1617) and passed beneath streets and sidewalks to a point northeast of the Oppenheimer Study Center (structure 03-207) where it discharged to the SWMU 03-052(f) outfall (Figure 6.11-1) before draining into Sandia Canyon (LANL 1993, 020947, p. 5-92).

Most of the corrugated metal pipe associated with SWMU 03-013(a) was removed in 2004 to accommodate the construction of the NSSB (03-1400) and a new parking structure (03-1402) east of the Otowi Building (LANL 2008, 099214). The corrugated metal pipe was managed as nonhazardous/nonradioactive industrial waste. Inspection of the drainline trench showed no evidence of a release from the drainpipe. A new storm drainline was installed west of SWMU 03-052(f) to manage stormwater runoff from the new parking structure. The new storm drain discharges to SWMU 03-052(f).

#### 6.11.1.2 Relationship to Other SWMUs and AOCs

Stormwater was discharged from this storm drain to the SWMU 03-052(f) outfall. SWMU 03-013(a) and the outfall make up Consolidated Unit 03-013(a)-00. AOC 03-013(b) (building 03-38 floor drains, discussed in section 6.12) formerly drained into SWMU 03-052(f) but was rerouted to the sanitary sewer system in 1987 (LANL 1995, 057590, p. 5-25-1).

#### 6.11.1.3 Summary of Previous Investigations

RFI activities conducted at SWMU 03-013(a) are represented by the activities conducted for SWMU 03-052(f), which was part of the 1994 RFI for Consolidated Unit 03-013(a)-00 (LANL 1996, 052930, pp. 73–74, 77) and are described in section 6.11.2.3 below.

#### 6.11.1.4 Delayed Site Investigation Rationale

No sampling was proposed for SWMU 03-013(a) in the approved work plan because it was removed to accommodate the NSSB and the new parking structure (LANL 2008, 100693). It is proposed that site characterization and investigation be delayed until D&D of building 03-1400 and structure 03-1402 has been completed.

### 6.11.2 SWMU 03-052(f), Outfall

#### 6.11.2.1 Site Description and Operational History

SWMU 03-052(f) is a former NPDES-permitted outfall (EPA 03A023) (Figure 6.11-1) which received wastewater from floor drains [AOC 03-013(b)], sinks, water fountains, and a storm drain [SWMU 03-013(a)], which served building 03-38 until 1987 when the drains in building 03-38 were rerouted to the TA-03 sanitary sewer system. Stoddard solvents, dry acid, and caustic materials from the maintenance shop were discarded through sinks and floor drains to this outfall. Spent paint solvents and cutting oils contaminated with machined beryllium particles may also have been released to the floor

drains during the 1960s and 1970s. In addition, cooling water for welding torches was discharged directly to the drains. The first spill was approximately 200 gal. of water-waste oil mixture that was discharged when an automatic compressor blowdown mechanism failed. A second spill from a ruptured air-compressor oil line resulted in the release of approximately 1 qt of compressor oil to the drain. This spill produced an oily sheen on the surface of the water at the SWMU 03-052(f) outfall (LANL 1995, 057590, p. 5-25-1). A third spill occurred when approximately 15 gal. of diesel fuel was released from a ruptured truck fuel line into the utilities construction trench between buildings 03-1793 and 03-1794. On the same day, a clay sewer pipe in the utility trench broke, releasing approximately 2000 gal. of wastewater into the excavation. A sump was used to remove the wastewater from the excavation and the wastewater was discharged to SWMU 03-052(f). The diesel-contaminated asphalt and soil was removed and disposed of. Runoff from parking lots and the surrounding areas also discharges to the outfall (LANL 1995, 057590, p. 5-25-2). Outfall 03A023 was removed from the NPDES permit on July 11, 1997.

#### 6.11.2.2 Relationship to Other SWMUs and AOCs

The former outfall at SWMU 03-052(f) discharge stormwater collected from the SWMU 03-013(a) storm drain and other storm drains from TA-03 buildings. The storm drain and the outfall make up Consolidated Unit 03-013(a)-00.

#### 6.11.2.3 Summary of Previous Investigations

RFI activities were conducted at SWMU 03-052(f) in the summer of 1994 as part of the RFI for Consolidated Unit 03-013(a)-00. Seven sediment samples (five samples plus one field duplicate and one collocated sample) were collected from five locations (at depths ranging from 0 to 0.5 ft) along the sides and within the SWMU 03-052(f) outfall channel 10 to 50 ft downstream from the outfall pipe (LANL 1995, 057590, p. 5-25-3). Sampling locations were biased to areas where sediment accumulated (LANL 1996, 052930, p. 75). Samples were field-screened and analyzed for gross-alpha, -beta, and -gamma radiation, tritium, TAL metals, PCBs, VOCs, and SVOCs. Data from the 1994 RFI are screening-level data and are summarized below. Section 2.10.1 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Chromium, copper, and mercury were detected above BVs in one sample. Lead was detected above BVs in three samples and zinc in six samples. Aroclor-1254 and total PCBs were detected in one sample. VOCs and radionuclides were not detected. Data also showed low concentrations of PAHs, which were attributed to runoff from the adjacent parking lot (LANL 1996, 052930, p. 82).

#### 6.11.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-052(f). As a result, the following activities were completed as part of the 2009 investigation.

- Fourteen samples were collected from seven locations along the storm drainage to confirm previous sampling results and to define nature and extent of contamination. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-052(f) are shown in Figure 6.11-1. Table 6.11-1 presents the samples collected and analyses requested at SWMU 03-052(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-052(f), a maximum concentration of 61.4 ppm was detected at a depth of 1.0–2.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-052(f) consist of 14 samples (10 soil and 4 tuff) collected from seven locations.

#### *Inorganic Chemicals*

Fourteen samples (10 soil and 4 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 6.11-2 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. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-052(f); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Fourteen samples (10 soil and 4 tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.11-3 summarizes the analytical results for detected organic chemicals. Figure 6.11-3 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-052(f); therefore, organic COPCs are not identified for the site.

#### *Radionuclides*

Fourteen samples (10 soil and 4 tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Radionuclides were not detected or detected above BVs/FVs. However, the existing site data are not sufficient to characterize the extent of contamination at SWMU 03-052(f); therefore, radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-052(f) are not defined. The nature and extent of radionuclides are defined.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at SWMU 03-052(f) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the

analytical DLs were above BVs. These inorganic chemicals are antimony, barium, cadmium, chromium, copper, cyanide, lead, perchlorate, selenium, and zinc.

Antimony was not detected above BV for soil (0.83 mg/kg) at SWMU 03-052(f) but had DLs (1.11 to 1.44 mg/kg) above BV in nine samples. Antimony was also not detected above BV for tuff (0.5 mg/kg) at SWMU 03-052(f), but had DLs above BV (1.04 to 1.3 mg/kg) in four samples. Because antimony was not detected at SWMU 03-052(f), the lateral and vertical extent of antimony are defined.

Barium was detected above BV for tuff (46 mg/kg) in two samples at SWMU 03-052(f). The maximum concentration of 92.6 mg/kg was detected at location 03-608216 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations at the 1.0–2.0 ft bgs depth decreased at the downgradient locations. Therefore, the lateral extent of barium is defined. Concentrations increased with depth at locations 03-608215 and 03-608216, and therefore, the vertical extent of barium is not defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in one sample at SWMU 03-052(f) at a concentration of 0.409 mg/kg at location 03-608218 in a sample collected from a depth of 0.0–1.0 ft bgs. The detected concentration was less than the maximum background concentration (2.6 mg/kg) of cadmium in soil. The applicable statistical tests (quantile and slippage) indicate site concentrations of cadmium are not different than background (Table H-2 and Figure H-28). The lateral and vertical extent of cadmium are defined.

Chromium was detected above BV for soil (19.3 mg/kg) in one sample at SWMU 03-052(f). Additionally, chromium was detected above BV for tuff (7.14 mg/kg) in four samples. The maximum concentration of 67.3 mg/kg was detected at location 03-608217 in a soil sample collected from a depth of 1.0–2.0 ft bgs. Concentrations detected at a depth of 1.0–2.0 ft bgs decreased towards the farthest downgradient location at 03-608219. Chromium was not detected above BV in any samples collected from a depth of 0.0–1.0 ft bgs. The lateral extent of chromium is defined. Concentrations increased with depth at locations 03-608215, 03-608216, 03-608217, 03-608219, and 03-608220. The vertical extent of chromium is not defined.

Copper was detected above BV for soil (14.7 mg/kg) in six samples at SWMU 03-052(f). Additionally, copper was detected above BV for tuff (4.66 mg/kg) in three tuff samples. The maximum concentration of 27.2 mg/kg was detected at location 03-608217 in a soil sample collected from a depth of 1.0–2.0 ft bgs. Copper concentrations decreased toward the farthest downgradient location 03-608219. The lateral extent of copper is defined. Concentrations increased with depth at location 03-608217 and decreased with depth at the other four locations. The vertical extent of copper is not defined.

Cyanide was detected above BV for soil (0.5 mg/kg) in three samples at SWMU 03-052(f). The maximum concentration of 12.8 mg/kg was detected at location 03-608217 in a sample collected from a depth of 0.0–1.0 ft bgs. Cyanide was detected at two locations; 03-608217 (upgradient) and 03-609219 (downgradient). Cyanide concentrations decreased at the farthest downgradient location 03-608219 in samples collected from a depth of 0.0–1.0 ft bgs. Cyanide concentrations decreased with depth at locations 03-608217 and 03-608219. The lateral and vertical extent of cyanide are defined.

Lead was detected above BV for soil (22.3 mg/kg) in eight samples at SWMU 03-052(f). Additionally, lead was detected above BV (11.2 mg/kg) in three tuff samples. The maximum concentration of 56.7 mg/kg was detected at location 03-608217 in a soil sample collected from depth of 1.0–2.0 ft bgs. Concentrations decreased to the farthest downgradient location 03-608219. Lead concentrations decreased in the deeper samples collected from 1.0–2.0 ft bgs, with the exception of location 03-608217. The lateral extent of lead is defined, and the vertical extent of lead is not defined.

Perchlorate was detected in one soil sample at SWMU 03-052(f). Additionally, perchlorate was detected in three tuff samples. The maximum concentration of 0.00085 mg/kg was detected at location 03-608215 in a tuff sample collected from a depth of 1.0–2.0 ft bgs. Perchlorate was not detected at the farthest downgradient location 03-608219. Concentrations increased with depth at locations 03-608215, 03-608216, and 03-608220 but were below the EQL. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected in tuff but had DLs (1.05 to 1.24 mg/kg) above BV (0.3 mg/kg) in four samples at SWMU 03-052(f). Because selenium was not detected at SWMU 03-052(f), the lateral and vertical extent of selenium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in seven samples at SWMU 03-052(f). Additionally, zinc was detected above BV for tuff (63.5 mg/kg) in three tuff samples. The maximum concentration of 200 mg/kg was detected at location 03-608217 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Zinc concentrations decreased to the farthest downgradient location 03-608219 and decreased with depth. The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff samples at SWMU 03-052(f) are acenaphthene, acenaphthylene, acetone, anthracene, Aroclor-1254, Aroclor-1260, 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, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, 4-nitroaniline, phenanthrene, pyrene, toluene, TPH-DRO, and 1,2,4-trimethylbenzene.

The maximum concentrations of acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO were detected at locations 03-608217 and 03-608218 decreased and to the farthest downgradient location 03-608219. Therefore, the lateral extent is defined. Concentrations decreased with depth at all locations, except at location 03-608219. The vertical extent is not defined.

Nitroaniline(4-) was detected in one soil sample at location 03-608218. Concentrations decreased with depth and decreased downgradient to location 03-608219. The lateral and vertical extent of 4-nitroaniline are defined.

Acetone was detected in three samples at SWMU 03-052(f). The maximum concentration of 0.0226 mg/kg was detected at location 03-608217 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Acetone was not detected at any depth at the farthest downgradient location 03-608219. Concentrations decreased with depth at all locations. The lateral and vertical extent of acetone are defined.

Aroclor-1254 was detected in 10 samples at SWMU 03-052(f). The maximum concentration of 0.128 mg/kg was detected at location 03-608219 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Samples were not collected farther downgradient, and therefore the lateral extent of Aroclor-1254 is not defined. Concentrations decreased with depth at all locations, and therefore the vertical extent of Aroclor-1254 is defined.

Aroclor-1260 was detected in 11 samples at SWMU 03-052(f). The maximum concentration of 0.14 mg/kg was detected at location 03-608216 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased at the farthest downgradient location 03-608219. Therefore, the lateral extent of Aroclor-1260 is defined. Aroclor-1260 concentrations increased with depth at location 03-608217, and therefore, the vertical extent of Aroclor-1260 is not defined.

Bis(2-ethylhexyl)phthalate was detected in seven samples at SWMU 03-052(f). The maximum concentration of 0.298 mg/kg was detected at location 03-608218 in a soil sample collected from 1.0–2.0 ft bgs. Concentrations decreased with depth and downgradient, and were also below the EQL. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Fluoranthene was detected in 13 samples at SWMU 03-052(f). The maximum concentration of 49.6 mg/kg was detected at location 03-608218 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased to the farthest downgradient location 03-608219 in samples collected from a depth of 0.0–1.0 ft bgs. However, concentrations increased in subsurface samples collected from 1.0–2.0 ft bgs at location 03-608219. Concentrations also increased with depth at location 03-608214. The lateral and vertical extent of fluoranthene are not defined.

Toluene was detected in one soil sample at SWMU 03-052(f), at a concentration of 0.000507 mg/kg at location 03-608217 in a sample collected from 1.0–2.0 ft bgs. The concentration was below the EQL. The lateral and vertical extent of toluene are defined.

Trimethylbenzene(1,2,4-) was detected in one tuff sample at SWMU 03-052(f), at a concentration of 0.000435 mg/kg in a sample collected from a depth of 1.0–2.0 ft bgs at location 03-608219. The concentration was below the EQL. The lateral and vertical extent of 1,2,4-trimethylbenzene are defined.

**Radionuclides**

Radionuclides were not detected or detected above BVs/FVs in soil and tuff samples at SWMU 03-052(f).

#### 6.11.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-052(f) because extent is not defined for the site.

#### 6.11.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-052(f) because extent is not defined for the site.

### 6.12 AOC 03-013(b), Floor Drains

#### 6.12.1 Site Description and Operational History

AOC 03-013(b) consists of floor drains located in the basement of building 03-38 (LANL 1993, 020947, p. 5-92) (Figure 6.12-1). The floor drains are located in the former plasma-burning machine area, the metals-cutting room, and the pipe-fabrication shop. Until 1987, the floor drains discharged into a storm drain [SWMU 03-013(a)] which ultimately discharged to the SWMU 03-052(f) outfall area (Figure 6.12-1) (LANL 1996, 052930, pp. 73–74). The piping for AOC 03-013(b) was rerouted to the sanitary sewer in 1987. During the 1960s and 1970s, spent paint solvents and cutting oils contaminated with machined beryllium particles may have been released to the floor drains.

### 6.12.2 Relationship to Other SWMUs and AOCs

The floor drains that make up AOC 03-013(b) are located in the basement of building 03-38. These drains emptied into a storm drain, SWMU 03-013(a), that ultimately discharged to the SWMU 03-052(f) outfall area. The floor drains were rerouted to the sanitary sewer in 1987.

### 6.12.3 Summary of Previous Investigations

RFI activities conducted at AOC 03-013(b) are represented by the activities conducted for SWMU 03-052(f), which was part of the 1994 RFI for Consolidated Unit 03-013(a)-00 (LANL 1996, 052930, pp. 73–74, 77) and are described in section 6.11.2.3 above.

### 6.12.4 Delayed Site Investigation Rationale

No sampling was proposed for AOC 03-013(b) in the approved work plan because the AOC is located within the basement of an active facility (LANL 2008, 100693). It is proposed that site characterization and investigation be delayed until D&D of building 03-38 has been completed.

## 6.13 SWMU 03-013(i), Operational Release

### 6.13.1 Site Description and Operational History

SWMU 03-013(i) is an area of soil and gravel contamination from historical releases of hydraulic oil at former buildings 03-246 and 03-247 (Figure 6.12-1). These buildings housed operations that involved testing the tensile strength of various steel cables used in conjunction with underground nuclear test assemblies. The cable control building (former building 03-246) and the cable stress building (former building 03-247) were collectively referred to as the Pull Test Facility. The facility was constructed before 1967 and operated until the mid-1980s when a replacement facility was constructed on Sigma Mesa. Building 03-246 was constructed on a concrete slab that contained a hydraulic oil compressor and storage tank. Building 03-247 was constructed on a concrete curb surrounding a gravel floor that contained two hydraulic rams used to perform the tensile strength testing. Hydraulic oil was provided to the rams through underground pipes between the buildings (LANL 2005, 091540, pp. 1-2).

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

### 6.13.2 Relationship to Other SWMUs and AOCs

SWMU 03-013(i) is not related to any other SWMUs or AOCs.

### 6.13.3 Summary of Previous Investigations

During the 2005 site investigation, eight fill samples were collected from four locations within the footprint of former building 03-246 from depths of 0 to 0.5 ft and at 1.5 ft bgs. Four confirmation samples were also collected from two locations downgradient of former building 03-246 at depths of 0 to 0.5 ft and at 1.5 ft bgs. Four additional samples were collected from two locations within the footprint of former building 03-247 at depths of 0 to 0.5 ft and at 1.5 ft bgs (LANL 2005, 091540, pp. 4–5). A total of 16 samples were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, TPH-DRO, and TPH-GRO. Each of the samples collected from 1.5 ft bgs were also submitted for analysis of VOCs.

Barium, copper, and nickel were detected above BVs; antimony, lead, and zinc were detected above BVs in three, seven, and eight samples, respectively; cadmium was detected above BV in eight samples. The DLs for cadmium were above BV in three samples, and the DL for selenium was greater that BV in most samples. Acenaphthene and 2-butanone were detected in one sample. Acenaphthylene, anthracene, 4-isopropyltoluene, and 2-methylnaphthalene were detected in two samples. Benzoic acid, bis(2-ethylhexly)phathalate, fluorene, and pyrene were detected in three samples. Acetone, fluoranthene, and phenanthrene were detected in four samples. Aroclor-1260 and Aroclor-1254 were detected in 10 and 12 samples, respectively. TPH-GRO and TPH-DRO were detected in 10 and 16 samples, respectively.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.13.4. Table 6.13-1 presents the samples collected and analyses requested at SWMU 03-013(i).

### 6.13.4 Site Contamination

#### 6.13.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-013(i). As a result, the following activities were completed as part of the 2009 investigation.

- Thirty-two samples were collected from 16 locations to define the extent of contamination. At each location, samples were collected from 0.0–1.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-013(i) are shown in Figure 6.12-1. Table 6.13-1 presents the samples collected and analyses requested at SWMU 03-013(i). 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 03-013(i), a maximum concentration of 43.4 ppm was detected at a depth of 0.0–1.0 ft bgs. This sample (RE03-10-5325) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.13.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-013(i) consist of 48 soil samples collected from 24 locations.

**Inorganic Chemicals**

A total of 48 soil samples were analyzed for TAL metals, and 32 soil samples were analyzed for cyanide. Table 6.13-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 16 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-013(i); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

A total of 48 soil samples were analyzed for SVOCs, PCBs, and TPH-DRO; 40 soil samples were analyzed for VOCs; and 16 soil samples were analyzed for TPH-GRO. Table 6.13-3 summarizes the analytical results for detected organic chemicals. Plate 17 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-013(i); therefore, organic COPCs are not identified for the site.

#### 6.13.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-013(i) are not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and fill samples at SWMU 03-013(i) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, barium, cadmium, calcium, chromium, copper, lead, magnesium, nickel, selenium, and zinc.

Antimony was detected above BV for soil and fill (0.83 mg/kg) in 13 samples at SWMU 03-013(i). The maximum concentration of 5.71 mg/kg was detected at location 03-608226 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations did not decrease laterally to the east, and therefore the lateral extent of antimony is not defined. Concentrations decreased with depth at all locations. The vertical extent of antimony is defined.

Barium was detected above BV for soil and fill (295 mg/kg) in two samples at SWMU 03-013(i). The maximum concentration of 373 mg/kg was detected at location 03-608224 in a sample collected from 4.0–5.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of barium are not different than background (Table H-3 and Figure H-29). The lateral and vertical extent of barium are defined.

Cadmium was detected above BV for soil and fill (0.4 mg/kg) in 15 samples at SWMU 03-013(i). The maximum concentration of 5.58 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. Cadmium concentrations decreased to the east. Cadmium concentrations increased with depth at location 03-24445 but decreased with at deeper depths at nearby locations 03-608234 and 03-608235, which are within 5 ft of location 03-24445. Concentrations decreased with depth at all other locations. The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for soil and fill (6120 mg/kg) in seven samples at SWMU 03-013(i). The maximum concentration of 14,200 mg/kg was detected at location 03-608228 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased laterally to the east. Concentrations of calcium decreased with depth at all locations in SWMU-03-013(i). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV for soil and fill (19.3 mg/kg) in two samples at SWMU 03-013(i). The maximum concentration of 21.6 mg/kg was detected at location 03-608225 in a sample collected from a depth of 4.0–5.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of chromium are not different than background (Table H-3 and Figure H-29). The lateral and vertical extent of chromium are defined.

Copper was detected above BV for soil and fill (14.7 mg/kg) in three samples at SWMU 03-013(i). The maximum concentration of 21.8 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. Copper concentrations decreased to the east and decreased with depth. The lateral and vertical extent of copper are defined.

Lead was detected above BV for soil and fill (22.3 mg/kg) in 19 samples at SWMU 03-013(i). The maximum concentration of 238 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. Concentrations of lead decreased to the east and decreased with depth. The lateral and vertical extent of lead are defined.

Magnesium was detected above BV for soil and fill (4610 mg/kg) in one sample at SWMU 03-013(i). A concentration of 4700 mg/kg was detected at location 03-608228 in a sample collected from a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of magnesium are not different than background (Table H-3 and Figure H-30). The lateral and vertical extent of magnesium are defined.

Nickel was detected above BV for soil and fill (15.4 mg/kg) in one sample at SWMU 03-013(i). A concentration of 16.3 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of nickel are not different than background (Table H-3 and Figure H-30). The lateral and vertical extent of nickel are defined.

Selenium was not detected above BV for soil and fill (1.52 mg/kg) at SWMU 03-013(i) but had DLs (1.66 to 1.97 mg/kg) above BV in 15 soil samples. Because selenium was not detected at SWMU 03-013(i), the lateral and vertical extent of selenium are defined.

Zinc was detected above BV for soil and fill (48.8 mg/kg) in 20 samples at SWMU 03-013(i). The maximum concentration of 482 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. Concentrations of zinc decreased to east and decreased with depth, except at location 03-24445 where the maximum concentration is less than the maximum background concentration. The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil and fill samples at SWMU 03-013(i) are acenaphthene, acenaphthylene, acetone, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, 2-butanone, chrysene, dibenz(a,h)anthracene, dibenzofuran, ethylbenzene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, methylene chloride,

2-methylnaphthalene, naphthalene, phenanthrene, pyrene, toluene, TPH-DRO, TPH-GRO, 1,2,4-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene.

All PAHs, Aroclor-1254, and Aroclor-1260 had concentrations that decreased with depth or remained the same at all locations. Concentrations of Aroclor-1254 and Aroclor-1260 at location 03-24444 decreased with depth. PAH concentrations increased slightly to the east at location 03-608224, and Aroclor concentrations decreased laterally. The lateral and vertical extent of PAHs, Aroclor-1254, and Aroclor-1260 are defined.

Acetone was detected in four samples at SWMU 03-013(i). The low concentrations ranged from 0.0091 to 0.376 mg/kg at four locations within a 10-ft × 10-ft area (location 03-24444, 03-24445, 03-24446, and 03-24447) at the same sampling depth of 1.5 ft bgs. No acetone was detected in any other sampling locations at any depths at SWMU 02-013(i). Concentrations were below the EQL, and therefore the lateral and vertical extent of acetone are defined.

Benzoic acid was detected in four samples at SWMU 03-013(i). The maximum concentration of 0.689 mg/kg was detected at location 03-24445 in a sample collected from 0.0–0.5 ft bgs. Concentrations decreased with depth at locations 03-24445 and 03-24447. Concentrations at locations 03-24448 and 03-608223 were below the EQL. The lateral and vertical extent of benzoic acid are defined.

Bis(2-ethylhexyl)phthalate was detected in six samples at SWMU 03-013(i). The maximum concentration of 1.39 mg/kg was detected at location 03-24449 in the deepest sample collected from this location (1.5 ft bgs). Concentrations of bis(2-ethylhexyl)phthalate decreased to the east. Bis(2-ethylhexyl)phthalate was detected in deeper samples collected from 1.5 ft bgs at locations 03-24447, 03-24449, and 03-24451 but were not detected in deeper samples at other nearby locations. Bis(2-ethylhexyl)phthalate was not detected in deeper samples collected from a depth of 4.0–5.0 ft bgs at locations 03-608223, 03-608229, and 03-608233. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Butanone(2-) was detected in one sample at SWMU 03-013(i), at a concentration of 0.0174 mg/kg at location 03-24445 in the deepest sample collected from this location (1.5 ft bgs). Concentrations decreased to the east. Butanone(2-) was not detected in deeper samples collected from a depth of 4.0–5.0 ft bgs at adjacent locations 03-608234, 03-608235, 03-608222 and 03-608221. The lateral and vertical extent of 2-butanone are defined.

Ethylbenzene was detected in one sample at SWMU 03-013(i) at a concentration of 0.000366 mg/kg at location 03-608230 in a sample collected from a depth of 0.0–1.0 ft bgs. The concentration decreased with depth and was below the EQL. The lateral and vertical extent of ethylbenzene are defined.

Isopropyltoluene(4-) was detected in two samples at SWMU 03-013(i). The 4-isopropyltoluene was detected at two locations approximately 15 ft apart (03-24447 [0.0017 mg/kg] and 03-24448 [0.00129 mg/kg]) at a depth of 1.5 ft bgs. Isopropyltoluene(4-) was not detected at any other location (at any depth), including in samples collected from depths of 4.0–5.0 ft bgs at locations 03-608223 and 03-608235, located within 10 ft of locations 03-24448 and 03-24447, respectively. The lateral and vertical extent of 4-isopropyltoluene are defined.

Methylene chloride was detected in 11 samples at SWMU 03-013(i). The maximum concentration of 0.00291 mg/kg was detected at location 03-608232 in a sample collected from a depth of 4.0–5.0 ft bgs. Concentrations were below the EQL. The lateral and vertical extent of methylene chloride are defined.

Toluene was detected in 11 samples at SWMU 03-013(i). The maximum concentration of 0.0104 mg/kg was detected at location 03-608230 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations of toluene decreased to the east and with depth. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in 39 samples at SWMU 03-013(i). The maximum concentration of 5370 mg/kg was detected at location 03-24447 in a sample collected from a depth of 0.0–0.5 ft bgs. Concentrations decreased to the east, and therefore the lateral extent of TPH-DRO is defined. Concentrations increased with depth at locations 03-24445, 03-24448, 03-24450, 03-608230, and 03-608235. The vertical extent of TPH-DRO is not defined.

TPH-GRO was detected in 10 samples at SWMU 03-013(i). The maximum concentration of 0.35 mg/kg was detected at location 03-24445 in a sample collected from a depth of 0.0–0.5 ft bgs. Concentrations decreased slightly to the east and the lateral extent of TPH-GRO is defined. Concentrations were detected at 1.5 ft bgs at locations 03-24447, 03-24448, 03-24450, and 03-24451 at low concentrations. The vertical extent of TPH-GRO is defined.

Trimethylbenzene(1,2,4-) was detected in one sample at SWMU 03-013(i) at a concentration of 0.00035 mg/kg at location 03-608223 in a sample collected from a depth of 4.0–5.0 ft bgs. This concentration was below the EQL. The lateral and vertical extent of 1,2,4-trimethylbenzene are defined.

Xylene(1,2-) was detected in one sample at SWMU 03-013(i) at a concentration of 0.000548 mg/kg at location 03-608230 in a sample collected from a depth of 0.0–1.0 ft bgs. This concentration was below the EQL and decreased with depth. The lateral and vertical extent of 1,2-xylene are defined.

Xylene(1,3-)+xylenes(1,4-) was detected in two samples at SWMU 03-013(i). The maximum concentration of 0.00111 mg/kg was detected at location 03-608230 in a sample collected from a depth of 0.0–1.0 ft bgs at location 03-608230. Concentrations decreased with depth at location 03-608229 and were below the EQL at both locations. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

### 6.13.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-013(i) 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 03-013(i) because extent is not defined for the site.

## 6.14 Consolidated Unit 03-014(a)-99

Consolidated Unit 03-014(a)-99 consists of 20 of the 30 SWMUs and AOCs associated with the former WWTP that operated at TA-03 from 1951 to 1992, until the Laboratory's SWSC Plant at TA-46 came online in 1992 (LANL 1993, 020947, p. 5-46). The former WWTP is next to and east of the utilities control center (building 03-223) on the southern rim near the head of Sandia Canyon. The WWTP served TA-03, TA-43, TA-59, and TA-60, the trailer park on West Jemez Road, and holding tank and septic system wastes throughout the Laboratory. The WWTP had two parallel systems, the north plant (Plant 1) built in 1951, and the south plant (Plant 2) built in 1964. Each system consisted of entrance works, Imhoff tanks, dosing siphons, trickling filters, and final clarifying tanks. The plants were different in some physical dimensions but functionally similar. The WWTP was designed with a 750,000 gal./d combined capacity

(LANL 1993, 020947, p. 5-45). Although no longer operational, many of the structures associated with the SWMUs and AOCs of Consolidated Unit 03-014(a)-99 are still present, the locations of which are shown in Figure 6.14-1.

Upon entering the former WWTP, raw sewage was metered at a splitter box (structure 03-677) where the flow was diverted to either Plant 1 or Plant 2. The water passed through a comminutor that shredded large solid material. Manually cleaned bar racks were available for both plants when the comminutors were down for repair. Effluent flow was approximately 150,000 gal./d (LANL 1993, 020947, pp. 5-45–5-47). The splitter box, comminutor, and bar racks are collectively identified as SWMU 03-014(i) (LANL 1993, 020947, p. 5-46).

Wastewater passed from the entrance works directly to the Imhoff tanks, structures 03-49 and 03-192 [SWMUs 03-014(a) and 03-014(e)], which functioned as settling/digestion tanks. Effluent water flowed from the Imhoff tanks to dosing siphons, structures 03-48 and 03-193 [SWMUs 03-014(b) and 03-014(f)], then to the trickling filters, structures 03-47 and 03-194 [SWMUs 03-014(c) and 03-014(g)], where organic waste was biologically digested through bacterial growth on rock media (LANL 1993, 020947, p. 5-47). Material sloughed from the trickling filter media settled in final clarifying tanks, structures 03-46 and 03-195 [SWMUs 03-014(d) and 03-014(h)]; the resulting sludge was then recirculated back to the head of the plant to allow solids to settle out in the Imhoff tanks (LANL 1993, 020947, p. 5-47).

Sludge collected in the Imhoff tanks was ultimately siphoned to four sludge drying beds, structures 03-196, 03-197, 03-198, and 03-199 [SWMUs 03-014(k,l,m,n)], located immediately north of the Imhoff tanks. Three of the four beds were used for sludge drying, while the fourth was used as a skimmer bed. Overflow sludge was directed to three additional sludge drying beds, structure 03-1871 [SWMU 03-014(o)], located north and downslope of the four sludge drying beds and west of the chlorine contact chamber [SWMU 03-014(j)] (LANL 1993, 020947, p. 5-47). SWMUs 03-014(k,l,m,n) were constructed in 1965 and are referred to as the “upper beds,” while the other three sludge drying beds [SWMU 03-014(o)] were constructed in 1987 and are referred to as the “lower beds” (LANL 1993, 020947, p. 5-46; LANL 1997, 056660.4, p. 57).

Effluent from the sludge beds flowed from a subsurface drain system to a holding tank, structure 03-1901 [SWMU 03-014(u)]. The contents of the tank were recirculated by truck to the head of the plant for additional treatment. From the late 1950s to the late 1970s, dried sludge was added to the soil around the entrance works as a soil amendment (LANL 1993, 020947, p. 5-47).

Additional AOCs and SWMUs addressed as part of Consolidated Unit 03-014(a)-99 include AOCs 03-014(b2) and 03-014(c2), historical outfalls associated with the former WWTP; SWMU 03-014(p), a lift station associated with the former WWTP; and SWMU 03-056(d), a drum storage area located on the northeast side and next to SWMU 03-014(c), the trickling filter (structure 03-47).

RFI activities were performed at the former WWTP in 1994 and 1997. In 1994, the area around the Imhoff tanks and the two historical outfalls were sampled. The Imhoff tanks were sampled because treated sludge was directly applied to the soil in the grassy areas around the tanks. The historical outfalls [AOC 03-014(b2) and AOC 03-014(c2)] were sampled because AOC 03-014(b2) was an active outfall for the WWTP, and AOC 03-014(c2) was believed to be an out-of-service outfall trench but was subsequently identified as a storm drain trench and overflow outlet pipe outfall (LANL 1996, 052930, p. 83). In 1997, the sludge drying beds [SWMUs 03-014(k,l,m,n,o)] were sampled. SWMU 03-014(n) was scheduled for sampling; however, oil was discovered in the bed, which was subsequently remediated in early September 1997 (LANL 1997, 056660.4, p. 60). RFI activities for SWMUs and AOCs in Consolidated Unit 03-014(a)-99 are discussed in more detail in the sections below.

### 6.14.1 SWMU 03-014(a), Structure Associated with Former WWTP

#### 6.14.1.1 Site Description and Operational History

SWMU 03-014(a) is the inactive Imhoff tank (structure 03-49) at Plant 1 at the former TA-03 WWTP (Figure 6.14-1). Water and effluent passed from the entrance works directly to the Imhoff tank, which functioned as a settling/digestion tank (LANL 1993, 020947, p. 5-47).

#### 6.14.1.2 Relationship to Other SWMUs and AOCs

Wastewater from the headworks, SWMU 03-014(i), was piped to the Imhoff tank at SWMU 03-014(a), which then flowed to the dosing siphon, SWMU 03-014(b). This Imhoff tank is located in the southwest corner of the former WWTP, next to SWMU 03-014(e). All these sites are components of Consolidated Unit 03-014(a)-99.

#### 6.14.1.3 Summary of Previous Investigations

During the 1994 Phase I RFI performed at SWMUs 03-014(a) and 03-014(e) (section 6.14.7), the area around these SWMUs (structures 03-49 and 03-192) was sampled to determine whether contaminants had been released as a result of the application of sludge to the soil or from tank overflow (LANL 1996, 052930, p. 85).

Twelve soil samples (including two field duplicates) were collected from five locations between and downgradient of the SWMUs. Two samples were collected from each location at depths of 0.0–1.0 ft bgs and 1.0–1.5 ft bgs. Samples from the 0.0–1.0 ft interval were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, isotopic plutonium, isotopic uranium, and tritium and by gamma spectroscopy. Samples from the 1.0–1.5 ft interval were submitted for laboratory analyses of cyanide, VOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL1996, 052930, p. 85). Data from the 1994 RFI are screening-level data and are summarized below. The HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cyanide was detected above BV in three samples. Cadmium, chromium, copper, lead, mercury, silver, and zinc were each detected above BVs in five samples. Aroclor-1260 was detected in four samples at concentrations less than 1 mg/kg. Americium-241, uranium-235, and uranium-238 were detected above BVs/FVs in one sample. Uranium-234 was detected above BV in four samples. Plutonium-239/240 and plutonium-238 and were detected above FVs in four and five samples, respectively. VOCs, SVOCs, pesticides, and herbicides were not detected.

#### 6.14.1.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(a) consisted of the following activities in 2009.

- Thirteen samples were collected from five locations to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a,b,e,f) because of their proximity to each other. At each location, samples were collected from the soil-tuff interface, 0.0–1.0 ft and 1.0–2.0 ft bgs. At locations 03-608238 and 03-608240, only two of the three proposed samples were collected because the soil-tuff interface corresponded to the 1.0–2.0 ft bgs depth interval (see Deviations in Appendix B). All samples were analyzed at off-site fixed laboratories

for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.

- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(a) are shown in Figure 6.14-1. Table 6.14-1 presents the samples collected and analyses requested at SWMU 03-014(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

The 2009 sampling locations and associated data for SWMU 03-014(a) are also associated with SWMUs 03-014(b,e,f).

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(a), a maximum concentration of 5.5 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(a) consist of 13 samples (8 soil and 5 tuff) collected from five locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(a) are presented in this report but are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.1.6).

***Inorganic Chemicals***

Thirteen samples (eight soil and five tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 6.14-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BV.

Inorganic chemicals in soil and tuff samples at SWMU 03-014(a) were detected at concentrations above their BV, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These chemicals are antimony, arsenic, barium, cadmium, chromium, cobalt, copper, cyanide, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, sodium, vanadium, and zinc.

***Organic Chemicals***

Thirteen samples (eight soil and five tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-3 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals.

Organic chemicals were detected in soil and tuff at SWMU 03-014(a), including anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

***Radionuclides***

Thirteen samples (eight soil and five tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.14-4 summarizes the analytical results for radionuclides. Plate 20 shows the spatial distribution of detected radionuclides.

Radionuclides in soil and tuff samples at SWMU 03-014(a) were detected at concentrations above their BV/FVs, were detected but corresponding BVs/FVs have not been established, or were detected at depths where FVs do not apply. These radionuclides include americium-241, plutonium-238, plutonium-239/240, uranium-235/236, and uranium-238.

#### 6.14.1.6 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(a) be delayed until D&D of structure 03-49 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMUs 03-014(a,b,e,f), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation.

### 6.14.2 SWMU 03-014(b), Structure Associated with Former WWTP

#### 6.14.2.1 Site Description and Operational History

SWMU 03-014(b) is the inactive dosing siphon (structure 03-48) for Plant 1 of the former TA-03 WWTP (Figure 6.14-1). Effluent from the Imhoff tank (structure 03-49) flowed to the dosing siphon, which dispersed accumulated effluent water in an amount sufficient to run the trickling filter (structure 03-47) rotary arms. The dosing siphon maintained the moisture throughout the trickling filter's rock media beds (LANL 1993, 020947, p. 5-47).

#### 6.14.2.2 Relationship to Other SWMUs and AOCs

This dosing siphon received wastewater from the Imhoff tank at SWMUs 03-014(a). Wastewater flowed from the dosing siphon to the trickling filter at SWMU 03-014(c). SWMU 03-014(b) is located in the southwest corner of the former WWTP, next to SWMU 03-014(f). SWMU 03-014(e) is the inactive Imhoff tank for Plant 2 and is located next to SWMU 03-014(a). All these sites are components of Consolidated Unit 03-014(a)-99.

#### 6.14.2.3 Summary of Previous Investigations

SWMU 03-014(b) was not specifically sampled during historical RFI activities, but soil samples were collected during the 1994 RFI for SWMUs 03-014(a) and 03-014(e) within the vicinity of SWMU 03-014(b). Samples for SWMU 03-014(a) are discussed in section 6.14.1.3.

#### 6.14.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(b) consisted of the following activities in 2009.

- Sampling was conducted to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a,b,e,f) because of their close proximity. Sampling activities are described in section 6.14.1.3 as part of SWMU 03-014(a).

The 2009 sampling locations at SWMU 03-014(b) are shown in Figure 6.14-1. Table 6.14-1 presents the samples collected and analyses requested at SWMU 03-014(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

Field-screening activities are described in section 6.14.1.4 as part of SWMU 03-014(a).

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(b) consist of 13 samples (8 soil and 5 tuff) collected from five locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(b) are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.2.6).

Sampling analytical results are described in section 6.14.1.4 as part of SWMU 03-014(a).

#### 6.14.2.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(b) be delayed until D&D of structure 03-48 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMUs 03-014(a,b,e,f), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation.

### 6.14.3 AOC 03-014(b2), Outfall

#### 6.14.3.1 Site Description and Operational History

AOC 03-014(b2) is a former NPDES-permitted outfall (EPA SSSO1S) for the former TA-03 WWTP (Figure 6.14-1). The outfall received treated effluent from a flow-measurement weir north of the WWTP chlorination system [SWMU 03-014(j), section 6.14-12] dosing and contact chamber via a 1.5-ft-diameter × 300-ft-long corrugated metal pipe. The outfall discharged to a rocky outcrop at the edge of Sandia Canyon (LANL 1993, 020947, p. 5-49). Outfall SSS01S was permitted for the discharge of wastewater and was removed from the NPDES permit in 1994 (LANL 1999, 064617, p. 2-7).

AOC 03-014(b2) received effluent from the former TA-03 WWTP from 1989 to 1992 when the WWTP was decommissioned. AOC 03-014(b2) received treated effluent from the SWSC plant at TA-46 from 1992 to 1998 when the effluent was switched to the outfall at the power plant, building 03-22. AOC 03-014(b2) was monitored three times per month for biochemical oxygen demand, total suspended solids (TSS), pH,

fecal coliform, total chlorine, and radioactive constituents. From 1989 to 1993, radioactive constituents were reported over the DLs (LANL 1993, 020947, p. 5-49).

#### 6.14.3.2 Relationship to Other SWMUs and AOCs

Effluent from the former TA-03 WWTP was discharged to the AOC 03-014(b2) outfall. This former outfall is located northeast of the former TA-03 WWTP and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.3.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC 03-014(b2), 12 sediment samples were collected from four locations within the outfall drainage channel in areas where sediment had accumulated. Samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, and tritium and by gamma spectroscopy (LANL 1996, 052930, pp. 95–98). Data from the 1994 RFI are screening-level data and are summarized below. Section 2.13.3 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Chromium was detected above BV in one sample. Lead and silver were detected above BVs in two samples. The analytes 4-isopropyltoluene, toluene, and bis(2-ethylhexyl)phthalate were detected in one sample. Cesium-137 was detected above BV/FV in one sample. Cobalt-60 was detected in one sample. Gross-alpha and -beta radiation were detected in four samples.

#### 6.14.3.5 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-014(b2). As a result, the following activities were completed as part of the 2009 investigation.

- Ten samples were collected from five locations to confirm the results of previous sampling events and to define the extent of contamination between the AOC and the Sandia Canyon reach S-1. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-014(b2) are shown in Figure 6.14-1. Table 6.14-5 presents the samples collected and analyses requested at AOC 03-014(b2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at AOC 03-014(b2), a maximum concentration of 4.0 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-014(b2) consist of 10 samples (6 soil and 4 tuff) collected from five locations.

#### *Inorganic Chemicals*

Ten samples (six soil and four tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.14-6 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(b2); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Ten samples (six soil and four tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.14-7 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(b2); therefore, organic COPCs are not identified for the site.

#### *Radionuclides*

Ten samples (six soil and four tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at AOC 03-014(b2); however, the existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(b2). Radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at AOC 03-014(b2) are not defined. The nature and extent of radionuclides are defined.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at AOC 03-014(b2) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, arsenic, cadmium, chromium, cyanide, lead, perchlorate, selenium, and zinc.

Antimony was not detected at AOC 03-014(b2) but had DLs (1.02 to 1.29 mg/kg) above BVs in all samples. Because antimony was not detected, the lateral and vertical extent of antimony are defined.

Arsenic was detected above BV for tuff (2.79 mg/kg) in one sample at AOC 03-014(b2) at a concentration of 3.61 mg/kg at location 03-608242 in a sample collected from a depth of 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of arsenic in tuff (5 mg/kg) (Figure H-31). The lateral and vertical extent of arsenic are defined.

Cadmium was not detected at AOC 03-014(b2) but had DLs (0.528 to 0.644 mg/kg) above BV (0.4 mg/kg) in six soil samples. Because cadmium was not detected, the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV (7.14 mg/kg) in one tuff sample at AOC 03-014(b2) with a concentration of 14.9 mg/kg at location 03-608242 in the deepest sample collected from depth of 1.0–2.0 ft bgs. The vertical extent of chromium is not defined. Chromium was not detected in samples collected from location 03-608243, approximately 35 ft directly downgradient, nor was it detected farther downgradient. The lateral extent of chromium is defined.

Cyanide was detected above BV (0.5 mg/kg) in three soil samples at two locations at AOC 03-014(b2). The maximum concentration of 1.61 mg/kg was detected at location 03-608246 in a sample collected from a depth of 1.0–2.0 ft bgs (the deepest sample collected). The vertical extent of cyanide is not defined. Although data have been collected as part of the investigation for Sandia Canyon immediately downgradient in reach S-2 at locations SA-600311, SA-600312, and SA-600313, the samples were not analyzed for cyanide. The lateral extent of cyanide is not defined.

Lead was detected above BVs for soil (22.3 mg/kg) and tuff (11.2 mg/kg) in two samples collected from location 03-608243. The maximum concentration of 37.3 mg/kg was detected in a sample collected from a depth of 0.0–1.0 ft bgs. Data have been collected as part of the investigation for Sandia Canyon downgradient in reach S-2, and lead was detected above sediment BVs in samples collected from locations SA-600310, SA-600311, SA-600312, and SA-00008. However, these concentrations decrease from the maximum concentration detected at location 03-608243. The lateral and vertical extent of lead are defined.

Perchlorate was detected in soil and tuff at AOC 03-014(b2) in samples collected from location 03-608244 directly below the 300-ft pipe outfall. The detected concentrations (0.0009 and 0.00173 mg/kg, respectively) are low. Perchlorate is not detected in samples collected downgradient; therefore, the lateral extent of perchlorate is defined. Because the maximum concentration was detected at location 03-608244 in the deepest sample collected from a depth of 1.0–2.0 ft bgs, the vertical extent of perchlorate is not defined.

Selenium was not detected in tuff at AOC 03-014(b2) but had DLs (0.999 to 1.19 mg/kg) above BV (0.3 mg/kg) in four tuff samples. Because selenium was not detected, the lateral and vertical extent of selenium are defined.

Zinc was detected above BV (48.8 mg/kg) in two soil samples in soil at AOC 03-014(b2). The maximum concentration of 82.4 mg/kg was detected at location 03-608245 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased downgradient in samples collected from location 03-608246. The lateral extent of zinc is defined. Concentrations decreased with depth at both locations. The vertical extent of zinc is defined.

### *Organic Chemicals*

Organic chemicals detected in soil and tuff at AOC 03-014(b2) are acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, phenanthrene, pyrene, and TPH-DRO.

Acetone was detected in three samples at two locations at AOC 03-014(b2). The maximum concentration of 0.0144 mg/kg was detected at location 03-608242 in the deepest sample collected from that location (1.0–2.0 ft bgs). The vertical extent of acetone is not defined. Concentrations decreased laterally at

location 03-608243 and were not detected at other downgradient locations. The lateral extent of acetone is defined.

Aroclor-1254 and Aroclor-1260 were detected in five samples at three locations at AOC 03-014(b2). The maximum concentrations of 0.0693 mg/kg and 0.0514 mg/kg, respectively, were detected at location 03-608244 in a tuff sample collected from a depth of 1.0–2.0 ft bgs (the deepest sample collected from this location). The vertical extent of Aroclor-1254 and Aroclor-1260 are not defined at location 03-608244. Aroclor concentrations decreased downgradient in samples collected from location 03-608245 and farther downgradient at location 03-608246. The lateral extent of Aroclor-1254 and Aroclor-1260 is defined at AOC 03-014(b2).

Benzo(a)pyrene, chrysene, fluoranthene, phenathrene, and pyrene were detected in two samples collected from locations 03-608243 and 03-608245. Concentrations decreased with depth and are below the EQL. The lateral and vertical extent of benzo(a)pyrene, chrysene, fluoranthene, phenathrene, and pyrene are defined.

Benzo(b)fluoranthene and benzo(k)fluoranthene were detected at concentrations in a single soil sample at AOC 03-014(b2). Concentrations decreased with depth and are below the EQL. The lateral and vertical extents of benzo(b)fluoranthene and benzo(k)fluoranthene are defined.

Bis(2-ethylhexyl)phthalate was detected in one tuff sample at AOC 03-014(b2) at a concentration below the EQL. The lateral and vertical extent of are defined.

TPH-DRO was detected in 10 samples at AOC 03-014(b2), with a maximum concentration of 32.1 mg/kg in a sample collected in soil from 0.0–1.0 ft bgs at location 03-608243. TPH-DRO was detected at lower concentrations downgradient at locations 03-608244, 03-608245, and 03-608246. The lateral extent of TPH-DRO is defined. Concentrations of TPH-DRO decreased with depth at all locations, except at location 03-608242. The vertical extent of TPH-DRO is not defined.

***Radionuclides***

No radionuclides were detected or detected above BVs/FVs at AOC 03-014(b2).

#### 6.14.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-014(b2) because extent is not defined for the site.

#### 6.14.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-014(b2) because extent is not defined for the site.

### 6.14.4 SWMU 03-014(c), Structure Associated with Former WWTP

#### 6.14.4.1 Site Description and Operational History

SWMU 03-014(c) is the inactive trickling filter (structure 03-47) for Plant 1 at the former TA-03 WWTP (Figure 6.14-1). The trickling filter received effluent from the Imhoff tank (structure 03-49) and dosing siphon where organic waste was digested through bacterial growth on filter media.

#### 6.14.4.2 Relationship to Other SWMUs and AOCs

Wastewater from the dosing siphon, SWMU 03-014(b), flowed into this trickling filter, and then into the final clarifying tank at SWMU 03-014(d). This trickling filter is located on the south side of the former WWTP, next to SWMU 03-014(g), and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.4.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(c).

#### 6.14.4.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(c) consisted of the following activities in 2009.

- Three samples were collected from one location between SWMUs 03-014(c) and 03-014(g). Samples were collected from the base of the tank, the soil-tuff interface, and 5 ft below the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at SWMU 03-014(c) is shown in Figure 6.14-1. Table 6.14-8 presents the samples collected and analyses requested at SWMU 03-014(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(c), a maximum concentration of 3.8 ppm was detected at a depth of 8.5–9.5 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(c) consist of three soil samples collected from one location. Data collected in 2009 as part of characterization efforts at SWMU 03-014(c) are presented in this report but are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.4.6).

***Inorganic Chemicals***

Three soil samples were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 6.14-9 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BV.

Inorganic chemicals in soil and tuff samples at SWMU 03-014(c) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the

analytical DLs were above BVs. These chemicals include antimony, cadmium, copper, cyanide, mercury, nitrate, silver, and zinc.

#### *Organic Chemicals*

Three soil samples were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-10 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals.

Organic chemicals were detected in soil at SWMU 03-014(c), including Aroclor-1242, Aroclor-1260, and TPH-DRO.

#### *Radionuclides*

Three soil samples were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at SWMU 03-014(c).

### 6.14.4.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(c) be delayed until D&D of structure 03-47 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMU 03-014(c), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is unlikely releases occurred while this component of the former TA-03 WWTP was in operation.

## 6.14.5 AOC 03-014(c2), Outfall

### 6.14.5.1 Site Description and Operational History

AOC 03-014(c2) is the inactive overflow outfall that previously received treated effluent from the former TA-03 WWTP from 1975 until the WWTP chlorination system [SWMU 03-014(j)] was constructed in 1985 (LANL 1993, 020947, pp. 5-48–5-49). The outfall was located on the north side of the chlorination system pump pit (structure 03-166) (Figure 6.14-1). Effluent for this outfall discharged as sheet flow onto a steep slope containing an erosion channel from stormwater runoff. The channel eventually trends northeast into Sandia Canyon. Soil and sediment were occasionally cleaned out of the channel with a backhoe and piled onto the upslope channel bank (LANL 1996, 052930, p. 103). Following the construction of the chlorination system, the outfall was rerouted underground from the pump pit to the chlorination dosing and contact chamber where the final effluent discharged freely into Sandia Canyon from a flow measurement weir north of the contact chamber. This outfall was abandoned in 1988 or 1989, when the WWTP effluent was routed to a new outfall, AOC 03-014(b2) (section 6.14.3) (LANL 1993, 020947, p. 5-49).

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

### 6.14.5.2 Relationship to Other SWMUs and AOCs

Before the chlorine contact chamber [SWMU 03-014(j)] was installed, clarified effluent from the final clarifying tanks. SWMUs 03-014(d) and 03-014(h) discharged through the outfall at AOC 03-014(c2). This

former outfall is located in the northeast corner of the former WWTP, west of the more recent outfall at AOC 03-014(b2), and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.5.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC 03-014(c2), 20 sediment samples (including 1 field duplicate) were collected from nine locations from depths of 0–1 ft and 1–1.5 ft bgs. Samples from the 0–1-ft interval were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, pesticides, herbicides, gross-alpha, -beta, and -gamma radiation, isotopic plutonium and uranium, strontium-90, and tritium and by gamma spectroscopy. Samples from the 1-1.5-ft interval were submitted for laboratory analyses of cyanide, VOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, p. 106). Data from the 1994 RFI are screening-level data and are summarized below. Section 2.13.5 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium and zinc were detected above BVs in one sample. Lead and nickel were detected above BVs in three samples. Cadmium, chromium, copper, cyanide, mercury, and silver were detected above BVs in six samples. 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 detected in one sample. Aroclor-1260 was detected in eight samples at less than 1 ppm. Plutonium-239/240 and plutonium-238 were detected above FVs in one and six samples, respectively. Europium-152 and tritium were detected in two samples. VOCs, pesticides, and herbicides were not detected.

#### 6.14.5.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-014(c2). As a result, the following activities were completed as part of the 2009 investigation.

- Ten samples were collected from five locations to characterize the drainage, confirm the results of a previous sampling event, and define the extent of contamination. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- Six samples were collected from three locations on the north-facing slope and associated drainage to confirm the results of a previous sampling event. At each location, samples were collected from 0.0–1.0 ft and 2.0–3.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-014(c2) are shown in Figure 6.14-1. Table 6.14-11 presents the samples collected and analyses requested at AOC 03-014(c2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors, at AOC 03-014(c2), a maximum concentration of 96.5 ppm was detected at a depth of 2.0–3.0 ft bgs. This sample (RE03-09-13642) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-014(c2) consist of 16 samples (12 soil and 4 tuff) collected from eight locations.

#### *Inorganic Chemicals*

Sixteen samples (12 soil and 4 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 6.14-12 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(c2); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Sixteen samples (12 soil and 4 tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-13 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(c2); therefore, organic COPCs are not identified for the site.

#### *Radionuclides*

Sixteen samples (12 soil and 4 tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. Table 6.14-14 summarizes radionuclides detected or detected above BVs/FVs. Plate 20 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-014(c2); therefore, radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals and radionuclides at AOC 03-014(c2) are not defined, as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at AOC 03-014(c2) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, calcium, chromium, copper, cyanide, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, and zinc.

Antimony was not detected in soil at AOC 03-014(c2) but had DLs (1.03 to 1.11 mg/kg) above BV (0.83 mg/kg) in 12 samples. Antimony was not detected in tuff at AOC 03-014(c2) but had DLs (0.999 to

1.05 mg/kg) above BV (0.5 mg/kg) in four samples. Because antimony was not detected at AOC 03-014(c2), the lateral and vertical extent of antimony are defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in four samples at AOC 03-014(c2). The maximum concentration of 1.09 mg/kg was detected at location 03-608251 in a soil sample collected from a depth of 1.0–2.0 ft bgs. The maximum detection (1.09 mg/kg) was less than the maximum background concentration (2.6 mg/kg) of cadmium in soil. The slippage test indicated that the site concentrations of cadmium are not different than background (Table H-4 and Figure H-32). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for soil (6120 mg/kg) in two samples at AOC 03-014(c2). The maximum concentration of 7270 mg/kg was detected at location 03-608255 in a sample collected from a depth of 2.0–3.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of calcium are not different than background (Table H-4 and Figure H-32). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV for soil (19.3 mg/kg) in three samples at AOC 03-014(c2). Additionally, chromium was detected above BV for tuff (7.14 mg/kg) in two samples. The maximum concentration of 34.4 mg/kg was detected at location 03-608251 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased at the farthest downgradient location 03-608255, and therefore the lateral extent of chromium is defined. Concentrations increased with depth at locations 03-608253, 03-608252 and 03-608248. The vertical extent of chromium is not defined.

Copper was detected above BV for soil (14.7 mg/kg) in five samples at AOC 03-014(c2). Additionally, copper was detected above BV for tuff (4.66 mg/kg) in three samples. The maximum concentration of 32.3 mg/kg was detected at location 03-608251 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased at the farthest downgradient location 03-608255, and therefore the lateral extent of copper is defined. Concentrations increased with depth at location 03-608253. The vertical extent of copper is not defined.

Cyanide was detected above BV for soil (0.5 mg/kg) in six samples at AOC 03-014(c2). Additionally, cyanide was detected above BV in tuff (0.5 mg/kg) in three samples. The maximum concentration of 30.2 mg/kg was detected at location 03-608254 in a sample collected from a depth of 0.0–1.0 ft bgs. Cyanide was not detected at the farthest downgradient location 03-608255 and therefore, the lateral extent of cyanide is defined. Concentrations increased with depth at location 03-608253. The vertical extent of cyanide is not defined.

Lead was detected above BV for soil (22.3 mg/kg) in two samples at AOC 03-014(c2). The maximum concentration of 30.5 mg/kg was detected at location 03-608249 in a sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of lead are not different than background (Table H-4 and Figure H-33). The lateral and vertical extent of lead are defined.

Mercury was detected above BV for soil (0.1 mg/kg) in 10 samples at AOC 03-014(c2). Additionally, mercury was detected above BV for tuff (0.1 mg/kg) in two samples. The maximum concentration of 0.847 mg/kg was detected at location 03-608251 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased at all depths at the farthest downgradient location 03-608255. Therefore, the lateral extent of mercury is defined. Concentrations increased with depth at locations 03-608249 and 03-608252. The vertical extent of mercury is not defined.

Nickel was detected above BV for soil (15.4 mg/kg) in one sample at AOC 03-014(c2). Additionally, nickel was detected above BV for tuff (6.58 mg/kg) in one sample. The maximum concentration of 18.6 mg/kg was detected at location 03-608251 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations decreased to levels below BV at all depths at the farthest downgradient location 03-608255. Therefore, the lateral extent of nickel is defined. Concentrations increased with depth at locations 03-608251 and 03-608253, but concentrations were equal to or less than the maximum background concentrations. The vertical extent of nickel is defined.

Nitrate was detected in four soil samples at AOC 03-014(c2). The maximum concentration of 2.75 mg/kg was detected at location 03-608251 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations reflect naturally occurring levels of nitrate. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one soil sample at AOC 03-014(c2). Additionally, perchlorate was detected in two tuff samples. Concentrations were below the estimated detection limit (EDL). Perchlorate was not detected at the farthest downgradient location 03-608255. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected in tuff at AOC 03-014(c2) but had DLs (1 to 1.03 mg/kg) above BV (0.3 mg/kg) in four tuff samples. Because selenium was not detected at AOC 03-014(c2), the lateral and vertical extent of selenium are defined.

Silver was detected above BV for soil and tuff (1 mg/kg) in nine soil and three tuff samples at AOC 03-014(c2).The maximum concentration of 10.9 mg/kg was detected at location 03-608251 in a sample collected from a depth of 0.0–1.0 ft bgs. Silver was not detected above BV at the farthest downgradient location 03-608255. Therefore, the lateral extent of silver is defined. Concentrations increased with depth at locations 03-608249 and 03-608252. The vertical extent of silver is not defined.

Zinc was detected above BV for soil (48.8 mg/kg) in four samples at AOC 03-014(c2). The maximum concentration of 89.4 mg/kg was detected at location 03-608251 in a sample collected from a depth of 0.0–1.0 ft bgs. Zinc was not detected above BV at the farthest downgradient location 03-608255. Therefore, the lateral extent of zinc is defined. Concentrations increased with depth at location 03-608249 but was less than the maximum background concentration (75.5 mg/kg). The vertical extent of zinc is defined.

### *Organic Chemicals*

Organic chemicals detected at AOC 03-014(c2) are acetone, anthracene, Aroclor-1248, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, butylbenzene(tert-), chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, toluene, and TPH-DRO.

The concentrations of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were all maximum at locations 03-608248 or 03-608250 and decreased at the farthest downgradient location 03-608255. These organic chemicals decreased with depth or were below EQLs in deeper samples at all locations in AOC 03-014(c2). The lateral and vertical extent of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene are defined.

Acetone was detected in three samples at AOC 03-014(c2). The maximum concentration of 0.0511 mg/kg was detected at location 03-608253 in a tuff sample collected from a depth of 2.0–3.0 ft bgs. Acetone was

not detected at downgradient locations, and therefore, the lateral extent of acetone is defined. Concentrations increased with depth at location 03-608253 but was below the EQL at location 03-608252. The vertical extent of acetone is not defined.

Aroclor-1248 was detected in one tuff sample at AOC 03-014(c2). The maximum concentration of 0.0141 mg/kg was detected at location 03-608254 in a sample collected from a depth of 2.0–3.0 ft bgs. Aroclor-1248 was not detected at downgradient locations, and therefore, the lateral extent of acetone is defined. Concentrations increased with depth at location 03-608254, and therefore, the vertical extent of Aroclor-1248 is not defined.

Aroclor-1254 was detected in 14 samples at AOC 03-014(c2). The maximum concentration of 6.78 mg/kg was detected at location 03-608249 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations decreased at downgradient locations and the lateral extent is defined. Concentrations increased with depth at locations 03-608249, 03-608251, and 03-608252. The vertical extent of Aroclor-1254 is not defined.

Aroclor-1260 was detected in 14 samples at AOC 03-014(c2). The maximum concentration of 6.03 mg/kg was detected at location 03-608249 in a sample collected from a depth of 1.0–2.0 ft bgs. Concentrations decreased at downgradient locations, and the lateral extent is defined. Concentrations increased with depth at locations 03-608249, 03-608251, and 03-608252. The vertical extent of Aroclor-1260 is not defined.

Butylbenzene(tert-) was detected in one sample at AOC 03-014(c2) at a concentration of 0.000685 mg/kg at location 03-608253 in a tuff sample collected from a depth 2.0–3.0 ft bgs. This concentration is below the EQL, and tert-butylbenzene was not detected downgradient. The lateral and vertical extent of tert-butylbenzene are defined.

Isopropyltoluene(4-) was detected in one sample at AOC 03-014(c2). The maximum concentration of 0.0333 mg/kg was detected at location 03-608253 in a tuff sample collected from a depth of 2.0–3.0 ft bgs. Isopropyltoluene(4-) was not detected at downgradient locations, and therefore, the lateral extent of 4-isopropyltoluene is defined. Concentrations increased with depth at location 03-608253, and therefore, the vertical extent of 4-isopropyltoluene is not defined.

Toluene was detected in one sample at AOC 03-014(c2). The maximum concentration of 0.00156 mg/kg was detected at location 03-608253 in a tuff sample collected from a depth of 2.0–3.0 ft bgs. Toluene was not detected at downgradient locations, and therefore, the lateral extent of toluene is defined. Concentrations increased with depth at location 03-608253, and therefore, the vertical extent of toluene is not defined.

TPH-DRO was detected in 16 samples at AOC 03-014(c2). The maximum concentration of 69.1 mg/kg was detected at location 03-608251 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased at the farthest downgradient location 03-608255, and therefore, the lateral extent of TPH-DRO is defined. Concentrations increased with depth at locations 03-608249 and 03-608253. The vertical extent of TPH-DRO is not defined.

### *Radionuclides*

Americium-241 was detected in one soil and one tuff sample at AOC 03-014(c2). The maximum activity of 0.0498 pCi/g was detected at location 03-608254 in a tuff sample collected from a depth of 2.0–3.0 ft bgs. Activities decreased slightly from location 03-608254 to the farthest downgradient location 03-608255 (located within approximately 40 ft) in samples collected from a depth of 2.0–3.0 ft bgs. The lateral extent

of americium-241 is defined. Activities increased with depth at both locations 03-608254 and 03-608255. Americium-241 was not detected at any other locations. The vertical extent of americium-241 is not defined.

#### 6.14.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-014(c2) because extent is not defined for the site.

#### 6.14.5.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-014(c2) because extent is not defined for the site.

### 6.14.6 SWMU 03-014(d), Structure Associated with Former WWTP

#### 6.14.6.1 Site Description and Operational History

SWMU 03-014(d) is the inactive secondary clarifying tank (structure 03-46) for Plant 1 at the former TA-03 WWTP (Figure 6.14-1). Material sloughed from the trickling filter media settled in this tank. The resulting sludge was subsequently recirculated back to the head of the plant (LANL 1993, 020947, p. 5-47).

#### 6.14.6.2 Relationship to Other SWMUs and AOCs

The secondary clarifying tank at SWMU 03-014(d) received wastewater from the trickling filter at SWMU 03-014(c). Clarified effluent flowed to the chlorine contact chamber, SWMU 03-014(j). Sludge from these tanks was recirculated to the Imhoff tanks at SWMUs 03-014(a) and 03-014(e). SWMU 03-014(d) is located in the southeast corner of the former WWTP, next to SWMU 03-014(h) (Figure 6.14-1) and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.6.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(d).

#### 6.14.6.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(d) consisted of the following activities in 2009.

- Nine samples were collected from three locations to characterize SWMUs 03-014(d) and 03-014(h). At each location, samples were collected from the base of the tank, the soil-tuff interface, and 3–8 ft below the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(d) are shown in Figure 6.14-1. Table 6.14-15 presents the samples collected and analyses requested at SWMU 03-014(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(d), a maximum concentration of 13.6 ppm was detected at a depth of 0.5–1.5 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(d) consist of nine samples (one soil and eight tuff) collected from three locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(d) are presented in this report but are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.6.6).

***Inorganic Chemicals***

Nine samples (one soil and eight tuff) were analyzed for TAL metals, cyanide, and perchlorate. Six tuff samples were analyzed for nitrate. Table 6.14-16 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BV.

Inorganic chemicals in soil and tuff samples at SWMU 03-014(d) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These chemicals are antimony, arsenic, barium, cadmium, chromium, copper, cyanide, lead, mercury, nitrate, perchlorate, selenium, silver, and zinc.

***Organic Chemicals***

Nine samples (one soil and eight tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-17 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals.

Organic chemicals were detected in soil and tuff at SWMU 03-014(d), including acenaphthene, acetone, Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, and TPH-DRO.

***Radionuclides***

Nine samples (one soil and eight tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at SWMU 03-014(d).

### 6.14.6.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(d) be delayed until D&D of the inactive clarifying tank (structure 03-46) has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted

around SWMU 03-014(d), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while this component of the former TA-03 WWTP was in operation.

### 6.14.7 SWMU 03-014(e), Structure Associated with Former WWTP

#### 6.14.7.1 Site Description and Operational History

SWMU 03-014(e) is the inactive Imhoff tank (structure 03-192) for Plant 2 at the former TA-03 WWTP (Figure 6.14-1). Water and effluent passed from the entrance works directly to the Imhoff tank, which functioned as a settling/digestion tank (LANL 1993, 020947, p. 5-47).

#### 6.14.7.2 Relationship to Other SWMUs and AOCs

Wastewater from the headworks, SWMU 03-014(i), was piped to this Imhoff tank which flowed to the dosing siphon, SWMU 03-014(f). SWMU 03-014(e) is located in the southwest corner of the former WWTP, next to SWMU 03-014(a), and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.7.3 Summary of Previous Investigations

During the 1994 Phase I RFI performed at SWMUs 03-014(a) and 03-014(e), the area around the Imhoff tanks (structures 03-192 and 03-49) was sampled to determine whether contaminants were released to the environment as a result of applying sludge to the soil or from tank overflow (LANL 1996, 052930, p. 85). Sampling data for SWMU 03-014(a) are discussed in section (section 6.14.1.3).

#### 6.14.7.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(e) consisted of the following activities in 2009.

- Sampling was conducted to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a,b,e,f) because of their close proximity. Sampling activities are described in section 6.14.1.4 as part of SWMU 03-014(a).

The 2009 sampling locations at SWMU 03-014(e) are shown in Figure 6.14-1. Table 6.14-1 presents the samples collected and analyses requested at SWMU 03-014(e). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(e), a maximum concentration of 5.5 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(e) consist of 13 samples (eight soil and five tuff) collected from 5 locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(e) are not

evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.7.6).

Sampling analytical results are described in section 6.14.1.4 as part of SWMU 03-014(a).

#### 6.14.7.6 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(e) be delayed until D&D of structure 03-192 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMUs 03-014(a,b,e,f), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation.

### 6.14.8 SWMU 03-014(f), Structure Associated with Former WWTP

#### 6.14.8.1 Site Description and Operational History

SWMU 03-014(f) is the inactive dosing siphon (structure 03-193) for Plant 2 at the former TA-03 WWTP (Figure 6.14-1). Effluent from the Imhoff tank (structure 03-192) flowed to the dosing siphon, which dispersed accumulated effluent water in an amount sufficient to run the trickling filter (structure 03-194) rotary arms. The dosing siphon maintained the moisture throughout the trickling filter's rock media beds (LANL 1993, 020947, p. 5-47).

#### 6.14.8.2 Relationship to Other SWMUs and AOCs

This dosing siphon received wastewater from the SWMU 03-014(e) Imhoff tank. Effluent flowed from the dosing siphons to the trickling filter, SWMU 03-014(g). SWMU 03-014(f) is located in the southwest corner of the former WWTP, next to SWMU 03-014(b), and is a component of Consolidated Unit 03-014(a)-99, the former WWTP.

#### 6.14.8.3 Summary of Previous Investigations

SWMU 03-014(f) was not specifically sampled as part of historical RFI activities, but samples collected during the 1994 RFI for SWMUs 03-014(a) and 03-014(e) are within the vicinity of SWMU 03-014(f). Sampling data for SWMU 03-014(a) are discussed in section (section 6.14.1.3).

#### 6.14.8.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(f) consisted of the following activities in 2009.

- Sampling was conducted to confirm the results of previous sampling events and to define the extent of contamination for SWMUs 03-014(a,b,e,f) because of their close proximity. Sampling activities are described in section 6.14.1.4 as part of SWMU 03-014(a).

The 2009 sampling locations at SWMU 03-014(f) are shown in Figure 6.14-1. Table 6.14-1 presents the samples collected and analyses requested. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

Field-screening activities are described in section 6.14.1.4 as part of SWMU 03-014(a).

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-014(f) consist of 13 samples (8 soil and 5 tuff) collected from five locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(f) are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.8.6).

Sampling analytical results are described in section 6.14.1.4 as part of SWMU 03-014(a).

### 6.14.8.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(f) be delayed until D&D of structure 03-193 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMUs 03-014(a,b,e,f), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while these components of the former TA-03 WWTP were in operation.

## 6.14.9 SWMU 03-014(g), Structure Associated with Former WWTP

### 6.14.9.1 Site Description and Operational History

SWMU 03-014(g) is the inactive trickling filter (structure 03-194) at Plant 2 at the former TA-03 WWTP (Figure 6.14-1). The trickling filter received effluent from the Imhoff tank (structure 03-192) and dosing siphon (structure 03-193) where organic waste was digested through bacterial growth on filter media. The filter bed is 72 ft in diameter × 6 ft deep with a design capacity of 325,000-gal./d (LANL 1993, 020947, p. 5-47).

### 6.14.9.2 Relationship to Other SWMUs and AOCs

Wastewater from the dosing siphon, SWMU 03-014(f), flowed into the trickling filter at SWMU 03-014(g). This trickling filter is located on the south side of the former WWTP, next to SWMU 03-014(c), and is a component of Consolidated Unit 03-014(a)-99.

### 6.14.9.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(g).

### 6.14.9.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Sampling at SWMU 03-014(g) consisted of the following activities in 2009.

- Sampling was conducted between SWMUs 03-014(c) and 03-014(g). Sampling activities are described in section 6.14.4.4 as part of SWMU 03-014(c).
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMUs 03-014(g) are shown in Figure 6.14-1. Table 6.14-8 presents the samples collected and analyses requested at SWMU 03-014(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening for organic vapors at SWMU 03-014(g), a maximum concentration of 3.8 ppm was detected at a depth of 8.5–9.5 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(g) consist of three soil samples collected from one location. Data collected in 2009 as part of characterization efforts at SWMU 03-014(g) are not evaluated for nature and extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.9.5).

Sampling analytical results are described in section 6.14.4.4 as part of SWMU 03-014(c).

#### 6.14.9.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(g) be delayed until D&D of structure 03-194 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMU 03-014(g), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while this component of the former TA-03 WWTP was in operation.

### 6.14.10 SWMU 03-014(h), Structure Associated with Former WWTP

#### 6.14.10.1 Site Description and Operational History

SWMU 03-014(h) is the inactive secondary clarifying tank (structure 03-195) at Plant 2 of the former TA-03 WWTP (Figure 6.14-1). Material sloughed from the trickling filter media settled in the secondary clarifying tank where the resulting sludge was subsequently recirculated back to the head of the plant (LANL 1993, 020947, p. 5-47).

#### 6.14.10.2 Relationship to Other SWMUs and AOCs

The secondary clarifying tank at SWMU 03-014(h) received wastewater from the trickling filter at SWMU 03-014(g). Clarified effluent flowed to the chlorine contact chamber, SWMU 03-014(j), and sludge from these tanks was recirculated to the Imhoff tanks, SWMUs 03-014(a) and 03-014(e). SWMU 03-014(h) is located in the southeast corner of the former WWTP, next to SWMU 03-014(d), and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.10.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(h).

#### 6.14.10.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(h) consisted of the following activities in 2009.

- Sampling was conducted at SWMUs 03-014(d) and 03-014(h). Sampling activities are described in section 6.14.6.4 as part of SWMU 03-014(d).

The 2009 sampling locations at SWMU 03-014(h) are shown in Figure 6.14-1. Table 6.14-15 presents the samples collected and analyses requested. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

Field-screening activities are described in section 6.14.6.4 as part of SWMU 03-014(d).

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(h) consist of nine samples (one soil and eight tuff) collected from three locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(h) are not evaluated for nature and extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.10.5).

Sampling analytical results are described in section 6.14.6.4 as part of SWMU 03-014(d).

#### 6.14.10.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(h) be delayed until D&D of structure 03-194 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMU 03-014(h), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while this component of the former TA-03 WWTP was in operation.

### 6.14.11 SWMU 03-014(i), Structure Associated with Former WWTP

#### 6.14.11.1 Site Description and Operational History

SWMU 03-014(i) consists of three inactive structures at the former TA-03 WWTP: a splitter box (structure 03-677) where raw sewage was metered and split between Plant 1 or Plant 2, a comminutor where large objects and material were shredded, and a bar screen (Figure 6.14-1). These structures were built in 1951 (LANL 1993, 020947, pp. 5-45–5-47).

#### 6.14.11.2 Relationship to Other SWMUs and AOCs

Wastewater from TA-03 buildings entered the former WWTP at the splitter box of SWMU 03-014(i) and passed though either comminutors or manual bar racks before it flowed to the Imhoff tanks, SWMUs 03-014(a) and 03-014(e) (Figure 6.14-1). The structures associated with SWMU 03-014(i) are located at the most southwestern corner of the former WWTP. SWMU 03-014(i) is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.11.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(i).

#### 6.14.11.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Sampling at SWMU 03-014(i) consisted of the following activities in 2009.

- Nine samples were collected from three boreholes. At each location, samples were collected from 0.0–1.0 ft bgs, the base of the structure, the soil-tuff interface, and 5 ft below the soil-tuff interface. At all three locations, only three of the four proposed samples were collected because the soil-tuff interface corresponded to the same interval as the base of the structure (see deviations in Appendix B). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(i) are shown in Figure 6.14-1. Table 6.14-18 presents the samples collected and analyses requested at SWMU 03-014(i). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening at SWMU 03-014(i), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-014(i) consist of nine samples (three soil and six tuff) collected from three locations. Data collected in 2009 as part of characterization efforts at SWMU 03-014(i) are not evaluated for nature and extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.11.5).

***Inorganic Chemicals***

Nine samples (three soil and six tuff) were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.14-19 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs.

Inorganic chemicals in soil and tuff samples at SWMU 03-014(j) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These chemicals include antimony, arsenic, barium, calcium, cobalt, lead, mercury, nitrate, perchlorate, selenium, and zinc.

#### *Organic Chemicals*

Nine samples (three soil and six tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-20 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals.

Organic chemicals detected in soil and tuff at SWMU 03-014(i) are Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, pyrene, and TPH-DRO.

#### *Radionuclides*

Nine samples (three soil and six tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at SWMU 03-014(i).

### 6.14.11.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(i) be delayed until D&D of structure 03-677 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMU 03-014(i), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while this component of the former TA-03 WWTP was in operation.

## 6.14.12 SWMU 03-014(j), Structure Associated with Former WWTP

### 6.14.12.1 Site Description and Operational History

SWMU 03-014(j), the inactive chlorination system for the former TA-03 WWTP, consists of two structures: a pump pit, structure 03-2209 (formerly identified as structure 03-166), and a dosing and contact chamber. Both structures are located approximately 100 ft north of structure 03-166 (Figure 6.14-1). The pump pit is a 9-ft × 11-ft × 10-ft-deep concrete pit with a steel grating cover that contains an effluent pump. The dosing and contact chamber is a 15-ft × 15-ft × 6-ft concrete pit with a concrete flow weir that is 225 $ft^2$ (LANL 1990, 007511, p. 3-14). When the chlorination system became active in 1985, AOC 03-014(c2), the original WWTP outfall, was abandoned (LANL 1993, 020947, p. 5-49).

### 6.14.12.2 Relationship to Other SWMUs and AOCs

Clarified effluent from the secondary clarifying tanks, SWMUs 03-014(d) and 03-014(h), flowed through the chlorine contact chamber at SWMU 03-014(j) before it was discharged through the former AOC 03-014(b2) outfall. SWMU 03-014(j) is located in the northeast corner of the former WWTP and is a component of Consolidated Unit 03-014(a)-99.

### 6.14.12.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(j).

### 6.14.12.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Sampling at SWMU 03-014(j) consisted of the following activities in 2009.

- Six samples were proposed for collection from two boreholes. At each location, samples were collected from the base of the structure, the soil-tuff interface, and 5 ft below the soil-tuff interface. At location 03-608263, only two of the three proposed samples were collected as the soil-tuff interface corresponded to the same interval as the base of the structure (see deviations in Appendix B). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- Two samples were collected from one location beneath the contact chamber. Samples were collected from 0.0–1.0 ft bgs and at the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(j) are shown in Figure 6.14-1. Table 6.14-21 presents the samples collected and analyses requested at SWMU 03-014(j). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-014(j), a maximum concentration of 7.1 ppm was detected at a depth of 0.5–1.5 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-014(j) consist of seven samples (four soil and three tuff) collected from three locations.

Data collected in 2009 as part of characterization efforts at SWMU 03-014(j) are not evaluated for nature and extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.14.12.5).

##### *Inorganic Chemicals*

Seven samples (four soil and three tuff) were analyzed for TAL metals, cyanide, and perchlorate. Five samples were analyzed for nitrate (two soil and three tuff). Table 6.14-22 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs.

Inorganic chemicals in soil and tuff samples at SWMU 03-014(j) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the

analytical DLs were above BVs. These chemicals are antimony, cadmium, cyanide, lead, mercury, perchlorate, selenium, silver, and zinc.

#### *Organic Chemicals*

Seven samples (four soil and three tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-23 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals.

Organic chemicals detected in soil at SWMU 03-014(j) are Aroclor-1254, Aroclor-1260, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, indeno(1,2,3-cd)pyrene, methylene chloride, and TPH-DRO.

#### *Radionuclides*

Seven samples (four soil and three tuff) were analyzed for americium-241, isotopic plutonium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at SWMU 03-014(j).

### 6.14.12.5 Delayed Site Investigation Rationale

The approved investigation work plan proposed that site characterization and investigation beneath SWMU 03-014(j) be delayed until D&D of structure 03-166 has been completed (LANL 2008, 100693; NMED 2008, 102721). Previous and current investigations conducted around SWMU 03-014(j), while not sufficient to fully determine the nature and extent of contamination, provide data indicating it is not likely releases occurred while this component of the former TA-03 WWTP was in operation.

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

### 6.14.13.1 Site Description and Operational History

SWMU 03-014(k), structure 03-196, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 6.14-1). The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks. Three of the four beds were used for drying sludge, while the fourth bed, SWMU 03-014(n), was used as a skimmer bed (LANL 1993, 020947, pp. 5-46–5-47).

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

### 6.14.13.2 Relationship to Other SWMUs and AOCs

SWMU 03-014(k) is located next to three other sludge drying beds, SWMUs 03-014(l,m,n), in the west-central portion of the former WWTP. Sludge was siphoned from the Imhoff tanks at SWMUs 03-014(a) and 03-014(e). All four SWMUs are components of Consolidated Unit 03-014(a)-99.

### 6.14.13.3 Summary of Previous Investigations

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

Mercury and silver were detected above BVs in the fill sample; copper was detected above BV in one tuff sample; chromium, nickel, and zinc were detected above BVs in the two tuff samples. The DLs for antimony and cadmium were above BVs in several samples. Organic chemicals and radionuclides were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.14.13.4. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(k).

### 6.14.13.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-014(k). As a result, the following activities were completed as part of the 2009 investigation.

- Ten samples were collected from historical sampling locations 03-03264, 03-03265, 03-03266, 03-03201, and 03-03202 to confirm the results of the previous sampling event and to define the vertical extent of contamination within and beneath the beds at SWMUs 03-014(k,l,m,n). At each location, samples were collected from 4.0–5.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, tritium, americium-241, isotopic plutonium, and isotopic uranium.
- Twelve samples were proposed for collection from four locations around and downgradient of SWMUs 03-014(k,l,m,n). At each location, samples were collected from 0.0–1.0 ft bgs, 0.0–1.0 ft beneath the sand and gravel layer at the base of bed, at bed-tuff interface, and 5.0 ft below the bed-tuff interface. At all four locations, the bed-tuff interface corresponded to the same interval as the base of the bed, for a total of eight samples were collected. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, tritium, americium-241, isotopic plutonium, and isotopic uranium.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(k) are shown in Figure 6.14-1. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(k). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-014(k), a maximum concentration of 3.8 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the

daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMUs 03-014(k,l,m,n) consist of 44 samples (18 soil and 26 tuff) collected from 12 locations.

#### *Inorganic Chemicals*

Thirty-four samples were analyzed for TAL metals (8 soil and 26 tuff), 21 samples were analyzed for cyanide (3 soil and 18 tuff), 21 samples were analyzed for nitrate (3 soil and 18 tuff), and 21 samples were analyzed for perchlorate (3 soil and 18 tuff). Table 6.14-25 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMUs 03-014(k,l,m,n); therefore, inorganic COPCs are not identified for the site.

#### *Organic Chemicals*

Forty-one samples were analyzed for SVOCs (15 soil and 26 tuff), 28 samples were analyzed for VOCs (5 soil and 23 tuff), 10 samples were analyzed for pesticides (4 soil and 6 tuff), 34 samples were analyzed for PCBs (12 soil and 22 tuff), 10 samples were analyzed for herbicides (4 soil and 6 tuff), and 28 samples were analyzed for TPH-DRO (8 soil and 20 tuff). Table 6.14-26 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMUs 03-014(k,l,m,n); therefore, organic COPCs are not identified for the site.

#### *Radionuclides*

Sixteen samples were analyzed for americium-241 (2 soil and 14 tuff), 30 samples were analyzed for isotopic plutonium (5 soil and 25 tuff), 9 samples were analyzed for strontium-90 (3 soil and 6 tuff), 30 samples were analyzed for tritium (5 soil and 25 tuff), and 30 samples were analyzed for isotopic uranium and plutonium (5 soil and 25 tuff).Table 6.14-27 summarizes the analytical results for radionuclides. Plate 20 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMUs 03-014(k,l,m,n); therefore, radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals and radionuclides at SWMUs 03-014(k,l,m,n) are not defined, as discussed below.

#### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at SWMUs 03-014(k,l,m,n) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, barium, cadmium, calcium, chromium, copper, cyanide, iron, lead, mercury, nickel, nitrate, perchlorate, selenium, silver, and zinc.

Antimony was detected above BV for soil (0.83 mg/kg) in one sample at SWMUs 03-014(k,l,m,n). The maximum concentration of 8.3 mg/kg was detected at location 03-03202 in a soil sample collected from a depth of 0.0–0.33 ft bgs. This location is within a former sludge-drying bed. Antimony was not detected above BV in samples collected around the perimeter of the beds (locations 03-608270, 03-608271, 03-608272, and 03-608273) or at any other location. The lateral extent of antimony is defined. Antimony was not detected in the two deepest samples collected from location 03-03202 (4.0–5.0 ft bgs and 6.0–7.0 ft bgs). The vertical extent of antimony is defined.

Barium was detected above BVs for soil (295 mg/kg) and tuff (46 mg/kg) in two samples at SWMUs 03-014(k,l,m,n), with a maximum concentration of 345 mg/kg. Because there were less than 10 soil samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of barium in soil (410 mg/kg) (Figure H-34). The applicable statistical tests (Gehan and quantile) indicate that the current site data for barium in tuff are not different than background (Table H-5 and Figure H-34). Because the current site data at SWMUs 03-014(k,l,m,n) for barium in soil and tuff are not different than background, the lateral and vertical extent of barium are defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in three samples at SWMUs 03-014(k,l,m,n). The maximum concentration of 15.5 mg/kg was detected at location 03-03202 (within the eastern sludge bed) in a sample collected from a depth of 0.0–0.33 ft bgs. Cadmium was also detected (0.49 mg/kg) at location 03-03266 in a fill sample from the adjacent sludge bed in a sample collected from a depth of 0.0–1.0 ft bgs, but it was not detected in any of the deeper samples collected from this location. Cadmium was detected at a concentration of 1.02 mg/kg at location 03-608273 on the northern perimeter of the beds in a soil sample collected from a depth of 0.0–1.0 ft bgs, but it was not detected above BV in any deeper samples at this location. Nor was cadmium detected at downgradient location 03-608280, which was sampled as part of the investigation for SWMU 03-014(o). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BVs for soil (6120 mg/kg) and tuff (2200 mg/kg) in two samples at SWMUs 03-014(k,l,m,n). The maximum concentration of 6430 mg/kg was detected at location 03-03202 in a fill sample collected from 0.0–0.33 ft bgs. Calcium concentrations decreased laterally to the east at location 03-608270. Concentrations also decreased with depth at all locations. The lateral and vertical extent of calcium are defined.

Chromium was detected above BVs for soil (19.3 mg/kg) and tuff (7.14 mg/kg) in 12 samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 51.9 mg/kg was detected at location 03-03202 in a fill sample collected from 0.0–0.33 ft bgs. The highest chromium concentrations were detected at sampling locations within the former sludge-drying beds. Chromium was not detected above BV in the samples collected on the northern, western, and eastern perimeter of the sludge beds (locations 03-608273, 03-608272, and 03-608270, respectively), and chromium concentrations decreased in the samples collected around the southern perimeter of the beds (location 03-608271). Concentrations of chromium increased with depth at locations 03-608271 and 03-03265, but the results were less than the maximum background concentration for chromium in tuff (13 mg/kg). The lateral and vertical extent of chromium are defined.

Copper was detected above BVs for soil (14.7 mg/kg) and tuff (4.66 mg/kg) in 14 samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 231 mg/kg was in a sample collected from location 03-03202 in a fill sample collected from a depth of 0.0–0.33 ft bgs. The highest copper concentrations were detected at sampling locations within the former sludge-drying beds. Copper was not detected above BV in the samples collected on the northern, western, and perimeters of the sludge beds, and copper concentrations decreased in the samples collected around the southern perimeter of the

beds. The lateral extent of copper is defined. Copper concentrations increased with depth at locations 03-608271 and 03-03265. The vertical extent of copper is not defined.

Cyanide was detected above BVs for soil (0.5 mg/kg) and tuff (0.5 mg/kg) in five samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 9.48 mg/kg was detected at location 03-608273 in a sample collected from a depth of 0.0–1.0 ft bgs. Cyanide was also detected at location 03-608272 along the western perimeter of the beds at a higher concentration than was detected in the samples collected within the beds. Concentrations increased at depth at location 03-03265. The lateral and vertical extent of cyanide are not defined.

Iron was detected above BV for tuff (14,500 mg/kg) in one sample at SWMUs 03-014(k,l,m,n), at a concentration of 15,200 mg/kg at location 03-608270 on the eastern perimeter of the sludge beds in the deepest sample collected from a depth of 8.0–9.0 ft bgs. This concentration was less than the maximum background concentration for iron in tuff (19,500 mg/kg). The lateral and vertical extent of iron are defined.

Lead was detected above BVs for soil (22.3 mg/kg) and tuff (11.2 mg/kg) in six samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 217 mg/kg was detected at location 03-03202 in a fill sample collected from a depth of 0.0–0.33 ft bgs. Concentrations decreased to the east at location 03-608270, and lower concentrations were detected at locations 03-608273 and 03-608271 along the northern and southern perimeter, respectively, of the beds. The later extent of lead is defined. Concentrations increased with depth at locations 03-608271 and 03-608273. The vertical extent of lead is not defined.

Mercury was detected above BVs for soil (0.1 mg/kg) and tuff (0.1 mg/kg) in seven samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 0.92 mg/kg was detected at location 03-03266 in a fill sample at a depth of 0.0–0.17 ft bgs. Mercury was also detected at location 03-608273 along the northern perimeter of the beds at a similar concentration (0.913 mg/kg); however, mercury concentrations decreased to the north at downgradient location 03-608280, which was sampled as part of the investigation for SWMU 03-014(o). As concentrations decreased laterally in all directions from the beds, the lateral extent of mercury is defined. Mercury is not detected above BV in any of the deepest samples collected at SWMUs 03-014(k,l,m,n). The vertical extent of mercury is defined.

Nickel was detected above BVs for soil (15.4 mg/kg) and tuff (6.58 mg/kg) in six samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 30.7 mg/kg was detected at location 03-03202 in a sample at a depth of 0.0–0.33 ft bgs. The highest nickel concentrations occur at sampling locations within the former sludge-drying beds. Nickel is not detected above BV in any of the perimeter locations. Nickel is not detected above BV in any of the deepest samples at SWMUs 03-014(k,l,m,n). The lateral and vertical extent of nickel are defined.

Nitrate was detected in six tuff samples at SWMUs 03-014(k,l,m,n). The concentrations ranged from 1.22 to 1.7 mg/kg. These concentrations reflect naturally occurring concentrations of nitrate. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in two tuff samples at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.000748 mg/kg was detected at location 03-608273 in a sample collected from a depth of 3.0–4.0 ft bgs. Concentrations were below the EDL. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected in at SWMUs 03-014(k,l,m,n) but had DLs (0.6 to 1.23 mg/kg) above BV (0.3 mg/kg) in 20 tuff samples. Because selenium was not detected, the lateral and vertical extent of selenium are defined.

Silver was detected above BVs for soil (1 mg/kg) and tuff (1 mg/kg) in nine samples at SWMUs 03-014(k,l,m,n). The maximum concentration of 18.3 mg/kg was detected at location 03-03266 in a sample at a depth of 0.0–0.17 ft bgs. Silver was also detected at location 03-608273 along the northern perimeter of the beds at a concentration of 6.19 mg/kg; however, silver was not detected above BV in the deepest sample at this location and concentrations decreased to the north at downgradient location 03-608280, which was sampled as part of the investigation for SWMU 03-014(o). Silver is not detected above BV at any other perimeter locations. Because the concentrations decreased laterally in all directions from the beds, the lateral extent of silver is defined. Silver concentrations decreased with depth, except at location 03-03265 where its concentrations increased with depth. The vertical extent of silver is not defined.

Zinc was detected above BVs for soil (48.8 mg/kg) and tuff (63.5 mg/kg) in 11 samples at SWMUs 03-014(k,l,m,n). The maximum concentration of 638 mg/kg was detected at location 03-03202 in a sample collected from a depth of 0.0–0.33 ft bgs. Zinc concentrations decreased in the samples collected around the perimeter of the beds. Zinc concentrations decreased with depth at all locations. The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals detected in soil and tuff at SWMUs 03-014(k,l,m,n) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, carbazole, carbon disulfide, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,4-dichlorobenzene, fluoranthene, fluorene, 2-hexanone, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, naphthalene, phenanthrene, pyrene, TPH-DRO, TPH-lubrication range organic (LRO), and toluene.

Acenaphthene, anthracene, and benzo(g,h,i)perylene were detected in two samples collected from two locations at SWMUs 03-014(k,l,m,n). The maximum concentrations of 2.3 mg/kg, 3.9 mg/kg, and 5.6 mg/kg, respectively, were detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. These organic chemicals were also detected at location 03-608273 along the northern perimeter at concentrations below EQLs. Concentrations decreased laterally in all directions from the beds; therefore, the lateral extent of acenaphthene, anthracene, and benzo(g,h,i)perylene are defined. Acenaphthene, anthracene, and benzo(g,h,i)perylene were not detected in any samples collected below 1.0 ft bgs at SWMUs 03-014(k,l,m,n). The vertical extent of acenaphthene, anthracene, and benzo(g,h,i)perylene is defined.

Acetone was detected in four samples at four locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 2.2 mg/kg was detected at location 03-03202 in a fill sample collected in soil from a depth of 0.0–0.33 ft bgs. Acetone was detected only within the former sludge-drying beds and was not detected at any of the perimeter sampling locations. The lateral extent of acetone is defined. Acetone was not detected in the deepest samples collected from most locations, with the exception of 03-03266 where it was detected at a concentration below the EQL. The vertical extent of acetone is defined.

Aroclor-1254 was detected in 14 samples collected from eight locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 6.5 mg/kg was detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. Concentrations decreased at the perimeter locations, except at location 03-608272 along the western perimeter. The lateral extent of Aroclor-1254 is not defined. Aroclor-1254 concentrations decreased with depth at most locations, with the exception of location 03-03202 where concentrations in tuff increased slightly. The vertical extent of Aroclor-1254 is not defined.

Aroclor-1260 was detected in 17 samples collected from 10 locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.206 mg/kg was detected at location 03-608272 in a soil sample collected from a depth of 0.0–1.0 ft bgs along the western perimeter. Concentrations are generally lower elsewhere around the site, except at location 03-608271 to the south. The lateral extent of Aroclor-1260 is not defined to the west and south. Aroclor-1260 concentrations decreased with depth at all locations; therefore, the vertical extent of Aroclor-1260 is defined.

Benzo(a)anthracene and phenanthrene were detected in two samples at two locations at SWMUs 03-014(k,l,m,n). The maximum concentrations of 11 mg/kg and 22 mg/kg, respectively, were detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. These organic chemicals were also detected at location 03-608272 along the western perimeter at concentrations below the EQL. Concentrations decrease laterally in all directions from the beds; therefore, the lateral extent of benzo(a)anthracene and phenanthrene is defined. Benzo(a)anthracene and phenanthrene were not detected in any samples below 1 ft bgs at SWMUs 03-014(k,l,m,n). The vertical extent of benzo(a)anthracene and phenanthrene is defined.

Benzo(a)pyrene and chrysene were detected in three samples at three locations at SWMUs 03-014(k,l,m,n). The maximum concentrations of 8.3 mg/kg and 9.3 mg/kg, respectively, were detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. These organic chemicals were also detected at locations 03-608272 and 03-608273 along the western and northern perimeter of the sludge beds, respectively, at concentrations below the EQL. Concentrations decreased laterally in all directions from the beds; therefore, the lateral extent of benzo(a)pyrene and chrysene is defined. Benzo(a)pyrene and chrysene were not detected in any samples below 1.0 ft bgs at SWMUs 03-014(k,l,m,n). The vertical extent of benzo(a)pyrene and chrysene is defined.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in four samples at four locations at SWMUs 03-014(k,l,m,n). The maximum concentrations of 15 mg/kg, 24 mg/kg, and 32 mg/kg, respectively, were detected in a soil sample collected from a depth of 0–0.17 ft bgs at location 03-03266. These organic chemicals were also detected at locations 03-608271, 03-608272, and 03-608273 along the southern, western, and northern perimeter, respectively, at concentrations below the EQL. Concentrations decreased laterally in all directions from the beds; therefore, the lateral extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined. Benzo(b)fluoranthene, fluoranthene, and pyrene were not detected in any samples below 1.0 ft bgs at SWMUs 03-014(k,l,m,n). The vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene is defined.

Bis(2-ethylhexyl)phthalate was detected in three samples at two locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 44 mg/kg was detected at location 03-03202 in a fill sample collected from a depth of 0.0–0.33 ft bgs. Bis(2-ethylhexyl)phthalate was not detected in the deepest sample collected from this location. At location 03-03201, approximately 5 ft away, concentrations decreased to 3.1 mg/kg at a depth of 0.0–1.58 ft bgs, and bis(2-ethylhexyl)phthalate was not detected in the deepest samples from this location. Bis(2-ethylhexyl)phthalate was not detected at any perimeter sampling locations or any other locations at SWMUs 03-014(k,l,m,n). The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Butylbenzylphthalate was detected in one sample at SWMUs 03-014(k,l,m,n). The maximum concentration of 30 mg/kg was detected at location 03-03202 in a fill sample collected from 0.0–0.33 ft bgs. Butylbenzylphthalate was not detected at the perimeter sampling locations, nor was it detected in samples at deeper depths at location 03-03202 (samples were collected to 6.0–7.0 ft bgs). The lateral and vertical extent of butylbenzylphthalate are defined.

Carbazole was detected in one sample at SWMUs 03-014(k,l,m,n). The maximum concentration of 3.2 mg/kg was detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. Carbazole was not detected in the deepest sample at this location (1.75–2.75 ft bgs), nor was it detected at the other two locations for which it was sampled within the beds (locations 03-03264 and 03-03265). The lateral extent of carbazole is defined. Carbazole was not detected in the deepest samples collected from location 03-03266; therefore, the vertical extent of carbazole is defined.

Carbon disulfide was detected in three samples at two locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.00978 mg/kg was detected at location 03-03266 in a tuff sample collected from a depth of 4.0–5.0 ft bgs. Carbon disulfide was also detected at location 03-608271 along the southern perimeter at concentrations below the EQL. Concentrations decreased laterally in all directions from the beds; therefore, the lateral extent of carbon disulfide is defined. Concentrations of carbon disulfide decreased with depth and it is not detected in the deepest samples at SWMUs 03-014(k,l,m,n). The vertical extent of carbon disulfide is defined.

Dibenz(a,h)anthracene, dibenzofuran, 1,4-dichlorobenzene, fluorene, indeno(1,2,3-cd)pyrene, and naphthalene were detected in one sample at SWMUs 03-014(k,l,m,n). The maximum concentrations of 1.1 mg/kg, 1.2 mg/kg, 1.4 mg/kg, 2 mg/kg, 4.6 mg/kg, and 0.94 mg/kg, respectively, were detected at location 03-03266 in a fill sample collected from a depth of 0.0–0.17 ft bgs. These organic chemicals were not detected at the perimeter sampling locations, nor were they detected in samples at deeper depths at location 03-03266 (samples were collected to 6.0–7.0 ft bgs). The lateral and vertical extent of dibenz(a,h)anthracene, dibenzofuran, 1,4-dichlorobenzene, fluorene, indeno(1,2,3-cd)pyrene, and naphthalene are defined.

Hexanone(2-) was detected in one sample at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.02 mg/kg was detected in a sample collected in tuff from 4.0–5.0 ft bgs at location 03-03265. Hexanone(2-) was not detected at the perimeter sampling locations, nor was it detected in samples collected from deeper depths at location 03-03265 (collected from depth of 6.0–7.0 ft bgs). The lateral and vertical extent of 2-hexanone are defined.

Isopropyltoluene(4-) was detected in three samples at three locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.0061 mg/kg was detected at location 03-03265 in a tuff sample collected from a depth of 4.0–5.0 ft bgs. Isopropyltoluene(4-) was detected at a lower concentration at location 03-608270 and at a concentration below the EQL at location 03-03266. Because the concentration at 03-608270 along the eastern perimeter was higher than the concentrations around it, the lateral extent of 4-isopropyltoluene is not defined to the east. Concentrations of 4-isopropyltoluene decreased with depth at all locations except 03-03266, where it is detected at a concentration below the EQL. The vertical extent of 4-isopropyltoluene is defined.

TPH-DRO was detected in 17 samples at nine locations at SWMUs 03-014(k,l,m,n). The maximum concentration of 31,000 mg/kg was detected at location 03-03202 in a fill sample collected from a depth of 0.0–0.33 ft bgs. TPH-DRO was detected at a lower concentration (3000 mg/kg) in a sample collected from location 03-03201, approximately 5 ft away. It was also detected at 786 mg/kg at location 03-03265 in a sample collected from a depth of 6.0–7.0 ft bgs. Concentrations of TPH-DRO were highest within the former sludge-drying beds and decreased laterally at the perimeter sampling locations. The lateral extent of TPH-DRO is defined. Concentrations of TPH-DRO decreased with depth at all locations, except for 03-03265. The vertical extent of TPH-DRO is not defined.

TPH-LRO was detected in three samples at SWMUs 03-014(k,l,m,n). However, this detection is probably because of an analytical misinterpretation, and the detections represent constituents associated with TPH-DRO. The analytical laboratory analyzing these samples calibrated for only DRO: a one-point motor

oil standard was analyzed as a response factor for any chromatograghic response outside the diesel range, and that calibration factor was used to give a number for lubricating oil quantitiation. The TPH-LRO results do not meet current Laboratory quality standards and are screening-level only. The lateral and vertical extent of TPH-LRO are defined.

Toluene was detected in one sample at SWMUs 03-014(k,l,m,n). The maximum concentration of 0.004 mg/kg was detected at location 03-03265 in a tuff sample collected from a depth of 2.67–3.67 ft bgs. Toluene was not detected at the perimeter sampling locations, nor was it detected at deeper depths at location 03-03265 (samples were collected to 6.0–7.0 ft bgs). The lateral and vertical extent of toluene are defined.

***Radionuclides***

Radionuclides detected or detected above BVs/FVs at SWMUs 03-014(k,l,m,n) are tritium, uranium-234, uranium-235/236, and uranium-238.

Tritium was detected in seven soil and tuff samples across SWMUs 03-014(k,l,m,n). The maximum concentration of 0.213 pCi/mL was detected at location 03-608270 in a sample collected from a depth of 8.0–9.0 ft bgs. Tritium was not detected at most locations within the beds, with the exception of location 03-03265. Concentrations decreased to the south and west perimeter locations but increased slightly at location 03-608273 along the northern perimeter. However, tritium was detected at a lower concentration at downgradient location 03-608280, which was sampled as part of the investigation for SWMU 03-014(o). The lateral extent of tritium is not defined to the east. Concentrations of tritium increased with depth at location 03-608270. The vertical extent of tritium is not defined.

Uranium-234 was detected above BV (2.59 pCi/g) at SWMUs 03-014(k,l,m,n) in one soil sample. The maximum concentration of 4.72 pCi/g was detected at location 03-608273 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The lateral extent of uranium-234 is not defined. Uranium-234 was not detected above BV in the deepest sample at location 03-608273 (3.0–4.0 ft bgs). The vertical extent of uranium-234 is defined.

Uranium-235/236 and uranium-238 were detected above soil BVs (0.2 pCi/g and 2.29 pCi/g) at SWMUs 03-014(k,l,m,n) in one sample. The maximum concentrations of 0.237 pCi/g and 2.94 pCi/g, respectively, were detected at location 03-608273 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The lateral extent of uranium-235/236 and uranium-238 are not defined. Uranium-235/236 and uranium-238 were not detected above BV in the deepest sample at location 03-608273 (3.0–4.0 ft bgs). The vertical extent of uranium-235/236 and uranium-238 is defined.

#### 6.14.13.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(k) because extent is not defined for the site.

#### 6.14.13.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(k) because extent is not defined for the site.

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

#### 6.14.14.1 Site Description and Operational History

SWMU 03-014(l), structure 03-197, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 6.14-1). The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks (LANL 1993, 020947, pp. 5-46–5-47). SWMU 03-014(l) consists of an unlined sludge drying bed excavated into the tuff. The sludge bed measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-14). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

#### 6.14.14.2 Relationship to Other SWMUs and AOCs

SWMU 03-014(l) is located next to three other sludge drying beds, SWMUs 03-014(k,l,m,n) in the west-central portion of the former WWTP. Sludge was siphoned from the Imhoff tanks, SWMUs 03-014(a) and 03-014(e). All four SWMUs are components of Consolidated Unit 03-014(a)-99.

#### 6.14.14.3 Summary of Previous Investigations

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

Copper, mercury, and silver were each detected above BVs in the fill sample; copper and nickel were detected above BVs in one tuff sample; chromium was detected above BV in the two tuff samples. The DLs for antimony and cadmium were above BVs. Toluene was detected in one tuff sample, and Aroclor-1254 was detected in the fill sample. Tritium was detected in one tuff sample. Pesticides herbicides, isotopic plutonium and uranium, and strontium-90 were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.14.14.4. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(l).

#### 6.14.14.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-014(l). As a result, the following activities were completed as part of the 2009 investigation.

- Sampling was conducted from historical sampling locations and locations around and downgradient of SWMUs 03-014(k,l,m,n). Sampling activities are described in section 6.14.13.4 as part of SWMU 03-014(k).

The 2009 sampling locations at SWMU 03-014(l) are shown in Figure 6.14-1. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(l). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

Field-screening activities are described in section 6.14.13.4 as part of SWMU 03-014(k).

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMUs 03-014(k,l,m,n) consist of 44 samples (18 soil and 26 tuff) collected from 12 locations. Sampling analytical results for SWMU 03-014(l) are described in section 6.14.13.4 as part of SWMU 03-014(k).

#### Nature and Extent of Contamination

SWMUs 03-014(k,l,m,n) were sampled collectively in 2009 per the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721) in an effort to characterize the former sludge-drying beds. All data within and around the perimeter of the beds have been evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(l); therefore, section 6.14.13.4 presents the nature and extent of contamination determination for SWMUs 03-014(k,l,m,n). The extent of contamination is not defined at SWMUs 03-014(k,l,m,n).

### 6.14.14.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(l) because extent is not defined for the site.

### 6.14.14.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(l) because extent is not defined for the site.

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

### 6.14.15.1 Site Description and Operational History

SWMU 03-014(m), structure 03-198, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the former TA-03 WWTP (Figure 6.14-1) (LANL 1993, 020947, pp. 5-46–5-47). The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks. The sludge bed is excavated into the tuff and measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-14). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

### 6.14.15.2 Relationship to Other SWMUs and AOCs

SWMU 03-014(m) is located next to three other sludge drying beds, SWMUs 03-014(k,l,n) in the west-central portion of the former TA-03 WWTP. Sludge was siphoned from the Imhoff tanks, SWMUs 03-014(a) and 03-014(e). All four SWMUs are components of Consolidated Unit 03-014(a)-99.

### 6.14.15.3 Summary of Previous Investigations

During the 1997 Phase I RFI conducted at SWMU 03-014(m), 10 samples were collected from three locations. At one location, one sample was collected from filter (fill) material within the bed, and two

samples were collected from successive 1-ft intervals (in tuff) beneath the bed. All samples from this location were submitted for laboratory analyses of TAL metals, SVOCs, PCBs, herbicides, pesticides, isotopic plutonium and uranium, strontium-90, and tritium. One tuff sample was also submitted for laboratory analysis of VOCs. Filter-material samples were collected from the second location at three successive 0.5–ft intervals and submitted for laboratory analyses of SVOCs and PCBs. Filter-material samples were collected from the third location at four successive 0.5-ft intervals and submitted for laboratory analyses of SVOCs and PCBs.

Cadmium, chromium, copper, lead, mercury, silver, and zinc were detected above BVs in one fill sample; copper was detected above BV in one tuff sample; and chromium and nickel were detected above BVs in the two tuff samples. The DLs for antimony were above BV in all samples. Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, carbazole, chrysene, dibenz(a,h)anthracene, dibenzofuran, 1,4-dichlorobenzene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and Aroclor-1254 were detected in one fill sample. Aroclor-1260 was detected in three fill samples. Herbicides, pesticides, and radionuclides were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.14.15.4. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(m).

### 6.14.15.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-014(m). As a result, the following activities were completed as part of the 2009 investigation.

- Sampling was conducted from historical sampling locations and locations around and downgradient of SWMUs 03-014(k,l,m,n). Sampling activities are described in section 6.14.13.4 as part of SWMU 03-014(k).

The 2009 sampling locations at SWMU 03-014(m) are shown in Figure 6.14-1. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(m). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

Field-screening activities are described in section 6.14.13.4 as part of SWMU 03-014(k).

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMUs 03-014(k,l,m,n) consist of 44 samples (18 soil and 26 tuff) collected from 12 locations. Sampling analytical results for SWMU 03-014(m) are described in section 6.14.13.4 as part of SWMU 03-014(k).

#### Nature and Extent of Contamination

SWMUs 03-014(k,l,m,n) were sampled collectively in 2009 per the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721) in an effort to characterize the former sludge-drying beds. All

data within and around the perimeter of the beds have been evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(m). Therefore, section 6.14.13.4 presents the nature and extent of contamination determination for SWMUs 03-014(k,l,m,n). The extent of contamination is not defined at SWMUs 03-014(k,l,m,n).

#### 6.14.15.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(m) because extent is not defined for the site.

#### 6.14.15.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(m) because extent is not defined for the site.

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

#### 6.14.16.1 Site Description and Operational History

SWMU 03-014(n), structure 03-199, is one of four unlined sludge-drying beds [SWMUs 03-014(k,l,m,n)] associated with the TA-03 WWTP (Figure 6.14-1) (LANL 1993, 020947, pp. 5-46, 5-47). The drying beds, located north of the Imhoff tanks, received sludge siphoned from the Imhoff tanks. The sludge drying bed is excavated into the tuff and measures 40 ft × 20 ft (LANL 1990, 007511, p. 3-014). A 3-ft-high soil berm covered with 2 in. of asphalt separates the beds. The asphalt is broken and cracked in various places, exposing the underlying soil-tuff (LANL 1997, 056660.4, p. 58).

#### 6.14.16.2 Relationship to Other SWMUs and AOCs

SWMU 03-014(n) is located next to three other sludge drying beds, SWMUs 03-014(k,l,m), in the west-central portion of the former WWTP. Sludge was siphoned from the Imhoff tanks, SWMUs 03-014(a) and 03-014(e). All four SWMUs are components of Consolidated Unit 03-014(a)-99.

#### 6.14.16.3 Summary of Previous Investigations

During the 1997 RFI conducted at SWMU 03-014(n), oil was discovered in the sludge bed, which was subsequently remediated in September 1997 (LANL 1997, 056660.4, p. 60). Four samples were collected from two locations. At the first location, one sample collected from the filter (fill) material within the bed and two samples collected from successive 1-ft intervals (in tuff) beneath the bed were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, PCBs, herbicides, pesticides, TPH-DRO, isotopic plutonium and uranium, strontium-90, and tritium. At the second location, one sample collected from the filter material was submitted for laboratory analyses of TAL metals, VOCs, SVOCs, herbicides, pesticides, and TPH-DRO. Four additional soil, fill, and sludge samples collected from a depth of 0 to 0.5 ft bgs following remediation activities were submitted for analysis of TPH-DRO.

Antimony, barium, cadmium, calcium, chromium, lead, and nickel were detected above BVs in one fill sample. Copper, mercury, silver, and zinc were detected above BVs in two fill samples. Chromium, mercury, nickel, and silver were detected above BVs in one tuff sample. Copper was detected above BV in two tuff samples. The DLs for antimony and selenium were above BVs in the tuff samples. Acetone was detected in one fill and one tuff sample; butylbenzylphthalate was detected in one fill sample; and bis(2-ethylhexyl)phthalate was detected in on two fill samples and one tuff sample. TPH-DRO was

detected in three fill samples and two tuff samples; and TPH- LRO was detected in one soil, one sludge, and two fill samples. No radionuclides were detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.14.16.4. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(n).

### 6.14.16.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-014(n). As a result, the following activities were completed as part of the 2009 investigation.

- Sampling was conducted from historical sampling locations and locations around and downgradient of SWMUs 03-014(k,l,m,n). Sampling activities are described in section 6.14.13.4, SWMU 03-014(k).

The 2009 sampling locations at SWMU 03-014(n) are shown in Figure 6.14-1. Table 6.14-24 presents the samples collected and analyses requested at SWMU 03-014(n). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-014(n), a maximum concentration of 3.8 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMUs 03-014(k,l,m,n) consist of 44 samples (18 soil and 26 tuff) collected from 12 locations. Sampling analytical results for SWMU 03-014(n) are described in section 6.14.13.4 as part of SWMU 03-014(k).

#### Nature and Extent of Contamination

SWMUs 03-014(k,l,m,n) were sampled collectively in 2009 per the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721) in an effort to characterize the former sludge-drying beds. All data within and around the perimeter of the beds have been evaluated to determine the nature and extent of contamination at SWMUs 03-014(k,l,m,n), including all data collected for SWMU 03-014(n). Therefore, section 6.14.13.4 presents the nature and extent of contamination determination for SWMUs 03-014(k,l,m,n). The extent of contamination is not defined at SWMUs 03-014(k,l,m,n).

### 6.14.16.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(n) because extent is not defined for the site.

#### 6.14.16.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(n) because extent is not defined for the site.

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

#### 6.14.17.1 Site Description and Operational History

SWMU 03-014(o) consists of three polypropylene-lined sludge-drying beds (structure 03-1871) excavated into tuff at the former TA-03 WWTP (Figure 6.14-1). SWMU 03-014(o) is located north and downslope of the four upper sludge-drying beds [SWMUs 03-014(k,l,m,n)]. The drying beds were constructed in 1987, and each bed measures 22 ft × 60 ft and approximately 8000-gal. capacity of liquid sludge (LANL 1993, 020947, pp. 5-46, 5-47). Berms separating the beds are covered with asphalt, and the asphalt has not deteriorated (LANL 1997, 056660.4, p. 58).

#### 6.14.17.2 Relationship to Other SWMUs and AOCs

SWMU 03-014(o) is located in the northwest corner of the former WWTP. These sludge drying beds received overflow sludge from the Imhoff tanks, SWMUs 03-014(a) and 03-014(e). SWMU 03-014(o) is a component of Consolidated Unit 03-014(a)-99,.

#### 6.14.17.3 Summary of Previous Investigations

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

Lead was detected above BV in one fill sample; cadmium, chromium, and zinc were detected above BVs in two fill samples; and copper, mercury, and silver were detected above BVs in three fill samples. Copper was detected above BV in one tuff sample, silver was detected above BV in two tuff samples, nickel was detected above BV in three tuff samples, and chromium was detected above BV in five tuff samples. The DLs for antimony and cadmium were above BVs in numerous samples. Acetone was detected in one tuff sample; acenaphthylene, anthracene, benzoic acid, carbazole, dibenz(a,h)anthracene, Aroclor-1260, methyl chlorophenoxy acetic acid (MCPA), and 2-(2-methyl-4-chlorophenoxy)propionic acid (MCPP) were each detected in one fill sample. 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 detected in two fill samples. Uranium-234 was detected above BV in one fill sample; strontium-90 was detected above FV in one fill and detected in one tuff sample; and plutonium-239/240 was detected in one tuff sample and detected above FV in two fill samples. Tritium was detected in two fill samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.14.17.4. Table 6.14-28 presents the samples collected and analyses requested at SWMU 03-014(o).

### 6.14.17.4 Site Contamination

#### Soil, Rock, Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-014(o). As a result, the following activities were completed as part of the 2009 investigation.

- Two samples were collected from historical sampling location 03-03204 in the center bed to define the vertical extent of contamination and four samples were collected from two locations from each of the other beds to confirm previous sampling results. Samples were collected from 3.0–4.0 and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, and cyanide.
- Sixteen samples were collected from four perimeter locations to define the lateral and vertical extent of contamination at SWMU 03-014(o). At each location, samples were collected from 0.0–1.0 ft, 1.0–2.0 ft, 4.0–5.0 ft, and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, strontium-90, and tritium.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(o) are shown in Figure 6.14-1. Table 6.14-28 presents the samples collected and analyses requested at SWMU 03-014(o). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-014(o), a maximum concentration of 5.0 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-014(o) consist of 31 samples (6 soil and 25 tuff) collected from nine locations.

##### *Inorganic Chemicals*

Thirty-two samples were analyzed for TAL metals (6 soil and 26 tuff), 22 samples were analyzed for cyanide (3 soil and 19 tuff), 16 samples were analyzed for nitrate (3 soil and 13 tuff), and 16 samples were analyzed for perchlorate (3 soil and 13 tuff). Table 6.14-29 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(o); therefore, inorganic COPCs are not identified for the site.

### *Organic Chemicals*

Twenty-five samples were analyzed for SVOCs (6 soil and 19 tuff), 19 samples were analyzed for VOCs (3 soil and 16 tuff), 9 samples were analyzed for pesticides (3 soil and 6 tuff), 32 samples were analyzed for PCBs (6 soil and 26 tuff), 9 samples were analyzed for herbicides (3 soil and 6 tuff), and 16 samples were analyzed for TPH-DRO (3 soil and 13 tuff). Table 6.14-30 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(o); therefore, organic COPCs are not identified for the site.

### *Radionuclides*

Sixteen samples were analyzed for americium-241 (3 soil and 13 tuff), 25 samples were analyzed for isotopic plutonium (6 soil and 19 tuff), 25 samples were analyzed for strontium-90 (6 soil and 19 tuff), 24 samples were analyzed for tritium (5 soil and 19 tuff), and 9 samples were analyzed for isotopic uranium (3 soil and 6 tuff). Table 6.14-31 summarizes the analytical results for radionuclides. Plate 20 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(o); therefore, radionuclide COPCs are not identified for the site.

## Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals and radionuclides at SWMU 03-014(o) are not defined, as discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at SWMU 03-014(o) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, chromium, copper, cyanide, lead, mercury, nickel, nitrate, selenium, silver, and zinc.

Antimony was not detected in soil at SWMU 03-014(o) but had DLs (1.03 to 5.38 mg/kg) above BV (0.83 mg/kg) in 6 soil samples and 23 tuff samples. Because antimony was not detected at SWMU 03-014(o), the lateral and vertical extent of antimony are defined.

Cadmium was detected above BV (0.4 mg/kg) in two soil samples at SWMU 03-014(o). The maximum concentration of 2.5 mg/kg was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. Cadmium was not detected above BV in deeper samples at any location. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum site concentration did not exceed the maximum background concentration (2.6 mg/kg) for cadmium in soil (Figure H-35). The current site data at SWMU 03-014(o) for cadmium in soil are not different than background. The lateral and vertical extent of cadmium are defined.

Chromium was detected above BVs for soil (19.3 mg/kg) and tuff (7.14 mg/kg) in 13 samples across SWMU 03-014(o). The maximum concentration of 136 mg/kg was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. The highest chromium concentrations were within the former sludge-drying beds. Chromium concentrations generally decreased in the samples collected along the perimeter of the beds (locations 03-608277, 03-608278, 03-608279, and 03-608280). Concentrations at locations 03-608277, 03-608278, and 03-608280 were less than the maximum background

concentrations. However, at location 03-608279 to the west of the maximum concentration, chromium was detected at the deepest depth (6.0–7.0 ft bgs) at a concentration of 17.6 mg/kg in tuff. The lateral extent of chromium is defined. At sampling locations within the beds, chromium concentrations decreased with depth. The vertical extent of chromium is not defined at the site.

Copper and silver were detected above BVs for soil (14.7 mg/kg and 1 mg/kg, respectively) and tuff (4.66 mg/kg and 1 mg/kg) in 11 and 12 samples, respectively, across SWMU 03-014(o). The maximum concentrations (122 mg/kg and 71.3 mg/kg, respectively) were detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. Copper and silver concentrations decreased laterally in samples collected from locations around the perimeter of the beds. Further, copper and silver concentrations decreased with depth at all locations. The lateral and vertical extent of copper and silver are defined.

Cyanide was detected above BV (0.5 mg/kg) in one soil sample at SWMU 03-014(o). The maximum concentration of 2.7 mg/kg was detected at location 03-608280 in a sample collected from a depth of 0.0–1.0 ft bgs. This location is immediately north and downslope of SWMUs 03-014(k,l,m,n). Cyanide was detected at a higher concentration (9.48 mg/kg) in a sample collected from the top of the slope (upgradient to the south) as part of the investigation of those sludge beds. Cyanide was not detected above BV at any other locations to the north, east, or south. Cyanide concentrations decreased with depth at location 03-608280. The lateral and vertical extent of cyanide are defined at SWMU 03-014(o).

Lead was detected above BVs for soil (22.3 mg/kg) and tuff (11.2 mg/kg) in three samples at SWMU 03-014(o). The maximum concentration of 45.1 mg/kg was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. Lead concentrations decreased laterally in samples collected from locations along the perimeter of the beds. Lead concentrations decreased with depth at all locations. The lateral and vertical extent of lead are defined.

Mercury was detected above BVs for soil and tuff in five samples at SWMU 03-014(o). The maximum concentration of 3.8 mg/kg was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. The locations with the highest mercury concentrations were the historical sampling locations within the three beds. Mercury concentrations decreased at locations 03-608278 and 03-608281 along the perimeter of the site. Mercury was not detected above BV in any of the deepest samples. The lateral and vertical extent of mercury are defined.

Nickel was detected above BV (6.58 mg/kg) in three tuff samples at SWMU 03-014(o). The maximum concentration of 11.4 mg/kg was detected at location 03-03205 in a sample collected from a depth of 1.25–2.25 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of nickel are not different than background (Table H-6 and Figure H-36). The lateral and vertical extent of nickel are defined.

Nitrate was detected in one soil sample at SWMU 03-014(o). The maximum concentration of 3.71 mg/kg was detected at location 03-608280 in a sample collected from a depth of 0.0–1.0 ft bgs. This concentration reflects naturally occurring levels of nitrate. The lateral and vertical extent of nitrate are defined at SWMU 03-014(o).

Selenium was not detected in tuff at SWMU 03-014(o) but had DLs (1.01 to 1.09 mg/kg) above BV (0.3 mg/kg) in 19 tuff samples. Because selenium was not detected at SWMU 03-014(o), the lateral and vertical extent of selenium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in three samples at SWMU 03-014(o). The maximum concentration of 131 mg/kg was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. Zinc was also detected above BV within the bed at location 03-03203 and south of the beds

at location 03-608280. Zinc concentrations decreased upgradient to the south of 03-608280. Zinc was not detected above BV in the perimeter locations to the west, north, and east of the beds. Zinc concentrations decreased with depth at all locations. The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals detected in soil and tuff at SWMU 03-014(o) are acenaphthene, acenaphthylene, acetone, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, carbazole, chrysene, dibenz(a,h)anthracene, fluoranthene, 2-hexanone, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, MCPA, MCPP, methylene chloride, phenanthrene, pyrene, and TPH-DRO.

Acenaphthene was detected at a concentration of 0.1 mg/kg in one sample. However, the sample was collected from the deepest interval (6.0–7.0 ft bgs) at location 03-608277 on the eastern perimeter of the beds. The lateral and vertical extent of acenaphthene are not defined.

Acenaphthylene, anthracene, carbazole, and dibenz(a,h)anthracene were detected in one sample collected from 0.0-0.75 ft bgs at location 03-03205. The concentrations decreased with depth and at the perimeter sampling locations. The lateral and vertical extent of acenaphthylene, anthracene, carbazole, and dibenz(a,h)anthracene are defined.

Acetone was detected in three samples at three locations at SWMU 03-014(o), with a maximum concentration of 0.00257 mg/kg in a sample collected from the deepest interval (6.0-7.0 ft bgs) at location 03-608279. The other acetone concentrations were also in the deepest samples analyzed for VOCs at the other locations (2.25–3.25 ft bgs at location 03-03205 and 6.0–7.0 ft bgs at location 03-608278). Concentrations are below the EQLs. The lateral and vertical extent of acetone are defined.

Aroclor-1242 was detected in two samples at two locations at SWMU 03-014(o).The maximum concentration of 0.0918 mg/kg was detected at location 03-608279 in a sample collected in tuff from a depth of 1.0–2.0 ft bgs. Aroclor-1242 was not detected in the deepest samples collected from both locations; therefore, the vertical extent of Aroclor-1242 is defined. However, the maximum concentration was of Aroclor-1242 detected in a sample collected from the western perimeter (location 03-608279). The lateral extent of Aroclor-1242 is not defined.

Aroclor-1254 was detected in 17 soil and tuff samples at six locations at SWMU 03-014(o). The maximum concentration of 0.551 mg/kg was detected in a sample collected in tuff from 4.0–5.0 ft bgs at location 03-608278 (the northern perimeter location). Aroclor-1254 concentrations decreased in the samples collected farthest downcanyon in the drainage to the north as part of the investigation for SWMU 03-014(u) (locations 03-608287 and 03-609990). However, the lateral extent of Aroclor-1254 is not defined to the east, south, and west of the beds. Aroclor-1254 concentrations decreased with depth at location 03-608278 but increased with depth at locations 03-608277 and 03-608279. The vertical extent of Aroclor-1254 is not defined.

Aroclor-1260 was detected in 20 soil and tuff samples at seven locations at SWMU 03-014(o). The maximum concentration of 1.22 mg/kg was detected in a soil sample collected from location 03-03205 in from a depth of 0.0–0.75 ft bgs. Aroclor-1260 is detected at lower concentrations in the samples collected around the perimeter of the beds; therefore, the lateral extent of Aroclor-1260 is defined. Aroclor-1260 concentrations decreased with depth at location 03-608276 but increased with depth at locations 03-608277 and 03-608279. The vertical extent of Aroclor-1254 is not defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected at their maximum concentrations at location 03-03205 in a soil sample collected from a depth of 0–0.75 ft bgs. Concentrations decreased with depth. In addition, the concentrations of most of these organic chemicals decreased in the perimeter locations. Benzo(b)fluoranthene and fluoranthene were detected at higher concentrations in the southern perimeter location (03-608280); however, the concentrations were lower than in samples collected from the upgradient location 03-608273 to the south, collected as part of the investigation for SWMUs 03-014(k,l,m,n). The lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene are defined.

Bis(2-ethylhexyl)phthalate was detected at two locations at SWMU 03-014(o) at concentrations below the EQL. Concentrations decreased with depth at location 03-608280. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Hexanone(2-) was detected in one sample at SWMU 03-014(o) at a concentration below the EQL. The lateral and vertical extent of 2-hexanone are defined.

Isopropyltoluene(4-) was detected in a single sample at SWMU 03-014(o) at a concentration below the EQL and decreasing with depth. The lateral and vertical extent of 4-isopropyltoluene are defined.

MCPA was detected at a concentration of 0.956 mg/kg in one sample. The concentration was detected in a sample collected in soil from 0.0–0.75 ft bgs at location 03-03205. MCPA was not detected in the deepest sample for which it was analyzed at this location (2.25–3.25 ft bgs) nor in any of the other samples from locations within the beds. The lateral and vertical extent of MCPA are defined.

MCPP was detected at a concentration of 0.993 mg/kg in one sample collected in soil from 0.0–0.83 ft bgs at location 03-03204. MCPP was not detected in the deepest sample for which it was analyzed at this location (2.75–3.75 ft bgs) nor in any of the other samples from locations within the beds. The lateral and vertical extent of MCPP are defined.

Methylene chloride was detected in 13 samples at four locations at SWMU 03-014(o) at concentrations below the EQL. Concentrations decreased with depth. The lateral and vertical extent of methylene chloride are defined.

TPH-DRO was detected in seven samples at three locations at SWMU 03-014(o). The maximum concentration of 7.79 mg/kg was detected in a sample collected in tuff from 4.0-5.0 ft bgs at location 03-608278 (the northern perimeter location). TPH-DRO concentrations decreased in the samples collected farthest downcanyon in the drainage to the north as part of the investigation for SWMU 03-014(u) (location 03-609990). The lateral extent of TPH-DRO is defined. TPH-DRO concentrations decreased with depth. The vertical extent of TPH-DRO is defined.

### *Radionuclides*

Radionuclides detected or detected above BVs/FVs at SWMU 03-014(o) are plutonium-239/240, strontium-90, tritium, and uranium-234.

Plutonium-239/240 was detected above the FV or at depths where FVs are not applicable in three samples at SWMU 03-014(o). The maximum activity of 0.186 pCi/g was detected at location 03-03205 in a sample collected in tuff from a depth of 1.25–2.25 ft bgs. It was also detected above the FV in soil at location 03-03203 at an activity of 0.088 pCi/g. Plutonium-239/240 was not detected in the deepest

samples collected from these locations (2.25–3.25 ft bgs and 2.5–3.5 ft bgs, respectively) or in samples collected from the perimeter locations. The lateral and vertical extent of plutonium-239/240 are defined.

Strontium-90 was detected above the FV or at depths where FVs are not applicable in two samples at SWMU 03-014(o). The maximum activity of 8.01 pCi/g was detected at location 03-03205 in a sample collected in soil from a depth of 0.0–0.75 ft bgs. Strontium-90 was also detected at 3.2 pCi/g at location 03-03204 in a sample collected in tuff from 1.75–2.75 ft bgs. Strontium-90 was not detected at the deepest samples collected from these locations (2.25–3.25 ft bgs and 5.0–6.0 ft bgs, respectively) or in samples collected from the perimeter locations. The lateral and vertical extent of strontium-90 are defined.

Tritium was detected in three soil and four tuff samples at SWMU 03-014(o). The maximum activity in soil of 2.906 pCi/mL was detected at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. Tritium activities decreased in the northern, southern, and eastern perimeter sampling locations (03-608278, 03-608280, and 03-608277, respectively); therefore, the lateral extent of tritium is defined. Tritium decreased or was not detected in the deepest samples at all locations. The vertical extent of tritium is defined.

Uranium-234 was detected above BV (2.59 pCi/g) in one sample at SWMU 03-014(o), at an activity of 2.68 pCi/g at location 03-03205 in a sample collected from a depth of 0.0–0.75 ft bgs. The activity is similar to BV. Uranium-234 was not detected in the deepest sample collected from this location (2.25–3.25 ft bgs). The lateral and vertical extent of uranium-234 are defined.

#### 6.14.17.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(o) because extent is not defined for the site.

#### 6.14.17.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(o) because extent is not defined for the site.

### 6.14.18 SWMU 03-014(p), Structure Associated with Former WWTP

#### 6.14.18.1 Site Description and Operational History

SWMU 03-014(p) is an active sanitary wastewater lift station (structure 03-265) located beneath asphalt paving next to the south side of building 03-223, the Utilities and Infrastructure building at TA-03 (Figure 6.14-1). The lift station was constructed in 1966 of reinforced concrete built over a 42-in.-diameter cast-iron basin. The structure measures 6 ft × 10 ft × 5 ft (LANL 1990, 007511, p. 3-014). From the mid-1970s, the lift station pumped sanitary wastewater from building 03-223 to the former TA-03 WWTP. In 1992, when the TA-46 SWSC Plant came online, the lift station discontinued pumping wastewater to the TA-03 WWTP and began pumping wastewater to the TA-46 SWSC Plant. SWMU 03-014(p) is still active and continues to pump sanitary wastewater from building 03-223 to the TA-46 SWSC (LANL 2008, 099214).

#### 6.14.18.2 Relationship to Other SWMUs and AOCs

Wastewater from SWMU 03-014(p) was previously pumped to the headworks, SWMU 03-014(i), of the former TA-03 WWTP.

#### 6.14.18.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(p).

#### 6.14.18.4 Delayed Site Investigation Rationale

No sampling was conducted at this SWMU during the 2009 investigation because it is an active lift station located within a utility corridor next to an active facility. The approved investigation work plan proposed site characterization activities for SWMU 03-014(p) be delayed until the structure is removed (LANL 2008, 103404; NMED 2008, 102721). Available information, including the characteristics of the wastewater managed by the lift station, indicates a very low likelihood of past releases of hazardous chemicals to the environment. Even if a release had occurred, any residual contamination would be located beneath paved areas, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation that could cause migration of contaminants.

The potential for releases of hazardous constituents and/or radionuclides is very low because of the nature of the wastewater received by the lift station. The sanitary lift station and associated drainlines are tied to drains in building 03-223 restrooms, water fountains, and equipment rooms containing hot water heaters and boilers and, therefore, have managed only sanitary wastewater (Santa Fe Engineering Ltd. 1993, 064050). Discharge of hazardous chemicals and radionuclides to the system is prohibited by Laboratory procedures. No releases to the environment from the SWMU 03-014(p) sanitary wastewater lift station were reported or documented, and the likelihood of undetected releases is very remote. The lift station and drainlines are equipped with alarms to prevent overflow and will continue to be maintained and monitored for as long as the lift station is operational. For these reasons, it is proposed that site characterization and investigation be delayed until D&D of building 03-223 and lift station 03-265 have been completed.

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

#### 6.14.19.1 Site Description and Operational History

SWMU 03-014(u) is the former location of a 1500-gal. holding tank (structure 03-1901) that collected effluent from the former TA-03 WWTP sludge beds [SWMUs 03-014(k,l,m,n,o)]. The holding tank was located approximately 50 ft northeast of the chlorination system dosing and contact chamber (Figure 6.14-1). The tank was installed in 1988 (LANL 1990, 007511, p. 3-014). Effluent from the sludge beds flowed through a subsurface drain system to the tank. The contents of the holding tank were recirculated by truck to the head of the plant for additional treatment (LANL 1993, 020947, p. 5-47). The SWMU 03-014(u) holding tank was removed in 1992 following the decommissioning of the TA-03 WWTP (LANL 2008, 099214).

#### 6.14.19.2 Relationship to Other SWMUs and AOCs

Wastewater from the former sludge drying beds, SWMUs 03-014(k,l,m,n,o), was collected in the SWMU 03-014(u) holding tank and trucked back to the WWTP headworks at SWMU 03-014(i). SWMU 03-014(u) is located on the north side of the former TA-03 WWTP, next to AOC 03-014(c2) and is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.19.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(u).

### 6.14.19.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-014(u) to assess potential contamination:

- Five samples were collected from three locations within and next to the location of the former tank and drainline. Samples were collected from 0.0–1.0 ft bgs, at the base of the tank, and at the soil-tuff interface. Only one sample was collected at location 03-608283 (see deviations in Appendix B). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium. One sample was also analyzed for strontium-90.
- Ten samples were collected from five locations in the drainage north of the site. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, nitrate, cyanide, perchlorate, americium-241, isotopic plutonium, and isotopic uranium. Four samples were also analyzed for strontium-90.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-014(u) are shown in Figure 6.14-1. Table 6.14-32 presents the samples collected and analyses requested at SWMU 03-014(u). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-014(u), a maximum concentration of 162 ppm was detected at a depth of 0.0–1.0 ft bgs and in the corresponding field duplicate sample. These samples (RE03-09-13799 and RE03-10-5399, respectively) were submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-014(u) consist of 15 samples (10 soil and 5 tuff) collected from eight locations.

##### *Inorganic Chemicals*

Fifteen samples (10 soil and 5 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 6.14-33 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(u); therefore, inorganic COPCs are not identified for the site.

### *Organic Chemicals*

Fifteen samples (10 soil and 5 tuff) were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.14-34 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(u); therefore, organic COPCs are not identified for the site.

### *Radionuclides*

Fifteen samples were analyzed for americium-241 (10 soil and 5 tuff), 15 samples were analyzed for isotopic plutonium (10 soil and 5 tuff), 5 samples were analyzed for strontium-90 (3 soil and 2 tuff), and 10 samples were analyzed for isotopic uranium (7 soil and 3 tuff). Table 6.14-35 summarizes the analytical results for radionuclides. Plate 20 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-014(u); therefore, radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-014(u) are not defined. The nature and extent of radionuclides are defined. All chemicals are discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in soil and tuff samples at SWMU 03-014(u) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, chromium, copper, cyanide, lead, manganese, mercury, nitrate, selenium, silver, and zinc.

Antimony was not detected in soil or tuff at SWMU 03-014(u) but had DLs above BVs in all samples. Because antimony was not detected at SWMU 03-014(u), the lateral and vertical extent of antimony are defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in one sample at SWMU 03-014(u) at a concentration of 1.66 mg/kg at location 03-608281in a sample collected from a depth of 0.0–1.0 ft bgs. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the sampling result did not exceed the maximum background concentration of cadmium in soil (2.6 mg/kg) (Figure H-37). The current site data at SWMU 03-014(u) for cadmium in soil is not different than background. The lateral and vertical extent of cadmium are defined.

Chromium was detected above BVs for soil (19.3 mg/kg) and tuff (7.14 mg/kg) in three samples at SWMU 03-014(u). The maximum concentration of 168 mg/kg was detected at location 03-608281 in a sample collected from a depth of 0.0–1.0 ft bgs. Chromium was also detected above BV in the deepest sample collected from location 03-608287 at a depth of 1.0–2.0 ft bgs. Concentrations decreased with depth at locations 03-608281 and were below the maximum background concentration at location 03-608287. Chromium is not detected above BV at location 03-608283, which is slightly downgradient and approximately 25 ft away from the maximum concentration at location 03-608281. Additionally, chromium is not detected above BV at location 03-609990 downcanyon from location 03-608287. The lateral and vertical extent of chromium are defined.

Copper was detected above BVs for soil (14.7 mg/kg) and tuff (4.66 mg/kg) in two samples at location 03-608281 at SWMU 03-014(u). The maximum concentration of 224 mg/kg was detected in a sample

collected in soil from a depth of 0.0–1.0 ft bgs. The concentration of copper decreased with depth. Copper was not detected above BV in samples collected from location 03-608283, which is slightly downgradient and approximately 25 ft away, nor was it detected above BV in downcanyon samples. The lateral and vertical extent of copper are defined.

Cyanide was detected above BV for tuff (0.5 mg/kg) in two samples at SWMU 03-014(u). The maximum concentration of 27.7 mg/kg was detected at location 03-608281 in the deepest sample collected from a depth of 1.0–2.0 ft bgs. The other cyanide concentration of 1.1 mg/kg was detected at location 03-608284 in the deepest sample collected (1.0–2.0 ft bgs). The vertical extent of cyanide is not defined. Cyanide was not detected above BV at location 03-608283, which is slightly downgradient of and approximately 25 ft away from the maximum cyanide concentration, and was not detected in samples at location 03-609990 downcanyon. The lateral extent of cyanide is defined.

Lead was detected above BVs for soil (22.3 mg/kg) and tuff (11.2 mg/kg) in four samples at three locations at SWMU 03-014(u). The maximum concentration of 116 mg/kg was detected at location 03-608281 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth. Lead was also detected above BV at locations 03-608287 and 03-608284 from a sample collected from a depth of 1.0–2.0 ft bgs. The vertical extent of lead is not defined. Lead was not detected above BV at location 03-608283, which is slightly downgradient of and approximately 25 ft away from the maximum lead concentration. Additionally lead was not detected above BV in samples at location 03-609990, downcanyon from location 03-608287. The lateral extent of lead is defined.

Manganese was detected above BV for tuff (482 mg/kg) in one sample at SWMU 03-014(u), with a concentration of 500 mg/kg at location 03-608286 in a sample collected from a depth of 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. The sampling result did not exceed the maximum background concentration of manganese in tuff (752 mg/kg) (Figure H-37). The current site data at SWMU 03-014(u) for manganese in tuff is not different than background. The lateral and vertical extent of manganese are defined.

Mercury was detected above BVs for soil (0.1 mg/kg) and tuff (0.1 mg/k) in four samples at three locations at SWMU 03-014(u). The maximum concentration of 1.99 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations of mercury decreased with depth at all locations. Mercury was not detected above BV at location 03-608283, which is slightly downgradient of and approximately 25 ft away from the maximum concentration. Additionally, mercury was not detected above BV at location 03-608290 downcanyon. The lateral and vertical extent of mercury are defined.

Nitrate was detected at location 03-608281 at SWMU 03-014(u) at a concentration of 4.11 mg/kg in one soil sample collected from a depth of 0.0–1.0 ft bgs. Nitrate was not detected in the deepest sample collected from that location. Concentrations reflect naturally occurring levels of nitrate. The lateral and vertical extent of nitrate are defined.

Selenium was not detected at SWMU 03-014(u), but had DLs (0.992 to 1.14 mg/kg) above BV for tuff (0.3 mg/kg) in five tuff samples. The lateral and vertical extent of selenium are defined.

Silver was detected above BVs for soil (1 mg/kg) and tuff (1 mg/kg) in four samples at SWMU 03-014(u). The maximum concentration of 66.7 mg/kg was detected at location 03-608281 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations of silver decreased with depth at all locations. Silver was not detected above BV at location 03-608283, which is slightly downgradient of and approximately 25 ft away from the maximum silver concentration. Additionally, silver was not detected above BV at location 03-608290 downcanyon. The lateral and vertical extent of silver are defined.

Zinc was detected above BVs for soil (48.8 mg/kg) and tuff (63.5 mg/kg) in five samples at SWMU 03-014(u). The maximum concentration of 110 mg/kg was detected at location 03-608281 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations of zinc decreased with depth at all locations. Zinc was not detected above BV at location 03-608283, which is slightly downgradient of and approximately 25 ft away from the maximum concentration. Additionally, zinc was not detected above BV at location 03-609990 downcanyon. The lateral and vertical extent of zinc are defined.

***Organic Chemicals***

Organic chemicals detected in soil and tuff at SWMU 03-014(u) are acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, diethylphthalate, fluoranthene, indeno(1,2,3-cd)pyrene, methylene chloride, phenanthrene, pyrene, and TPH-DRO.

Acenaphthene was detected at SWMU 03-014(u) at a concentration of 0.0377 mg/kg at location 03-608284 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Acenaphthene was not detected at location 03-608285, which is downgradient in the canyon bottom. Acenaphthene was not detected in the deepest sample collected from 03-608284 at a depth of 1.0–2.0 ft bgs. The lateral and vertical extent of acenaphthene are defined.

Anthracene was detected at two locations at SWMU 03-014(u). Concentrations decreased with depth and downgradient. The lateral and vertical extent of anthracene are defined.

Aroclor-1254 and Aroclor-1260 were detected in all samples at SWMU 03-014(u). The maximum concentrations of 0.581 mg/kg and 0.417 mg/kg, respectively, were detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased to the farthest downgradient location (03-609990). The lateral extent of Aroclor-1254 and Aroclor-1260 is defined. Aroclor-1254 and Aroclor-1260 concentrations increased with depth at location 03-608282. The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined.

Benzo(a)anthracene was detected in six samples at three locations at SWMU 03-014(u). The maximum concentration of 0.0774 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth and downgradient. The lateral and vertical extent of benzo(a)anthracene are defined.

Benzo(a)pyrene was detected in nine samples at six locations at SWMU 03-014(u). The maximum concentration of 0.114 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased laterally downgradient. The lateral extent of benzo(a)pyrene is defined. Concentrations decreased with depth at all locations. The vertical extent of benzo(a)pyrene is defined.

Benzo(b)fluoranthene was detected in 10 samples at six locations at SWMU 03-014(u). The maximum concentration of 0.257 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Benzo(b)fluoranthene was not detected at location 03-609990 downcanyon, and concentrations decreased with depth at all locations. The lateral and vertical extent of benzo(b)fluoranthene are defined.

Benzo(g,h,i)perylene was detected in six samples at five locations at SWMU 03-014(u). The maximum concentration of 0.0968 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased laterally downcanyon and decreased with depth at all locations. The lateral and vertical extent of benzo(g,h,i)perylene are defined.

Bis(2-ethylhexyl)phthalate was detected in two samples at location 03-608281. The maximum concentration of 0.341 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0-1.0 ft bgs. Concentrations decreased with depth and downcanyon. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Chrysene was detected in nine samples at six locations at SWMU 03-014(u). The maximum concentration of 0.121 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Chrysene was not detected at location 03-609990 downcanyon. Concentrations of chrysene decreased with depth at all locations. The lateral and vertical extent of chrysene are defined.

Dibenz(a,h)anthracene and diethylphthalate were detected in one sample at SWMU 03-014(u). Concentrations decreased with depth and laterally downcanyon. The lateral and vertical extent are defined.

Diethylphthalate was detected in one sample at location 03-608287. The maximum concentration was 0.0916 mg/kg in a sample collected from a depth of 0.0–1.0 ft bgs. Diethylphthalate was not detected in the deeper sample at this location or at any other locations. The lateral and vertical extent of diethylphthalate are defined.

Fluoranthene was detected in 11 samples at 7 locations at SWMU 03-014(u). The maximum concentration of 0.159 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Fluoranthene concentrations decreased at location 03-609990 downcanyon. Concentrations of fluoranthene decreased with depth at all locations, except location 03-609990. The concentration in the deepest sample at this location was below the EQL. The lateral and vertical extent of fluoranthene are defined.

Indeno(1,2,3-cd)pyrene was detected in six samples collected from five locations at SWMU 03-014(u). The maximum concentration of 0.0882 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased laterally downcanyon and decreased with depth at all locations. The lateral and vertical extent of indeno(1,2,3-cd)pyrene are defined.

Methylene chloride was detected in four samples collected from three locations at SWMU 03-014(u). Concentrations were below the EQL. The lateral and vertical extent of methylene chloride are defined.

Phenanthrene was detected in eight samples collected from five locations at SWMU 03-014(u). The maximum concentration of 0.0728 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Phenanthrene was also detected at a concentration of 0.0403 mg/kg at location 03-608285 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The concentration of phenanthrene decreased with depth at all locations. Phenanthrene concentrations decreased downcanyon. The lateral and vertical extent of phenanthrene are defined.

Pyrene was detected in 11 samples collected from seven locations at SWMU 03-014(u). The maximum concentration of 0.179 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Pyrene concentrations decreased downcanyon to location 03-609990 and decreased with depth at all locations, except location 03-609990. The concentration at the deepest sample at this location was below the EQL. The lateral and vertical extent of pyrene are defined.

TPH-DRO was detected in all samples at SWMU 03-014(u). The maximum concentration of 270 mg/kg was detected at location 03-608281 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations of TPH-DRO decreased downgradient of location 03-608281 to location 03-609990, the

farthest downcanyon sample. The lateral extent of TPH-DRO is defined. Concentrations of TPH-DRO decreased with depth at all locations, except location 03-609990. The vertical extent of TPH-DRO is not defined.

***Radionuclides***

Plutonium-238 was detected above the FV (0.023 pCi/g) at SWMU 03-014(u) in one soil sample. The activity of 0.0285 pCi/g was detected at location 03-608281 in a sample collected from a depth of 0.0–1.0 ft bgs. Activities decreased with depth and laterally. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background activity of plutonium-238 in soil (0.037 pCi/g) (Figure H-38). The current site data at SWMU 03-014(u) for plutonium-238 in soil are not different than background. The lateral and vertical extent of plutonium-238 are defined.

#### 6.14.19.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-014(u) because extent is not defined for the site.

#### 6.14.19.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-014(u) because extent is not defined for the site.

### 6.14.20 SWMU 03-056(d), Drum Storage

#### 6.14.20.1 Site Description and Operational History

SWMU 03-056(d) is a drum-storage area located on the northeast side of the inactive Plant 1 trickling filter [SWMU 03-014(c)] associated with the former TA-03 WWTP (Figure 6.14-1). Use of the storage area began in 1965. The storage area consists of an asphalt base and two bermed areas that measure 25 ft × 5 ft × 10 in. deep. The berms were constructed in 1989. The asphalt floor of the bermed area was covered with oil-absorbing material (LANL 1995, 057590, p. 6-48). Before 1989, only containers of lubricating oil were stored at this site. Inactive containers were placed on pallets over bare soil. Active containers were mounted in racks with drip pans beneath. Use of the storage area ceased in 1992 when the TA-46 SWSC Plant came online, and the TA-03 WWTP was decommissioned.

#### 6.14.20.2 Relationship to Other SWMUs and AOCs

SWMU 03-056(d) is located between the inactive trickling filter, SWMU 03-014(c), and the inactive secondary clarifying tank, SWMU 03-014(d) at the former TA-03 WWTP. Materials used at the former TA-03 WWTP were stored at the SWMU 03-056(d) storage area, which is a component of Consolidated Unit 03-014(a)-99.

#### 6.14.20.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-056(d).

#### 6.14.20.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-056(d) to assess potential contamination.

- Two samples were collected from one location. Samples were collected from 0.0–1.0 ft bgs and at the soil-tuff interface. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at SWMU 03-056(d) is shown in Figure 6.14-1. Table 6.14-36 presents the samples collected and analyses requested at SWMU 03-056(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening at SWMU 03-056(d), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-056(d) consist of two soil samples collected from one location.

***Inorganic Chemicals***

Two soil samples were analyzed for TAL metals and cyanide. Table 6.14-37 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 18 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-056(d); therefore, inorganic COPCs are not identified for the site.

***Organic Chemicals***

Two soil samples were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.14-38 summarizes the analytical results for detected organic chemicals. Plate 19 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-056(d); therefore, organic COPCs are not identified for the site.

**Nature and Extent of Contamination**

The extent of inorganic and organic chemicals at SWMU 03-056(d) is not defined, as discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in soil samples at SWMU 03-056(d) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, chromium, copper, cyanide, mercury, silver, and zinc.

Antimony was not detected in soil at SWMU 03-056(d) but had DLs (1.07 mg/kg) above BV (0.83 mg/kg) in two soil samples. Because antimony was not detected at SWMU 03-056(d), the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 03-056(d) but had one DL (0.533 mg/kg) above BV. Because cadmium was not detected at SWMU 03-056(d), the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV (19.3 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 22.6 mg/kg at location 03-608288 in a sample collected from a depth of 3.0–4.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. The sampling result did not exceed the maximum background concentration of chromium in soil (36.5 mg/kg) (Figure H-39). The current site data at SWMU 03-056(d) for chromium in soil are not different than background. The lateral and vertical extent of chromium are defined.

Copper was detected above BV (14.7 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 21.8 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of copper is not defined. Copper concentrations decreased or copper was not detected above BV in samples collected to the north, northeast, and south as part of the investigations of SWMUs 03-014(c), 03-014(g), 03-014(d), 03-014(h), and 03-014(j) (locations 03-608247, 03-608256, and 03-608263, respectively). However, samples were not collected to the west of location 03-608288. The lateral extent of copper is not defined at SWMU 03-056(d).

Cyanide was detected above BV (0.5 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 0.554 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of cyanide is not defined. Cyanide was not detected above BV at location 03-608263 to the north or location 03-608288 to the northeast [sampled as part of the investigations of SWMUs 03-014(c), 03-014(g), 03-014(d), and 03-014(h), respectively]. Cyanide was detected at higher concentrations at location 03-608247 to the south [sampled as part of the investigation for SWMUs 03-014(c) and 03-014(g)]. Samples were not collected to the west of location 03-608288. The lateral extent of cyanide is not defined at SWMU 03-056(d).

Mercury was detected above BV (0.1 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 0.161 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs). The vertical extent of mercury is not defined. Mercury was not detected above BV at location 03-608263 to the north or location 03-608288 to the northeast. Mercury was detected at a higher concentration at location 03-608247 to the south. Samples were not collected to the west of location 03-608288. The lateral extent of mercury is not defined.

Silver was detected above BV (1 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 12 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of silver is not defined. Silver concentrations decreased or silver was not detected above BV in samples collected to the north, northeast, and south at locations 03-608247, 03-608256, and

03-608263, respectively. However, samples were not collected to the west of location 03-608288. The lateral extent of silver is not defined.

Zinc was detected above BV (48.8 mg/kg) in one soil sample at SWMU 03-056(d) at a concentration of 52.3 mg/kg at location 03-608288 in the deepest sample collected (3.0–4.0 ft bgs). Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-39). The current site data at SWMU 03-056(d) for zinc in soil are not different than background. The lateral and vertical extent of zinc are defined.

***Organic Chemicals***

Organic chemicals detected in soil and tuff at SWMU 03-056(d) are Aroclor-1254, Aroclor-1260, and TPH-DRO.

Aroclor-1254 was detected in one sample at SWMU 03-056(d) at a concentration of 0.0539 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of Aroclor-1254 is not defined. Aroclor-1254 was not detected at location 03-608263 to the north or location 03-608288 to the northeast; it was detected at higher concentrations at location 03-608247 to the south. Samples were not collected to the west of location 03-608288. The lateral extent of Aroclor-1254 is not defined.

Aroclor-1260 was detected in two samples at SWMU 03-056(d) at a maximum concentration of 0.0769 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of Aroclor-1260 is not defined. Aroclor-1260 was not detected at location 03-608263 to the north; it was detected at lower concentrations to the northeast at location 03-608288 to the northeast, and it was detected at higher concentrations at location 03-608247 to the south. Samples were not collected to the west of location 03-608288. The lateral extent of Aroclor-1260 is not defined.

TPH-DRO was detected in one sample at SWMU 03-056(d), at a concentration of 3.19 mg/kg at location 03-608288 in the deepest sample collected from a depth of 3.0–4.0 ft bgs. The vertical extent of TPH-DRO is not defined. TPH-DRO was detected at higher concentrations at location 03-608263 to the north and location 03-608247 to the south; it was not detected at location 03-608288 to the northeast. Samples were not collected to the west of location 03-608288. The lateral extent of TPH-DRO is not defined.

#### 6.14.20.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-056(d) because extent is not defined for the site.

#### 6.14.20.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-056(d) because extent is not defined for the site.

### 6.15 SWMU 03-014(r), Lift Station Associated with Former WWTP

#### 6.15.1 Site Description and Operational History

SWMU 03-014(r) is an active sanitary wastewater lift station (structure 03-693) located south of building 03-271 at TA-03 (Figure 6.8-1). The lift station was built in the 1970s and consists of two 7.5 horsepower

pumps (LANL 1990, 007511, p. 3-014). From the mid-1970s, the lift station pumped sanitary wastewater from building 03-271 to the former TA-03 WWTP. In 1992, when the TA-46 SWSC Plant came online, the lift station discontinued pumping wastewater to the TA-03 WWTP and began pumping wastewater to the TA-46 SWSC Plant. SWMU 03-014(r) is still active and continues to pump sanitary wastewater from building 03-271 to the TA-46 SWSC Plant (LANL 2008, 099214).

### 6.15.2 Relationship to Other SWMUs and AOCs

Wastewater from SWMU 03-014(r) was previously pumped to the headworks, SWMU 03-014(i), of the former TA-03 WWTP (Figure 6.14-1).

### 6.15.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(r).

### 6.15.4 Delayed Site Investigation Rationale

No sampling was conducted at this SWMU during the 2009 investigation because it is an active lift station. The approved investigation work plan proposed site characterization activities for SWMU 03-014(r) be delayed until the structure is removed (LANL 2008, 103404; NMED 2008, 102721). Available information, including the characteristics of the wastewater managed by the lift station, indicates a very low likelihood of past releases of hazardous chemicals to the environment.

The potential for releases of hazardous constituents and/or radionuclides is very low because of the nature of the wastewater received by the lift station. The sanitary lift station and associated drainlines are tied to drains in building 03-271 restrooms, water fountains, and equipment rooms containing hot water heaters and boilers and have therefore only managed sanitary wastewater (Santa Fe Engineering Ltd. 1993, 064050). Discharge of hazardous chemicals and radionuclides to the system is prohibited by Laboratory procedures. No releases to the environment from the SWMU 03-014(r) sanitary wastewater lift station were reported or documented, and the likelihood of undetected releases is very remote. The lift station and drainlines are equipped with alarms to prevent overflow and will continue to be maintained and monitored for as long as the lift station is operational. For these reasons, it is proposed that site characterization and investigation be delayed until the D&D of building 03-271 and structure 03-265 have been completed.

## 6.16 SWMU 03-014(s), Lift Station Associated with Former WWTP

### 6.16.1 Site Description and Operational History

SWMU 03-014(s) is an active sanitary wastewater lift station (structure 03-1693) located adjacent to the south side of the University House (building 03-443) at TA-03 (Figure 6.11-1). The lift station was built in the 1970s, houses two pumps, and measures 5 ft in diameter × 11 ft deep (LANL 1990, 007511, p. 3-014). From the mid-1970s, the lift station pumped sanitary wastewater from building 03-443 to the former TA-03 WWTP. In 1992 when the TA-46 SWSC Plant came online, the lift station discontinued pumping wastewater to the TA-03 WWTP and began pumping wastewater to the TA-46 SWSC Plant. SWMU 03-014(s) is still active and continues to pump sanitary wastewater from building 03-443 to the TA-46 SWSC Plant (LANL 2008, 099214).

### 6.16.2 Relationship to Other SWMUs and AOCs

Wastewater from SWMU 03-014(s) was previously pumped to the headworks, SWMU 03-014(i), of the former TA-03 WWTP.

### 6.16.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-014(s).

### 6.16.4 Delayed Site Investigation Rationale

No sampling was conducted at this SWMU during the 2009 investigation because it is an active sanitary lift station. The investigation work plan proposed site characterization activities for SWMU 03-014(s) be delayed until the structure is removed (LANL 2008, 103404; NMED 2008, 102721). Available information, including the characteristics of the wastewater managed by the lift station, indicates a very low likelihood of past releases of hazardous chemicals to the environment.

The potential for releases of hazardous constituents and/or radionuclides is very low because of the nature of the wastewater received by the lift station. The sanitary lift station and associated drainlines are tied to drains in building 03-443 restrooms, water fountains, and equipment room containing a hot water heater and boiler and, therefore, have managed only sanitary wastewater (Santa Fe Engineering Ltd. 1993, 064050). Discharge of hazardous chemicals and radionuclides to the system is prohibited by Laboratory procedures. No releases to the environment from the SWMU 03-014(s) sanitary wastewater lift station were reported or documented, and the likelihood of undetected releases is very remote. The lift station and drainlines are equipped with alarms to prevent overflow and will continue to be maintained and monitored for as long as the lift station is operational. For these reasons, it is proposed that site characterization and investigation be delayed until D&D of building 03-443 and structure 03-1693 have been completed.

## 6.17 AOC 03-014(v), Drain Associated with Former WWTP

### 6.17.1 Site Description and Operational History

AOC 03-014(v) is the former location of a floor drain within a former garage (former building 03-36) at TA-03 (Figure 6.3-1). The drain was installed in 1953 and connected to the sanitary sewer tied to the former TA-03 WWTP (LANL 1990, 007511, p. 3-014).

The garage (former building 03-36) was removed in 1999 to prepare for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the demolition of the garage, AOCs 03-014(v), 03-027, and an underground storage tank were removed. Soil below the footprint of the garage was excavated and removed. Approximately 60 $yd^3$ of contaminated soil was removed during the demolition. Additional soil was subsequently excavated from the area to accommodate the foundation of building 03-2327. The area was excavated to a depth of approximately 15 ft below grade. The depth of the excavation was approximately 8 ft deeper than the two confirmation samples collected in 1999.

### 6.17.2 Relationship to Other SWMUs and AOCs

AOC 03-014(v) is the former location of a floor drain within a former garage (former building 03-36), that was also the location of a former underground storage tank, and hydraulic lift wells, AOC 03-027. This drain once discharged to the former TA-03 WWTP.

### 6.17.3 Summary of Previous Investigations

Following the removal of former building 03-36 and contaminated soil from the building footprint in 1999, two samples were collected from one location from the bottom of the excavation from 3 to 3.5 ft and 4 to 4.5 ft bgs and submitted for laboratory analyses of TAL metals, VOCs, PCBs, TPH-DRO, and TPH-GRO.

Cobalt was detected slightly above the soil BV in the sample collected from 4 to 4.5 ft bgs, and TPH-DRO was detected in both samples.

Table 6.17-1 presents the samples collected and analyses requested at AOC 03-014(v).

### 6.17.4 Site Contamination

#### 6.17.4.1 Soil, Rock, and Sediment Sampling

Samples were not collected at AOC 03-014(v) during the 2009 investigation because the site was remediated during the construction of the computing center (building 03-2327).

#### 6.17.4.2 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-014(v) consist of two soil samples collected from one location. The sampling location was excavated during site preparation activities prior to the construction of the computing center (building 03-2327).

**Inorganic Chemicals**

Two soil samples were analyzed for TAL metals. Table 6.17-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Cobalt was detected above at AOC 03-014(v), with a maximum concentration of 9 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of cobalt in soil (9.5 mg/kg) (Figure H-40). Cobalt is not identified as a COPC in soil.

**Organic Chemicals**

Two soil samples were analyzed for VOCs, PCBs, TPH-DRO, and TPH-GRO. Table 6.17-3 summarizes the analytical results for detected organic chemicals. TPH-DRO was detected in two soil samples, with a maximum concentration of 31 mg/kg. TPH-DRO is identified as a COPC in soil.

#### 6.17.4.3 Nature and Extent of Contamination

Cobalt concentrations are not different than background. The lateral and vertical extent of cobalt are defined.

TPH-DRO concentrations decreased with depth. The extent of TPH-DRO is defined at this site (LANL 2008, 103404, p. 47; NMED 2008, 102721).

### 6.17.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-014(v) is discussed in Appendix I, sections I-4.2 and I-4.4.

The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to humans and ecological receptors are present at this site. Because potential risk from this site has not been formally evaluated elsewhere, human health risk was assessed for soil that was excavated.

No COPCs were detected in the 0.0–1.0-ft depth interval and the industrial scenario was not evaluated for AOC 03-014(v). The only COPC identified was TPH-DRO. NMED screening guidelines for TPH do not provide screening levels for the construction worker scenario; therefore, the industrial screening guideline was used to evaluate the construction worker scenario (NMED 2006, 094614). The construction worker and residential HQs are 0.03 and 0.06, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

### 6.17.6 Summary of Ecological Risk Screening

The potential contamination associated with AOC 03-014(v) has been removed. The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to receptors are present at this site, and an ecological risk-screening assessment was not conducted.

## 6.18 AOC 03-014(y), Drain Associated with Former WWTP

### 6.18.1 Site Description and Operational History

AOC 03-014(y) is a floor drain in the basement of the TA-03 press building (03-35) (Figure 6.5-1) that formerly discharged to the former TA-03 WWTP. The drain was installed in 1954 and became inactive in 1981 (LANL 1993, 020947, p. 5-46). Building 03-35 was constructed in 1953–1954 and housed operations to fabricate enriched-uranium-loaded graphite and carbide fuel elements. Enriched uranium (uranium-235) was processed in an area located in the northern portion of the first floor of the building. The rest of the building was used to fabricate cable assemblies in support of the weapons program, rack mechanics, the Meson Physics Facility, and service programs.

### 6.18.2 Relationship to Other SWMUs and AOCs

The AOC 03-014(y) floor drain in the basement of the press building, 03-35, is located approximately 30 ft from the former location of the PCB-containing transformer, AOC 03-003(g). This drain discharged to the former TA-03 WWTP.

### 6.18.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-014(y).

### 6.18.4 Delayed Site Investigation Rationale

No sampling was conducted at this AOC during the 2009 investigation because it is located in the basement of an active nuclear facility. The approved investigation work plan proposed site characterization activities for AOC 03-014(y) be delayed until D&D of building 03-35 (LANL 2008, 103404; NMED 2008, 102721). Any potential contamination from past releases would be located beneath the building and surrounding asphalt paved areas, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation. For these reasons, it is proposed that site characterization and investigation be delayed until D&D of building 03-35 has been completed.

## 6.19 Consolidated Unit 03-015-00

Consolidated Unit 03-015-00 includes SWMU 03-015 and AOC 03-053 (Figure 6.4-1). SWMU 03-015 is a former NPDES-permitted outfall that received effluent from janitorial sinks and roof and floor drains from building 03-141 until the lines to the outfall were decommissioned in early 1993 (LANL 1996, 052930, p. 121). AOC 03-053 consists of floor drains in the basement of building 03-141 which housed electrochemical and depleted uranium (DU) processing facilities. The floor drains discharged to SWMU 03-015 and were rerouted to the TA-50 radioactive liquid waste (RLW) line before 1992 (LANL 1995, 057590, p. 5-24-1).

### 6.19.1 SWMU 03-015, Outfall

#### 6.19.1.1 Site Description and Operational History

SWMU 03-015 is an outfall located between Eniwetok Drive and the security fence northeast of the building 03-141 (Figure 6.4-1) (LANL 1996, 052930, p. 121). This SWMU is a formerly NPDES-permitted outfall EPA 04A140 that was removed from the permit in 1995 (LANL 1999, 064617, p. 2-7). The outfall historically received effluent from janitorial sinks as well as from floor and roof drains of building 03-141. From 1962 to 1990, building 03-141 housed electrochemical and DU-processing facilities. Powder characterization, plasma flame spray processing, beryllium processing, and DU-processing operations were also performed. In 1992, the basement floor drains in building 03-141 were rerouted to the TA-50 RLW line, and the roof drains were rerouted to an existing storm sewer outfall in Mortandad Canyon. Lines draining to SWMU 03-015 were decommissioned in 1993 (LANL 1995, 057590, p. 5-24-1).

#### 6.19.1.2 Relationship to Other SWMUs and AOCs

This former outfall received wastewater from the janitorial sinks, floor drains, and roof drains of building 03-141. AOC 03-053 consists of floor drains in the basement of building 03-141 which directed wastewater to the outfall at SWMU 03-015. SWMU 03-015 is located about 55 ft east of building 03-141 and the storage area designated as SWMU 03-056(l). The basement floor drains and outfall make up Consolidated Unit 03-015-00.

#### 6.19.1.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 03-015, four surface soil samples and one sediment sample were collected from five locations downgradient of the outfall in the associated drainage channel. All samples were collected from a depth 0 to 1.5 ft bgs and analyzed for TAL metals, SVOCs, gross-alpha, -beta, and -gamma radiation, isotopic plutonium and uranium, and tritium and by gamma spectroscopy. The fourth soil sample was analyzed for TAL metals, SVOCs, gross-alpha, -beta, and -gamma radiation, and tritium. The sediment sample was analyzed for TAL metals, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, pp. 121–124).

Barium and lead were detected above BVs in the sediment sample; lead, mercury, nickel, and silver were detected above BVs in one soil sample. The DL for selenium was above BV in one sample. Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene were detected in one soil sample; fluoranthene and pyrene were detected in two soil samples. Uranium-234, uranium-235, and uranium-238 were detected above BV in one soil sample. Europium-152 and gross-alpha radiation were detected in one soil sample; gross-beta radiation was detected in two soil samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in Section 6.19.1.4, Site contamination. Table 6.19-1 presents the samples collected and analyses requested at SWMU 03-015.

### 6.19.1.4 Site Contamination

#### Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-015. As a result, the following activities were completed as part of the 2009 investigation.

- Twenty samples were collected from 10 locations (including 1 location beneath the former drainline) to characterize SWMU 03-015 and AOC 03-053. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs, except at one location where samples were collected from 2.5–3.5 ft and 5.5–6.5 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, perchlorate, americium-241, isotopic plutonium, and isotopic uranium.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-015 are shown in Figure 6.4-1. Table 6.19-1 presents the samples collected and analyses requested at SWMU 03-015. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors, at SWMU 03-015, a maximum concentration of 125 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-015 consist of 21 samples (20 soil and 1 sediment) collected from 11 locations.

##### *Inorganic Chemicals*

Twenty-one samples were analyzed for TAL metals (20 soil and 1 sediment), and 20 soil samples were analyzed for perchlorate. Table 6.19-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 3 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-015; therefore, inorganic COPCs are not identified for the site.

##### *Organic Chemicals*

Twenty soil samples were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.19-3 summarizes the analytical results for detected organic chemicals. Plate 4 shows the spatial distribution of detected

organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-015; therefore, organic COPCs are not identified for the site.

### *Radionuclides*

Twenty soil samples were analyzed for americium-241, 1 sediment sample was analyzed for gamma-emitting radionuclides, 20 soil samples were analyzed for isotopic plutonium, and 20 soil samples were analyzed for isotopic uranium. Table 6.19-4 summarizes the analytical results for radionuclides. Plate 5 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-015; therefore, radionuclide COPCs are not identified for the site.

## Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals and radionuclides at SWMU 03-015 are not defined, as discussed below.

### *Inorganic Chemicals*

Inorganic chemicals in soil and sediment samples at SWMU 03-015 were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are antimony, barium, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, perchlorate, selenium, silver, sodium, vanadium, and zinc.

Antimony was detected above BV for soil (0.83 mg/kg) in three samples at SWMU 03-015. The maximum concentration of 7.39 mg/kg was detected at location 03-608297 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth laterally and downgradient. Antimony was also detected at location 03-608293 but was not detected above BV at any other locations at SWMU 03-015. The lateral and vertical extent of antimony are defined.

Barium was detected above BV for sediment (127 mg/kg) in one sample at SWMU 03-015. The maximum concentration of 181 mg/kg was detected at location 03-02004 in a sediment sample collected from a depth of 0.0–1.5 ft bgs. Barium concentrations decreased at locations 03-608289 and 03-608294. Barium was not detected above BV at any other location at SWMU 03-015. The lateral and vertical extent of barium are defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in one sample at SWMU 03-015. The maximum concentration of 0.57 mg/kg was detected at the outfall location 03-608293 in a sample collected from a depth of 0.0–1.0 ft bgs. The slippage test indicate site concentrations of cadmium are not different than background (Table H-7 and Figure H-41). The maximum site concentration (0.57 mg/kg) did not exceed the maximum background concentration for cadmium in soil (2.6 mg/kg). Because the current site data at SWMU 03-015 for cadmium in soil are not different than background, the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV for soil (19.3 mg/kg) in three samples at SWMU 03-015. The maximum concentration of 45.2 mg/kg was detected at location 03-608292 in the deepest sampling interval (1.0–2.0 ft bgs). Chromium was also detected above BV at locations 03-608297 and 03-608290 in the deepest sampling interval. The vertical extent of chromium is not defined. The chromium

concentration decreased with distance from the outfall to levels below BV at locations 03-608294, 03-608296, and 03-608295. The lateral extent of chromium is defined.

Cobalt was detected above BV for soil (8.64 mg/kg) in two samples at SWMU 03-015. The maximum concentration of 26.6 mg/kg was detected at location 03-608291 in the deepest sampling interval (1.0–2.0 ft bgs). Cobalt was also detected at 9.62 mg/kg, slightly higher than the maximum background concentration (9.5 mg/kg) for cobalt in soil at location 03-608295 in the deepest soil sample collected (1.0–2.0 ft bgs). The vertical extent of cobalt is not defined. Cobalt concentrations decreased laterally in samples from surrounding locations and downgradient. The lateral extent of cobalt is defined.

Copper was detected above BV for soil (14.7 mg/kg) in two samples at SWMU 03-015. The maximum concentration of 18.8 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Copper was also detected above BV at the downgradient drainage location 03-608297 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Copper concentrations decreased with depth and downgradient. Copper was not detected at any other location at SWMU 03-015. The lateral and vertical extent of copper are defined.

Lead was detected above BVs for soil (22.3 mg/kg) and sediment (19.3 mg/kg) in seven samples at SWMU 03-015. The maximum concentration of 197 mg/kg was detected at location 03-608297 in the deepest sampling interval (1.0–2.0 ft bgs). Lead was also detected above BV at the outfall location 03-608293 and at locations 03-608292, 03-608291, and 03-608296. Lead was detected above BV for sediment (25.6 mg/kg) at location 03-02004. Lead concentrations were below BV in the deepest soil samples collected from locations 03-608293, 03-608292, and 03-608296 and increased with depth at locations 03-608291 and 03-608297. Lead concentrations were below BV at locations 03-608290, 03-608294, and 03-608295. The lateral extent of lead is defined, and the vertical extent of lead is not defined.

Manganese was detected above BV for soil (671 mg/kg) in four samples at SWMU 03-015. The maximum concentration of 1320 mg/kg was detected at the drainline location 03-608298 in a soil sample collected from a depth of 5.5–6.5 ft bgs and also increased at location 03-608291. No deeper samples were collected from any other location at SWMU 03-015; therefore, the vertical extent of manganese is not defined. Manganese concentrations were above BV at locations 03-608291, 03-608294, and 03-608296 but decreased with distance from the outfall at locations 03-608294 and 03-608296. The lateral extent of manganese is defined.

Mercury was detected at concentrations above BV for soil (0.1 mg/kg) in two samples at SWMU 03-015. The maximum concentration of 0.211 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Mercury concentrations decreased with depth. Mercury was not detected at any other location at SWMU 03-015. The lateral and vertical extent of mercury are defined.

Nickel was detected above BV (15.4 mg/kg) in one sample at SWMU 03-015. The maximum concentration of 28.7 mg/kg was detected at location 03-608289 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site sampling results are not different than background (Table H-7 and Figure H-41). The lateral and vertical extent of nickel are defined.

Perchlorate was detected in three samples at SWMU 03-015. The maximum concentration of 0.00119 mg/kg was detected at location 03-608291 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Perchlorate was also detected at the outfall location 03-608293 and location 03-608295. Perchlorate concentrations decreased with depth at locations 03-608291 and 03-608293 and were below

the EDL at location 03-608295. Concentrations also decreased laterally downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected in soil or sediment but had a DL (0.61 mg/kg) above BV for sediment (0.3 mg/kg) in one sample at SWMU 03-015. Because selenium was not detected at SWMU 03-015, the lateral and vertical extent of selenium are defined.

Silver was detected above BV for soil (1 mg/kg) in one sample at SWMU 03-015. The maximum concentration of 1.36 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Silver concentrations decreased with depth at that location. Silver was not detected at any other location at SWMU 03-015. The lateral and vertical extent of silver are defined.

Sodium was detected above BV for soil (915 mg/kg) in two samples at SWMU 03-015. The maximum concentration of 3260 mg/kg was detected at location 03-608290 in the deepest sampling interval (1.0–2.0 ft bgs). Sodium was also detected above BV at that location in a shallower sample (0.0–1.0 ft bgs). These samples were collected near Eniwetok Drive and the access road next to the motor pool and are probably impacted by road salts. Sodium was not detected elsewhere at SWMU 03-015. The lateral and vertical extent of sodium are defined.

Vanadium was detected above BV for soil (39.6 mg/kg) in one sample at SWMU 03-015. The maximum concentration of 56.6 mg/kg was detected at location 03-608296 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Vanadium concentrations decreased with depth and laterally in surrounding locations. The lateral and vertical extent of vanadium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in five samples at SWMU 03-015. The maximum concentration of 129 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations. The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals were detected in soil at SWMU 03-015 including acenaphthalene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, toluene, and TPH-DRO.

Acetone was detected in two samples at SWMU 03-015. The maximum concentration of 0.00842 mg/kg was detected at the drainline location 03-608298 in a soil sample collected from a depth of 5.5–6.5 ft bgs. Acetone was also detected at that location in a soil sample collected from a depth of 2.5–3.5 ft bgs. Concentrations were slightly above or below the EQL (0.006 mg/kg). The lateral and vertical extent of acetone are defined.

Aroclor-1254 was detected in four samples at SWMU 03-015. The maximum concentration of 1.28 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth at location 03-608293 but not at locations 03-608290 and 03-608297. Aroclor-1254 concentrations decreased downgradient at locations 03-608294, 03-608296, and 03-608295. The lateral extent of Aroclor-1254 is defined, but vertical extent of Aroclor-1254 is not defined.

Aroclor-1260 was detected in nine samples at SWMU 03-015. The maximum concentration of 0.487 mg/kg was detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations, except at location 03-608290. Aroclor-1260 concentrations decreased downgradient at locations 03-608294, 03-608296, and 03-608295. The lateral extent of Aroclor-1260 is defined, but vertical extent of Aroclor-1260 is not defined.

PAHs were detected in 3 to 12 samples at SWMU 03-015. The maximum concentrations were detected at the outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased with depth at all locations, except for concentrations of benzo(g,h,i)perylene and benzo(k)fluoranthene at location 03-608297. Concentrations decreased downgradient at locations 03-608294, 03-608296, and 03-608295. The lateral extent of PAHs is defined, and the vertical extent of benzo(g,h,i)perylene and benzo(k)fluoranthene is not defined.

Isopropyltoluene(4-) was detected in one sample at SWMU 03-015. The concentration of 0.00125 mg/kg was detected at location 03-608294 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The lateral and vertical extent of 4-isopropyltoluene are defined.

Methylene chloride was detected in two samples at SWMU 03-015. Concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Toluene was detected in one sample at SWMU 03-015. The maximum concentration of 0.00262 mg/kg was detected at location 03-608296 in a soil sample collected from a depth of 1.0–2.0 ft bgs. The concentration is near the EQL, and toluene was not detected at any other location at SWMU 03-015. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in 15 samples at SWMU 03-015. The maximum concentration of 271 mg/kg was detected at location 03-608294 in a soil sample collected from a depth of 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at all locations, except at location 03-608296. The vertical extent of TPH-DRO is not defined. Concentrations at this location remained unchanged with depth. TPH-DRO concentrations decreased at downgradient location 03-608295. The lateral extent of TPH-DRO is defined.

***Radionuclides***

Uranium-238 was detected above BV (2.29 pCi/g) in one sample at SWMU 03-015. The maximum activity of 2.36 pCi/g was detected at outfall location 03-608293 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The activity was similar to BV. The lateral and vertical extent of uranium-238 are defined.

#### 6.19.1.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-015 because extent is not defined for the site.

#### 6.19.1.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-015 because extent is not defined for the site.

### 6.19.2 AOC 03-053, Operational Facility

#### 6.19.2.1 Site Description and Operational History

AOC 03-053 (Figure 6.4-1) consists of floor drains in the basement of building 03-141 at TA-03. The floor drains historically discharged to SWMU 03-015 (section 6.19.1) but were rerouted to the TA-50 RLW line before 1992. From 1962 to 1990, building 03-141 housed electrochemical and DU-processing facilities. Powder characterization, plasma flame spray processing, beryllium processing, and DU-processing operations were also performed (LANL 1995, 057590, p. 5-24-1).

#### 6.19.2.2 Relationship to Other SWMUs and AOCs

AOC 03-053 is the designation for the basement area of building 03-141, where floor drains formerly directed wastewater to the outfall at SWMU 03-015. The basement floor drains and outfall make up Consolidated Unit 03-015-00.

#### 6.19.2.3 Summary of Previous Investigations

Samples collected at SWMU 03-015 during the 1994 RFI (section 6.19.1.3) were used to evaluate potential contamination at AOC 03-053 (LANL 1996, 052930, p. 121).

#### 6.19.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-053. As a result, the following activities were completed as part of the 2009 investigation.

- Sampling was conducted to characterize AOC 03-053 and its outfall, SWMU 03-015. Sampling activities are described in section 6.19.1.4 as part of SWMU 03-015.

The 2009 sampling locations at AOC 03-053 are shown in Figure 6.4-1. Table 6.19-1 presents the samples collected and analyses requested at AOC 03-053. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

Sampling activities are described in section 6.19.1.4 as part of SWMU 03-015.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at AOC 03-053 consist of 21 samples (20 soil and 1 sediment) collected from 11 locations. Sampling analytical results are described in section 6.19.1.4 as part of SWMU 03-015. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-053; therefore, inorganic, organic, and radionuclide COPCs are not identified for the site.

**Nature and Extent of Contamination**

Nature and extent of contamination are evaluated in section 6.19.1.4 as part of SWMU 03-015. The nature and extent of contamination are not defined at AOC 03-053.

#### 6.19.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-053 because extent is not defined for the site.

#### 6.19.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-053 because extent is not defined for the site.

### 6.20 AOC C-03-016, Oil Metal Bin

#### 6.20.1 Site Description and Operational History

AOC C-03-016 is a former oil cleanout bin that was located north of the former TA-03 asphalt batch plant structure 03-73 (Figure 6.2-1). The bin was approximately 4 ft wide × 16 ft long × 3 ft deep, had a hinged lid, and was buried with the top flush to the ground surface. The bin, installed in the mid-1970s, contained used asphalt emulsion oil, which was applied to roads before laying asphalt. Photographs from the 1970s and 1980s show extensive staining in the immediate vicinity of the bin. In the late 1980s, the area surrounding the oil cleanout bin was excavated and removed. New sand and gravel fill was placed around the bin (LANL 1995, 057590, pp. 6-26–6-27). The bin and stained soil around the bin were subsequently removed in the late 1990s (LANL 2003, 080912, p. 4). The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

#### 6.20.2 Relationship to Other SWMUs and AOCs

AOC C-03-016 was part of the former asphalt batch plant, although it is not a component of Consolidated Unit 03-009(a)-00. It is located about 120 ft northwest of the former asphalt plant structure 03-73.

#### 6.20.3 Summary of Previous Investigations

Sampling was conducted at AOC C-03-016 in 2003 before the planned construction of a new parking structure; however, the parking structure was never built. Two shallow boreholes were drilled at AOC C-03-016. Two tuff samples were collected from one borehole at depths of 1–1.5 ft and 16–16.5 ft bgs. Three tuff samples were collected from the second borehole at a depth of 4–5 ft, 9.5–10 ft, and 19.5–20 ft bgs. All samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO (Shaw Environmental Inc., 2003, 085517, pp. 1, 7–8, 10, 26–27).

Aluminum, arsenic, beryllium, calcium, chromium, iron, magnesium, manganese, nickel, and vanadium were detected above BVs in one sample. Barium and copper were detected above BVs in two samples. Lead and selenium were detected above BVs in three and five samples, respectively. Bis(2-ethylhexly)phthalate was detected in two samples. TPH-DRO and TPH-GRO were also detected in two samples. VOCs were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.20.4. Table 6.20-1 presents the samples collected and analyses requested at AOC C-03-016.

### 6.20.4 Site Contamination

#### 6.20.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC C-03-016. As a result, the following activities were completed as part of the 2009 investigation.

- Three samples were collected from historical sampling location 03-22533. Samples were collected from 4.0–5.0 ft, 10.0–11.0 ft, and 19.0–20.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, and cyanide.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at AOC C-03-016 is shown in Figure 6.2-1. Table 6.20-1 presents the samples collected and analyses requested at AOC C-03-016. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.20.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at AOC-C-03-016, no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.20.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC C-03-016 consist of eight tuff samples collected from two locations.

**Inorganic Chemicals**

Eight tuff samples were analyzed for TAL metals, and three tuff samples were analyzed for cyanide. Table 6.20-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at AOC C-03-016; inorganic COPCs are identified below.

The inorganic chemicals identified as COPCs in tuff are aluminum, antimony, barium, beryllium, calcium, copper, lead, magnesium, manganese, nickel, and selenium.

Aluminum was detected above BV (7340 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 24,800 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-42). Aluminum is identified as a COPC in tuff.

Antimony was not detected above BV (0.5 mg/kg) in tuff at AOC C-03-016 but had DLs (1.09 to 1.16 mg/kg) above BV in three tuff samples. Antimony is identified as a COPC in tuff.

Arsenic was detected above BV (2.79 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 3.6 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of arsenic in tuff (5 mg/kg) (Figure H-42). Arsenic is not identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in two tuff samples at AOC C-03-016, with a maximum concentration of 156 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-43). Barium is identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 4.2 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-43). Beryllium is identified as a COPC in tuff.

Calcium was detected above BV (2200 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 9830 mg/kg. The maximum concentration was above BV (Figure H-44). Calcium is identified as a COPC in tuff.

Chromium was detected above BV (7.14 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 12 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of chromium in tuff (13 mg/kg) (Figure H-44). Chromium is not identified as a COPC in tuff.

Copper was detected above BV (4.66 mg/kg) in two tuff samples at AOC C-03-016, with a maximum concentration of 10.8 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-45). Copper is identified as a COPC in tuff.

Iron was detected above BV (14,500 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 16400 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in tuff (19500 mg/kg) (Figure H-45). Iron is not identified as a COPC in tuff.

Lead was detected above BV (11.2 mg/kg) in three tuff samples at AOC C-03-016, with a maximum concentration of 31.5 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-46). Lead is identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 4980 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-46). Magnesium is identified as a COPC in tuff.

Manganese was detected above BV (482 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 1490 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-47). Manganese is identified as a COPC in tuff.

Nickel was detected above BV (6.58 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 10 mg/kg. The maximum concentration was above the maximum background concentration (Figure H-47). Nickel is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in five tuff samples at AOC C-03-016, with a maximum concentration of 0.69 mg/kg. Additionally, three DLs were above BV with a maximum DL of 1.2 mg/kg (Figure H-48). Selenium is identified as a COPC in tuff.

Vanadium was detected above BV (17 mg/kg) in one tuff sample at AOC C-03-016, with a maximum concentration of 19.4 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of vanadium in tuff (21 mg/kg) (Figure H-48). Vanadium is not identified as a COPC in tuff.

**Organic Chemicals**

Eight tuff samples were analyzed for SVOCs, VOCs, TPH-DRO, and TPH-GRO. Three tuff samples were analyzed for PCBs. Table 6.20-3 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at AOC C-03-016; organic COPCs are identified below.

The following organic chemicals were detected in tuff at AOC C-03-016 and are identified as COPCs in tuff: bis(2-ethylhexyl)phthalate, TPH-DRO, and TPH-GRO.

### 6.20.4.4 Nature and Extent of Contamination

In the late 1980s, AOC C-03-016, the metal bin, was removed along with surrounding surface soil, and the excavated bin and material were replaced with clean sand and gravel. Since the metal bin and possible surface contaminated soil were removed, per the approved Upper Sandia Aggregate Area investigation work plan (LANL 2008, 103404, p. 49–50; NMED 2008, 102721), only the vertical extent of contamination at AOC C-03-016 needed to be defined. Two boreholes were drilled and sampled at various depths to define the vertical extent of contamination.

The nature and extent of inorganic and organic chemicals at AOC C-03-016 are defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at AOC C-03-016 were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are aluminum, antimony, arsenic, barium, beryllium, calcium, chromium, copper, iron, lead, magnesium, manganese, nickel, selenium, and vanadium.

Aluminum was detected above BV (7,340 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 24,800 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs. Aluminum was not detected at the deeper TD sample from this location (19.0–20.0 ft bgs). Aluminum was not detected at location 03-22534 at any sampling depth. The vertical extent of aluminum is defined.

Antimony was not detected above BV (0.5 mg/kg) in tuff but had DLs (1.09 to 1.16 mg/kg) above BV in three samples. Because antimony was not detected above BV at AOC C-03-016, the vertical extent is defined.

Arsenic concentrations were not different than background at AOC C-03-016, and vertical extent of arsenic is defined.

Barium was detected above BV (46 mg/kg) in two samples at AOC C-03-016, with a maximum concentration of 156 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs but was not detected at TD (19.0–20.0 ft bgs). Barium was not detected at location 03-22534 at any sampling depth. The vertical extent of barium is defined.

Beryllium was detected above BV (1.21 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 4.2 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs but was not detected at TD (19.0–20.0 ft bgs). Beryllium was not detected at location 03-22534 at any sampling depth. The vertical extent of beryllium is defined.

Calcium was detected above BV (2200 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 9830 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs) but was not detected at TD (19.0–20.0 ft bgs). Calcium was not detected at location 03-22534 at any sampling depth. The vertical extent of calcium is defined.

Chromium concentrations are not different than background at AOC C-03-016, and vertical extent of chromium is defined.

Copper was detected above BV (4.66 mg/kg) in two samples at AOC C-03-016, with a maximum concentration of 10.8 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs but was not detected at TD (19.0–20.0 ft bgs). Copper was not detected at location 03-22534 at any sampling depth. The vertical extent of copper is defined.

Iron concentrations are not different than background at AOC C-03-016, and vertical extent of iron is defined.

Lead was detected above BV (11.2 mg/kg) in three samples at AOC C-03-016, with a maximum concentration of 31.5 mg/kg at location 03-22533 in a sample collected from 1.0–1.5 ft bgs. Lead was also detected at this location from 16.0–16.5 ft bgs at 26 mg/kg and was not detected above BV at TD (19.0–20.0 ft bgs). Lead was detected above BV at location 03-22534 from the middle sampling depth of 9.5–10.0 ft bgs at a concentration of 12.6 mg/kg but was not detected at TD (19.5–20.0 ft bgs). The vertical extent of lead is defined.

Magnesium was detected above BV (1,690 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 4980 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs but was not detected at TD (19.0–20.0 ft bgs). Magnesium was not detected above BV at location 03-22534 at any sampling depth. The vertical extent of magnesium is defined.

Manganese was detected above BV (482 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 1490 mg/kg at location 03-22533 in a sample collected from 1.0–1.5 ft bgs. Manganese was not detected at TD. Manganese was not detected at location 03-22534 at any sampling depth. The vertical extent of manganese is defined.

Nickel was detected above BV (6.58 mg/kg) in one sample at AOC C-03-016, with a maximum concentration of 10 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs but was not detected at TD (19.0–20.0 ft bgs). Nickel was not detected at location 03-22534 at any sampling depth. The vertical extent of nickel is defined.

Selenium was detected above BV (0.3 mg/kg) in five samples at AOC C-03-016, with a maximum concentration of 0.69 mg/kg at location 03-22533 in a sample collected from 16.0–16.5 ft bgs. Selenium was not detected at TD (19.0–20.0 ft bgs) at this location. Selenium was also detected above BV at location 03-22534 in all three sampling depths (4.0–5.0 ft, 9.5–10 ft, and 19.5–20.0 ft bgs), with concentrations decreasing in the two deepest samples. The vertical extent of selenium is defined.

Vanadium concentrations are not different than background at AOC C-03-016, and vertical extent of chromium is defined.

**Organic Chemicals**

Organic chemicals were detected in tuff at AOC C-03-016 including bis(2-ethylhexyl)phthalate, TPH-DRO and TPH-GRO.

Bis(2-ethylhexyl)phthalate was detected in two samples at AOC C-03-016, with a maximum concentration of 0.15 mg/kg in a sample collected in tuff from 4.0–5.0 ft bgs at location 03-22534. Bis(2-ethylhexyl)phthalate concentration decreased with depth and was not detected at location 03-22533. The vertical extent of bis(2-ethylhexyl)phthalate is defined.

TPH-DRO was detected in two samples at AOC C-03-016 at location 03-22534, with a maximum concentration of 7100 mg/kg in a sample collected in tuff from 9.5–10.0 ft bgs. TPH-DRO was not detected at TD (19.5–20.0 ft bgs) at this same location. TPH-DRO was not detected at location 03-22533. The vertical extend of TPH-DRO is defined.

TPH-GRO was detected in four samples collected from two locations at AOC C-03-016, with a maximum concentration of 770 mg/kg in a sample collected in tuff from 9.5–10.0 ft bgs at location 03-22534. TPH-GRO was not detected at TD (19.5–20.0 ft bgs) at this location. TPH-GRO was detected at location 03-22533 from 4.0–5.0 ft and 10.0–11.0 ft bgs and was not detected at TD (19.5–20.0 ft bgs) at this location. The vertical extent of TPH-GRO is defined.

### 6.20.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC C-03-016 is discussed in Appendix I, sections I-4.2 and I-4.4.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for AOC C-03-016. No carcinogenic COPCs were identified for the construction worker scenario. The HI for the construction worker scenario is 3, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The construction worker HI is primarily the result of manganese. The maximum detected concentration, which is the EPC, overestimates the exposure and risk. In addition, the construction worker SSL is similar to or less than the BVs for soil and Qbt 2, 3, 4. If the EPC is divided by the maximum soil or tuff background concentrations, the ratios are approximately 1 and 2, respectively. The HI without manganese is reduced to 0.05 for AOC C-03-016. The total excess cancer risk for the residential scenario is $4 \times 10^{-9}$, which is less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.2, which is less than the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH-GRO were identified as COPCs. NMED screening guidelines do not provide screening levels for TPH-GRO. Typical constituents associated with gasoline (e.g., PAHs and BTEX) were not detected. For TPH-DRO, NMED screening guidelines do not provide screening levels for the construction worker scenario; therefore, the construction worker scenario was evaluated using the industrial screening guideline (NMED 2006, 094614). The construction worker and residential HQs are 6 and 14, respectively, which are above the NMED target HI of 1.0. Although the TPH-DRO HQs are above 1.0, the constituents of the TPH-DRO (i.e., BTEX and PAHs) were not detected at this site.

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

### 6.20.6 Summary of Ecological Risk Screening

AOC C-03-016 is covered with asphalt pavement. Therefore, an ecological risk-screening assessment was not conducted because no complete exposure pathways to ecological receptors exist.

## 6.21 SWMU 03-021, Outfall

### 6.21.1 Site Description and Operational History

SWMU 03-021 is an outfall and associated daylight channel located approximately 60 ft north of the north exterior wall of the liquid and compressed gas facility (building 03-170) (Figure 6.9-1). The outfall is a formerly NPDES-permitted outfall (EPA 04A094) and was removed from the 1997 permit (LANL 1999, 064617, p. 2-7). From 1964 to 1976, the outfall discharged caustic wash and rinse water from compressed-gas-cylinder cleaning operations. Cylinders were washed and stripped of paint using a caustic soda solution before they were repainted. Cylinders were screened for radioactive contamination and cleaned of any exterior oil, dirt, and grease before they were brought to building 03-170. Washing and stripping were done in a below-floor-grade pit in the northern part of building 03-170. A 2-in.-diameter iron outfall pipe in an open exterior ditch carried the caustic wash and rinse water from the pit. The end of the outfall pipe discharged into a northeast-trending surface ditch that continued about 180 ft to the main north-south drainage ditch. This outfall was not used after 1976, when the compressed gas suppliers assumed cylinder washing and painting responsibilities. The outfall was buried when 5 to 10 ft of fill material was placed over the former outfall area and graded during site preparation activities for the construction of building 03-1650, the compressed-gas cylinder storage shed (LANL 1995, 057590, pp. 5-14-1–5-14-3).

### 6.21.2 Relationship to Other SWMUs and AOCs

SWMU 03-021 is located about 60 ft north of the liquid and compressed gas facility, building 03-170 and about 160 ft west of the surface disposal site, SWMU 03-009(i). It is not related to any other SWMUs or AOCs.

### 6.21.3 Summary of Previous Investigations

During the 1997 RFI conducted at SWMU 03-021, one soil sample was collected from one location within the area of the former outfall area at a depth of 0–1 ft bgs. Ten soil samples were collected from five locations along two transects positioned across the former location of the channel (LANL 1997, 056660.4, pp. 79–82). Four samples were collected from two locations at depths of 2–3 ft and 3–4 ft bgs; four samples were collected from two locations at depths of 3–4 ft and 4–5 ft bgs; two samples were collected from the fifth location at depths of 2.75 ft–3.75 ft and 3.75 ft–4.25 ft bgs. All samples were analyzed for metals and SVOCs, and one sample was also analyzed for VOCs.

Cobalt, copper, iron, and nickel were detected above BVs in one sample. Chromium and thallium were detected above BVs in three samples; zinc was detected above BV in six samples; lead was detected above BV in nine samples. VOCs and SVOCs were not detected. The DL for antimony was greater than its BV in two samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.21.4. Table 6.21-1 presents the samples collected and analyses requested at SWMU 03-021.

### 6.21.4 Site Contamination

#### 6.21.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-021. As a result, the following activities were completed as part of the 2009 investigation.

- Four samples were proposed for collection at historical sampling locations 03-03329 and 03-03331 to define the vertical extent of contamination and confirm Phase I RFI results. Location 03-03329 was moved 5 ft north, and location 03-0331 was moved 5 ft south at the request of Utilities and Infrastructure–UMAP because of a buried water line (see deviations in Appendix B); these locations are now identified as 03-611943 and 03-611944. At each location, samples were collected from 4.0–5.0 ft and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, and cyanide.
- Twelve samples were collected from six locations downgradient of the outfall and drainlines to define the extent of contamination in the drainage. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, VOCs, SVOCs, and cyanide.
- All soil samples were field screened for VOCs and for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-021 are shown in Figure 6.9-1. Table 6.21-1 presents the samples collected and analyses requested at SWMU 03-021. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.21.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-021, no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.21.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-021 consist of 27 samples (20 soil and 7 tuff) collected from 14 locations.

**Inorganic Chemicals**

Twenty-seven samples were analyzed for TAL metals (20 soil and 7 tuff), and 16 samples were analyzed for cyanide (10 soil and 6 tuff). Table 6.21-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 12 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-021; therefore, inorganic COPCs are not identified for the site.

### Organic Chemicals

Twenty-three samples were analyzed for SVOCs (20 soil and 3 tuff), 13 samples were analyzed for VOCs (11 soil and 2 tuff), and 16 samples were analyzed for PCBs (10 soil and 6 tuff). Table 6.21-3 summarizes the analytical results for detected organic chemicals. Plate 13 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-021; therefore, organic COPCs are not identified for the site.

#### 6.21.4.4 Nature and Extent of Contamination

The extent of inorganic and organic chemicals at SWMU 03-021 are not defined, as discussed below.

### Inorganic Chemicals

Inorganic chemicals in soil and tuff samples at SWMU 03-021 were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, barium, cadmium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, thallium, and zinc.

Antimony was detected above BV for soil (0.83 mg/kg) in four samples at SWMU 03-021. The maximum concentration of 1.24 mg/kg was detected at location 03-608303 in a sample collected from a depth of 0.0–1.0 ft bgs. Concentrations decreased laterally in adjacent sampling location 03-608304, approximately 10 ft to the east, and farther downgradient. The concentration at depth at location 03-608304 is below the maximum background concentration (1 mg/kg). The lateral and vertical extent of antimony are defined.

Barium was detected above BV for tuff (46 mg/kg) in one sample at SWMU 03-021 at a concentration of 63.1 mg/kg from location 03-03331 collected from a depth of 4.0–5.0 ft bgs. Barium was not detected in above BV in adjacent sampling locations and decreases 15 ft downgradient to the northeast, south, and southwest. Although the maximum concentration was detected in the deepest sample at this location, barium was not detected above BV at adjacent locations 03-611943 and 03-611944 at 5.0–6.0 ft bgs. The lateral and vertical extent of barium are defined.

Cadmium was not detected above BVs for soil (0.4 mg/kg) or tuff (1.63 mg/kg) at SWMU 03-021, but one soil sample had a DL (0.587 mg/kg) above BV. The lateral and vertical extent of cadmium are defined.

Chromium was detected above BVs for soil (19.3 mg/kg) in three samples and tuff (7.14 mg/kg) in two samples at SWMU 03-021. The maximum concentration of 101 mg/kg was detected at location 03-03327 in a soil sample collected from a depth of 3.0–4.0 ft bgs. Concentrations decreased laterally in adjacent samples to the northeast and south and downgradient. The lateral extent of chromium is defined. Chromium was detected at its highest concentrations in the deepest samples at locations 03-03327, 03-611943, 03-03331, and 03-03329. The vertical extent of chromium is not defined.

Cobalt was detected above BV for soil (8.64 mg/kg) in one sample at SWMU 03-021 at a concentration of 11.2 mg/kg at location 03-03329 in a sample collected from a depth of 3.0–4.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of cobalt are not different than background (Table H-8 and Figure H-49). The lateral and vertical extent of cobalt are defined.

Copper was detected above BV for soil (14.7 mg/kg) in one sample at SWMU 03-021 at a concentration of 22.9 mg/kg at location 03-03326 in a sample collected from a depth of 0.0–1.0 ft bgs. The applicable

statistical tests (Gehan and quantile) indicate site concentrations of copper are not different than background (Table H-8 and Figure H-49). The lateral and vertical extent of copper are defined.

Iron was detected above BV for soil (21,500 mg/kg) in one sample at SWMU 03-021 at a concentration 33200 mg/kg at location 03-03327 in a sample collected from a depth of 3.0–4.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of iron are not different than background (Table H-8 and Figure H-50). The lateral and vertical extent of iron are defined.

Lead was detected above BVs for soil (22.3 mg/kg) in 10 samples and tuff (11.2 mg/kg) in three samples at SWMU 03-021. The maximum concentration of 358 mg/kg was detected at location 03-03329 in a sample collected from a depth of 3.0–4.0 ft bgs. Concentrations decreased laterally in the adjacent samples collected within 20 ft around the maximum concentration and decreased downgradient. The lateral extent of lead is defined. Lead was detected at its highest values in the deepest samples collected from locations 03-03329 and 03-03331. The vertical extent of lead is not defined.

Manganese was detected above BV for soil (671 mg/kg) in one sample at SWMU 03-021 at a concentration of 746 mg/kg at location 03-608301 in a sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of manganese are not different than background (Table H-8 and Figure H-50). The lateral and vertical extent of manganese are defined.

Nickel was detected above BV for soil (15.4 mg/kg) in one sample and tuff (6.58 mg/kg) in one sample at two locations at SWMU 03-021. The maximum concentration of 24.5 mg/kg was detected at location 03-03326 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of nickel in soil are not different than background (Table H-8 and Figure H-51). The lateral and vertical extent of nickel are defined.

Selenium was not detected in soil or tuff at SWMU 03-021, but the tuff analyses had DLs (0.63 to 1.14 mg/kg) above BV (0.3 mg/kg) in seven samples. The lateral and vertical extent of selenium are defined.

Thallium was detected above BV for soil (0.73 mg/kg) in three samples at SWMU 03-021. The maximum concentration of 2.1 mg/kg was detected at location 03-03326 in a sample collected from a depth of 0.0–1.0 ft bgs. Thallium was not detected in samples collected from location 03-608299, about 45 ft directly downgradient. Thallium was detected at lower concentrations in deeper samples. The lateral and vertical extent of thallium are defined.

Zinc was detected above BVs in soil (48.8 mg/kg) in nine samples and tuff (63.5 mg/kg) in two samples at SWMU 03-021. The maximum concentration of 193 mg/kg was detected at location 03-03329 in a sample collected from a depth of 3.0–4.0 ft bgs. The lateral extent of zinc is defined because concentrations decreased in adjacent samples collected in all directions and downgradient. Zinc concentrations increased with depth at location 03-03329. However, concentrations decreased with depth at locations 03-611943 and 03-611944 at 5.0–6.0 ft bgs. The vertical extent of zinc is defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 03-021 are acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene.

Acetone was detected at SWMU 03-021 at a concentration of 0.0144 mg/kg at location 03-608301 in the deepest sample collected (1.0–2.0 ft bgs) in soil. Acetone is not detected in samples down drainage. The lateral extent of acetone is defined. Because acetone was detected in the deepest sample at location 03-608301, the vertical extent of acetone is not defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and chrysene were detected in one sample at SWMU 03-021. Concentrations decreased with depth, and these organic chemicals were not detected downgradient. The lateral and vertical extent of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(k)fluoranthene, and chrysene are defined.

Aroclor-1254 and Aroclor-1260 were detected in five samples at three locations at SWMU 03-021. The maximum concentrations of 0.0492 mg/kg and 0.0344 mg/kg, respectively, were detected at location 03-608304 in a sample collected in soil from a depth of 1.0–2.0 ft bgs. Concentrations decreased downgradient. The lateral extent of Aroclor-1254 and Aroclor-1260 is defined. Aroclor-1254 and Aroclor-1260 concentrations increased with depth at locations 03-608303 and 03-608304. The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined.

Benzo(b)fluoranthene and phenanthrene were detected in two samples at two locations at SWMU 03-021, with maximum concentrations of 0.0431 mg/kg and 0.0806 mg/kg, respectively, at location 03-608303 in a sample collected in soil from a depth of 0.0–1.0 ft bgs, and concentrations decreased downgradient. The lateral extent of benzo(b)fluoranthene and phenanthrene is defined. Benzo(b)fluoranthene concentrations decreased with depth. Phenanthrene was detected below the EQL in the deepest sample at location 03-608304 and was not detected in the deepest sample at location 03-608303. The vertical extent of benzo(b)fluoranthene and phenanthrene is defined.

Fluoranthene and pyrene were detected in four samples at three locations at SWMU 03-021, with maximum concentrations of 0.13 mg/kg and 0.125 mg/kg, respectively, at location 03-608303 in a sample collected in soil from a depth of 0.0–1.0 ft bgs. Concentrations decreased downgradient. Fluoranthene and pyrene were not detected downcanyon at location 03-608300. Fluoranthene and pyrene concentrations decreased with depth at location 03-608303 and were detected below EQL at location 03-608304. The lateral and vertical extent of fluoranthene and pyrene are defined.

### 6.21.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-021 because extent is not defined for the site.

### 6.21.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-021 because extent is not defined for the site.

## 6.22 AOC 03-027, Lift Wells

### 6.22.1 Site Description and Operational History

AOC 03-027 consists of two lift wells that were located at a former garage, building 03-36, at TA-03 (Figure 6.3-1). The lift wells were located in the floor of the former garage beneath the hydraulic lifts and were lined with concrete blocks. When the floors of the vehicle maintenance bays were washed, the lift wells collected the floor wash water, which contained residual oil. Lift well contents were manually pumped to 55-gal. containers that were emptied into an oil/water separator before being discharged to the

sanitary sewer. From 1976 to 1980, a bottle-washing operation was also conducted in former building 03-36. New sample vial bottles were immersed in a 35%-concentration nitric acid bath and triple-rinsed with deionized water. The rinse water was reused several times before it was discharged to floor drains that discharged to storm drains (LANL 1995, 057590, pp. 6-54–6-55). Building 03-36 was removed in 1999 to prepare for construction of building 03-2327, the Nicholas C. Metropolis Computing Center.

### 6.22.2 Relationship to Other SWMUs and AOCs

The former garage, building 03-36, housed the lift wells and a floor drain, AOC 03-014(v), which once discharged to the former TA-03 WWTP. Near the garage was a former underground storage tank.

### 6.22.3 Summary of Previous Investigations

Building 03-36 was removed in 1999 to prepare for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. During the task of demolishing the gas station, AOCs 03-014(v) and 03-027 and an underground storage tank were removed. Soil surrounding the underground storage tank and below the building footprint was excavated. Approximately 60 $yd^3$ of TPH-contaminated soil was removed during the demolition project. Additional soil was subsequently excavated from the area to a depth of approximately 15 ft below grade to accommodate the foundation of building 03-2327.

Following the demolition of building 03-36 and before the foundation for building 03-2327 was excavated, nine fill and tuff samples were collected from six locations within the footprint of the former lift wells (two fill samples from a depth of 7–7.5 ft; four fill samples from a depth of 7.5–8 ft; two tuff samples from a depth of 8.5–9 ft bgs; and one tuff sample from a depth of 9–9.5 ft bgs). The fill samples were submitted for laboratory analyses of TAL metals, VOCs, PCBs, TPH-DRO, and TPH-GRO. The tuff samples were submitted for laboratory analyses of TPH-DRO.

Aluminum, beryllium, iron, magnesium, nickel, and sodium were detected above BVs in one fill sample; zinc was detected above BV in two fill samples. The DL for antimony was above BV in three samples. Butanone(2-), isopropylbenzene, and PCE were detected in one fill sample; sec-butylbenzene, 4-isopropyltoluene, 1-propylbenzene and xylene were detected in two fill samples; n-butylbenzene, 1,3,5-trimethylbenzene, and TPH-GRO were detected in three fill samples; 1,2,4-trimethylbenzene was detected in four fill samples; TPH-DRO was detected in five fill and three tuff samples. PCBs were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.22.4. Table 6.22-1 presents the samples collected and analyses requested at AOC 03-027.

### 6.22.4 Site Contamination

#### 6.22.4.1 Soil, Rock, and Sediment Sampling

No sampling was conducted at AOC 03-027 during the 2009 investigation because the nature and extent of contamination were defined in previous investigations.

#### 6.22.4.2 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-027 consist of five fill and three tuff samples collected from six locations.

### Inorganic Chemicals

Six soil samples were analyzed for TAL metals. Table 6.22-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. The nature and extent of contamination are defined at AOC 03-027; inorganic COPCs are identified below.

The only inorganic chemical identified as a COPC in soil at AOC 03-027 is antimony.

Aluminum was detected above the soil BV (29,200 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 31,000 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of aluminum in soil (61,500 mg/kg) (Figure H-52). Aluminum is not identified as a COPC in soil.

Antimony was not detected above the soil BV (0.83 mg/kg) in one sample at AOC 03-027 but had DLs (2.8 to 3.1 mg/kg) above BV in three samples. The maximum DL was above the maximum background concentration (1 mg/kg). Antimony is identified as a COPC in soil.

Beryllium was detected above the soil BV (1.83 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 2.5 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of beryllium in soil (3.95 mg/kg) (Figure H-52). Beryllium is not identified as a COPC in soil.

Iron was detected above the soil BV (21,500 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 22000 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in soil (36,000 mg/kg) (Figure H-53). Iron is not identified as a COPC in soil.

Magnesium was detected above the soil BV (4610 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 5100 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of magnesium in soil (10,000 mg/kg) (Figure H-53). Magnesium is not identified as a COPC in soil.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 22 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of nickel in soil (29 mg/kg) (Figure H-54). Nickel is not identified as a COPC in soil.

Sodium was detected above the soil BV (915 mg/kg) in one sample at AOC 03-027, with a maximum concentration of 1100 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of sodium in soil (1800 mg/kg) (Figure H-54). Sodium is not identified as a COPC in soil.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at AOC 03-027, with a maximum concentration of 54 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-55). Zinc is not identified as a COPC in soil.

### Organic Chemicals

Six soil samples were analyzed for VOCs, PCBs, TPH-DRO, and TPH-GRO. Table 6.22-3 summarizes the analytical results for detected organic chemicals. The nature and extent of contamination are defined at AOC 03-027; organic COPCs are identified below.

The following organic chemicals were detected in fill at AOC 03-027 and are identified as COPCs: 2-butanone, n-butylbenzene, sec-butylbenzene, isopropylbenzene, 4-isopropyltoluene, 1-propylbenzene, tetrachloroethene, TPH-DRO, TPH-GRO, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and xylene (total).

#### 6.22.4.3 Nature and Extent of Contamination

Antimony was not detected above BV (0.5 mg/kg) but had DLs (2.8 to 3.1 mg/kg) above BV in three soil samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined. Confirmation samples detected several concentrations of inorganic chemicals above BVs but below 2 times BVs (LANL 2008, 103404, p. 51–52; NMED 2008, 102721). Concentrations of aluminum, beryllium, iron, manganese, nickel, sodium, and zinc are not different than background, and lateral and vertical extent are defined.

Several organic chemicals were detected at five locations (LANL 2008, 100693). Butanone(2-), n-butylbenzene, sec-butylbenzene, isopropylbenzene, 4-isopropyltoluene, 1-isopropylbenzene, tetrachloroethene, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and xylene were detected below the EQLs. TPH-DRO and TPH-GRO were detected at maximum concentrations at location 03-14225, and decreased laterally to the nearby locations. TPH-DRO and TPH-GRO concentrations also decreased from all locations to the deepest depth at location 03-14225. Lateral and vertical extent of all organic chemicals are defined.

### 6.22.4 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-027 is discussed in Appendix I, sections I-4.2 and I-4.4.

The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to humans and ecological receptors are present at this site. However, because potential risk from this site has not been evaluated elsewhere, human health risk was assessed for soil that was excavated.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for AOC 03-027. The total excess cancer risks for the construction worker and residential scenarios are $2 \times 10^{-11}$ and $8 \times 10^{-10}$, respectively, which are less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HIs are 0.007 and 0.03, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO and TPH-GRO are also COPCs at this site. Potential risk from TPH-GRO is based on constituents, but typical constituents associated with gasoline are not identified as COPCs at this site, except for xylene. The xylene EPC is below the SSLs and the TPH-GRO EPC (0.112 mg/kg) is very low. NMED screening guidelines for TPH do not provide screening levels for the construction worker scenario; therefore, the industrial screening guideline was used to evaluate the construction worker scenario (NMED 2006, 094614). The construction worker and residential HQs are 0.2 and 0.3, respectively, which is less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

### 6.22.5 Summary of Ecological Risk Screening

The potential contamination associated with AOC 03-027 has been removed. The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to receptors are present at this site and an ecological risk-screening assessment was not conducted.

## 6.23 AOC 03-036(b), Former Aboveground Storage Tanks

### 6.23.1 Site Description and Operational History

AOC 03-036(b) is the former location of two 25- to 50-gal. aboveground storage tanks located at the former TA-03 asphalt batch plant. The tanks, which stored kerosene and No. 2 diesel fuel, were located 100 ft west of the former asphalt batch plant (building 03-73) and were surrounded by a 3-ft soil berm (Figure 6.2-1). Use of tanks began in 1960 (LANL 2003, 080912, p. 3). Before 1989, kerosene was stored in the tanks; after 1989, No. 2 diesel fuel was stored in the tanks. To prevent sticking, kerosene or diesel fuel from the tanks was applied to dump truck beds before they were loaded with asphalt. Residual fuel was collected in an aboveground metal catch basin on the east side of the berm. Periodic drips and splashes from the tanks stained the gravel surrounding the tanks (LANL 1995, 057590, p. 6-27). In 2002, the two tanks, the soil berm, and stained soil were removed during D&D of the asphalt batch plant. The area formerly occupied by the tanks has been paved over for use as a parking lot.

### 6.23.2 Relationship to Other SWMUs and AOCs

These two former storage tanks were associated with the former TA-03 asphalt batch plant, although this AOC is not a component of Consolidated Unit 03-009(a)-00. AOC 03-036(b) is located about 50 ft southwest of the former asphalt plant structure 03-73.

### 6.23.3 Summary of Previous Investigations

Sampling activities were conducted at AOC 03-036(b) in 2003 before the planned construction of a new parking structure (Shaw Environmental Inc., 2003, 085517, p. 1). As part of the sampling activities, two boreholes were drilled at the site. Three tuff samples were collected from one borehole at depths of 11–11.5 ft, 14.5–15 ft, and 19.5–20 ft bgs; one soil and two tuff samples were collected from the second borehole at depths of 10–11 ft, 14.5–15 ft, and 19.5–20 ft bgs. All samples were field screened for organic chemicals and submitted for laboratory analyses of TAL metals, VOCs, SVOCs, TPH-DRO, and TPH-GRO. Field-screening results did not indicate elevated concentrations of organic chemicals (Shaw Environmental Inc., 2003, 085517, pp. 7–8, 10, 27).

Barium, beryllium, calcium, copper, and zinc were detected above BVs in one tuff sample. Lead and selenium were detected above BVs in three and five tuff samples, respectively. PCE and 1,2,4-trimethylbenzene were detected in the single soil sample; acetone, and phenanthrene were detected in one tuff sample. Methylnaphthalene(2-) and TPH-DRO were detected in two tuff samples; TPH-GRO was detected in all six samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.23.4. Table 6.23-1 presents the samples collected and analyses requested at AOC 03-036(b).

### 6.23.4 Site Contamination

#### 6.23.4.1 2009 Investigation

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-036(b). As a result, the following activities were completed as part of the 2009 investigation.

- Six samples were collected from two boreholes to define the extent of contamination. At each location, samples were collected from 14.0–15.0 ft, 19.0–20.0 ft, and 24.0–25.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, VOCs, SVOCs, TPH-DRO, TPH-GRO, and cyanide.
- All soil samples were field screened for VOCs and all samples were screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-036(b) are shown in Figure 6.2-1. Table 6.23-1 presents the samples collected and analyses requested at AOC 03-036(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.23.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-036(b), a maximum concentration of 3.7 ppm was detected at a depth of 14.0–15.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.23.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-036(b) consist of 12 samples (1 soil and 11 tuff) collected from four locations.

**Inorganic Chemicals**

Twelve samples were analyzed for TAL metals (1 soil and 11 tuff) and six samples were analyzed for cyanide. Table 6.23-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at AOC 03-036(b); inorganic COPCs are identified below.

No inorganic chemicals were identified as COPCs in soil at AOC 03-036(b). The inorganic chemicals identified as COPCs in tuff at AOC 03-036(b) are antimony, calcium, copper, lead, manganese, selenium, and zinc.

Antimony was detected above BV (0.5 mg/kg) in one tuff sample at AOC 03-036(b), with a maximum concentration of 0.537 mg/kg. Additionally, five DLs were above BV with a maximum DL of 1.2 mg/kg. Antimony is identified as a COPC in tuff.

Barium was detected above BV (46 mg/kg) in two tuff samples at AOC 03-036(b), with a maximum concentration of 66.4 mg/kg. Statistical tests were performed to determine if the site sampling results for barium in tuff are different than background. The statistical test results are presented in Table H-9. The results of both the Gehan test and the quantile test indicate site sampling results are not different than

background. The box plot for barium in tuff is presented in Figure H-56. Barium is not identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in one tuff sample at AOC 03-036(b), with a maximum concentration of 1.3 mg/kg. Statistical tests were performed to determine if the site sampling results for beryllium in tuff are different than background. The statistical test results are presented in Table H-9. The results of both the Gehan test and the quantile test indicate site sampling results are not different than background. The box plot for beryllium in tuff is presented in Figure H-56. Beryllium is not identified as a COPC in tuff.

Calcium was detected above BV (2200 mg/kg) in two tuff samples at AOC 03-036(b), with a maximum concentration of 6250 mg/kg. The maximum concentration was above background (Figure H-57). Calcium is identified as a COPC in tuff.

Copper was detected above BV (4.66 mg/kg) in two tuff samples at AOC 03-036(b), with a maximum concentration of 5.9 mg/kg. Statistical tests were performed to determine if the site sampling results for copper in tuff are different than background. The statistical test results are presented in Table H-9. The results of the Gehan test indicate site sampling results may be different than background. The box plot for copper in tuff is presented in Figure H-57. Copper is identified as a COPC in tuff.

Lead was detected above BV (11.2 mg/kg) in four tuff samples at AOC 03-036(b), with a maximum concentration of 27.3 mg/kg. The maximum concentration was above BV (Figure H-58). Lead is identified as a COPC in tuff.

Manganese was detected above BV (482 mg/kg) in one tuff sample at AOC 03-036(b), with a maximum concentration of 533 mg/kg. Statistical tests were performed to determine if the site sampling results for manganese in tuff are different than background. The statistical test results are presented in Table H-9. The results of the Gehan test indicate site sampling results may be different than background. The box plot for manganese in tuff is presented in Figure H-58. Manganese is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in five tuff samples at AOC 03-036(b), with a maximum concentration of 1.2 mg/kg. Additionally, there were 6 DLs above BV with a maximum DL of 1.2 mg/kg (Figure H-59). Selenium is identified as a COPC in tuff.

Zinc was detected above BV (63.5 mg/kg) in one tuff sample at AOC 03-036(b), with a maximum concentration of 64.5 mg/kg. Statistical tests were performed to determine if the site sampling results for zinc in tuff are different than background. The statistical test results are presented in Table H-9. The results of the Gehan test indicate site sampling results may be different than background. The box plot for zinc in tuff is presented in Figure H-59. Zinc is identified as a COPC in tuff.

**Organic Chemicals**

Twelve samples were analyzed for SVOCs (1 soil and 11 tuff), 12 samples were analyzed for VOCs (1 soil and 11 tuff), 6 samples were analyzed for PCBs, 12 samples were analyzed for TPH-DRO (1 soil and 11 tuff), and 12 samples were analyzed for TPH-GRO (1 soil and 11 tuff). Table 6.23-3 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at AOC 03-036(b); organic COPCs are identified below.

The following organic chemicals were detected in tuff at AOC 03-036(b) and are identified as COPCs in tuff: acetone, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, phenanthrene, tetrachloroethene, TPH-DRO, TPH-GRO, and 1,2,4-trimethylbenzene.

#### 6.23.5.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals and organic chemicals at AOC 03-036(b) are defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in tuff samples at AOC 03-036(b) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, barium, beryllium, calcium, copper, lead, manganese, selenium, and zinc.

Antimony was detected above BV (0.5 mg/kg) in one tuff sample at AOC 03-036(b). The maximum concentration of 0.537 mg/kg was detected at location 03-608306, in the middle sampling interval (14.0–15.0 ft bgs). Antimony is not detected above BV at any other location. The lateral and vertical extent of antimony are defined.

Barium and beryllium concentrations are not different than background at AOC 03-036(b). Lateral and vertical extent of barium and beryllium are defined.

Calcium was detected above BV (2200 mg/kg) in two tuff samples at AOC 03-036(b), with a maximum concentration of 6250 mg/kg at location 03-608305 in a sample collected from 14.0–15.0 ft bgs. Calcium concentrations decreased with depth at this location and laterally downgradient at location 03-608306. The lateral and vertical extent of calcium are defined

Copper was detected above BV (4.66 mg/kg) in two tuff samples at AOC 03-036(b). The maximum concentration of 5.9 mg/kg was detected at location 03-22529 in a sample collected from 11.0–11.5 ft bgs. Copper was also detected above BV at location 03-608305 at a depth of 14.0–15.0 ft bgs at a concentration of 5.34 mg/kg. Both concentrations were less than the maximum background concentration for copper of 6.2 mg/kg. Copper was not detected at above BV in deeper samples at either of these locations or at the other two locations. The lateral and vertical extent of copper are defined.

Lead was detected above BV (11.2 mg/kg) in four tuff samples at AOC 03-036(b). The maximum concentration of 27.3 mg/kg was detected in a sample collected from 11.0–11.5 ft bgs at location 03-22529. Lead was not detected at greater depths at this location. At upgradient location 03-22530, lead concentrations decreased with depth. Lead also decreased laterally. Lead was not detected above BV at downgradient location 03-608306. The lateral and vertical extent of lead are defined.

Manganese was detected above BV (482 mg/kg) in one tuff sample at AOC 03-036(b). The single detection (533 mg/kg) was in a sample collected from a depth of 19.0–20.0 ft bgs at location 03-608305. The concentration decreased with depth. Manganese was not detected above BV at the other three locations sampled. The lateral and vertical extent of manganese are defined.

Selenium was detected above BV (0.3 mg/kg) in five tuff samples at AOC 03-036(b). The maximum concentration of 1.2 mg/kg was in a sample collected from a depth of 14.5–15.0 ft bgs at location 03-22530. Selenium concentrations decreased with depth and downgradient. The lateral and vertical extent of selenium are defined.

Zinc was detected above BV (63.5 mg/kg) in one tuff sample at AOC 03-036(b) at a concentration of 64.5 mg/kg in a sample collected from the middle interval (14.0–15.0 ft bgs) at location 03-22529. Zinc was not detected above BV in a deeper sample at this location or elsewhere at the site. The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in tuff at AOC 03-036(b) are acetone, 4-isopropyltoluene, methylene chloride, 2-methylnaphthalene, phenanthrene, tetrachloroethene, TPH-GRO, TPH-DRO, and 1,2,4-trimethylbenzene.

Acetone was detected in two samples at two locations at AOC 03-036(b). The maximum concentration of 0.00432 mg/kg was detected in a sample collected in tuff from 14.0–15.0 ft bgs at location 03-22530. Acetone was detected below the EQL. The lateral and vertical extent of acetone are defined.

Isopropyltoluene(4-) was detected in one sample at AOC 03-036(b) at a concentration of 0.00527 mg/kg in a sample collected in tuff from 14.0–15.0 ft bgs at location 03-608306. Isopropyltoluene(4-) was not detected laterally downgradient or at depth. The lateral and vertical extent of 4-iopropyltoluene are defined.

Methylene chloride was detected in two samples at AOC 03-036(b), at a maximum concentration of 0.00268 mg/kg in a sample collected in tuff from 14.0–15.0 ft bgs, at location 03-608305. Methylene chloride was detected below the EQL and concentrations decreased laterally and with depth. The lateral and vertical extent of methylene chloride are defined.

Methylnaphthalene(2-) was detected in two samples at two locations at AOC 03-036(b). The maximum concentration of 0.61 mg/kg was in a sample collected in tuff from 11.0–11.5 ft bgs at location 03-22529, near the center of AOC 03-036(b). Methylnaphthalene(2-) concentrations decreased with depth and laterally. The lateral and vertical extent of 2-methylnaphthalene are defined.

Phenanthrene was detected in one sample at AOC 03-036(b) at a concentration of 0.092 mg/kg in a sample collected in tuff from 11.0–11.5 ft bgs at location 03-22529. Phenanthrene concentrations decreased with depth and laterally. The lateral and vertical extent of phenanthrene are defined.

Tetrachloroethene was detected in one sample at AOC 03-036(b), with a maximum estimated concentration of 0.00075 mg/kg in a sample collected in soil from 10.0–11.0 ft bgs at location 03-22530. The tetrachloroethene concentration was below the EQL and decreased with depth and laterally. The lateral and vertical extent of tetrachloroethene are defined.

TPH-DRO was detected in three samples at three locations at AOC 03-036(b). The maximum concentration of 51 mg/kg was detected in a sample collected in tuff from 14.5–15.0 ft bgs at location 03-22530. TPH-DRO was not detected in the deepest interval at this location and other locations. Concentrations also decreased laterally. The lateral and vertical extent of TPH-DRO are defined.

TPH-GRO was detected in 10 samples at four locations at AOC 03-036(b). The maximum concentration of 0.64 mg/kg was detected in a sample collected in tuff from 19.5–20.0 ft bgs at location 03-22529 near the center of AOC 03-036(b). TPH-GRO concentrations decreased or did not change in a deeper sample at the site. Concentrations decreased laterally. The lateral and vertical extent of TPH-GRO are defined.

Trimethylbenzene(1,2,4-) was detected in two samples at two locations at AOC 03-036(b). The maximum concentration of 0.0013 mg/kg was detected in a sample collected in soil from 10.0–11.0 ft bgs at location

03-22530. Trimethylbenzene(1,2,4-) concentrations decreased with depth and laterally and were below the EQL. The lateral and vertical extent of 1,2,4-trimethylbenzene are defined.

### 6.23.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-036(b) is discussed in Appendix I, sections I-4.2.2 and I-4.4.

Sampling did not occur in the depth intervals relevant to human health (0–10 ft bgs); however, the construction worker and residential scenarios were evaluated for AOC 03-036(b) because potential risk from this site has not been formally evaluated elsewhere.

Samples were not collected in the 0.0–1.0-ft depth interval, and the industrial scenario was not evaluated for AOC 03-036(b). The total excess cancer risks for the construction worker and residential scenarios are $2 \times 10^{-11}$ and $1 \times 10^{-9}$, respectively , which are below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HIs for the construction worker and residential scenarios are 0.9 and 0.09, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH-GRO were identified as COPCs. Potential risk from TPH-GRO is based on constituents, but typical constituents associated with gasoline are not identified as COPCs at this site. The TPH-GRO EPC (0.31 mg/kg) is very low. NMED screening guidelines for TPH do not provide screening levels for the construction worker scenario; therefore, the industrial screening guideline was used to evaluate the construction worker scenario (NMED 2006, 094614). The construction worker and residential HQs are 0.02 and 0.04, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker and residential scenarios.

### 6.23.6 Summary of Ecological Risk Screening

The potential contamination associated with AOC 03-036(b) is at 10 ft bgs or deeper, and the site is covered with asphalt pavement. Therefore, no complete exposure pathways to receptors are present at AOC 03-036(b), and an ecological risk-screening assessment was not conducted.

## 6.24 SWMU 03-037, Underground Storage Tanks

### 6.24.1 Site Description and Operational History

SWMU 03-037 is an inactive belowgrade 9000-gal. concrete tank located in the basement of the Sigma Building, building 03-66, at TA-03 (Figure 6.5-1) (LANL 1993, 020947, p. 6-11). The tank is divided into two 4500-gal. unlined sections that are fitted with separate covers. One section was used to store spent cyanide solution, while the other section stored nitric, sulfuric, and hydrochloric acid solutions from electroplating operations. Both sections of the tank discharged to the industrial waste line. The tank began operation in 1960 (LANL 1990, 007511, p. 3-037). In 1989, the acid waste line within the Sigma Building serving the cyanide tank collapsed and leaked. The leak was repaired, and two samples collected along the route of the line were analyzed for potential contaminants; neither VOCs nor SVOCs were detected (LANL 1993, 020947, p. 6-11). Results from a 1991 reconnaissance survey performed at the site showed gross-alpha, -beta, and -gamma radiation at background levels. Samples were also analyzed for toxicity characteristic leaching procedure metals and total uranium. Analytes were below

regulatory levels (LANL 1993, 020947, pp. 6-11–6-12). The entire tank was taken out of service in 1990, and the inlet and outlet drainlines were plugged.

### 6.24.2 Relationship to Other SWMUs and AOCs

This tank is located below the basement floor of the Sigma Building (03-66), about 50 ft north of the former location of nine PCB-containing transformers, AOC 03-003(f). This basement location is about 180 ft south of the first-floor loading dock where AOC 03-056(k), a container storage area, is located; however, SWMU 03-037 is not associated with these sites.

### 6.24.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-037.

### 6.24.4 Delayed Site Investigation Rationale

No sampling was conducted at SWMU 03-037 during the 2009 investigation because it is located in the basement of an active nuclear facility. The approved investigation work plan proposed site characterization activities for SWMU 03-037 be delayed until D&D of building 03-66 (LANL 2008, 103404; NMED 2008, 102721). Any potential contamination from past releases would be located beneath the building, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation. For these reasons, it is proposed that site characterization and investigation be delayed until D&D of building 03-66 has been completed.

## 6.25 AOC 03-038(c), Waste Lines

### 6.25.1 Site Description and Operational History

AOC 03-038(c) is a 2-in. cast-iron drainline in building 03-28 at TA-03 (Figure 6.25-1). Previously, this drainline carried rinse solution from a copper electroplating bath in building 03-28 (room 46) to the industrial waste line. The electroplating bath began operation in the 1960s and was used to plate very small parts of printed circuit boards. During the electroplating process, water was sprayed through rows of holes in a manifold on either side of the rinse sink. Minute amounts of plating and acid solutions were washed off the circuit boards and down the drain. Spent plating baths and the spent acid-strip solutions were transported to TA-50 for treatment. These solutions contained cyanide, chromic sulfuric acid, and hydrochloric acid. The electroplating bath ceased operation in the early 1970s. The drainpipe was cut and capped inside the wall to make it inaccessible.

### 6.25.2 Relationship to Other SWMUs and AOCs

Drainlines associated with AOC 03-038(c) discharged to the same industrial waste lines as AOC 03-038(d).

### 6.25.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-038(c).

### 6.25.4 Site Contamination

#### 6.25.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC 03-038(c) to assess potential contamination:

- Six samples were collected from three locations where the former drainline exited the building and where the former drainline discharged to the industrial waste line to characterize the site. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft below the bottom of the drainline. All samples were analyzed at off-site fixed laboratories for TAL metals, and cyanide, and two samples were also analyzed for PCBs.
- All investigation samples were field screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-038(c) are shown in Figure 6.25-1. Table 6.25-1 presents the samples collected and analyses requested at AOC 03-038(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.25.4.2 Soil, Rock, and Sediment Field-Screening Results

No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.25.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-038(c) consist of six soil samples collected from three locations.

**Inorganic Chemicals**

Six soil samples were analyzed for TAL metals and cyanide. Table 6.25-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.25-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at AOC 03-038(c); inorganic COPCs are identified below.

Antimony was not detected in soil at AOC 03-038(c) but had DLs (1.07 to 1.16 mg/kg) above BV (0.83 mg/kg) in six soil samples. The maximum DL was also greater than the maximum background concentration (1 mg/kg). Antimony is identified as a COPC in soil.

Cadmium was not detected above BV (0.4 mg/kg) in soil at AOC 03-038(c) but had DLs (0.536 to 0.58 mg/kg) above BV in four soil samples. The DLs were less than the maximum background concentration of cadmium in soil (2.6 mg/kg) (Figure H-60). Cadmium is not identified as a COPC in soil.

Chromium was detected above BV (19.3 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 22.2 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of chromium in soil (36.5 mg/kg) (Figure H-60). Chromium is not identified as a COPC in soil.

Cobalt was detected above BV (8.64 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 37.8 mg/kg. The maximum concentration was above BV (Figure H-61). Therefore, cobalt is identified as a COPC in soil.

Lead was detected above BV (22.3 mg/kg) in three soil samples at AOC 03-038(c), with a maximum concentration of 83.7 mg/kg. The maximum concentration was above BV (Figure H-61). Therefore, lead is identified as a COPC in soil.

Manganese was detected above BV (671 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 3280 mg/kg. The maximum concentration was above BV (Figure H-62). Therefore, manganese is identified as a COPC in soil.

Silver was detected above BV (1 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 1.17 mg/kg. Silver is identified as a COPC in soil.

Sodium was detected above BV (915 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 969 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of sodium in soil (1800 mg/kg) (Figure H-62). Sodium is not identified as a COPC in soil.

Vanadium was detected above BV (39.6 mg/kg) in one soil sample at AOC 03-038(c), with a maximum concentration of 47.3 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of vanadium in soil (56.5 mg/kg) (Figure H-63). Vanadium is not identified as a COPC in soil.

**Organic Chemicals**

Two soil samples were analyzed for PCBs. No PCBs were detected at AOC 03-038(c).

#### 6.25.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals at AOC 03-038(c) are defined, as discussed below.

**Inorganic Chemicals**

The inorganic chemicals detected above BVs or having DLs above BVs at AOC 03-038(c) are antimony, cadmium, chromium, cobalt, lead, manganese, silver, sodium, and vanadium. The spatial distribution of these chemicals is discussed below.

Antimony was not detected in soil at AOC 03-038(c) but had DLs (1.07 to 1.16 mg/kg) above BV (0.83 mg/kg) in all soil samples. Because antimony was not detected at AOC 03-038(c), the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BVs (19.3 mg/kg) in soil samples at AOC 03-038(c) but the DLs for a few samples were greater than the BVs. Lateral and vertical extent of cadmium are defined.

Chromium concentrations are not different than background at AOC 03-038(c), and the lateral and vertical extent of chromium are defined.

Cobalt was detected above BV (8.64 mg/kg) in one soil sample at AOC 03-038(c). The maximum concentration of 37.8 mg/kg was detected at location 03-608307 in a sample collected from a depth of 0.0–1.0 ft bgs. Cobalt concentrations decreased laterally downgradient at location 03-608309

(approximately 10 ft to the east). Concentrations decrease with depth at location 03-608307. The lateral and vertical extent of cobalt are defined.

Lead was detected above BV (22.3 mg/kg) in soil at two locations at AOC 03-038(c). The maximum concentration of 83.7 mg/kg was detected at location 03-608308 in a sample collected from a depth of 0.0–1.0 ft bgs. Lead concentrations decreased downgradient at location 03-608309. Concentrations decreased with depth at location 03-608308. The lateral and vertical extent of lead are defined.

Manganese was detected above BV (671 mg/kg) in soil at one location at AOC 03-038(c). The maximum concentration of 3280 mg/kg was detected at location 03-608307 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Manganese was not detected above BV in any downgradient samples at locations 03-608309 and 03-608308. Manganese was not detected above BV in the deepest sample at location 03-608307. The lateral and vertical extent of manganese are defined.

Silver was detected above BV (1 mg/kg) in soil at one location at AOC 03-038(c). The maximum concentration of 1.17 mg/kg was detected at location 03-608307 in a sample collected from a depth of 0.0–1.0 ft bgs. Silver was not detected above BV in any samples downgradient at locations 03-608309 and 03-608308. Silver was not detected above BV in the deepest sample at location 03-608307. The lateral and vertical extent of silver are defined.

Sodium concentrations are not different than background at AOC 03-038(c), and lateral and vertical extent of sodium are defined.

Vanadium concentrations are not different than background at AOC 03-038(c), and lateral and vertical extent of vanadium are defined.

### 6.25.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-038(c) is discussed in Appendix I, sections I-4.2 and I-4.4.

No carcinogenic COPCs were identified for the industrial, construction worker or residential scenarios. The HI for the industrial scenario is 0.3, which is less than the NMED target HI of 1.0 (NMED 2009, 108070). The HI for the construction worker scenario is 7, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is from manganese. The exposure and risk from manganese are overestimated because the SSL is less than the soil BV, the EPC for manganese is biased high based on one sampling result, and the HI is substantially lower if the EPC is compared with the maximum soil background concentration. Without manganese, the construction worker HI is 0.1 for AOC 03-038(c). The HI for the residential scenario is approximately 2, which is slightly above the NMED target HI of 1.0 (NMED 2009, 108070). The slightly elevated HI is primarily from cobalt. The exposure and risk from cobalt are overestimated because of one sampling result. In addition, lead is a COPC and because the lead SSL is based upon blood lead levels, lead can be evaluated separately from the other noncarcinogenic COPCs. Without lead, the residential HI for AOC 03-038(c) is approximately, which is equivalent to the NMED target HI.

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker, and residential scenarios.

### 6.25.6 Summary of Ecological Risk Screening

AOC 03-038(c) is covered with asphalt pavement. Therefore, an ecological risk-screening assessment was not conducted because no complete exposure pathways to ecological receptors exist.

## 6.26 AOC 03-038(d), Waste Lines

### 6.26.1 Site Description and Operational History

AOC 03-038(d) consists of the former industrial waste lines from buildings 03-32 (Center for Materials Science) and 03-34 (Cryogenics Building "B") (Figure 6.26-1). Between the 1950s and the 1970s, these waste lines connected the two buildings to the former industrial waste sewer, which was replaced with a RLW line in 1986 that connected building 03-34 to the TA-50 radioactive liquid waste treatment facility (RLWTF). Drainlines from building 03-32 were connected to the sanitary sewer in 1986. Industrial waste lines throughout TA-03 were removed between 1981 and 1986 as part of the Laboratory's Industrial Waste Line Removal Project; no evidence of a release was observed during removal activities (LANL 1995, 057590, p. 6-45).

### 6.26.2 Relationship to Other SWMUs and AOCs

Drainlines associated with AOC 03-038(d) discharged to the same industrial waste lines as AOC 03-038(c).

### 6.26.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-038(d).

### 6.26.4 Site Contamination

#### 6.26.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC 03-038(d) to assess potential contamination:

- Twelve samples were collected from six locations to characterize the site. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, americium-241, tritium, isotopic plutonium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-038(d) are shown in Figure 6.26-1. Table 6.26-1 presents the samples collected and analyses requested at AOC 03-038(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.26.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-038(d), a maximum concentration of 4.8 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site

background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.26.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-038(d) consist of 12 soil samples collected from six locations.

**Inorganic Chemicals**

Twelve soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.26-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.26-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-038(d); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twelve soil samples were analyzed for SVOCs, VOCs, and PCBs. Table 6.26-3 summarizes the analytical results for detected organic chemicals. Figure 6.26-3 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-038(d); therefore, organic COPCs are not identified for the site.

**Radionuclides**

Twelve soil samples were analyzed for americium-241, isotopic plutonium, tritium, and isotopic uranium. Table 6.26-4 summarizes the analytical results for radionuclides. Figure 6.26-4 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-038(d); therefore, radionuclide COPCs are not identified for the site.

#### 6.26.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals at AOC 03-038(d) are not defined. The nature and extent of organic chemicals and radionuclides are defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil samples at AOC 03-038(d) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or have analytical DLs above BVs. These inorganic chemicals are antimony, cadmium, chromium, cobalt, manganese, nitrate, and thallium.

Antimony was detected above BV for soil (0.83 mg/kg) in six samples at AOC 03-038(d). The maximum concentration of 1.63 mg/kg was detected at location 03-608311 in a soil sample collected from a depth of 1–2 ft bgs. Antimony concentrations increased with depth at this and two other locations, and no deeper samples were collected at AOC 03-038(d). The vertical extent of antimony is not defined. Antimony was not detected north along the drainline at location 03-608312. The lateral extent of antimony is defined.

Cadmium was not detected in soil but had DLs (0.572 to 0.651 mg/kg) above BV (0.4 mg/kg) in 6 out of 12 samples. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum DL did not exceed the maximum

background concentration for cadmium in soil (2.6 mg/kg) (Figure H-64). Because the current site data at AOC 03-038(d) for cadmium in soil is not different than background, the lateral and vertical extent of cadmium are defined.

Chromium was detected above BV for soil (19.3 mg/kg) in one sample at AOC 03-038(d). The maximum concentration of 24.7 mg/kg was detected at location 03-608311 in a soil sample collected from a depth of 0 to 1 ft bgs. Chromium decreases with depth to a level below BV at this location and was not detected north along the drainline at location 03-608312. The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV for soil (8.64 mg/kg) in one sample at AOC 03-038(d). The maximum concentration of 16.4 mg/kg was detected at location 03-608311 in a soil sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of cobalt are not different than background (Table H-10 and Figure H-64). The lateral and vertical extent of cobalt are defined.

Manganese was detected above BV for soil (671 mg/kg) in one sample at AOC 03-038(d). The maximum concentration of 1010 mg/kg was detected at location 03-608311 in the deepest soil sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of manganese are not different than background (Table H-10 and Figure H-65). The lateral and vertical extent of manganese are defined.

Nitrate was detected in four samples at AOC 03-038(d). The maximum concentration of 2.52 mg/kg was detected at location 03-608311 in a sample collected from a depth of 1.0–2.0 ft bgs. Detected nitrate concentrations for all samples are consistent with naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Thallium was detected above BV for soil (0.73 mg/kg) in one sample at AOC 03-038(d). The maximum concentration of 1.09 mg/kg was detected at location 03-608314 in the soil sample collected from a depth of 0.0–1.0 ft bgs. Thallium was not detected in the deepest sample (1.0–2.0 ft bgs) collected from this location. Thallium was not detected along the drainline at locations 03-608315, 03-608310, or 03-608312. The lateral and vertical extent of thallium are defined.

**Organic Chemicals**

Organic chemicals detected in soil at AOC 03-038(d) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, toluene, 1, 2-xylene, and 1,3-xylene+1,4-xylene.

Acetone, 2-methylnaphthalene, naphthalene, 1, 2-xylene, and 1,3-xylene+1,4-xylene were detected at concentrations near the EQL at AOC 03-038(d). The lateral and vertical extent of acetone, 2-methylnaphthalene, naphthalene, 1,2-xylene, and 1,3-xylene+1,4-xylene are defined.

Maximum concentrations of acenaphthalene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene were detected in one soil sample collected from a depth of 0.0–1.0 ft bgs at location 03-608314. Concentrations of these organic chemicals decreased with depth at this location and were not detected above EQLs at locations 03-608310, 03-608311, or 03-608312 farther along the drainline. The lateral and vertical extent of acenaphthalene, anthracene, benzo(a)anthracene, benzo(b)fluoranthene,

benzo(g,h,i)perylene, benzo(a)pyrene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene are defined.

Aroclor-1254 and Aroclor-1260 were detected in three samples at AOC 03-038(d). The maximum concentration of Aroclor-1254 (0.0168 mg/kg) was detected at location 03-608313 in the soil sample collected from a depth of 0.0–1.0 ft bgs. The maximum concentration of Aroclor-1260 (0.0171 mg/kg) was detected at location 03-608314 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at these locations and were not detected at locations 03-608310, 03-608311, or 03-608312 farther along the drainline. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Methylene chloride was detected in four samples at AOC 03-038(d). The maximum concentration of 0.00622 mg/kg was detected at location 03-608312 in a sample collected from a depth of 1.0–2.0 ft bgs. All results were near or below the EQLs. The lateral and vertical extent of methylene chloride are defined.

Toluene was detected in one sample at AOC 03-038(d). The maximum concentration of 0.0016 mg/kg was detected at location 03-608311 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Toluene was not detected in the deepest soil sample (1.0–2.0 ft bgs) collected from this location or at any other location at AOC 03-038(d). The lateral and vertical extent of toluene are defined.

Xylene(1,2-) and xylene(1,3-)+xylene(1,4-) were each detected in one sample at AOC 03-038(d). The maximum concentrations of 0.000514 and 0.000611 mg/kg, respectively, were detected at location 03-608312 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The detected concentrations were below EQLs. The lateral and vertical extent of 1,2-xylene and 1,3-xylene+1,4-xylene are defined.

**Radionuclides**

Tritium was detected in four samples at AOC 03-038(d). The maximum activity of 0.0647351 pCi/mL was detected at location 03-608310 in a soil sample collected from a depth of 1.0–2.0 ft bgs. Tritium was also detected at a depth of 0.0–1.0 ft bgs at this location and at depths of 0.0–1.0 ft and 1.0–2.0 ft bgs at location 03-608311. Tritium was not detected at any other locations at AOC 03-038(d). Tritium activities were low and consistent at both locations. There is no evidence of a tritium release. The lateral and vertical extent of tritium are defined.

### 6.26.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-038(d) because extent is not defined for the site.

### 6.26.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-038(d) because extent is not defined for the site.

## 6.27 AOC 03-043(a), Aboveground Storage Tank

### 6.27.1 Site Description and Operational History

AOC 03-043(a) is the former location of a 20,000-gal. aboveground storage tank, structure 03-74, at the former TA-03 asphalt batch plant (Figure 6.2-1). The tank was installed in 1948 to store asphalt emulsion. In 1963, the tank was removed, disassembled, disposed of at the Los Alamos County landfill, and

replaced with another storage tank, structure 03-178 [AOC 03-043(f)]. No record of releases to the environment is associated with this AOC. Review of historical aerial photographs revealed no staining in the area of AOC 03-043(a) (LANL 1995, 057590, pp. 6-12, 6-18). In 2003, the site was paved over with asphalt for use as a parking lot. AOC 03-043(a) is a duplicate of SWMUs 03-036(c) and 03-036(d).

### 6.27.2 Relationship to Other SWMUs and AOCs

This former underground storage tank supplied emulsion to the former TA-03 asphalt batch plant, but it is not a component of Consolidated Unit 03-009(a)-00.

### 6.27.3 Summary of Previous Investigations

Samples were collected within the vicinity of AOC 03-043(a) as part of sampling activities for SWMUs 03-036(c) and 03-036(d). Results of these sampling activities are discussed in sections 6.8.5.3 and 6.8.6.3.

### 6.27.4 Site Contamination

No sampling was conducted at AOC 03-043(a) during the 2009 investigation because the nature and extent of contamination have been defined. Although previous sampling identified inorganic chemicals in the area as part of investigations of SWMUs 03-036(c) and 03-036(d), the contaminant concentrations decreased with depth. Organic chemicals were also detected but at concentrations less than EQLs (LANL 2008, 103404, p. 54–55; NMED 2008, 102721). The summaries of the human health risk screening assessment results for SWMUs 03-036(c) and 03-036(d) are presented in sections 6.8.5.5 and 6.8.6.6, respectively. Ecological risks for SWMUs 03-036(c) and 03-036(d) are summarized in sections 6.8.5.6 and 6.8.6.7.

## 6.28 AOC 03-043(f), Aboveground Storage Tank

### 6.28.1 Site Description and Operational History

AOC 03-043(f) is the former location of an aboveground asphalt emulsion storage tank (structure number 03-178) at the TA-03 former asphalt batch plant (Figure 6.2-1). The 1990 SWMU (LANL 1990, 007511) report lists AOC 03-043(f) under the heading of decommissioned product tanks. AOC 03-043(f) is a duplicate of SWMUs 03-036(c) and 03-036(d).

The 1990 SWMU (LANL 1990, 007511) report lists AOC 03-043(f) under the heading of decommissioned product tanks. The 1990 SWMU report also separately lists areas of potential soil contamination associated with tanks (LANL 1990, 007511). The SWMU report associates three of these areas, SWMUs 03-036(a,c,d), with asphalt storage tanks that were located at the former asphalt batch plant at TA-03. Five asphalt storage tanks occupied a relatively small area to the northeast of the main plant building (former structure 03-73). The three southern asphalt storage tanks are associated with the area of potential soil contamination designated by the SWMU report as SWMU 03-036(a) (LANL 1990, 007511). The SWMU report provides no tank structure numbers for the two remaining areas of potential soil contamination [SWMUs 03-036(c) and 03-036(d)]. Although no tank structure numbers are provided, the SWMU report describes each of these areas of potential soil contamination associated with asphalt batch plant storage tanks. Because the asphalt batch plant contained only five tanks and the three southern tanks are known to be associated with the area of potential soil contamination designated as SWMU 03-036(a), the two remaining areas of soil contamination [SWMUs 03-036(c) and 03-036(d)] can be associated only with the two remaining tanks, that is, the northern tanks [AOCs 03-043(f) and

03-043(g)]. Because the northern tanks have been removed, each of these AOCs is no longer the tank itself but rather is the area of potential soil contamination associated with each former tank. However, the SWMU report has already designated SWMUs 03-036(c) and 03-036(d) as the areas of potential soil contamination from the two tanks (LANL 1990, 007511). Therefore, AOCs 03-043(f) and 03-043(g) are the same areas of soil contamination as SWMUs 03-036(c) and 03-036(d).

Sections 6.8.5.1 through 6.8.6.6 summarize the investigation of SWMUs 03-036(c) and 03-036(d).

## 6.29 AOC 03-043(g), Aboveground Storage Tank

### 6.29.1 Site Description and Operational History

AOC 03-043(g) is the former location of an aboveground asphalt storage tank (structure number 03-335) at the former asphalt batch plant at TA-03 (Figure 6.2-1). AOC 03-043(g) is a duplicate of SWMUs 03-036(c) and 03-036(d).

The 1990 SWMU (LANL 1990, 007511) report lists AOC 03-043(g) under the heading of decommissioned product tanks. The 1990 SWMU report also lists separately areas of potential soil contamination associated with tanks. The SWMU report associates three of these areas, SWMUs 03-036(a,c,d), with asphalt storage tanks that were located at the former asphalt batch plant (LANL 1990, 007511). Five asphalt storage tanks occupied a relatively small area to the northeast of the main plant building (former structure 03-73). The three southern asphalt storage tanks are associated with the area of potential soil contamination designated by the SWMU report as SWMU 03-036(a) (LANL 1990, 007511). The SWMU report provides no tank structure numbers for the two remaining areas of potential soil contamination [SWMUs 03-036(c) and 03-036(d)]. Although no tank structure numbers are provided, the SWMU report does describe each of these areas of potential soil contamination to be associated with asphalt batch plant storage tanks(LANL 1990, 007511). Because the asphalt batch plant contained only five tanks and because the three southern tanks are known to be associated with the area of potential soil contamination designated as SWMU 03-036(a), the two remaining areas of soil contamination [SWMUs 03-036(c) and 03-036(d)] can only be associated with the two remaining tanks, that is, the northern tanks [AOCs 03-043(f) and 03-043(g)]. Because the northern tanks have been removed, each of these AOCs is no longer the tank itself but rather is the area of potential soil contamination associated with each former tank. However, the SWMU report has already designated SWMUs 03-036(c) and 03-036(d) as the areas of potential soil contamination from the two tanks. Therefore, AOCs 03-043(f) and 03-043(g) are the same areas of soil contamination as SWMUs 03-036(c) and 03-036(d).

Sections 6.8.5.1 through 6.8.6.6 summarize the investigation of SWMUs 03-036(c) and 03-036(d).

## 6.30 SWMU 03-045(a), Outfall

### 6.30.1 Site Description and Operational History

SWMU 03-045(a) is an inactive outfall from the TA-03 power plant (building 03-22) (Figure 6.10-1). The outfall operated from the 1950s to 1993 The primary outflow from building 03-22 to the SWMU 03-045(a) outfall was noncontact water from steam condensate. In addition, water from floor drains in the building basement, first floor, mezzanine, heater floor, platform, and roof drains previously discharged to this outfall. In 1989, an oil/water separator was installed near the outfall to prevent oil from building operations reaching the outfall. In 1993, the separator was removed and the discharge pipe was capped, causing this outfall to become inactive (LANL 1995, 057590, p. 6-71). In mid-1991, a diesel fuel release of approximately 100 to 200 gal. occurred from the two aboveground diesel-fuel tanks at building 03-22. As the system was being pressurized, a faulty fitting on a fuel line to the diesel tanks caused the release

(LANL 1995, 057590, p. 6-79). The release occurred directly above SWMU 03-045(a) and flowed down the slope south of the steam plant into the drainage channel (LANL 1996, 055035, Attachment B, p. 1, Attachment D, p. 1). The spill was contained approximately 120 yd east of the leak. The drainage was blocked, and an extensive cleanup was performed to remove all diesel fuel and diesel-contaminated soil (LANL 1995, 057590, p. 6-79). Remediation activities included removal of contaminated soil and sediment in and around SWMU 03-045(a) and backfilling the excavation with clean fill (LANL 1995, 057590, p. 6-71).

### 6.30.2 Relationship to Other SWMUs and AOCs

The capped discharge point for this former outfall is located approximately 260 ft west of the active power plant outfall, SWMU 03-045(b), in the same drainage channel that is a tributary to Sandia Canyon. In addition, stormwater runoff from parking lots and building roof drains in the northwestern portion of TA-03 are discharged to the same drainage channel from a large corrugated metal pipe 100 ft west of the SWMU 03-045(a) outfall.

### 6.30.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-045(a).

### 6.30.4 Site Contamination

#### 6.30.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-045(a) to assess potential contamination:

- Eight samples were collected from four locations to define the nature and extent of contamination. Sampling locations were biased to the outfall area and areas of sediment accumulation. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, PCBs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-045(a) are shown in Figure 6.10-1. Table 6.30-1 presents the samples collected and analyses requested at SWMU 03-045(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.30.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-045(a), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.30.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-045(a) consist of eight samples (three soil and five tuff) collected from four locations.

**Inorganic Chemicals**

Eight samples (three soil and five tuff) were analyzed for TAL metals and cyanide. Table 6.30-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(a); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Eight samples (three soil and five tuff) were analyzed for SVOCs, VOCs, PCBs, TPH-DRO, and TPH-GRO. Table 6.30-3 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(a); therefore, organic COPCs are not identified for the site.

### 6.30.4.4 Nature and Extent of Contamination

The extent of inorganic and organic chemicals at SWMU 03-045(a) is not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil samples at SWMU 03-045(a) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or have analytical DLs above BVs. These inorganic chemicals are antimony, cadmium, chromium, copper, lead, mercury, selenium, silver, and zinc.

Antimony was not detected above BV in soil at SWMU 03-045(a) but had DLs (1.22 to 1.23 mg/kg) above BV (0.83 mg/kg) in two samples. The maximum DL was greater than the maximum background concentration (1.0 mg/kg) for soil. Antimony was not detected above BV in tuff at SWMU 03-045(a) but had DLs (1.18 to 1.29 mg/kg) above BV (0.5 mg/kg) in three samples. The maximum DL was greater than the maximum background concentration (0.4 mg/kg) for tuff. Because antimony was not detected at SWMU 03-045(a), the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV for soil (0.4 mg/kg) at SWMU 03-045(a) but had a DL (0.615 mg/kg) above BV in one sample. No sampling results exceeded the maximum background concentration (2.6 mg/kg) of cadmium in soil (Figure H-66). The lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample and above the tuff BV (7.14 mg/kg) in four samples at SWMU 03-045(a). The maximum concentration of 88.2 mg/kg was detected in a sample collected from a depth from 0.0–1.0 ft bgs at location 03-608317. Chromium concentrations decreased with distance down drainage from location 03-608317 to locations 03-608318 and 03-608319. However, concentrations increased with depth at three of the four locations (03-608316, 03-608318, and 03-608319). The lateral extent of chromium is defined, and the vertical extent is not defined.

Copper was detected above BV for soil (14.7 mg/kg) in one sample and above BV for tuff in two samples at SWMU 03-045(a). The maximum concentration of 34 mg/kg was detected in a sample collected from a depth of 0.0–1.0 ft bgs at location 03-608319. Copper concentrations decreased with depth at this location; however, copper concentrations increased from location 03-608318 to 03-608319, and samples

were not collected farther downgradient. The vertical extent of copper is defined, and the lateral extent is not defined.

Lead was detected above BV for soil (22.3 mg/kg) in three samples and above the tuff BV (11.2 mg/kg) in one sample at SWMU 03-045(a).The maximum concentration of 365 mg/kg was detected at location 03-608317 in a sample collected from 0.0–1.0 ft bgs. Lead concentrations decreased to the downgradient location 03-608319 and decreased with depth at all locations. The lateral and vertical extent of lead are defined.

Mercury was detected above BV for soil (0.1 mg/kg) in one sample at SWMU 03-045(a), at a concentration of 0.374 mg/kg at location 03-608319 in a sample collected from a depth of 0.0–1.0 ft bgs. Because location 03-608319 is the most downgradient location, lateral extent of mercuy is not defined. Mercury was not detected in the deepest samples collected from depths of 1.0–2.0 ft bgs at all locations. The vertical extent of mercury is defined.

Selenium was not detected in tuff at SWMU 03-045(a), but had DLs (1.12 to 1.32 mg/kg) above BV (0.3 mg/kg) in five samples. Because selenium was not detected at SWMU 03-045(a), the lateral and vertical extent of selenium are defined.

Silver was detected above BV for soil (1 mg/kg) in one sample at SWMU 03-045(a) at a concentration of 1.76 mg/kg at location 03-608319 in a sample collected from a depth of 0.0–1.0 ft bgs. Because location 03-608319 is the most downgradient location, the lateral extent of silver is not defined. Silver was not detected in the deepest samples (1.0–2.0 ft bgs) collected from all locations. The vertical extent of silver is defined.

Zinc was detected above BV for soil (48.8 mg/kg) in three samples and above BV for tuff (63.5 mg/kg) in one sample at SWMU 03-045(a). The maximum concentration of 161 mg/kg was detected at location 03-608317 in a sample collected from a depth of 0.0–1.0 ft bgs. Zinc concentrations decreased to downgradient location 03-608319 and with depth in the deepest samples (1.0–2.0 ft bgs) collected from all locations. The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 03-045(a) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and TPH-GRO.

Acetone was detected in one sample at SWMU 03-045(a) at a concentration of 0.00224 mg/kg in a sample collected in soil from 0.0–1.0 ft bgs at location 03-608319. This detection is below the EQL. The lateral and vertical extent of acetone is defined.

The maximum concentrations of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were in a soil sample collected from a depth of 0.0–1.0 ft bgs at location 03-608317. Concentrations decreased downgradient to location 03-608319 and with depth in the deepest samples (1.0–2.0 ft bgs) collected from all locations. The lateral and vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene are defined.

Aroclor-1254 was detected in four samples at two locations at SWMU 03-045(a). The maximum concentration of 0.137 mg/kg was detected at location 03-608319 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Location 03-608319 is the most downgradient location. Concentrations increased with depth at location 03-608317. The lateral and vertical extent of Aroclor-1254 are not defined.

Aroclor-1260 was detected in six samples at four locations at SWMU 03-045(a). The maximum concentration of 0.366 mg/kg was detected at location 03-608319 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Location 03-608319 is the most downgradient location. Concentrations increased with depth at locations 03-608316, 03-608317, and 03-608318. The lateral and vertical extent of Aroclor-1260 are not defined.

Fluorene was detected in two samples at two locations at SWMU 03-045(a). The maximum concentration (1.05 mg/kg) was detected at location 03-608317 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Fluorene concentrations decreased with depth at this location and was not detected above the EQL downgradient at locations 03-608317 and 03-608318. The lateral and vertical extent of fluorene are defined.

Isopropyltoluene(4-) was detected in one soil sample at SWMU 03-045(a), at a concentration of 0.023 mg/kg from 0.0–1.0 ft bgs at location 03-608319 (the most downgradient location at the site). Isopropyltoluene(4-) decreased with depth to levels below the EQL at all locations. The lateral extent of 4-isopropyltoluene is not defined, and the vertical extent is defined.

Methylnaphthalene(2-) and naphthalene were detected in one sample at location 03-608617 from a depth of 0.0–1.0 ft bgs. Concentrations of both organic chemicals decreased with depth and laterally down the drainage. The lateral and vertical extent of 2-methylnaphthalene and naphthalene are defined.

TPH-DRO was detected in five samples from three locations at SWMU 03-045(a). The maximum concentration of 273 mg/kg was detected at location 03-608317 in a soil sample collected from a depth of 0.0–1.0 ft bgs. TPH-DRO concentrations decreased to the downgradient location 03-608319. The concentration of TPH-DRO increased with depth at location 03-608316 and decreased with depth at the other locations. The lateral extent of TPH-DRO is defined, and the vertical extent is not defined.

TPH-GRO was detected in two samples at SWMU 03-045(a). The maximum concentration of 0.0191 mg/kg was detected at location 03-608316 in a tuff sample collected from a depth of 1.0–2.0 ft bgs. TPH-GRO concentrations were detected only at trace levels. The lateral and vertical extent of TPH-GRO are defined.

### 6.30.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(a) because extent is not defined for the site.

### 6.30.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(a) because extent is not defined for the site.

## 6.31 SWMU 03-045(e), Outfall

### 6.31.1 Site Description and Operational History

SWMU 03-045(e) is an inactive outfall (Figure 6.2-1) from a floor drain in the oil pump house (structure 03-57) located at the TA-03 power plant, building 03-22 (Figure 6.10-1). One line from each of two diesel fuel storage tanks (structures 03-26 and 03-27) passes through the pump house to the power plant. The diesel fuel is backup fuel for the power plant. Valves in the pump house operate each line and allow diesel fuel to flow from one or both storage tanks. The floor drain was in place to prevent the pump house from filling with diesel fuel in the event a valve junction should rupture or leak. The floor drain and associated drainline to the outfall were plugged in 1989. A concrete apron is located at the point where the drainline discharged into Sandia Canyon (LANL 1995, 057590, pp. 6-7–6-8).

### 6.31.2 Relationship to Other SWMUs and AOCs

SWMU 03-045(e) is not associated with any other SWMUs or AOCs and is not a component of Consolidated Unit 03-012(b)-00. However, the outfall is located directly downgradient of the former TA-03 asphalt batch plant SWMUs and AOCs, including the former SWMU 03-045(g) outfall.

### 6.31.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-045(e).

### 6.31.4 Site Contamination

#### 6.31.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-045(e) to assess potential contamination:

- Two samples were collected from one location at the outfall to define the nature and extent of potential contamination. Samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling location at SWMU 03-045(e) is shown in Figure 6.2-1. Table 6.31-1 presents the samples collected and the analyses requested for each sample associated with SWMU 03-045(e).

#### 6.31.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 03-045(e), a maximum concentration of 222 ppm was detected at a depth of 0.0–1.0 ft bgs; the sample was submitted to a fixed laboratory for analysis of organic chemicals. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.31.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-045(e) consist of two soil samples collected from one location at the outfall. Data collected in 2009 as part of characterization efforts at SWMU 03-045(e) are presented in this report but are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.31.5).

**Inorganic Chemicals**

Two soil samples were analyzed for TAL metals and cyanide. Table 6.31-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BV.

Inorganic chemicals in soil and samples at SWMU 03-045(e) were detected at concentrations above their BV, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These chemicals are antimony, cadmium, lead, thallium, and zinc.

**Organic Chemicals**

Two soil samples were analyzed for SVOCs, VOCs, TPH-DRO, and PCBs. Table 6.31-3 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals.

Organic chemicals detected in soil at SWMU 03-045(e) are Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, fluoranthene, 4-isopropyltoluene, phenanthrene, pyrene, toluene, and TPH-DRO.

### 6.31.5 Delayed Site Investigation Rationale

No sampling was conducted beneath the oil pump house (structure 03-57) or outlet drainline because of the close proximity of active diesel fuel storage tanks, associated fuel lines, and ancillary equipment associated with the TA-03 power plant (Figure 6.10-1). The approved investigation work plan proposed site characterization activities for this portion of SWMU 03-045(e) be delayed until D&D of structure 03-57, the diesel fuel storage tanks, associated fuel lines, and ancillary equipment associated with the TA-03 power plant (LANL 2008, 103404; NMED 2008, 102721). Any potential contamination from past releases would be located beneath the pump house, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation. For these reasons, it is proposed that additional site characterization and investigation be delayed until the D&D of structure 03-57, along with the diesel fuel storage tanks, associated fuel lines, and ancillary equipment associated with the TA-03 power plant.

## 6.32 SWMU 03-045(f), Outfall

### 6.32.1 Site Description and Operational History

SWMU 03-045(f) is an outfall from a sink drain that served the TA-03 utilities control center (building 03-223) from 1950 to the late 1980s (Figure 6.10-1). The outfall was located on the north side of the building and discharged to Sandia Canyon. The sink was used as a quench tank for welding and cutting. No releases of hazardous wastes or constituents from the sink to the SWMU 03-045(f) outfall have been documented (LANL 1995, 057590, p. 6-8). The sink was removed in the late 1980s.

### 6.32.2 Relationship to Other SWMUs and AOCs

The SWMU 03-045(f) outfall is downgradient of the SWMU 03-045(a,b,c) outfalls that are all located in the same drainage channel that is a tributary to Sandia Canyon. In addition, stormwater runoff from SWMU 03-012(b) and AOC 03-047(d) discharged upgradient of the SWMU 03-045(f) outfall.

### 6.32.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 03-045(f).

### 6.32.4 Site Contamination

#### 6.32.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at SWMU 03-045(f) to assess potential contamination:

- Four samples were collected from two locations to define the nature and extent of contamination. Sampling locations were biased to the outfall and sediment accumulations. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, and nitrate.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-045(f) are shown in Figure 6.10-1. Table 6.32-1 presents the samples collected and analyses requested at SWMU 03-045(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.32.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-045(f), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.32.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-045(f) consist of four soil samples collected from two locations.

**Inorganic Chemicals**

Four soil samples were analyzed for TAL metals, cyanide, and nitrate. Table 6.32-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 14 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(f); therefore, inorganic COPCs are not identified for the site.

### Organic Chemicals

Four soil samples were analyzed for SVOCs, VOCs, and PCBs. Table 6.32-3 summarizes the analytical results for detected organic chemicals. Plate 15 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(f); therefore, organic COPCs are not identified for the site.

#### 6.32.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-045(f) are not defined, as discussed below.

### Inorganic Chemicals

Antimony was detected above BV (0.83 mg/kg) in two samples in soil at SWMU 03-045(f). The maximum concentration of 1.08 mg/kg was detected at location 03-608322 in a sample collected from 1.0–2.0 ft bgs. Antimony concentrations decreased from the upgradient location 03-608322 to the downgradient location 03-608321. However, concentrations increased with depth to 1.0–2.0 ft bgs at location 03-608322. The lateral extent of antimony is defined, and the vertical extent is not defined.

### Organic Chemicals

Organic chemicals detected in soil at SWMU 03-045(f) are acetone, Aroclor-1260, fluoranthene, isopropylbenzene, 4-isopropyltoluene, phenanthrene, and pyrene.

Acetone, fluoranthene, 4-isopropyltoluene, phenanthrene, and pyrene were detected in the same sample. The maximum concentrations of acetone, fluoranthene, 4-isopropyltoluene, phenanthrene, and pyrene were detected at location 03-608322 at depths of 0.0–1.0 ft bgs, and they were not detected in the deepest samples collected (1.0–2.0 ft bgs). These organic chemicals were not detected in samples at the downgradient location 03-608321. The lateral and vertical extent of acetone, fluoranthene, 4-isopropyltoluene, phenanthrene, and pyrene are defined.

Aroclor-1260 was detected in four samples from two locations at SWMU 03-045(f). The maximum concentration of 0.0314 mg/kg was detected in a sample collected from 0.0–1.0 ft bgs at location 03-608322. The concentration of Aroclor-1260 decreased with depth at this location. Aroclor-1260 concentrations also decreased laterally downgradient at location 03-608321. However, the concentration of Aroclor-1260 increased with depth at location 03-608321. The lateral extent of Aroclor–1260 is defined, and the vertical extent is not defined.

Isopropylbenzene was detected in one soil sample at SWMU 03-045(f) at a concentration below the EQL. The lateral and vertical extent of isopropylbenzene are defined.

### 6.32.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(f) because extent is not defined for the site.

### 6.32.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(f) because extent is not defined for the site.

## 6.33 SWMU 03-045(h), Outfall

### 6.33.1 Site Description and Operational History

SWMU 03-045(h) is a former NPDES-permitted outfall (EPA 03A024) located in TA-03 at the north perimeter of the Sigma Complex security fence, approximately 50 ft north of a cooling tower (structure 03-187) (Figure 6.5-1). The outfall was formerly permitted for the discharge of treated cooling water and stormwater. It served a former cooling tower from 1953 until the late 1980s when the cooling tower became inactive. The cooling tower remained inactive until early 1995, when it was reactivated. In 1997, the cooling tower was removed and the outfall pipe plugged. The outfall was removed from the NPDES permit in 2007 (EPA 2007, 099009). The area at the outfall pipe is about 3-ft wide × 6-ft long. Effluent drained into a corrugated metal storm drainpipe that trended northeast and east of structure 03-187 where it combined with more stormwater runoff from surrounding areas. The drainage continued south and joined a channel north of Eniwetok Drive that ultimately drained into Sandia Canyon. Routine water treatment began in 1968. Treatment included biocides and fungicides to reduce algae growth and chelating agents such as ethylenediaminetetraacetic acid to inhibit corrosion.

### 6.33.2 Relationship to Other SWMUs and AOCs

This former outfall and stormwater drainline is located about 50 ft north of the Sigma Building cooling tower, structure 03-187. The storm drainline ends northeast of the outfall and stormwater drains east in an unlined channel towards Eniwetok Drive, collecting stormwater from other drainlines on the north and west of the Sigma Building from AOC 03-052(b).

### 6.33.3 Summary of Previous Investigations

No sampling activities have been conducted at this site before the 2009 investigation of Upper Mortandad Canyon Aggregate Area; however, RFI sampling activities were conducted in 1997 at AOC 03-052(b), located northeast and downgradient of the corrugated metal storm drain pipe into which SWMU 03-045(h) discharged. RFI sampling activities for AOC 03-052(b) are discussed in section 6.37.3.

### 6.33.4 Site Contamination

#### 6.33.4.1 Soil, Rock, and Sediment Sampling

SWMU 03-045(h) is included in the Upper Mortandad Canyon Aggregate Area and was sampled in 2009 in accordance with the approved investigation work plan for the Upper Mortandad Canyon Aggregate Area (LANL 2007, 098954). All data collected as part of the investigation of SWMU 03-045(h) are presented in the 2009 investigation report for the Upper Mortandad Canyon Aggregate Area. In accordance with the approved investigation work plan for the Upper Sandia Canyon Aggregate Area (LANL 2008, 103404; NMED 2008, 102721), data from one SWMU 03-045(h) sampling location is also presented in this investigation report. The data are included because data collected to characterize AOC 03-052(b) are necessary to complete characterization of SWMU 03-045(h) beyond the end of the

SWMU 03-045(h) storm drainline. Information for the SWMU 03-045(h) samples included in this investigation report are summarized below.

- Two samples were collected from location MO-604952, north of cooling tower 03-0187, from 0.0–0.5 ft and 6.0–7.0 ft bgs (the soil-tuff interface). All samples were analyzed at off-site fixed laboratories for TAL metals, hexavalent chromium, VOCs, SVOCs, dioxins and furans, PCBs, cyanide, perchlorate, nitrate, and gamma-emitting radionuclides, tritium, and isotopic uranium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in SCLs and were presented in the Upper Mortandad Canyon Aggregate Area investigation report (LANL 2009, 107495).

The 2009 sampling location at SWMU 03-045(h) is shown Figure 6.5-1. Table 6.33-1 presents the sampling depths and analyses requested for the sampling location.

#### 6.33.4.2 Soil, Rock, and Sediment Field-Screening Results

Field-screening results are presented in the Upper Mortandad Canyon Aggregate Area investigation report (LANL 2009, 107495).

#### 6.33.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-045(h) presented in this report consist of two samples (one soil and one tuff) collected from one location.

**Inorganic Chemicals**

One soil and one tuff sample were analyzed for TAL metals, hexavalent chromium, cyanide, nitrate, and perchlorate. Table 6.33-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 6 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(h) beyond the end of the storm drainline; therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

One soil and one tuff sample were analyzed for SVOCs, PCBs, and dioxins and furans. One tuff sample was analyzed for VOCs. Table 6.33-3 summarizes the analytical results for detected organic chemicals. Plate 7 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-045(h) beyond the end of the storm drainline; therefore, organic COPCs are not identified for the site.

**Radionuclides**

One soil and one tuff sample were analyzed for gamma-emitting radionuclides, tritium, and isotopic uranium. No radionuclides were detected or detected above BVs/FVs at SWMU 03-045(h).

#### 6.33.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals at SWMU 03-045(h) are not defined. The nature and extent of organic chemicals and radionuclides are defined. All chemicals are discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at SWMU 03-045(h) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, hexavalent chromium, cobalt, copper, lead, magnesium, nickel, nitrate, selenium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 10,500 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Aluminum was detected below BVs at downgradient location 03-03291 in AOC 03-052(b). The lateral extent of aluminum is defined, and the vertical extent of aluminum is not defined.

Antimony was not detected in soil or tuff at SWMU 03-045(h) but had DLs (1.12 and 1.13 mg/kg, respectively) above BVs for soil and tuff (0.83 and 0.5 mg/kg, respectively) in two samples. Because antimony was not detected at SWMU 03-045(h), the lateral and vertical extent of antimony are defined.

Barium was detected above BV for tuff (46 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 112 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Barium was detected below BVs at downgradient location 03-03291 in adjacent AOC 03-052(b). The lateral extent of barium is defined, and the vertical extent of barium is not defined.

Beryllium was detected above BV for tuff (1.21 mg/kg) in one sample at SWMU 03-045(h) at a concentration of 1.4 mg/kg at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Because there were less than 10 samples, statistical tests could not be performed. This concentration was less than the maximum background concentration for beryllium in tuff (1.8 mg/kg) (Figure H-67). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected in soil or tuff, but had a DL (0.567 mg/kg) above BV (0.4 mg/kg) in one sample at SWMU 03-045(h). Because cadmium was not detected at SWMU 03-045(h), the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for tuff (2200 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 4560 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Calcium was detected below BVs at downgradient location 03-03291 in adjacent AOC 03-052(b). The lateral extent of calcium is defined, and the vertical extent of calcium is not defined.

Chromium was detected above BV for tuff (7.14 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 15.7 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Chromium was detected below BVs at downgradient location 03-03291 in adjacent AOC 03-052(b). The lateral extent of chromium is defined, and the vertical extent of chromium is not defined.

Hexavalent chromium was detected in one sample at SWMU 03-045(h). The maximum concentration of 0.142 mg/kg was detected at location MO-604952 in a soil sample collected from a depth of 0.0–0.5 ft bgs. Hexavalent chromium was not detected in the deepest tuff sample (6.0–7.0 ft bgs) from this

location or in any downgradient soil or tuff sample collected from adjacent AOC 03-052(b).The lateral and vertical extent of hexavalent chromium are defined.

Cobalt was detected above BV for tuff (3.14 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 4.46 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Cobalt was detected above BV at downgradient location 03-03291 in AOC 03-052(b) but decreased to levels below BV at location 03-608336 farther downgradient. The lateral extent of cobalt is defined, and the vertical extent of cobalt is not defined.

Copper was detected above BV for tuff (4.66 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 10.5 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Copper was detected below BVs at downgradient location 03-03291 and 03-608336 in adjacent AOC 03-052(b). The lateral extent of copper is defined, and the vertical extent of copper is not defined.

Lead was detected above BV for tuff (11.2 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 14 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Because there were less than 10 samples, statistical tests could not be performed. This concentration was less than the maximum background concentration for lead in tuff (15.5 mg/kg) (Figure H-67). The lateral and vertical extent of lead are defined.

Magnesium was detected above BV for tuff (1690 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 2570 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Because there were less than 10 samples, statistical tests could not be performed. This concentration was less than the maximum background concentration for magnesium in tuff (2820 mg/kg) (Figure H-68). The lateral and vertical extent of magnesium are defined.

Nickel was detected above BV for tuff (6.58 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 11.4 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). Nickel was detected above BV at downgradient location 03-03291 in AOC 03-052(b) but decreased to levels below BV at location 03-608336 farther downgradient. The lateral extent of nickel is defined, and the vertical extent of nickel is not defined.

Nitrate was detected in two samples at SWMU 03-045(h). The maximum concentration of 1.69 mg/kg was detected at location MO-604952 in a soil sample collected from a depth of 0.0–0.5 ft bgs. The nitrate concentrations are consistent with naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Selenium was not detected in soil or tuff at SWMU 03-045(h), but had one DL (1.14 mg/kg) above BV for tuff (0.3 mg/kg). Because selenium was not detected at SWMU 03-045(h), the lateral and vertical extent of selenium are defined.

Vanadium was detected above BV in tuff (17 mg/kg) in one sample at SWMU 03-045(h). The maximum concentration of 21.4 mg/kg was detected at location MO-604952 in the deepest tuff sample (6.0–7.0 ft bgs). This concentration was slightly higher than the maximum background concentration (21 mg/kg) of vanadium in tuff. Vanadium decreased to levels below the maximum background concentration at downgradient locations 03-03291 and 03-608336 in AOC 03-052(b). The lateral and vertical extent of vanadium are defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 03-045(h) are Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, fluoranthene, 1,2,3,4,6,7,8-heptachlorodibenzodioxin, total heptachlorodibenzodioxins, 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,4,7,8,9-heptachlorodibenzofuran, total heptachlorodibenzofurans, 1,2,3,4,7,8-hexachlorodibenzodioxin, 1,2,3,6,7,8-hexachlorodibenzodioxin, 1,2,3,7,8,9-hexachlorodibenzodioxin, total hexachlorodibenzodioxins, 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-hexachlorodibenzofuran, total hexachlorodibenzofurans, 1,2,3,4,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,6,7,8,9-octachlorodibenzofuran, 1,2,3,7,8-pentachlorodibenzodioxin, total pentachlorodibenzodioxins, 1,2,3,7,8-pentachlorodibenzofuran, 2,3,4,7,8-pentachlorodibenzofuran, total pentachlorodibenzofurans, phenanthrene, pyrene, 2,3,7,8-tetrachlorodibenzofuran, and total tetrachlorodibenzofurans.

Aroclor-1254 and Aroclor-1260 were detected in one sample at SWMU 03-045(h). The maximum concentrations were detected at location MO-604952 in a soil sample collected from a depth of 0.0–0.5 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased to levels below the EQL with depth at this location and to levels below the EQL laterally downgradient at locations 03-608337 and 03-608338 associated with AOC 03-052(b). The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

The following organic chemicals were detected at concentrations equal to or less than the EQL at SWMU 03-045(h): benzo(b)fluoranthene, fluoranthene, 1,2,3,4,6,7,8-heptachlorodibenzodioxin, total heptachlorodibenzodioxins, 1,2,3,4,6,7,8-heptachlorodibenzofuran, 1,2,3,4,7,8,9-heptachlorodibenzofuran, total heptachlorodibenzofurans, 1,2,3,4,7,8-hexachlorodibenzodioxin, 1,2,3,6,7,8-hexachlorodibenzodioxin, 1,2,3,7,8,9-hexachlorodibenzodioxin, total hexachlorodibenzodioxins, 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-hexachlorodibenzofuran, total hexachlorodibenzofurans, 1,2,3,4,6,7,8,9-octachlorodibenzodioxin, 1,2,3,4,6,7,8,9-octachlorodibenzofuran, 1,2,3,7,8-pentachlorodibenzodioxin, total pentachlorodibenzodioxins, 1,2,3,7,8-pentachlorodibenzofuran, 2,3,4,7,8-pentachlorodibenzofuran, total pentachlorodibenzofurans, 2,3,7,8-tetrachlorodibenzofuran, and total tetrachlorodibenzofurans. The lateral and vertical extent of these chemicals are defined.

**Radionuclides**

No radionuclides were detected at SWMU 03-045(h).

### 6.33.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-045(h) because extent is not defined for the site.

### 6.33.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-045(h) because extent is not defined for the site.

## 6.34 AOC 03-047(d), Storage Area

### 6.34.1 Site Description and Operational History

AOC 03-047(d) is the former location of a container storage area along the east wall of the TA-03 power plant building 03-22 (Figure 6.10-1). The storage area consisted of an asphalt pad where drums of new motor oil, used oil, and Stoddard solvent were stored from 1954 to 1989. The area was elevated compared with the rest of the site east of the power plant. The asphalt pad was removed in 1989 when the storage area was decommissioned (LANL 1995, 057590, p. 6-83). A VCA was implemented at the site in 1995 that involved the characterization, excavation, and removal of asphalt and soil. Approximately 6 $yd^3$ of soil was excavated to a depth of 4 to 6 in. from a 20 ft × 20 ft area that encompassed the AOC and adjacent area directly north and east of the AOC boundary. The site was subsequently restored by backfilling and compacting the excavated area, followed by revegetation (LANL 2002, 073868.138, p. 5).

### 6.34.2 Relationship to Other SWMUs and AOCs

This former container storage area location on the east side of the TA-03 power plant, building 03-22 is not associated with any other SWMU or AOCs. The AOC was not impacted by other SWMUs or AOCs nor would it have impacted other SWMUs or AOC at the power plant.

### 6.34.3 Summary of Previous Investigations

During the 1995 VCA, three confirmation samples were collected from 0 to 0.5 ft bgs within the excavated area and submitted for analysis of TAL metals, VOCs, SVOCs, PCBs, and pesticides. Data from the 1995 VCA are summarized below. Section 2.34 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium and lead were detected above BVs in one sample; copper, mercury, and zinc were detected above BVs in two samples. Chrysene and indeno(1,2,3-cd)pyrene were detected in one sample; acetone and methylene chloride were detected in three samples; benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, and Aroclor-1260 were detected in two samples (LANL 2002, 073868.138, p. 8).

In January 2002, soil was excavated within the boundary of AOC 03-047(d), including the 1995 sampling locations, before a concrete pad was installed for an emergency backup generator and transformer for the TA-03 steam plant. Shortly after the area had been excavated, a 6-in. main potable-water-supply line to the steam plant ruptured, releasing approximately 250,000 gal. of water. As a result, soil and fill along the entire eastern wall of building 03-22, including soil and fill within and around the AOC boundary, was eroded. The eroded soil and fill were deposited as mud in a flat area northeast of the power plant. The eroded soil and fill from the AOC, along with soil that washed into the excavation, was subsequently removed to a depth of 3 ft and disposed of off-site. The entire area along the eastern wall of the steam plant, including the location of AOC 03-047(d), was backfilled with more than 5 ft of clean fill to bring the site back up to grade, and a concrete support pad with an emergency generator and transformer were installed at the site during the spring and summer of 2002 (LANL 2002, 073868.138, p. 8).

### 6.34.4 Site Contamination

As proposed in the approved investigation work plan, no sampling was conducted at AOC 03-047(d) in 2009 (LANL 2008, 100693; NMED 2009, 102721). Confirmation sampling data from the VCA remediation demonstrated that residual contamination posed no potential unacceptable risk to humans and ecological

receptors (LANL 2002, 073868.138, p. 19). In January 2002, soil was excavated within the boundary of AOC 03-047(d) before a concrete pad was installed for an emergency backup generator and transformer for the TA-03 steam plant. Two days later, a waterline at the TA-03 power plant ruptured and eroded all remaining soil/fill within AOC 03-047(d), including the VCA sampling locations. The entire area along the eastern wall of the steam plant including the location of AOC 03-047(d) was backfilled with more than 5 ft of clean fill to bring the site back up to grade and a concrete support pad with an emergency generator and transformer were installed at the site during the spring and summer of 2002 (LANL 2002, 073868.138, p. 8).

## 6.35 AOC 03-047(g), Drum Storage

### 6.35.1 Site Description and Operational History

AOC 03-047(g) is a paved area on the north side of building 03-141 at TA-03 where drums of acetone, vacuum pump oil, and ethylene glycol were stored (Figure 6.4-1). During a 1989 site reconnaissance survey, staining was found on the cement. During a site visit in September 1993, the building manager stated the area had been used for approximately 20 yr to store product oil and occasionally solvents. Only one drum was on the pad when the site visit was conducted. The drum contained mineral oil used in vacuum pumps. As oil was dispensed, spills were known to occur. Stains were evident on the concrete around the barrel; however, the staining did not continue beyond the concrete, indicating that small oil spills did not migrate off the concrete pad (LANL 1995, 057590, p. 6-46).

### 6.35.2 Relationship to Other SWMUs and AOCs

This formerly used drum storage area is located on the north side of building 03-141. It is located about 40 ft west of AOC 03-051(c), which was another stained area. It is not related to any other SWMUs or AOCs.

### 6.35.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-047(g).

### 6.35.4 Site Contamination

#### 6.35.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC 03-047(g) to assess potential contamination.

- Eight samples were collected from four locations. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, and nitrate.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-047(g) are shown in Figure 6.4-1. Table 6.35-1 presents the samples collected and analyses requested at AOC 03-047(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.35.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-047(g), a maximum concentration of 196 ppm was detected at a depth of 1.0–2.0 ft bgs. This sample (RE03-09-13951) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.35.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-047(g) consist of eight soil samples collected from four locations.

**Inorganic Chemicals**

Eight soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.35-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 3 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-047(g); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Eight soil samples were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.35-3 summarizes the analytical results for detected organic chemicals. Plate 4 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-047(g); therefore, organic COPCs are not identified for the site.

#### 6.35.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at AOC 03-047(g) are not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil samples at AOC 03-047(g) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs . These inorganic chemicals are antimony, cadmium, lead, nitrate, and zinc.

Antimony was not detected in soil at AOC 03-047(g) but had DLs (1.07 to 1.3 mg/kg) above BV (0.83 mg/kg) in eight samples. Because antimony was not detected at AOC 03-047(g), the lateral and vertical extent of antimony are defined.

Cadmium was not detected in soil at AOC 03-047(g) but had DLs (0.537 to 0.648 mg/kg) above BV (0.4 mg/kg) in eight soil samples. Because cadmium was not detected at AOC 03-047(g), the lateral and vertical extent of cadmium are defined.

Lead was detected above BV (22.3 mg/kg) in four samples in soil at AOC 03-047(g). The maximum concentration of 37.4 mg/kg was detected at location 03-608325 in a sample collected from a depth of 1.0–2.0 ft bgs (the deepest sampling interval). At all locations, lead concentrations increased in the deepest sampling interval. The lateral and vertical extent of lead are not defined.

Nitrate was detected in six samples in soil at AOC 03-047(g). The maximum concentration of 2.04 mg/kg was detected at location 03-608327 in a sample collected from 1.0–2.0 ft bgs. The concentrations reflect naturally occurring concentrations of nitrate. The lateral and vertical extent of nitrate are defined.

Zinc was detected above BV (48.8 mg/kg) in five samples in soil at AOC 03-047(g). The maximum concentration of 69 mg/kg was detected at location 03-608326 in a sample collected from 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-69). The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil at AOC 03-047(g) are acenaphthene, acetone, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, and tetrachloroethene.

The maximum concentrations of acenaphthene, anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, fluorine, indeno(1,2,3-cd)pyrene, and tetrachloroethene were detected at location 03-608324 in one soil sample from a depth of 0.0–1.0 ft bgs. These chemicals were not detected in the deepest sample collected from this same location and were not detected or were detected at concentrations below the EQL at other locations. The lateral and vertical extent of acenaphthene, anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, fluorine, indeno(1,2,3-cd)pyrene, and tetrachloroethene are defined.

Acetone was detected in three samples at two locations at AOC 03-047(g). The maximum concentration of 0.00486 mg/kg was detected at location 03-608326 in a soil sample collected from 1.0–2.0 ft bgs. Acetone concentrations were below the EQL. The lateral and vertical extent of acetone are defined.

Aroclor-1242 and Aroclor-1254 were detected at maximum concentrations (0.364 mg/kg and 0.313 mg/kg, respectively) at location 03-608325 in a sample collected from the deepest sampling interval (1.0–2.0 ft bgs). These chemicals were also detected at location 03-608327 in a sample collected from a depth of 0.0–1.0 ft bgs. The lateral and vertical extent of Aroclor-1242 and Aroclor-1254 are not defined.

Aroclor-1260 was detected in three samples at two locations at AOC 03-047(g). The maximum concentration (0.241 mg/kg) was detected in a sample from a depth of 0.0–1.0 ft bgs at location 03-608327. Aroclor-1260 was also detected at location 03-608325 in a sample collected from the deepest sampling interval (1.0–2.0 ft bgs). The lateral and vertical extent of Aroclor-1260 are not defined.

Benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected at two or three locations at AOC 03-047(g). The maximum concentrations of benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in a sample at a depth of 0.0–1.0 ft bgs at location 03-608324. Concentrations decreased laterally from location 03-60824 to the other locations and decreased with depth at all locations. The lateral and vertical extent of benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene are defined.

### 6.35.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-047(g) because extent is not defined for the site.

### 6.35.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-047(g) because extent is not defined for the site.

## 6.36 AOC 03-051(c), Soil Contamination–Vacuum Pump Leak

### 6.36.1 Site Description and Operational History

AOC 03-051(c) consists of two former areas of stained asphalt at TA-03 attributed to operational leaks of vacuum pump oil (Figure 6.4-1) (LANL 1995, 057590, p. 6-84). The first area, located on the east side of building 03-141, measured approximately 6 ft × 6 ft. The second area, located at the northeast corner of the building, measured approximately 10 ft × 15 ft (LANL 1996, 053780, p. 15). Both areas were removed during a VCA conducted in 1995.

### 6.36.2 Relationship to Other SWMUs and AOCs

These two stained areas were located east of and at the northeast corner of building 03-141. The northern location is about 40 ft east of AOC 03-047(g). The southern area is collocated with the storage area, SWMU 03-056(l), which is about 50 ft upgradient of the discharge point for the former outfall, SWMU 03-015.

### 6.36.3 Summary of Previous Investigations

During the 1995 VCA performed at AOC 03-051(c), the stained areas of asphalt were removed along with all stained soil. The stained area next to the east side of building 03-141 was excavated to a depth of 1.5–2 ft bgs, and the stained area at the northeast corner of the building was excavated to a depth of 1.0 ft bgs. Soil samples were field screened for radioactivity, PAHs, TPH, x-ray fluorescence (XRF), TAL metals, and VOCs. The first set of XRF samples showed elevated thallium levels. After the results from cleanup verification samples were received, cleanup activities resumed to remove an additional 2 to 3 in. of thallium-contaminated soil from both excavation locations. Data from two samples collected from the bottom of the excavation showed no elevated thallium levels. The excavated areas were backfilled with soil and gravel and compacted (LANL 1996, 053780, pp. 14–16). Before the area was backfilled, four soil samples were collected from four locations at a depth of 0–0.5 ft bgs from the bottom of each excavation to verify site cleanup. Samples were analyzed for TAL metals, SVOCs, and pesticides. Data from 1995 VCA confirmation samples are screening-level data and are summarized below. Section 2.36 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium was detected above the soil BV in four samples. SVOCs and pesticides were not detected.

### 6.36.4 Site Contamination

#### 6.36.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC 03-051(c) to assess potential contamination:

- Four samples were collected from two locations to confirm the results of the VCA. At each location, samples were collected from 2.5–3.5 ft and 4.5–5.5 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, and nitrate.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-051(c) are shown in Figure 6.4-1. Table 6.36-1 presents the samples collected and analyses requested at AOC 03-051(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.36.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors, at AOC 03-051(c), a maximum concentration of 3.3 ppm was detected at a depth of 4.5–5.5 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.36.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-051(c) consist of four soil samples collected from two locations.

##### Inorganic Chemicals

Four soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.36-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 3 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-051(c); therefore, inorganic COPCs are not identified for the site.

##### Organic Chemicals

Four soil samples were analyzed for SVOCs, PCBs, and TPH-DRO. Table 6.36-3 summarizes the analytical results for detected organic chemicals. Plate 4 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-051(c); therefore, organic COPCs are not identified for the site.

#### 6.36.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at AOC 03-051(c) are not defined, as discussed below.

##### Inorganic Chemicals

Inorganic chemicals in soil or tuff samples at AOC 03-051(c) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs These inorganic chemicals are antimony, arsenic, cadmium, cobalt, lead, manganese, and zinc.

Antimony was not detected in soil at AOC 03-051(c) but had DLs (1.15 to 1.26 mg/kg) above BV (0.83 mg/kg) in four samples. Because antimony was not detected at AOC 03-051(c), the lateral and vertical extent of antimony are defined.

Arsenic was detected above BV (8.17 mg/kg) in one soil sample in at AOC 03-051(c). The maximum concentration of 8.49 mg/kg was detected at location 03-608328 in a sample collected from 4.5–5.5 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No

sampling results exceeded the maximum background concentration of arsenic in soil (9.3 mg/kg) (Figure H-70). The lateral and vertical extent of arsenic are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at AOC 03-051(c) but had DLs (0.574 to 0.628 mg/kg) above BV in three soil samples (Figure H-70). Because cadmium was not detected above BV at AOC 03-051(c), the lateral and vertical extent of cadmium are defined.

Cobalt was detected above BV (8.64 mg/kg) in two samples in soil at AOC 03-051(c). The maximum concentration of 11.2 mg/kg was detected at location 03-608329 in a soil sample collected from 4.5–5.5 ft bgs. Cobalt was detected only in the deepest sampling intervals at the two locations. The lateral and vertical extent of cobalt are not defined.

Lead was detected above BV (22.3 mg/kg) in one soil sample at AOC 03-051(c). The maximum concentration of 25.6 mg/kg was detected at location 03-608328 in a sample collected from 2.5–3.5 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of lead in soil (28 mg/kg) (Figure H-71). The lateral and vertical extent of lead are defined.

Manganese was detected above BV (671 mg/kg) in one sample in soil at AOC 03-051(c). The maximum concentration of 988 mg/kg was detected at location 03-608328 in a sample collected from 4.5–5.5 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of manganese in soil (1100 mg/kg) (Figure H-71). The lateral and vertical extent of manganese are defined.

Zinc was detected above BV (48.8 mg/kg) in one sample in soil at AOC 03-051(c). The maximum concentration of 114 mg/kg was detected in a sample collected from a depth of 2.5–3.5 ft bgs at the northern location 03-608328. Zinc was not detected in the deeper sampling interval at this location. However, no sampling locations are farther downgradient (to the north). The lateral extent of zinc is not defined, and the vertical extent is defined.

**Organic Chemicals**

Organic chemicals detected in soil at AOC 03-051(c) are acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene were detected in two soil samples at the southern location (03-608329). The maximum concentrations of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene were in the sample from the deepest sampling interval (4.5–5.5 ft bgs) at this location. No locations are farther south of location 03-0608329. The lateral and vertical extent of these chemicals are not defined.

Aroclor-1242 was detected in one sample at AOC 03-051(c) at a concentration of 0.0091 mg/kg at location 03-608328 in a soil sample collected from of the deepest sampling interval (4.5–5.5 ft bgs). Aroclor-1242 was not detected at the southern location. The lateral extent of Aroclor-1242 is defined, and the vertical extent is not defined.

Aroclor-1254 and Aroclor-1260 were detected at maximum concentrations (0.038 mg/kg and 0.109 mg/kg, respectively) at location 03-608329 in a sample collected from the shallowest sampling interval (2.5–3.5 ft bgs). Concentrations of these chemicals decreased with depth at this location, but Aroclor-1254 and Aroclor-1260 were detected at a depth of 4.5–5.5 ft bgs at location 03-608328. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are not defined.

Dibenz(a,h)anthracene was detected in one sample at AOC 03-051(c). The maximum concentration of 0.168 mg/kg was detected at location 03-608329 in a soil sample collected from the deepest interval (4.5–5.5 ft bgs). Dibenz(a,h)anthracene was not detected at the northern location. The lateral extent is defined, and the vertical extent is not defined at location 03-608329.

TPH-DRO was detected in three samples collected from two locations at AOC 03-051(c). The maximum concentration of 62.9 mg/kg was detected at location 03-608329 in a soil sample collected from 2.5–3.5 ft bgs. TPH-DRO concentrations decreased with depth at this location and laterally to location 03-608328. The lateral and vertical extent of TPH-DRO are defined.

### 6.36.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-051(c) because extent is not defined for the site.

### 6.36.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-051(c) because extent is not defined for the site.

## 6.37 AOC 03-052(b), Storm Drainage

### 6.37.1 Site Description and Operational History

AOC 03-052(b) consists of five stormwater collection areas at TA-03 about 20 ft north and west of the Sigma Building (03-66) (Figure 6.5-1). Surface runoff flows from the area around the north end of the Sigma Building to three stormwater-collection areas within the building fence, which channel stormwater to two collection areas north of the building 03-66 fence: the area to the northeast of building 03-66 discharges to a storm drain outlet just north of Eniwetok Drive, and the area to the northwest of building 03-66 flows to a single storm drain that discharges to a low-lying grassy area northwest of building 03-66 (LANL 1995, 057590, p. 5-15-1).

### 6.37.2 Relationship to Other SWMUs and AOCs

Stormwater from SWMU 03-045(h) located upgradient of AOC 03-052(b) combines with the flow from the stormwater collection area northwest of building 03-66. Stormwater from the AOC 03-056(k) storage area also flowed to AOC 03-052(b).

### 6.37.3 Summary of Previous Investigations

During the 1997 conducted at AOC 03-052(b), two samples were collected from each of five stormwater collection areas, and one additional sample was collected from the stormwater collection area directly north of building 03-66. Samples were collected from 0–1 ft and 1–5 ft bgs and field screened for radioactivity and organic chemicals. Screening did not detect organic chemicals, and radioactivity was

detected at or below background levels (LANL 1997, 056660.4, p. iv). All samples were analyzed for metals and isotopic uranium, and one sample was also analyzed for VOCs.

Cadmium, manganese, and nickel were detected above BVs in one sample; cobalt, lead, and zinc were detected above BVs in two samples. The DLs for antimony, cadmium, and silver were above BVs for most samples. Organic chemicals and radionuclides were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.37.4. Table 6.37-1 presents the samples collected and analyses requested at AOC 03-052(b).

### 6.37.4 Site Contamination

#### 6.37.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-052(b). As a result, the following activities were completed as part of the 2009 investigation.

- Six samples were collected from historical locations 03-03291 and 03-03286. At each location, samples were collected from 7.0–8.0 ft and 10.0–11.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, and cyanide.
- Twenty samples were collected from 10 locations (two within each area). At each location, samples were collected from 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, and cyanide.
- Six samples were collected from three locations along the northern part of the drainage between the northwest and northeast polygons associated with this site. At each location, samples were collected from 1.0–2.0 and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, and cyanide.
- Four samples were collected from two locations within the stormwater collection area to the northeast across Eniwetok Drive. At each location, samples were collected from 3.0–4.0 ft and 5.0–6.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-052(b) are shown in Figure 6.5-1. Table 6.37-1 presents the samples collected and analyses requested at AOC 03-052(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.37.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-052(b), a maximum concentration of 694 ppm was detected at a depth of 5.0–6.0 ft bgs. This sample (RE03-09-13961) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

### 6.37.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-052(b) consist of 47 samples (42 soil and 5 tuff) collected from 21 locations.

#### Inorganic Chemicals

Forty-seven samples were analyzed for TAL metals (42 soil and 5 tuff), and 36 samples were analyzed for cyanide (31 soil and 5 tuff). Table 6.37-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 6 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-052(b); therefore, inorganic COPCs are not identified for the site.

#### Organic Chemicals

Thirty-six samples were analyzed for SVOCs (31 soil and 5 tuff), 37 samples were analyzed for VOCs (32 soil and 5 tuff), and thirty-six samples were analyzed for PCBs (31 soil and 5 tuff). Table 6.37-3 summarizes the analytical results for detected organic chemicals. Plate 7 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-052(b); therefore, organic COPCs are not identified for the site.

#### Radionuclides

Eleven soil samples were analyzed for isotopic uranium. No radionuclides were detected or detected above BVs/FVs at AOC 03-052(b).

### 6.37.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at AOC 03-052(b) are not defined. The nature and extent of radionuclides are defined. Inorganic and organic chemicals and radionuclides are discussed below.

#### Inorganic Chemicals

Inorganic chemicals in soil and tuff samples at AOC 03-052(b) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, magnesium, manganese, nickel, selenium, silver, sodium, vanadium, and zinc.

Aluminum was detected above BV for tuff (7340 mg/kg) in two samples at AOC 03-052(b). The maximum concentration of 17,000 mg/kg was detected at location 03-608334 in the deepest sampled interval (4.0–5.0 ft bgs). Aluminum concentrations decreased to levels below BV downgradient of location 03-608334. The lateral extent of aluminum is defined, and the vertical extent is not defined.

Antimony was not detected, but the analytical DLs for soil and tuff samples (0.983 to 7.7 mg/kg and 1.1 to 1.21 mg/kg, respectively) were above the soil and tuff BVs (0.83 mg/kg and 0.5 mg/kg) in 46 samples at AOC 03-052(b). Because antimony was not detected at AOC 03-054(b), the lateral and vertical extent of antimony are defined.

Barium was detected above BVs for soil and tuff (295 mg/kg and 46 mg/kg, respectively) in five samples. The maximum concentration of 811 mg/kg was detected at location 03-608338 in a soil sample collected from a depth of 4.0–5.0 ft bgs. Barium concentrations were also above BV in the deepest soil and tuff samples (4.0–5.0 bgs) collected from locations 03-608334, 03-608335, and 03-608336. Barium was not detected above BVs at any location farther downgradient, including locations 03-608332, 03-608330, and 03-608331. The lateral extent of barium is defined, and the vertical extent is not defined.

Beryllium was detected above BV for soil and tuff (1.83 and 1.21 mg/kg, respectively) in three samples at AOC 03-052(b). The maximum concentration of 3.17 mg/kg was detected at location 03-608334 in the deepest (4.0–5.0 ft bgs) sampling interval. In addition, beryllium concentrations were above BV in the deepest (4.0–5.0 bgs) samples collected from locations 03-608335 and 03-608336. Beryllium was not detected above BVs at any location farther downgradient, including locations 03-608332, 03-608330, and 03-608331. The lateral extent of beryllium is defined, and the vertical extent is not defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in one sample at AOC 03-052(b). The maximum concentration of 0.61 mg/kg was detected at location 03-03292 at a depth of 0.0– 0.67 ft bgs. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum site concentration did not exceed the maximum background concentration for cadmium in soil (2.6 mg/kg) (Figure H-72). Because the current site data at AOC 03-052(b) for cadmium in soil is not different than background, the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for tuff (2200 mg/kg) in two samples at AOC 03-052(b). The maximum concentration of 4980 mg/kg was detected at location 03-608334 in the deepest sample collected (4.0–5.0 ft bgs). Calcium concentrations were also above BV in the deepest sampling interval (4.0–5.0 ft bgs) at location 03-608336. Calcium was not detected above BVs at any location farther downgradient, including locations 03-608332, 03-608330, and 03-608331. The lateral extent of calcium is defined, and the vertical extent is not defined.

Chromium was detected above BVs for soil and tuff (19.3 and 7.14 mg/kg, respectively) in three samples at AOC 03-052(b). The maximum concentration of 20.7 mg/kg was detected at location 03-608332 in a soil sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of chromium are not different than background (Table H-11 and Figure H-72). The lateral and vertical extent of chromium are defined.

Cobalt was detected above BVs in soil and tuff (8.64 and 3.14 mg/kg) in five samples at AOC 03-052(b). The maximum concentration of 21.5 mg/kg was detected at location 03-03291 at a depth of 0.0–1.0 ft bgs. Cobalt concentrations were also above BV in the deepest sampling interval (4.0–5.0 ft bgs) at locations 03-608334 and 03-608335. Cobalt was not detected above BVs at the three downgradient locations 03-608332, 03-608330, and 03-608331. The lateral extent of cobalt is defined, and the vertical extent is not defined.

Copper was detected above BV in tuff (4.66 mg/kg) in two samples at AOC 03-052(b). The maximum concentration of 7.6 mg/kg was detected at location 03-608336 in the deepest sampling interval (4.0–5.0 ft bgs). The copper concentration (6.21 mg/kg) at the same depth in the downgradient location 03-608334 was also slightly above the maximum background concentration (6.2 mg/kg). Copper was not detected above BV at any location farther downgradient, including locations 03-608332, 03-608330, and 03-608331. The lateral extent of copper is defined, and the vertical extent is not defined.

Lead was detected above BV for soil and tuff (22.3 and 11.2 mg/kg, respectively) in five samples at AOC 03-052(b). The maximum concentration of 64 mg/kg was detected at location 03-03286 in a fill

sample collected from a depth of 1.0–2.0 ft bgs. Lead was also above BV in a sample collected from a similar depth at location 03-03287, immediately next to location 03-03286. Lead concentrations decreased with depth to levels below the DL at location 03-03286, and lead was not detected in samples from surrounding locations. Lead was detected above BV in three other locations (03-03291, 03-608335, and 03-608334). At location 03-03291 and 03-608335, lead was not detected in the deepest soil samples (7.0–8.0 ft bgs and 4.0–5.0 ft bgs, respectively). At location 03-608334, lead was detected in the deepest sampling interval (4.0–5.0 ft bgs). However, the concentrations were all below the maximum background concentrations for soil (28 mg/kg) and tuff (18.3 mg/kg). Lead was also not detected above BVs in any sample from the three downgradient locations 03-608332, 03-608330, and 03-608331. The lateral and vertical extent of lead are defined.

Magnesium was detected above BV for tuff (1690 mg/kg) in two samples at AOC 03-052(b). The maximum concentration of 2690 mg/kg was detected at location 03-608334 in a sample collected from a depth of 4.0–5.0 ft bgs. Both concentrations were less than the maximum background concentration (2820 mg/kg) for magnesium in tuff (Figure H-73); the lateral and vertical extent of magnesium are defined.

Manganese was detected above BV for soil (671 mg/kg) in four samples at AOC 03-052(b). The maximum concentration of 1420 mg/kg was detected at location 03-03291 in a sample collected from a depth of 4.0–5.0 ft bgs. Manganese decreased to levels below the DL with depth at this location and was not detected above BVs at the four downgradient locations at AOC 03-052(b). The lateral and vertical extent of manganese are defined.

Nickel was detected above BV in soil (15.4 mg/kg) in one sample at AOC 03-052(b). The maximum concentration of 20 mg/kg was detected at location 03-03291 in a sample collected from a depth of 4.0–5.0 ft bgs. Nickel was not detected in any of the deeper samples. Nickel was also not detected above BV in any of the adjacent locations (03-608338, 03-608337, and 03-608340) or the three downgradient locations (03-608332, 03-608330, and 03-608331). The lateral and vertical extent of nickel are defined.

Selenium was not detected, but the analytical DLs (1.08 to 1.19 mg/kg) were above BV for tuff (0.3 mg/kg) in five samples at AOC 03-052(b). Because selenium was not detected at AOC 03-052(b), the lateral and vertical extent of selenium are defined.

Silver was not detected above BV for soil but had DLs (1.7 to 2.2 mg/kg) above BV (1 mg/kg) in 11 samples. Because it was not detected at AOC 03-052(b), the lateral and vertical extent of silver are defined.

Sodium was detected above BV for soil (915 mg/kg) in one sample at AOC 03-052(b). The maximum concentration of 1010 mg/kg was detected at location 03-608343 in a soil sample collected from a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of sodium are not different than background (Table H-11 and Figure H-73). The lateral and vertical extent of sodium are defined.

Vanadium was detected above BV for tuff (17 mg/kg) in one sample at AOC 03-052(b). The maximum concentration of 18.3 mg/kg was detected at location 03-608336 in a sample collected from a depth of 4.0–5.0 ft bgs. This concentration is less than the maximum background concentration for vanadium in tuff (21 mg/kg) (Figure H-74). The lateral and vertical extent of vanadium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in two samples at AOC 03-052(b). The maximum concentration of 152 mg/kg was detected at location 03-03292 in a soil sample collected from a depth of 0.0–0.67 ft bgs, the only sampling depth at this location. Zinc was not detected in any sample, including

the sample from the deeper interval (1.0–2.0 ft bgs) from location 03-608332, 25 ft away. Zinc was also detected at location 03-03287 at a concentration of 49.8 mg/kg in the fill samples collected from a depth of 0.0–1.0 ft bgs but was not detected in the deepest sample collected from this location. Zinc concentrations were less than BV in soil samples collected from 1.0– 2.0 ft bgs and 4.0– 5.0 ft bgs at locations 03-608345 and 03-608346, approximately 20 ft northeast and northwest from location 03-03287. Zinc was not detected above BV in any locations south at AOC 03-056(k) or in the western areas of AOC 03-052(b). The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at AOC 03-052(b) are acenaphthene, acetone, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, 2-butanone, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, naphthalene, phenanthrene, and pyrene.

Acenaphthene, benzo(g,h,i)perylene, fluorene, 4-isopropyltoluene, and naphthalene were detected at concentrations below the EQL. The lateral and vertical extent of these chemicals are defined at AOC 03-052(b).

Acetone was detected in 18 samples at AOC 03-052(b). The maximum concentration of 0.0417 mg/kg was detected at location 03-608341 at a depth of 4.0–5.0 ft bgs, the deepest sampling interval at this location. Acetone was also detected in the deepest sampling interval at locations 03-608335, 03-608340, 03-608343, 03-608344, and 03-608346. Acetone concentrations decreased laterally downgradient of location 03-608341 to concentrations below the EQL at most locations. The lateral extent of acetone is defined, and the vertical extent is not defined.

Anthracene was detected in five samples at AOC 03-052(b). The maximum concentration of 0.0538 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Anthracene concentrations decreased to levels below the EQL with depth and with distance along the drainage. Anthracene concentrations were also below the EQL at the three downgradient locations 03-608332, 03-608330, and 03-608331. The lateral and vertical extent of anthracene are defined.

Aroclor-1242 was detected in one sample at AOC 03-052(b). The maximum concentration of 0.36 mg/kg was detected at location 03-608344 at a depth of 4.0–5.0 ft bgs, the deepest sampled interval. Aroclor-1242 was not detected at any other location at AOC 03-052(b). The lateral extent of Aroclor-1242 is defined, and the vertical extent is not defined.

Aroclor-1254 was detected in 13 samples at AOC 03-052(b). The maximum concentration of 0.581 mg/kg was detected at location 03-608344 at a depth of 1.0–2.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations, except 03-03286. Aroclor-1254 was not detected at the last two downgradient locations (03-608330 and 03-608331) at AOC 03-052(b). The lateral extent of Aroclor-1254 is defined, and the vertical extent is not defined.

Aroclor-1260 was detected in 18 samples at AOC 03-052(b). The maximum concentration of 1.13 mg/kg was detected at location 03-608344 at a depth of 1.0–2.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations except 03-03286. Aroclor-1260 was not detected at the last two downgradient locations (03-608330 and 03-608331) at AOC 03-052(b). The lateral extent of Aroclor-1260 is defined, and the vertical extent is not defined.

Benzo(a)anthracene was detected in four samples at AOC 03-052(b). The maximum concentration of 0.0977 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Benzo(a)anthracene

concentrations decreased with depth at this location. Benzo(a)anthracene was not detected above EQL at the last three downgradient locations (03-608332, 03-608330 and 03-608331) at AOC 03-052(b). The lateral and vertical extent of benzo(a)anthracene are defined.

Benzo(a)pyrene was detected in six samples at AOC 03-052(b). The maximum concentration of 0.0719 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Benzo(a)pyrene was also detected at a similar concentration (0.0651 mg/kg) at TD (4.0–5.0 ft bgs) at location 03-608330. Benzo(a)pyrene was not detected at concentrations greater than the EQL at the last downgradient location (03-608331) at AOC 03-052(b). The lateral extent of benzo(a)pyrene is defined, and the vertical extent is not defined.

Benzo(b)fluoranthene was detected in seven samples at AOC 03-052(b). The maximum concentration of 0.231 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Benzo(b)fluoranthene was detected at TD (5.0–6.0) at locations 03-608330 and 03-608331, the last two downgradient locations at AOC 03-052(b), and the TD (4.0–5.0 ft bgs) at location 03-608344. The lateral and vertical extent of benzo(b)fluoranthene are not defined.

Benzo(k)fluoranthene was detected in two samples at AOC 03-052(b). The maximum concentration of 0.041 mg/kg was detected at location 03-608330 at a depth of 5.0–6.0 ft bgs, the deepest sampled interval. Benzo(k)fluoranthene was not detected at concentrations above the EQL at any other location at AOC 03-052(b). The lateral extent of benzo(k)fluoranthene is defined, and the vertical extent is not defined.

Butanone(2-) was detected in one sample at AOC 03-052(b). The maximum concentration of 0.00798 mg/kg was detected at location 03-608341 in the deepest sampled interval (4.0–5.0 ft bgs). The lateral extent of 2-butanone is defined, and the vertical extent is not defined.

Chrysene was detected in seven samples at AOC 03-052(b). The maximum concentration of 0.101 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Chrysene was also detected in the deepest sample collected (5.0–6.0 ft bgs) at location 03-608330. Chrysene was detected below the EQL at the last downgradient location (03-608331) at AOC 03-052(b). The lateral extent of chrysene is defined, and the vertical extent is not defined.

Fluoranthene was detected in nine samples at AOC 03-052(b). The maximum concentration of 0.249 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Fluoranthene was also detected in the deepest samples collected (5.0–6.0 ft bgs) at locations 03-608330 and 03-608331, the last two downgradient locations at AOC 03-052(b).The lateral and vertical extent of fluoranthene are not defined.

Indeno(1,2,3-cd)pyrene was detected in three samples at AOC 03-052(b). The maximum concentration of 0.15 mg/kg was detected at location 03-608330 at a depth of 5.0–6.0 ft bgs. Indeno(1,2,3-cd)pyrene was also detected in the deepest sample collected (5.0–6.0 ft bgs) at location 03-608331, the most downgradient location at AOC 03-052(b). The lateral and vertical extent of indeno(1,2,3-cd)pyrene are not defined.

Phenanthrene was detected in six samples at AOC 03-052(b). The maximum concentration of 0.207 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Phenanthrene was also detected in the deepest sample collected (5.0–6.0 ft bgs) at location 03-608330. Phenanthrene decreased to a level below the EQL at the last downgradient location (03-608331) at AOC 03-052(b). The lateral extent of phenanthrene is defined, and the vertical extent is not defined.

Pyrene was detected in eight samples at AOC 03-052(b). The maximum concentration of 0.242 mg/kg was detected at location 03-03291 at a depth of 1.0–2.0 ft bgs. Pyrene was also detected at TD (5.0–6.0) at location 03-608330. Pyrene decreased to a level below the EQL at the last downgradient location (03-608331) at AOC 03-052(b). The lateral extent of pyrene is defined, and the vertical extent is not defined.

**Radionuclides**

No radionuclides were detected at AOC 03-052(b) above BVs/FVs.

### 6.37.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-052(b) because extent is not defined for the site.

### 6.37.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-052(b) because extent is not defined for the site.

## 6.38 SWMU 03-054(c), Outfall

### 6.38.1 Site Description and Operational History

SWMU 03-054(c) is an outfall from a former cooling tower (former structure 03-156) and pump house (former structure 03-163) at TA-03 (Figure 6.3-1). The outfall discharged to the storm sewer that was formerly located 25 ft east of the cooling tower and ultimately to former NPDES-permitted outfall, EPA 03A023 [SWMU 03-052(f), section 6.11.1]. The cooling tower and pump house were located southwest of the former Sherwood Complex (building 03-105) and northwest of the former Syllac Building (03-287). Former structures 03-156 and 03-163 were used to cool an electromagnet formerly located in the Sherwood Complex.

### 6.38.2 Relationship to Other SWMUs and AOCs

This former cooling tower, pump house, and outfall discharged to the storm sewer that carried water to the former outfall at SWMU 03-052(f).

### 6.38.3 Summary of Previous Investigations

The Laboratory's former Environmental, Safety, and Health group collected two composite surface soil samples directly north of the cooling tower in 1992 and two samples from the cooling tower in 1993 to characterize the structure and surrounding soil before D&D of the structures. Samples were screened for gross-alpha, -beta, and -gamma radiation and submitted for laboratory analysis of total chromium. Chromium was not detected above the EPA action level (LANL 1995, 057590, pp. 6-71, 6-72). The cooling tower and pump house were dismantled and removed, leaving only the concrete pad of the former pump house at a depth of 10 ft bgs (LANL 2001, 071214).

The Syllac Building (03-287) underwent D&D from 2003 to 2004 and the Sherwood Complex (building 03-105) underwent D&D in 2001 (LANL 2002, 073868.4, Appendix B-7, p. 1). As part of the D&D of the Sherwood Complex in 2001, the former cooling tower (structure 03-156), all associated piping and

storm drainlines, fill material within the footprint of former building 03-156, and the existing roadway were removed (LANL 2001, 071214). Seven confirmation soil/fill samples were collected from seven locations at the bottom of the SWMU 03-054(c) excavations from depth intervals ranging from 2–8.5 ft bgs. One grab sample was also collected from drainline excavated material and analyzed for metals and hexavalent chromium (Tucker 2001, 100702, pp. 1–3, 13–22).

Calcium, lead, and zinc were each detected above soil BVs in one sample. The DL for antimony was above BV in all samples. Hexavalent chromium was not detected.

In 2004, the location of the former cooling tower and pump house (structures 03-156 and 03-163) and former storm drain locations to the east were excavated during site preparation activities for the new NSSB (03-1400). The pump house foundation and remaining sections of the SWMU 03-054(c) storm drainline north of the former Administration Building (03-43) and east of the Otowi Building (03-261) were removed. The corrugated metal storm drainlines were inspected and found to be intact and in good condition. No evidence of a release was observed in the soil around and beneath the storm drainline. Four confirmation samples were collected from two locations beneath the former cooling tower footprint (former structure 03-156) at 2001 confirmation sampling location depths, and two confirmation samples were collected from one location beneath the former pump house foundation (former structure 03-163). The samples were collected from depths of 0.0–0.5 ft and 1.5–2 ft bgs from the bottom of the new excavation and submitted for analysis of TAL metals. No inorganic chemicals were detected above BVs.

Decision-level data from the 2001 and 2003 investigation activities are included in this report and indicate that the vertical extent of inorganic chemicals has not been defined at SWMU 03-054(c). Table 6.38-1 presents the samples collected and analyses requested at SWMU 03-054(c).

### 6.38.4 Site Contamination

#### 6.38.4.1 Soil, Rock, and Sediment Sampling

No sampling was conducted at this site during the 2009 investigation.

#### 6.38.4.2 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected to date at SWMU 03-054(c) consist of 14 soil samples collected from 11 locations. Data collected during previous investigations as part of characterization efforts at SWMU 03-054(c) are presented in this report but are not evaluated for extent of contamination or COPC identification because additional sampling will be performed following D&D of existing structures (section 6.38.5).

**Inorganic Chemicals**

Fourteen soil samples were analyzed for TAL metals and eight samples were analyzed for hexavalent chromium. Table 6.38-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs.

Inorganic chemicals in soil and samples at SWMU 03-054(c) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, calcium, lead, and zinc.

### 6.38.5 Delayed Site Investigation Rationale

Based on the approved work plan, no sampling was conducted at SWMU 03-054(c) during the 2009 investigation (LANL 2008, 103404; NMED 2009, 102721). Previous investigations conducted at

SWMU 03-054(c) were not sufficient to determine nature and extent of contamination. However, if a release had occurred, any residual contamination would be located beneath 10 ft of fill and infrastructure, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation that could cause migration of contaminants. It is proposed that site characterization and investigation be delayed until the D&D of building 03-1400 has been completed.

## 6.39 SWMU 03-056(a), Storage Area

### 6.39.1 Site Description and Operational History

SWMU 03-056(a) is an inactive used-oil accumulation facility built in 1986 at TA-03. The 12-ft × 45-ft structure is located approximately 15 ft north of building 03-271 (Figure 6.8-1). The storage area has a concrete floor that slopes toward a small sump and is surrounded by a concrete berm. The area is roofed, but the sides are open. No spills from the bermed area to the environment have been documented (LANL 1993, 020947, p. 6-36).

### 6.39.2 Relationship to Other SWMUs and AOCs

This storage area is north of building 03-271 and about 80 ft northeast of AOC 03-003(n), the site of a PCB spill. It is located about 100 ft east of the subsurface contamination site, AOC C-61-002. SWMU 03-056(a) is not related to any other SWMUs or AOCs.

### 6.39.3 Summary of Previous Investigations

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

Calcium was detected above the soil BV in all four samples; silver and zinc were detected above soil BVs in one sample. Antimony, cadmium, and silver were detected in one asphalt sample; with the exception of selenium and thallium (which were not detected), all remaining inorganic chemicals were detected in all asphalt samples. TPH was not detected in any of the soil samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.39.4. Table 6.39-1 presents the samples collected and analyses requested at SWMU 03-056(a).

### 6.39.4 Site Contamination

#### 6.39.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-056(a). As a result, the following activities were completed as part of the 2009 investigation.

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

- All investigation samples were field screened for VOCs and for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-056(a) are shown in Figure 6.8-1. Table 5.39-1 presents the samples collected and analyses requested at SWMU 03-056(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.39.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-056(a), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.39.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-056(a) consist of 12 soil samples collected from eight locations.

##### Inorganic Chemicals

Twelve soil samples were analyzed for TAL metals, and eight soil samples were analyzed for cyanide. Table 6.39-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 9 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-056(a); therefore, inorganic COPCs are not identified for the site.

##### Organic Chemicals

Eight soil samples were analyzed for SVOCs, VOCs, and PCBs. Twelve samples were analyzed for TPH-DRO. Table 6.39-3 summarizes the analytical results for detected organic chemicals. Plate 10 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-056(a); therefore, organic COPCs are not identified for the site.

#### 6.39.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals at SWMU 03-056(a) are defined. The nature and extent of organic chemicals at SWMU 03-056(a) are not defined.

##### Inorganic Chemicals

Inorganic chemicals in soil and tuff samples at SWMU 03-056(a) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, calcium, cobalt, lead, silver, and zinc.

Antimony was detected above BV (0.83 mg/kg) in one sample at SWMU 03-056(a). The sample was collected from a depth of 1.0–2.0 ft bgs at location 03-608347 and had an antimony concentration of 0.901 mg/kg. The detected concentration is less than the maximum concentration in the background

dataset for antimony in soil (1.0 mg/kg) (Figure H-75). The lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 03-056(a) but had DLs (0.496 to 0.584 mg/kg) above BV in eight samples. Because cadmium was not detected above BV at SWMU 03-056(a), the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in seven samples in soil at SWMU 03-056(a). The maximum concentration of 11,500 mg/kg was detected at location 03-14483 in a sample collected from 0.5–1.0 ft bgs. Concentrations decreased with depth at all locations, and all concentrations were below the maximum concentration in the background dataset (14,000 mg/kg) (Figure H-75). The lateral and vertical extent of calcium are defined.

Cobalt was detected above BV (8.64 mg/kg) in one sample in soil at SWMU 03-056(a). The maximum concentration of 14.7 mg/kg was detected at location 03-608349 in a sample collected from 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of cobalt are not different than background (Table H-12 and Figure H-76). The lateral and vertical extent of cobalt are defined.

Lead was detected above BV (22.3 mg/kg) in one sample in soil at SWMU 03-056(a). The maximum concentration of 32.2 mg/kg was detected at location 03-608347 in a sample collected from 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of lead are not different than background (Table H-12 and Figure H-76). The lateral and vertical extent of lead are defined.

Silver was detected above BV (1 mg/kg) in one sample in soil at SWMU 03-056(a). The maximum concentration of 1.6 mg/kg was detected at location 03-14483 in a sample collected from 0.5–1.0 ft bgs. Silver concentrations decreased with depth, and silver was not detected above BV in the 2009 sample collected from location 03-608349 next to the historical location. The lateral and vertical extent of silver are defined.

Zinc was detected above BV (48.8 mg/kg) in two samples in soil at SWMU 03-056(a). The maximum concentration of 89.8 mg/kg was detected at location 03-14483 in a sample collected from 0.5–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of zinc are not different than background (Table H-12 and Figure H-77).The lateral and vertical extent of zinc are defined.

**Organic Chemicals**

Organic chemicals detected in soil at SWMU 03-056(a) are acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, pyrene, and TPH-DRO.

The maximum concentrations of acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in a sample collected from a depth of 0.0–1.0 ft bgs at location 03-608349. Concentrations of these chemicals decreased with depth and their vertical extent is defined. These chemicals (with the exception of acetone) are likely related to the asphalt covering the sampling locations, and further sampling to define their lateral extent is not warranted.

Aroclor-1254 was detected in two samples from two locations at SWMU 03-056(a). The maximum concentration of 0.0366 mg/kg was detected at the farthest west location (location 03-608347) in a soil

sample collected from the deepest interval (1.0–2.0 ft bgs). The lateral and vertical extent for Aroclor-1254 are not defined.

Aroclor-1260 was detected in six samples from four locations at SWMU 03-056(a). The maximum concentration of 0.0279 mg/kg was detected at location 03-608347 in a soil sample collected from a depth of 1.0–2.0 ft bgs, the deepest sampling interval. Aroclor-1260 concentrations increased with depth at all locations. The lateral and vertical extent of Aroclor-1260 are not defined.

TPH-DRO was detected in six samples from four locations at SWMU 03-056(a). The maximum concentration of 288 mg/kg was detected at location 03-608347 in a soil sample collected from the deepest sampling interval (1.0–2.0 ft bgs). TPH-DRO concentrations increased with depth at all locations. The lateral and vertical extent of TPH-DRO are not defined.

### 6.39.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-056(a) because extent is not defined for the site.

### 6.39.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-056(a) because extent is not defined for the site.

## 6.40 SWMU 03-056(c), Transformer Storage Area–PCB Site

### 6.40.1 Site Description and Operational History

SWMU 03-056(c) is an inactive outdoor storage area located at TA-03 on the north side of a utilities shop, building 03-223 (Figure 6.10-1). The SWMU extends along the length of building 03-223 to the south and is bounded by a security fence to the north (Faulk 1995, 055741, p. 13). The outdoor storage area was used to store electrical equipment, capacitors, and transformers with PCB-containing dielectric fluids. Waste solvents used for cleaning electrical equipment were also stored at this location (LANL 1993, 020947, pp. 5-100–5-101). The types of solvents used at the site from 1967 to approximately 1981 are not known. Viking R30 (1,1,1-trichloroethane) was used from 1981 to 1990 (Faulk 1995, 055741, p. 13). Beginning in 1990 and continuing to 1992, a nonhazardous citrus-based solvent was used as a substitute for solvent-based cleaners. In addition, Transclene, which contains PCE, may have been stored at the site because it was used by an electrical equipment maintenance subcontractor to retrofill transformers in the field. It is believed that the maintenance crew disposed of all these waste materials at an approved waste-disposal facility. In 1991, the site's facility manager placed approximately 1–2 ft of clean fill on the area occupying the former storage area to elevate it and to reroute run-on drainage away from this site. In 1992, the storage area was decommissioned (LANL 2001, 071259, p. 6).

### 6.40.2 Relationship to Other SWMUs and AOCs

This inactive storage area was north of the utilities shop, building 03-223. It is located east of the inactive outfall, SWMU 03-045(f). It is not related to any other SWMUs or AOCs.

### 6.40.3 Summary of Previous Investigations

Previous investigation and cleanup activities were performed at SWMU 03-056(c) in 1994, 1995, and 1999. In 1994, a total of 21 samples, 19 confirmatory samples, and 3 sample splits were collected from 18 locations (LANL 1994, 040397, pp. 1-49) at depths ranging from 0–3 ft bgs. Samples were analyzed for TAL metals, SVOCs, PCB/pesticides, and VOCs. Samples were also screened for gross-alpha and -beta, -gamma, and tritium (LANL 2001, 071259, p. 10).

In 1995, the site was further characterized as part of an expedited cleanup to identify the lateral extent of soil containing residual PCBs. Ten samples were collected from the western slope area to better define the lateral extent of the PCB contamination. A 45-ft-diameter area was initially mapped to represent the area of suspected contamination. A 10-ft × 10-ft grid was placed over the area of suspected contamination and soil samples were collected within grid nodes. The results of the grid sampling effort were used to target areas for soil excavation. During soil excavation activities, the lateral extent of soil contamination was further defined to encompass an area approximately 130 ft long × 70 ft wide. The western slope excavation area was expanded in a northerly direction along the mesa edge. Additional site characterization samples were collected in the northern slope area of the site. PCB-contaminated soil was excavated from an area approximately 60 ft long × 70 ft wide. Also, three soil samples were collected from the ephemeral slope drainages, downslope from the north and west slope areas (LANL 2001, 071259, p. 10).

A VCA plan was developed in 1999 for removing PCB-contaminated soil from the western and northern slope areas and the ephemeral slope drainage areas. Because of the site's proximity to a watercourse, the PCB cleanup targets were less than 1 ppm of PCBs in soil. The VCA plan was approved by NMED in 2000 (LANL 2001, 071259, p. 2).

The remedial activities at the site, as specified in the VCA plan, began in August 2000. SWMU 03-056(c) was characterized using field-screening techniques, PCB EnSys soil test, to determine the extent of PCB contamination (LANL 2001, 071259, p. 12). After site characterization, the contaminated soil and unconsolidated tuff were excavated. Approximately 2400 $yd^3$ of contaminated soil was excavated from the SWMU. During the excavation activities, field screening was used to provide immediate confirmation that all PCB-contaminated soil and unconsolidated tuff in the excavated area had been removed to a cleanup level of less than 1 ppm. Excavation field-screening activities results determined that contamination extended beyond the original SWMU boundary (LANL 2001, 071259, pp. 17–20).

Following excavation activities, 89 confirmation samples were collected from 79 locations. All samples were submitted for laboratory analysis of PCBs. Twenty-one samples were also analyzed for metals and VOCs (LANL 2001, 071259, p. 17). Thirteen inorganic chemicals were detected above BVs. Seven organic chemicals were detected. Aroclor-1260 was detected at the highest frequency. In March 2001, the areas with elevated PCB detections were excavated. In April 2001, additional confirmation sampling was conducted. One sample was collected from each excavated location. All samples were analyzed for PCBs, and three samples were also analyzed for VOCs and metals (LANL 2001, 071259, p. 17). Confirmation sampling results indicated the site met the EPA cleanup criterion for less than 1 ppm (LANL 2001, 071259, pp. iii–iv, 58). Results of final VCA activities are discussed in the VCA report (LANL 2001, 071259).

The VCA report for SWMU 03-056(c) was approved by EPA in November 2001 (EPA 2001, 072810) and by NMED in September 2002 (NMED 2002, 073363).

### 6.40.4 Site Contamination

As proposed in the approved investigation work plan, no sampling was conducted in 2009 because the nature and extent of contamination have been defined at this site (LANL 2008, 103404; NMED 2008, 102721). The site has been sampled and remediated separately from other sites in the aggregate area, and all data have been presented in a VCA report (LANL 2001, 071259) and approved by NMED (2002, 073363).

## 6.41 AOC 03-056(h), Container Storage Area

### 6.41.1 Site Description and Operational History

AOC 03-056(h) is described in the 1990 SWMU report (LANL 1990, 007511) as a container storage area near former buildings 03-105 (the Sherwood Complex) and 03-287 (the Syllac Building) at TA-03 (Figure 6.3-1) (LANL 1990, 007511, p. 3-056.2). Building 03-105 underwent D&D activities in 2001 (LANL 2002, 073868.4, Appendix B-7, p. 1). The site is currently occupied by the NSSB (03-1400). Approximately 10 ft of clean fill was placed over the entire site to accommodate the construction of the NSSB (LANL 2008, 099214).

### 6.41.2 Relationship to Other SWMUs and AOCs

AOC 03-056(h) probably stored containers associated with the magnetic fusion energy experiments conducted in former building 03-105, which included non-PCB capacitors similar to those used for the Syllac Project conducted in former building 03-287 and to the equipment and containers stored at SWMU 03-003(c) and AOC 03-003(o).

### 6.41.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC 03-056(h).

### 6.41.4 Delayed Site Investigation Rationale

Based on the approved work plan, no sampling was conducted at AOC 03-056(h) during the 2009 investigation (LANL 2008, 103404; NMED 2008, 102721). If a release had occurred, any residual contamination would be located beneath building 03-1400, effectively preventing exposure to receptors and preventing contact with infiltrating precipitation that could cause migration of contaminants. For these reasons, it is proposed that site characterization and investigation be delayed until the D&D of building 03-1400 has been completed.

## 6.42 AOC 03-056(k), Container Storage Area

### 6.42.1 Site Description and Operational History

AOC 03-056(k) is a container storage area on the north side of a loading dock at the northwest corner of the Sigma Building, building 03-66 (Figure 6.5-1). Waste oil, solvents, and radioactively contaminated graphite were staged in this area (LANL 1990, 007511, p. 3-056). Four documented releases of radiological materials are known to have occurred at this site (LANL 1995, 057590, pp. 5-15-1, 5-15-3–5-15-4).

### 6.42.2 Relationship to Other SWMUs and AOCs

This container storage area is located on the loading dock at the northwest corner of the Sigma Building, building 03-66. Stormwater from this area flowed into AOC 03-052(b).

### 6.42.3 Summary of Previous Investigations

During the 1997 RFI conducted at AOC 03-056(k), 10 soil and fill samples were collected from six locations at depths ranging from 0–4.5 ft bgs. Four asphalt samples were collected from four of the locations. Samples were field screened for organic chemicals and radioactivity. Screening did not detect organic chemicals, and radioactivity was detected at or below BVs (LANL 1997, 056660.4, pp. 101, 104). All samples were submitted for laboratory analysis of isotopic uranium; all soil and fill samples were submitted for laboratory analysis of metals. One asphalt sample and one fill sample were analyzed for gross-alpha and -beta radiation and by gamma spectroscopy. One fill sample was also analyzed for VOCs.

Lead was detected above BV in one sample, and copper was detected above BV in two fill samples. Detection limits for antimony, cadmium, and silver were above BVs in the 10 soil and fill samples. Carbon disulfide and 2-butanone were detected in one sample. Gross-alpha and -beta radiation were detected in one fill sample; uranium-235 was detected above BV in one fill sample, and uranium-238 was detected above BV in three fill samples. Uranium-234, uranium-235, and uranium-238 were detected in all asphalt samples; gross-alpha and -beta radiation, cesium-134, and cesium-137 were detected in one asphalt sample.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.42.4. Table 6.42-1 presents the samples collected and analyses requested at AOC 03-056(k).

### 6.42.4 Site Contamination

#### 6.42.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-056(k). As a result, the following activities were completed as part of the 2009 investigation.

- Two samples were collected from sampling location 03-03290. Samples were collected from 3.0–4.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, americium-241, isotopic plutonium, and isotopic uranium.
- Two samples were collected from sampling location 03-03281 to define the extent of organic chemical contamination detected. Samples were collected from 3.0–4.0 ft and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for VOCs, SVOCs, and PCBs.
- Nine samples were collected from three new locations to the south, west, and northeast of the historical sampling locations to define the lateral and vertical extents of inorganic chemical contamination. At each location, samples were collected from 0.0–1.0 ft, 3.0–4.0 ft, and 6.0–7.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, americium-241, isotopic plutonium, and isotopic uranium.
- Eight samples were collected from four new locations to characterize the organic chemical contamination at the AOC. Samples were collected from 1.0–2.0 ft and 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for VOCs, SVOCs, and PCBs.

- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-056(k) are shown in Figure 6.5-1. Table 6.42-1 presents the samples collected and analyses requested at AOC 03-056(k). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.42.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-056(k), a maximum concentration of 8.9 ppm was detected at a depth of 3.0–4.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.42.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 03-056(k) consist of 35 soil samples collected from 13 locations.

**Inorganic Chemicals**

Twenty-one soil samples were analyzed for TAL metals, and 11 soil samples were analyzed for cyanide. Table 6.42-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 6 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-056(k); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twenty-one soil samples were analyzed for SVOCs, 22 soil samples were analyzed for VOCs, and 21 soil samples were analyzed for PCBs. Table 6.42-3 summarizes the analytical results for detected organic chemicals. Plate 7 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-056(k); therefore, organic COPCs are not identified for the site.

**Radionuclides**

Eleven soil samples were analyzed for americium-241, 1 soil sample was analyzed for gamma-emitting radionuclides, 1 soil sample was analyzed for gross alpha/beta, 11 soil samples were analyzed for isotopic plutonium, and 21 samples were analyzed for isotopic uranium. Table 6.42-4 summarizes the analytical results for radionuclides. Plate 8 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at AOC 03-056(k); therefore, radionuclide COPCs are not identified for the site.

#### 6.42.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals, and radionuclides at AOC 03-056(k) are not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil samples at AOC 03-056(k) were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, lead, manganese, mercury, and silver.

Antimony was not detected in soil at AOC 03-056(k) but had DLs (1.07 to 7.6 mg/kg) above BV (0.83 mg/kg) in 21 samples. Because antimony was not detected at AOC 03-056(k), the lateral and vertical extent of antimony are defined.

Barium was detected above BV for soil (295 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 296 mg/kg was detected at location 03-03290 at a depth of 6.0–7.0 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of barium are not different than background (Table H-13 and Figure H-78). The lateral and vertical extent of barium are defined.

Beryllium was detected above BV in soil (1.83 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 1.92 mg/kg was detected at location 03-608351 at a depth of 6.0–7.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of beryllium are not different than background (Table H-13 and Figure H-78). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected above BV in soil (0.4 mg/kg) at AOC 03-056(k) but had DLs (0.52 to 0.63 mg/kg) above BV in 20 samples. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum site concentration (0.201 mg/kg) did not exceed the maximum background concentration for cadmium in soil (2.6 mg/kg) (Figure H-79). Because the current site data at AOC 03-056(k) for cadmium in soil is not different than background, the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for soil (6120 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 6180 mg/kg was detected at location 03-608352 in the deepest sample (6.0–7.0 ft bgs). Calcium was not detected above BV in any other sample. The lateral and vertical extent of calcium is defined.

Chromium was detected above BV for soil (19.3 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 25.1 mg/kg was detected at location 03-608353 in the soil sample collected from a depth of 3.0–4.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of chromium are not different than background (Table H-13 and Figure H-79). The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV for soil (8.64 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 15 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 6.0–7.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of cobalt are not different than background (Table H-13 and Figure H-80). The lateral and vertical extent of cobalt are defined.

Copper was detected above BV for soil (14.7 mg/kg) in two samples at AOC 03-056(k). The maximum concentration of 28.2 mg/kg was detected at location 03-03290 in a soil sample collected from a depth of 1.0–1.5 ft bgs, with the second detection at location 03-03289 approximately 20 ft south of the maximum concentration in a soil sample collected from a depth of 0.0–1.0 ft bgs. Copper was not detected in the deepest samples collected from either location; therefore, the vertical extent of copper is defined. Copper

was not detected in any other locations at any depth to the north, east, south, or west of locations 03-03289 and 03-03290. The lateral extent of copper is defined.

Lead was detected above BV for soil (22.3 mg/kg) in two samples at AOC 03-056(k). The maximum concentration of 33.1 mg/kg was detected at location 03-608353 in the deepest sampling interval (6.0–7.0 ft bgs); therefore, the vertical extent of lead is not defined. The second lead concentration of 24.9 mg/kg was detected at location 03-03289, approximately 20 ft to the north, in a sample collected from a depth of 0.0–1.0 ft bgs. Lead was not detected in the deepest sample collected from location 03-03289. Lead was not detected above BV at any other AOC 03-052(k) location to the west, north, or east; however, south of location 03-03253, the lateral extent of lead is not defined.

Manganese was detected above BV for soil (671 mg/kg) in two samples at AOC 03-056(k). The maximum concentration of 1200 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 6.0–7.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of manganese are not different than background (Table H-13 and Figure H-80). The lateral and vertical extent of manganese are defined.

Mercury was detected above BV for soil (0.1 mg/kg) in one sample at AOC 03-056(k). The maximum concentration of 0.113 mg/kg was detected at location 03-608351 in a soil sample collected from a depth of 0.0–1.0 ft bgs. The applicable statistical tests (quantile and slippage) indicate site concentrations of mercury are not different than background (Table H-13 and Figure H-81). The lateral and vertical extent of mercury are defined.

Silver was not detected above BV for soil (1 mg/kg) at AOC 03-056(k) but had DLs (1.8 to 2.2 mg/kg) above BV in 10 samples. Because silver was not detected at AOC 03-056(k), the lateral and vertical extent of silver are defined.

**Organic Chemicals**

Organic chemicals detected in soil at AOC 03-056(k) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, carbon disulfide, chrysene, dibenz(a,h)anthracene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 4-methyl-2-pentanone, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, toluene, 1,2,4-trimethylbenzene, and 1,3-xylene+1,4-xylene.

Carbon disulfide, dibenzofuran, 4-methyl-2-pentanone, 1,2,4-trimethylbenzene, and 1,3-xylene+1,4-xylene were detected only at concentrations near or below the EQL. The lateral and vertical extent of these chemicals are defined.

Acenaphthene was detected in 11 samples at AOC 03-056(k). The maximum concentration of 0.975 mg/kg was detected at location 03-608353 at a depth of 0.0–1.0 ft bgs. Acenaphthene concentrations decreased with depth at that location and at location 03-608357. The lateral and vertical extent of acenaphthene are defined.

Acetone was detected in 13 samples at AOC 03-056(k). The maximum concentration of 0.386 mg/kg was detected at location 03-608357 at a depth of 3.0–4.0 ft bgs. Acetone was also detected at locations 03-608355 and 03-608356 in the deepest samples collected (3.0–4.0 ft bgs). Acetone concentrations decreased at downgradient location 03-608341 in the deepest (4.0–5.0 ft bgs) sample collected, at 03-03290 in the samples collected from 4.0–5.0 ft and 7.0–8.0 ft bgs, and the tuff sample collected from 10.0–11.0 ft bgs in adjacent AOC 03-052(b). The lateral extent of acetone is defined, and the vertical extent is not defined.

Anthracene was detected in 11 samples at AOC 03-056(k). The maximum concentration of 1.65 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Anthracene was also detected at locations 03-608354 and 03-608355 in the deepest (3.0–4.0 ft bgs) soil samples collected. Anthracene concentrations decreased with depth and downgradient at location 03-03281. The lateral and vertical extent of anthracene are defined.

Aroclor-1254 was detected in nine samples at AOC 03-056(k). The maximum concentration of 0.0403 mg/kg was detected at location 03-608355 at a depth of 3.0–4.0 ft bgs. Aroclor-1254 concentrations decreased with depth at this location but was detected at location 03-03290 in the deepest (6.0–7.0 ft bgs) sample. Aroclor-1254 concentrations decreased at downgradient locations 03-03290 and 03-608352. The lateral extent of Aroclor-1254 is defined, and the vertical extent is not defined.

Aroclor-1260 was detected in 14 soil samples at AOC 03-056(k). The maximum concentration of 0.0535 mg/kg was detected at location 03-608355 in the deepest sampling interval (3.0–4.0 ft bgs). Aroclor-1260 also increased with depth at location 03-03290. Aroclor-1260 decreased with depth at all other locations. Aroclor-1260 decreased at downgradient location 03-608352. The lateral extent of Aroclor-1260 is defined, and the vertical extent is not defined.

Benzo(a)anthracene and benzo(a)pyrene were detected in 12 samples at AOC 03-056(k). The maximum concentrations of 2.08 and 1.63 mg/kg, respectively, were detected at location 03-608353 at a depth of 0.0–1.0 ft bgs. Benzo(a)anthracene and benzo(a)pyrene concentrations decreased with depth at these locations but increased with depth at location 03-03281. Benzo(a)anthracene and benzo(a)pyrene concentrations decreased at the downgradient location 03-608352. The lateral extent of benzo(a)anthracene and benzo(a)pyrene is defined, and the vertical extent is not defined.

Benzo(b)fluoranthene was detected in 13 samples at AOC 03-056(k). The maximum concentration of 2.59 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth at this and most other locations but increased with depth at location 03-03281. Benzo(b)fluoranthene concentrations decreased downgradient at location 03-608352. The lateral extent of benzo(b)fluoranthene is defined, and the vertical extent is not defined.

Benzo(g,h,i)perylene was detected in nine samples at AOC 03-056(k). The maximum concentration of 0.949 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Benzo(g,h,i)perylene concentrations decreased with depth at this and all other locations and decreased downgradient at location 03-608352. The lateral and vertical extent of benzo(g,h,i)perylene are defined.

Butanone(2-) was detected in 10 samples at AOC 03-056(k). The maximum concentration of 0.0213 mg/kg was detected at location 03-608352 in a soil sample collected from the deepest sampling interval (3.0–4.0 ft bgs). Butanone(2-) concentrations also increased with depth at locations 03-608355 and 03-608357. Concentrations decreased at downgradient locations in adjacent AOC 03-052(b). The lateral extent of 2-butanone is defined, and the vertical extent is not defined.

Chrysene was detected in 12 samples at AOC 03-056(k). The maximum concentration of 1.78 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Chrysene concentrations decreased with depth at all locations except location 03-03281. Chrysene decreased to trace levels at downgradient location 03-608352. The lateral extent of chrysene is defined, and the vertical extent is not defined.

Dibenz(a,h)anthracene and dibenzofuran were each detected in one sample at AOC 03-056(k). The maximum concentrations of 0.0912  and 0.409 mg/kg, respectively, were detected at location 03-608353

at a depth of 0.0–1.0 ft bgs. Dibenz(a,h)anthracene and dibenzofuran concentrations decreased with depth at this location and downgradient at location 03-608352. The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Fluoranthene was detected in 16 samples at AOC 03-056(k). The maximum concentration of 5.22 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations except 03-03281 and 03-608356. Fluoranthene concentrations decreased at downgradient location 03-608352. The lateral extent of fluoranthene is defined, and the vertical extent is not defined.

Fluorene was detected in nine samples at AOC 03-056(k). The maximum concentration of 0.876 mg/kg was detected at location 03-608353 at a depth of 0.0–1.0 ft bgs. Fluorene concentrations decreased with depth at this location and downgradient at location 03-608352. The lateral and vertical extent of fluorene are defined.

Indeno(1,2,3-cd)pyrene was detected in 10 samples at AOC 03-056(k). The maximum concentration of 0.896 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth at all locations and decreased downgradient at location 03-608352. The lateral and vertical extent of indeno(1,2,3-cd)pyrene are defined.

Isopropyltoluene(4-) was detected in four samples at AOC 03-056(k). The maximum concentration of 7.64 mg/kg was detected at location 03-608357 in the deepest sampling interval (3.0–4.0 ft bgs). Isopropyltoluene(4-) was also detected at locations 03-60835 in the deepest sampling interval (3.0–4.0 ft bgs). Isopropyltoluene(4-) decreased with depth at other locations and downgradient at location 03-608352. The lateral extent of 4-isopropyltoluene is defined, and the vertical extent is not defined.

Methylnaphthalene(2-) was detected in two samples at AOC 03-056(k). The maximum concentration of 0.236 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Methylnaphthalene(2-) concentrations decreased to trace levels at location 03-608353 in the deepest sampling interval (6.0–7.0 ft bgs) and was not detected downgradient. The lateral and vertical extent of 2-methylnaphthalene are defined.

Naphthalene was detected in three samples at AOC 03-056(k). The maximum concentration of 0.705 mg/kg was detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Naphthalene concentrations decreased with depth at this location and was not detected at any other location. The lateral and vertical extent of naphthalene are defined.

Phenanthrene and pyrene were detected in 16 samples at AOC 03-056(k). The maximum concentrations of 5.05 mg/kg and 4.56 mg/kg, respectively, were detected at location 03-608353 in a soil sample collected from a depth of 0.0–1.0 ft bgs. Phenanthrene and pyrene concentrations decreased with depth at all other locations, except at locations 03-03281 and 03-608356. Phenanthrene and pyrene were not detected at downgradient location 03-608352. The lateral extent of phenanthrene and pyrene is defined, and the vertical extent is not defined.

Toluene was detected in nine samples at AOC 03-056(k). The maximum concentration of 0.00294 mg/kg was detected at location 03-608357 in the deepest sampling interval (3.0–4.0 ft bgs). Toluene concentrations also increased with depth at locations 03-608356 and 03-608357. Toluene was not detected at downgradient locations 03-608352, 03-608354, 03-608355, or 03-608356. The lateral extent of toluene is defined, and the vertical extent is not defined.

**Radionuclides**

Radionuclides in soil samples from AOC 03-056(k) that were detected or were detected above BV/FV are uranium 235/236 and uranium-238.

Uranium-235/236 was detected above BV (0.2 pCi/g) in one soil sample at AOC 03-056(k). The maximum activity (0.203 pCi/g) was detected at location 03-03290 in a sample collected from a depth of 1.0–1.5 ft bgs. Uranium-235/236 activities decreased with depth. Uranium-235/236 was not detected above BV in soil samples from surrounding locations. The lateral and vertical extent of uranium-235/236 are defined.

Uranium-238 was detected above BV (2.29 pCi/g) in three soil samples at AOC 03-056(k).The maximum activity of 10.07 pCi/g was detected at location 03-03290 in a sample collected from a depth of 0.0–1.0 ft bgs. Uranium-238 activities decreased with depth at this location. Uranium-238 was also not detected above BVs in soil at locations surrounding location 03-03290. The lateral and vertical extent of uranium-238 are defined.

### 6.42.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 03-056(k) because extent is not defined for the site.

### 6.42.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 03-056(k) because extent is not defined for the site.

## 6.43 SWMU 03-056(l), Storage Area

### 6.43.1 Site Description and Operational History

SWMU 03-056(l) is the former location of an outdoor storage area at TA-03 next to the east side of building 03-141 (Figure 6.4-1). Containers of disposable clothing contaminated with beryllium powder were reportedly staged at this location before disposal. Carboys used to store beryllium powder in water were also staged in this area. The carboys were usually in a tray that served as secondary containment. No known releases from the drums or carboys to the environment have occurred (LANL 1995, 057590, p. 6-11).

### 6.43.2 Relationship to Other SWMUs and AOCs

This storage area is located on the east side of building 03-141 in the same area as the stained area on the south side of AOC 03-051(c). The storage area is about 50 ft upgradient of the discharge point for the former outfall, SWMU 03-015; however, the sites are not related.

#### 6.43.3.1 Previous Investigations

In 2003, samples were collected from the former storage area before the planned construction of a new beryllium storage vault. Three asphalt samples were collected from three locations, and three soil samples were collected from beneath the asphalt samples at depths of approximately 0.5–2.25 ft bgs (two samples) and 0.5–1.6 ft bgs (one sample) (LANL 2003, 075992). One soil sample was collected from a

fourth location at a depth of 0.0–1.6 ft bgs. All samples were submitted for analysis of TAL metals, although total beryllium was the only potential contaminant associated with this SWMU.

Manganese and zinc were detected above BVs in one soil sample. Calcium and copper were detected above BVs in two soil samples. Thallium and beryllium were detected in one and two asphalt samples, respectively. With the exception of antimony and silver (which were not detected in any asphalt samples), all remaining inorganic chemicals were detected in all three asphalt samples.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.43.4. Table 6.43-1 presents the samples collected and analyses requested at SWMU 03-056(l).

### 6.43.4 Site Contamination

#### 6.43.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-056(l). As a result, the following activities were completed as part of the 2009 investigation.

- Ten samples were collected from five locations in and below the asphalt to confirm the results from previous investigations. At each location, samples were collected from the asphalt and 2.0–3.0 ft below the asphalt. All samples were analyzed at off-site fixed laboratories for TAL metals, cyanide, and PCBs. The asphalt data are not included in the discussion on the spatial distribution of inorganic and organic chemicals and radionuclides. The data are also not shown on figures but are presented in the data tables.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-056(l) are shown in Figure 6.4-1. Table 6.43-1 presents the samples collected and analyses requested at SWMU 03-056(l). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.43.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at SWMU 03-056(l), no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.43.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 03-056(l) consist of 17 samples (8 soil and 9 asphalt) collected from nine locations. Asphalt samples have no background concentrations for comparison and are not evaluated for COPCs.

**Inorganic Chemicals**

Seventeen samples were analyzed for TAL metals (8 soil and 9 asphalt), and 10 samples were analyzed for cyanide (4 soil and 6 asphalt). Table 6.43-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 3 shows the spatial distribution of inorganic chemicals detected or

detected above BV. The nature and extent of contamination are defined at SWMU 03-056(l); inorganic COPCs are identified below.

The inorganic chemicals identified as COPCs in soil at SWMU 03-056(l) are copper and manganese. The following inorganic chemicals were detected in asphalt: aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, cyanide, iron, lead, magnesium, manganese, mercury, nickel, potassium, selenium, silver, sodium, thallium, vanadium, and zinc.

Antimony was not detected in soil at SWMU 03-056(l) but had DLs (1.19 to 1.27 mg/kg) above BV (0.83 mg/kg) in four soil samples. Because antimony was not detected at SWMU 03-056(l), antimony is not identified as a COPC in soil.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 03-056(l), but had DLs (0.593 to 0.636 mg/kg) above BV in four samples. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration for cadmium in soil (2.6 mg/kg) (Figure H-82). Cadmium is not identified as a COPC in soil.

Calcium was detected above BV (6120 mg/kg) in two samples in soil at SWMU 03-056(l), with a maximum concentration of 9050 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of calcium in soil (14,000 mg/kg) (Figure H-82). Calcium is not identified as a COPC in soil.

Copper was detected above BV (14.7 mg/kg) in two samples in soil at SWMU 03-056(l), with a maximum concentration of 29.4 mg/kg. The maximum DL was above the maximum background concentration (16 mg/kg) (Figure H-83). Copper is identified as a COPC in soil.

Lead was detected above BV (22.3 mg/kg) in one soil sample at SWMU 03-056(l) at a concentration of 25.8 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of lead in soil (28 mg/kg) (Figure H-83). Lead is not identified as a COPC in soil.

Manganese was detected above BV (671 mg/kg) in one soil sample at SWMU 03-056(l) at a concentration of 1530 mg/kg. The maximum concentration exceeded the maximum background concentration (1100 mg/kg) (Figure H-84). Manganese is identified as a COPC in soil.

Zinc was detected above BV (48.8 mg/kg) in two soil samples at SWMU 03-056(l), with a maximum concentration of 60.9 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of zinc in soil (75.5 mg/kg) (Figure H-84). Zinc is not identified as a COPC in soil.

**Organic Chemicals**

Ten samples were analyzed for PCBs (four soil and six asphalt). Table 6.43-3 summarizes the analytical results for detected organic chemicals. Plate 4 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 03-056(l); organic COPCs are identified below.

Aroclor-1254 was detected in one soil sample at SWMU 03-056(l), with a maximum concentration of 0.0019 mg/kg. Aroclor-1254 is identified as a COPC in soil.

#### 6.43.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at SWMU 03-056(l) are defined, as discussed below.

**Inorganic Chemicals**

The inorganic chemical detected above BVs or having DLs above BV in soil at SWMU 03-056(l) are antimony, cadmium, calcium, copper, lead, manganese, and zinc. Inorganic chemicals detected in asphalt samples are not above background in soils, except for antimony, copper, and manganese. Therefore, the extent of these chemicals is defined, and only the inorganic chemicals in soil are discussed below.

The maximum concentrations of antimony, cadmium, calcium, lead, and zinc are not different than background. The lateral and vertical extent of antimony, cadmium, calcium, lead, and zinc are defined.

The maximum copper concentration of 29.4 mg/kg was detected at location 03-22333 at a depth of 0.6562–1.6404 ft bgs. Copper concentrations decreased with depth at this location, and copper was not detected above BV in soil at any other location. The lateral and vertical extent of copper are defined.

The maximum manganese concentration in soil of 1530 mg/kg was detected at location 03-22333 at a depth of 0.6562-1.6404 ft bgs. Manganese was not detected above BV at the same depth at nearby location 03-22334 or at 2.0–3.0 ft bgs at location 03-608364. Also, manganese was not detected at any of the surrounding locations. The lateral and vertical extent of manganese are defined.

**Organic Chemicals**

Aroclor-1254 was detected in one location at SWMU 03-056(l). The maximum concentration of 0.0019 mg/kg was detected at location 03-608362 at a depth of 2.0–3.0 ft bgs. Aroclor-1254 was not detected at any other location and the maximum concentration was below the EQL. The lateral and vertical extent of Aroclor-1254 are defined.

### 6.43.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for SWMU 03-056(l) is discussed in Appendix I, sections I-4.2 and I-4.4.

No carcinogenic COPCs were identified for the industrial, construction worker, and residential scenarios. The HIs for the industrial, construction worker, and residential scenarios are 0.01, approximately 2, and 0.2, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070) for the industrial and residential scenarios and slightly above 1.0 for the construction worker scenario. The elevated construction worker HI is primarily the result of manganese. The exposure and risk from manganese is overestimated because it was detected above background at one location; all other concentrations were below the soil BV. The EPC is also similar to the maximum soil background concentration (1100 mg/kg), and the construction worker SSL is less than the soil BV. If the EPC is divided by the maximum soil background concentration, the ratio is approximately 1. Without manganese, the HI for the construction worker is 0.002, which is less than the NMED target HI.

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exists for the industrial, construction worker, and residential scenarios.

### 6.43.6 Summary of Ecological Risk Screening

SWMU 03-056(l) is covered with asphalt pavement. Therefore, an ecological risk-screening assessment was not conducted because no complete exposure pathways to ecological receptors exist.

## 6.44 Consolidated Unit 03-059-00

Consolidated Unit 03-059-00 consists of AOC 03-003(n) and SWMU 03-059. This consolidated unit is a former storage area next to building 03-271 (Figure 6.8-1). SWMU 03-059 was identified as the former salvage yard, and AOC 03-003(n) was the location of a one-time PCB spill in that salvage yard. SWMU 03-059 was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. The spill area [AOC 03-003(n)] is located approximately 20 ft south of the northwest corner of building 03-271.

### 6.44.1 AOC 03-003(n), One-Time Spill–PCB Site

#### 6.44.1.1 Site Description and Operational History

AOC 03-003(n) is the location of a one-time PCB spill at TA-03 in the salvage yard (SWMU 03-059) located next to the south side of building 03-271 (Figure 6.8-1). The perimeter is fenced, except for the part that abuts building 03-271. With the exception of two small portions of the yard, most of the area is asphalt-paved. The salvage yard was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. Small and weather-sensitive items were stored inside building 03-271. All other items were placed in and around the former salvage yard. The spill area identified as AOC 03-003(n) is approximately 20 ft south of the northwest corner of building 03-271. At that location, a transformer ruptured in 1977 and leaked an estimated 10 gal. of PCB-contaminated oil into the soil. It is unclear whether the spill was cleaned up or if confirmation sampling was conducted. The drainage pattern west of building 03-271 was altered in 1991 when the parking lot was regraded and base course was applied. The entire area received additional base course at least once since 1991. The salvage operation and materials were moved to the building 60-2 in 1993. Currently, the former salvage-yard area is used as a parking lot and storage area for empty containers (LANL 1995, 057590, pp. 5-19-1, 5-19-3).

#### 6.44.1.2 Relationship to Other SWMUs and AOCs

This spill site is located on the west side of building 03-271 about 80 ft southwest of SWMU 03-056(a), a storage area. AOC 03-003(n) is a component of Consolidated Unit 03-059-00, along with SWMU 03-059.

#### 6.44.1.3 Summary of Previous Investigations

During the 1994 RFI conducted at AOC 03-003(n), two soil samples were collected from two locations within the area of the PCB spill at a depth of 0 to 0.8 ft bgs and analyzed for PCBs, gross-alpha, -beta, and -gamma radiation, and tritium. Data from the 1994 RFI are screening-level data and are summarized below. Section 2.44.1 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Neither PCBs nor tritium were detected and no elevated gross radiation was observed.

#### 6.44.1.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 03-003(n). As a result, the following activities were completed as part of the 2009 investigation.

- Eight samples were collected from four locations to confirm the effectiveness of previous remedial actions. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. All samples were analyzed at off-site fixed laboratories for PCBs.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 03-003(n) are shown in Figure 6.8-1. Table 6.44-1 presents the samples collected and analyses requested at AOC 03-003(n). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.44.1.4 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 03-003(n), a maximum concentration of 14.2 ppm was detected at a depth of 1.0–2.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at AOC 03-003(n) consist of eight soil samples collected from four locations.

***Organic Chemicals***

- Eight soil samples were analyzed for PCBs. Table 6.44-2 summarizes the analytical results for detected organic chemicals. Plate 10 shows the spatial distribution of detected organic chemicals.

The following organic chemicals were detected in soil at AOC 03-003(n) and are identified as COPCs in soil: Aroclor-1254 and Aroclor-1260.

**Nature and Extent of Contamination**

The nature and extent of organic chemicals at AOC 03-003(n) are defined, as discussed below.

***Organic Chemicals***

The following organic chemicals are identified as COPCs at AOC 03-003(n): Aroclor-1254 and Aroclor-1260.

Aroclor-1254 was detected in one soil sample at AOC 03-003(n). The maximum concentration (0.0063 mg/kg) was detected at location 03-608369 at a depth of 0.0–1.0 ft bgs. Aroclor-1254 was not detected at the deepest depth of 1.0–2.0 ft bgs at any location. Aroclor-1254 was not detected to the

north at location 03-608368 or to the south at locations 03-608370 and 03-608371. Buildings surround the AOC to the east and west. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in three soil samples at AOC 03-003(n). The maximum concentration (0.0095 mg/kg) was detected at location 03-608369 at a depth of 0.0–1.0 ft bgs. Concentrations at this location decreased with depth. Concentrations at location 03-608371 did not change with depth (0.005 mg/kg at 0.0–1.0 ft bgs and 0.006 mg/kg at 1.0–2.0 ft bgs). Aroclor-1260 was not detected to the north at location 03-608368 or to the south at location 03-608370. Concentrations decreased from the north at location 03-608369 and to the southernmost location 03-608371. Buildings surround the AOC to the east and west. The lateral and vertical extent of Aroclor-1260 are defined.

#### 6.44.1.5 Summary of Human Health Risk Screening

The human health risk-screening assessment for AOC 03-003(n) is discussed in Appendix I, sections I-4.2 and I-4.4.

There are no noncarcinogenic COPCs for the industrial scenario. The total excess cancer risks for the industrial, construction worker and residential scenarios are $2 \times 10^{-8}$, $1 \times 10^{-9}$ and $4 \times 10^{-8}$, respectively, which are all less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). For the construction worker and residential scenarios, the HIs are 0.001 and 0.006, respectively, which are less than the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker ,and residential scenarios.

#### 6.44.1.6 Summary of Ecological Risk Screening

The ecological risk-screening assessment is presented in Appendix I, section I-5.4. No potential ecological risk was found for any receptor following evaluations based on minimum ESL comparisons.

### 6.44.2 SWMU 03-059, Storage Area–PCB Site

#### 6.44.2.1 Site Description and Operational History

SWMU 03-059 is a former salvage yard at TA-03 consisting of two areas (Figure 6.8-1). The first area is about 250 ft × 115 ft and is located next to the south side of building 03-271. The perimeter is fenced, except for the part that abuts building 03-271. With the exception of two small portions of the yard, it is asphalt-paved. The second area is about 100 ft × 60 ft, asphalt-paved, and fenced. Paving over both areas occurred incrementally over a period of years.

#### 6.44.2.2 Relationship to Other SWMUs and AOCs

This former salvage yard is located south of building 03-271. It is a component of Consolidated Unit 03-059-00, along with AOC 03-003(n). Stormwater from SWMU 03-059 flows toward SWMU 03-029, a component of Consolidated Unit 03-009(a)-00.

#### 6.44.2.3 Summary of Previous Investigations

During the 1994 RFI conducted at SWMU 03-059, 10 asphalt samples were collected from 10 locations within the salvage yard at a depth of 0.0–0.5 ft bgs. Samples were analyzed for PCBs, gross-alpha, -beta,

and -gamma radiation, and tritium. Data from the 1994 RFI are screening-level data and are summarized below. Section 2.44.2 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Tritium was detected in three samples and PCBs were not detected.

#### 6.44.2.4 Site Contamination

**Soil, Rock, and Sediment Sampling**

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 03-059. As a result, the following activities were completed as part of the 2009 investigation.

- Thirty-four samples were collected from 17 locations to define nature and extent of potential contamination. The samples at 11 locations were accessed beneath asphalt using an electric concrete coring device and an asphalt core bit. At each location, samples were collected from 0.0–1.0 ft and 2.0–3.0 ft beneath the asphalt. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, cyanide, perchlorate, nitrate, and tritium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 03-059 are shown in Figure 6.8-1. Table 6.44-3 provides the sampling locations, depths, and analytical suites. Coordinates of sampling locations are presented in Table 3.2-1.

**Soil, Rock, and Sediment Field-Screening Results**

During headspace screening at SWMU 03-059, no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

**Soil, Rock, and Sediment Sampling Analytical Results**

Decision-level data collected at SWMU 03-059 consist of 34 soil samples collected from 17 locations.

***Inorganic Chemicals***

Thirty-four soil samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 6.44-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 9 shows the spatial distribution of inorganic chemicals detected or detected above BV. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-059; therefore, inorganic COPCs are not identified for the site.

***Organic Chemicals***

Thirty-four soil samples were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 6.44-5 summarizes the analytical results for detected organic chemicals. Plate 10 shows the spatial distribution

of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-059; therefore, organic COPCs are not identified for the site.

### *Radionuclides*

Thirty-four soil samples were analyzed for tritium. Table 6.44-6 summarizes the analytical results for radionuclides. Plate 11 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMU 03-059; therefore, radionuclide COPCs are not identified for the site.

### Nature and Extent of Contamination

The nature and extent of inorganic chemicals at SWMU 03-059 are defined. The nature and extent of organic chemicals and radionuclides at SWMU 03-059 are not defined.

### *Inorganic Chemicals*

Inorganic chemicals in soil at SWMU 03-059 were detected at concentrations above BVs, were not detected but the analytical DLs were above BVs, or were detected with no BVs. These chemicals are: antimony, cadmium, calcium, chromium, cobalt, copper, lead, mercury, nitrate, perchlorate, thallium, and zinc.

Antimony was detected above BV (0.83 mg/kg) in seven soil samples at SWMU 03-059. The maximum concentration (2.23 mg/kg) was detected at location 03-608372 in a sample collected from the shallow depth of 0.0–1.0 ft bgs. Antimony was not detected in the downgradient drainage samples at locations 03-608185 and 03-608186, and concentrations decreased with depth. The lateral and vertical extent of antimony are defined.

Cadmium was detected above BV (0.4 mg/kg) in three samples in soil at SWMU 03-059. The maximum concentration (2.64 mg/kg) was detected at location 03-608387 in a sample collected inside the fenced area from 0.0–1.0 ft bgs. Additionally, 27 DLs were above BV, with a maximum DL of 0.638 mg/kg. Cadmium was also detected above BV in soil samples outside the fenced area at locations 03-608372 and 03-60874. Concentrations decreased from location 03-608387 to locations 03-608372 and 03-608374, and concentrations at all locations decreased with depth. The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in four samples in soil at SWMU 03-059. The maximum concentration (13,100 mg/kg) was detected at location 03-608376 in a sample collected from 0.0–1.0 ft bgs. The concentrations at all locations were below the maximum soil background concentration (14,000 mg/kg) (Figure H-85). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (19.3 mg/kg) in one soil sample at SWMU 03-059. The maximum concentration (26.5 mg/kg) was detected at location 03-608387 in a sample collected from 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of lead are not different than background (Table H-14 and Figure H-85). The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV (8.64 mg/kg) in two soil samples at SWMU 03-059. The maximum concentration (21.8 mg/kg) was detected at location 03-608376 from a depth of 0.0–1.0 ft bgs. Cobalt concentrations decreased with depth at both locations. The concentrations of cobalt increased to the south outside the fenced area, toward location 03-608376. However, cobalt was not detected above BV in

the drainage samples to the south at locations 03-608185 and 03-608186. The lateral and vertical extent of cobalt are defined.

Copper was detected above BV (14.7 mg/kg) in three soil samples at SWMU 03-059. The maximum concentration (29.3 mg/kg) was detected at location 03-608387 at a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of copper are not different than background (Table H-14 and Figure H-86). The lateral and vertical extent of copper are defined.

Lead was detected above BV (22.3 mg/kg) in seven soil samples at SWMU 03-059. The maximum concentration (48.1 mg/kg) was detected at location 03-608372 in a sample collected from 0.0–1.0 ft bgs. Concentrations decreased with depth at five locations. Lead concentrations increased with depth at locations 03-608381 and 03-608385; however, concentrations were less than the maximum soil background concentration (28 mg/kg). Lead concentrations increased to the east outside the fenced area toward location 03-608372 but were not above BV in the downgradient drainage samples at locations 03-608185 and 03-608186. The lateral and vertical extent of lead are defined.

Mercury was detected above BV (0.1 mg/kg) in four soil samples at SWMU 03-059. The maximum concentration (0.653 mg/kg) was detected at location 03-608374 in a sample collected from 0.0–1.0 ft bgs. Concentrations decreased with depth at all locations. Concentrations increased to the south outside the fenced area toward location 03-608374. However, mercury was not detected above BV in the drainage samples to the south at locations 03-608185 and 03-608186. The lateral and vertical extent of mercury are defined.

Nitrate was detected in 16 samples in soil at SWMU 03-059. The concentrations ranged from 0.82–1.55 mg/kg at 0.0–1.0 ft bgs and 0.98–1.98 mg/kg at 2.0–3.0 ft bgs. These concentrations reflect naturally occurring concentrations of nitrate. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples at SWMU 03-059. The maximum concentration of 0.00171 mg/kg was detected at location 03-608372 in a sample collected from 2.0–3.0 ft bgs. Concentrations were below the EDL for perchlorate. The lateral and vertical extent of perchlorate are defined.

Thallium was detected above BV (0.73 mg/kg) in one soil sample at SWMU 03-059. The maximum concentration (1.73 mg/kg) was detected at location 03-608382 in a sample collected from 0.0–1.0 ft bgs. Concentrations decreased with depth. Thallium was not detected above BV in samples outside the fenced area. The lateral and vertical extent of thallium are defined.

Zinc was detected above BV (48.8 mg/kg) in five soil samples at SWMU 03-059. The maximum concentration (133 mg/kg) was detected at locations 03-608387 and 03-608372 in samples collected from 0.0–1.0 ft and 0.0–1.0 ft bgs, respectively. Zinc concentrations decreased with depth. Concentrations did not change to the east outside the fenced area toward location 03-608372 and were not above BV in the downgradient drainage samples at locations 03-608185 and 03-608186. The lateral and vertical extent of zinc are defined.

### *Organic Chemicals*

Organic chemicals detected in soil at SWMU 03-059 are acenaphthene, acenaphthylene, acetone, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, butylbenzylphthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene,

indeno(1,2,3-cd)pyrene, methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

Acetone, benzoic acid, and methylene chloride were detected in one sample at several locations at SWMU 03-059. The concentrations of acetone, benzoic acid, and methylene chloride at locations 03-608382, 03-608379, and 03-608375, respectively were below the EQLs. The lateral and vertical extent of acetone, benzoic acid, and methylene chloride are defined.

Aroclor-1242 was detected in one sample at SWMU 03-059. The maximum concentration of 0.0182 mg/kg was detected at location 03-608382 in a soil sample collected from 0.0–1.0 ft bgs. Concentrations decreased with depth. Aroclor-1242 was not detected in samples outside of the fenced area. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 was detected in 16 samples at SWMU 03-059. The maximum concentration of 12.3 mg/kg was detected at location 03-608374 in a soil sample collected from 0.0–1.0 ft bgs. Aroclor-1254 concentrations increased with depth at locations 03-608384 and 03-608386 and decreased with depth at all other locations. Concentrations increased to the east and south outside the fenced area; however, concentrations decreased to the south at downgradient drainage locations 03-608185 and 03-608186. The lateral extent of Aroclor-1254 is defined, and the vertical extent is not defined.

Aroclor-1260 was detected in 22 samples at SWMU 03-059. The maximum concentration of 5.25 mg/kg was detected at location 03-608374 in a soil sample collected from 0.0–1.0 ft bgs. Aroclor-1260 concentrations increased with depth at location 03-608386 and decreased with depth at all other locations. Concentrations increased to the east and south outside the fenced area; however, concentrations decreased to the south at downgradient drainage locations 03-608185 and 03-608186. The lateral extent of Aroclor-1260 is defined, and the vertical extent is not defined.

Acenaphthene and anthracene were detected in soil samples at four and six locations at SWMU 03-059, respectively. The maximum concentrations of acenaphthene (0.0411 mg/kg) and anthracene (0.073 mg/kg) were detected from depths of 0.0–1.0 ft bgs at location 03-608381 and 2.0–3.0 ft bgs at location 03-608386, respectively. Concentrations increased with depth at locations 03-608377 and 03-608386 and decreased with depth at the other locations. Concentrations decreased laterally outside of the fenced area, and these chemicals were not detected at downgradient drainage locations 03-608185 and 03-608186. The lateral extent of acenaphthene and anthracene is defined, and the vertical extent is not defined.

Bis(2-ethylhexyl)phthalate was detected in 10 samples at SWMU 03-059. The maximum concentration of 1.13 mg/kg was detected at location 03-608378 in a soil sample collected from 0.0–1.0 ft bgs. Concentrations were below the EQL at deeper depths and at other locations. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Butylbenzylphthalate was detected in one sample at location 03-608376. The maximum concentration was 1.83 mg/kg in a sample collected from a depth of 0.0–1.0 ft bgs. Butylbenzylphthalate was not detected in the deeper sample at this location or at any other locations. The lateral and vertical extent of butylbenzylphthalate are defined.

Methylnaphthalene(2-) and naphthalene were detected in soil at two samples at SWMU 03-059. The maximum concentrations of 2-methylnaphthalene and naphthalene were detected from a depth of 0.0–1.0 ft bgs at location 03-608381. Concentrations decreased with depth at location 03-608381 and were detected only in the deeper sample at location 03-608386. The concentrations were below the EQLs at both locations. The lateral and vertical extent of 2-methylnaphthalene and naphthalene are defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and indeno(1,2,3-cd)pyrene were detected in soil at 4 to 14 samples at SWMU 03-059. Concentrations of these chemicals increased with depth at location 03-608377 and, with the exception of benzo(k)fluoranthene, also increased with depth at location 03-608386. Concentrations decreased laterally from inside the fenced area to outside the fenced area, and these chemicals were not detected in the downgradient drainage samples at locations 03-608385 and 03-608386. The lateral extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, and indeno(1,2,3-cd)pyrene is defined, and the vertical extent is not defined.

Dibenz(a,h)anthracene was detected in two samples at SWMU 03-059. The maximum concentration of 0.028 mg/kg was detected at location 03-608385 in a soil sample collected from 0.0–1.0 ft bgs. The concentrations were below the EQLs at both locations. The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Fluorene was detected in two samples at SWMU 03-059. The maximum concentration of 0.0484 mg/kg was detected at location 03-608386 in a soil sample collected from bottom depth of 2.0–3.0 ft bgs. Fluorene was not detected outside the fenced area or at downgradient drainage locations 03-608185 and 03-608186. The lateral extent of fluorene is defined, and the vertical extent is not defined.

Phenanthrene was detected in 10 samples at SWMU 03-059. The maximum concentration of 0.281 mg/kg was detected at location 03-608386 in a soil sample collected from bottom depth of 2.0–3.0 ft bgs. Concentrations increased with depth at locations 03-608377 and 03-608386. Concentrations decreased laterally from inside the fenced area to outside the fenced area, and these chemicals were not detected in drainage samples at locations 03-608385 and 03-608386. The lateral extent of phenanthrene is defined, and the vertical extent is not defined.

Pyrene was detected in 13 samples at SWMU 03-059. The maximum concentration of 0.424 mg/kg was detected at location 03-608372 in a soil sample collected from 0.0–1.0 ft bgs. Concentrations increased with depth at locations 03-608377 and 03-608386. Concentrations increased to the east outside the fenced area toward location 03-608372, however pyrene was not detected at downgradient drainage locations 03-608185 and 03-608186. The lateral extent of pyrene is defined, and the vertical extent is not defined.

TPH-DRO was detected in ten samples at SWMU 03-059. The maximum concentration of 70.1 mg/kg was detected at location 03-608372 in a soil sample collected from 0.0–1.0 ft bgs. Concentrations increased with depth or TPH-DRO was only detected in the deeper samples at five locations, 03-608373, 03-608374, 03-608386, 03-608377, and 03-608378. TPH-DRO was only detected at one location (location 03-608386) inside the fenced area. Concentrations decreased laterally from inside the fenced area to outside the fenced area, and TPH-DRO was not detected in the downgradient drainage location 03-608186. The lateral extent of TPH-DRO is defined, and the vertical extent is not defined.

***Radionuclides***

Tritium was detected in 10 soil samples at SWMU 03-059. The maximum activity of 1.36423 pCi/mL was detected at location 03-608387 in a sample collected from 2.0–3.0 ft bgs. Tritium activity decreased with depth at two locations but increased or remained unchanged with depth at three locations (03-608383, 03-608386, and 03-608387) inside the fenced area. Tritium was not detected or was detected at lower activity at the lateral locations to the east, west and south. Building 03-271 lies alongside the SWMU to the north. The lateral extent of tritium is defined, and the vertical extent is not defined.

#### 6.44.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 03-059 because extent is not defined for the site.

#### 6.44.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 03-059 because extent is not defined for the site.

### 6.45 AOC C-03-022, Kerosene Tanker Trailer

#### 6.45.1 Site Description and Operational History

AOC C-03-022 is the former location of a tanker trailer used to store and distribute kerosene for former asphalt batch plant operations (Figure 6.2-1). The tanker trailer was located in a bermed materials storage area on a hill directly north of the former TA-03 asphalt batch plant. The tanker was in service for approximately 15 yr and supplied kerosene through a gravity-feed line that had a valve near the oil distributor tank, AOC C-03-016, located approximately 12 ft south (directly below the hill) of the tanker. The tanker and gravity-feed line were removed in 1989, and kerosene was replaced with No. 2 diesel fuel. No record of release is associated with this storage tanker.

#### 6.45.2 Relationship to Other SWMUs and AOCs

This former trailer location supplied kerosene to the former asphalt batch plant, Consolidated Unit 03-009(a)-00, through a pipe that passed the oil distributor tank, AOC C-03-016. AOC C-03-022 is not a component of Consolidated Unit 03-009(a)-00.

#### 6.45.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-03-022.

#### 6.45.4 Site Contamination

##### 6.45.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC C-03-022 to assess potential contamination:

- Eight samples were collected from four locations on each side of the former tanker site to define the nature and extent of potential contamination. The samples at two locations were accessed beneath asphalt using an electric concrete coring device and an asphalt core bit. At each location, samples were collected from 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals and TPH-DRO.
- All investigation samples were field screened for gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC C-03-022 are shown in Figure 6.2-1. Table 6.45-1 presents the samples collected and analyses requested at AOC C-03-022. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 6.45.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening at AOC-C-03-022, no organic vapors were detected. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 6.45.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC C-03-022 consist of eight soil samples collected from four locations.

**Inorganic Chemicals**

Eight soil samples were analyzed for TAL metals. Table 6.45-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC C-03-022; therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Eight soil samples were analyzed for TPH-DRO. Table 6.45-3 summarizes the analytical results for detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC C-03-022; therefore, organic COPCs are not identified for the site.

#### 6.45.4.4 Nature and Extent of Contamination

The nature and extent for inorganic and organic chemicals are not defined at AOC C-03-022.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at AOC C-03-022 were detected at concentrations above their BVs, were detected but corresponding BVs have not been established, or were not detected but the analytical DLs were above BVs. These inorganic chemicals are antimony, cadmium, calcium and magnesium.

Antimony was not detected above BV in soil at AOC C-03-022 but had DLs (1.03 to 1.12 mg/kg) above BV (0.83 mg/kg) in eight soil samples. Since antimony was not detected, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above BV in soil at AOC C-03-022 but had DLs (0.517 to 0.56 mg/kg) above BV (0.4 mg/kg) in eight soil samples. The maximum DL is less than the maximum background concentration (2.6 mg/kg). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6,120 mg/kg) in two soil samples at AOC C-03-022. The maximum concentration of 34,100 mg/kg was detected at location 03-608392 at the bottom depth of 4.0–5.0 ft bgs. Calcium was not detected above BV at the other locations. The lateral and vertical extent of calcium are not defined.

Magnesium was detected above BV (4610 mg/kg) in two soil samples at AOC C-03-022. The maximum concentration of 5080 mg/kg was detected at location 03-608392 in the deepest interval (4.0–5.0 ft bgs).

Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of magnesium in soil (10,000 mg/kg) (Figure H-87). The lateral and vertical extent of magnesium are defined.

**Organic Chemicals**

TPH-DRO was detected in three samples at AOC C-03-022. The maximum concentration of 27900 mg/kg was detected in a soil sample collected from the bottom depth of 4.0–5.0 ft bgs at location 03-608389. Concentrations of TPH-DRO increased with depth at location 03-608389 and decreased with depth at other locations. The lateral and vertical extent of TPH-DRO are not defined.

### 6.45.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-03-022 because extent is not defined for the site.

### 6.45.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-03-022 because extent is not defined for the site.

## 7.0 TA-60 BACKGROUND AND FIELD-INVESTIGATION RESULTS

Seven sites (three AOCs and four SWMUs) located in TA-60 are addressed in this investigation report (Table 1.1-1). Each site is described separately in sections 7.2 through 7.8, including site description and operational history; relationship to other SWMUs and AOCs; if applicable, historical and 2009 investigation activities conducted; site contamination results based on qualified data (decision-level data from the current and previous investigations); and summaries of human health and ecological risk-screening assessment.

The following sections present inorganic chemical, organic chemical, and radionuclide concentrations detected at TA-60 in Plates 21 through 23.

## 7.1 Background of TA-60

TA-60, also known as Sigma Mesa Site, was created from the eastern portion of TA-03 and lies on Sigma Mesa, between Sandia and Mortandad Canyons. All buildings at TA-60 are located on the western end of the mesa and contain Laboratory support and maintenance operations and subcontractor-service facilities. The NTS Test Fabrication Facility; the NTS test tower (buildings 60-17 and 60-18); several small abandoned experimental areas, including a solar pond and a test drill hole; and storage sites for pesticides, topsoil, and recyclable asphalt are also located at TA-60 (LANL 1999, 064617, p. 2-25).

### 7.1.1 Operational History

TA-60 was created in 1989 when the Laboratory redefined its TAs and designated a portion of TA-03 to TA-60. The operational history of TA-60 is described in section 6.1.1.

### 7.1.2 Summary of Releases

Potential contaminants at TA-60 may have been released into the environment through drainages, outfalls, liquid spills, leaks, or operational releases.

### 7.1.3 Current Site Usage and Status

TA-60, also known as Sigma Mesa, provides physical support and infrastructure activities for the Laboratory. Support services and physical support areas for Laboratory subcontractors are also located at TA-60. The TA includes a number of fuel tanks, a fuel pumping station, an asphalt batch plant, and numerous storage areas, including transportainers, trailers, buildings, and outdoor materials and equipment storage areas. Approximately half of TA-60 is developed. Roads and paved parking areas surround most of the buildings; however, the eastern two-thirds of Sigma Mesa is mostly unpaved.

## 7.2 SWMU 60-002, Storage Areas

### 7.2.1 Site Description and Operational History

SWMU 60-002 consists of three former storage areas (designated as west, central, and east) on Sigma Mesa at TA-60 (Figures 7.2-1, 7.2-3, 7.2-4 respectively). The former western storage area (Figure 7.2-1) measures approximately 150 ft × 300 ft and is located approximately 300 ft southeast of building 60-2, on the north side of the unimproved portion of Eniwetok Drive that traverses the mesa. Historically, piles of concrete blocks, wooden poles, tuff, fill, and cables were stored at this location. A large mound of fill, with pieces of cured asphalt and concrete, was situated in the northern portion of the site. The central storage area (Figure 7.2-3) was located approximately 50 ft north of the Roads and Grounds salt and sand storage facility (building 60-178) and consisted of a 50-ft-diameter mound of fill approximately 10 ft high with construction debris, including concrete fence post supports, pipe, metal strips, and wood. The eastern storage area is on the south side of the unimproved portion of Eniwetok Drive about 300 ft west of SWMU 60-007(a) near the east end of Sigma Mesa (Figure 7.2-4). This area was used to stage piles of broken cured asphalt removed from roadways and parking lots for recycling (LANL 2005, 100704). The eastern storage area is currently the site of the Laboratory's asphalt batch plant (Shaw Environmental Inc., 2003, 085517, p. 1).

### 7.2.2 Relationship to Other SWMUs and AOCs

The western storage area of SWMU 60-002 was located approximately 150 ft southeast of the AOC 60-004(f) storage area. The central storage area of SWMU 60-002 was located approximately 300 ft east of the SWMU 60-006(a) septic system. The eastern storage area of SWMU 60-002 was located approximately 300 ft west of SWMU 60-007(a). None of the former SWMU 60-002 storage areas are associated with another SWMU or AOC.

### 7.2.3 Summary of Previous Investigations

The SWMU 60-002 central storage area debris pile was removed and disposed of off-site in 2002 to accommodate a new fenced equipment storage yard. Six confirmation samples were collected from two depths of 0 to 1 ft and 1.5 to 2 ft bgs from three locations beneath the former debris pile. Five samples were submitted for analysis of TAL metals, VOCs, SVOCs, PCBs, and TPH. One sample was analyzed for VOCs, PCBs, and TPH (LANL 2005, 100704, p. 5). Manganese was detected above the soil BV in one sample. Acenaphthene, Aroclor-1254, Aroclor-1260, and TPH-GRO were each detected at trace concentrations in two samples.

The piles of cured asphalt were removed from the SWMU 60-002 eastern storage area to accommodate a new asphalt batch plant (structures 60-234, 60-235, 60-236, 60-237, and 60-280) (LANL 2003, 080912, p. 4). Before the construction and start-up of the new asphalt batch plant, 10 soil and tuff samples were collected from five boreholes at two depth intervals ranging from 3.0–6.0 ft and 13.5 to 17.0 ft bgs. Three tuff samples were collected from the sixth borehole at depths of 4.0–4.5 ft, 8.5–9.0 ft, and 14.5–15.0 ft bgs. All samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, and TPH DRO. Barium, cobalt, and zinc were each detected above soil BVs in one sample; calcium and nickel were detected above soil BVs in two samples. Beryllium, cobalt, copper, manganese, and selenium were each detected above tuff BVs in one sample; iron and lead were detected above tuff BVs in two samples; arsenic, barium, calcium, chromium, magnesium, nickel, and vanadium were detected above tuff BVs in three samples; aluminum was detected above the tuff BV in four samples. Fluoranthene, fluorene, and pyrene were each detected in one soil sample; 2-hexanone was detected in one tuff sample; acetone was detected in five tuff samples; and TPH-DRO was detected in all samples. The DLs for cadmium and selenium in numerous soil and tuff samples were higher than BVs.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.2.4. Tables 7.2-1 and 7.2-2 present the samples collected and analyses requested for each sample associated with SWMU 60-002.

### 7.2.4 Site Contamination

#### 7.2.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 60-002 (west). As a result, the following activities were completed as part of the 2009 investigation.

- Twelve samples were collected from six locations at SWMU 60-002 (west) to define nature and extent of contamination. At each location, samples were collected from 1.0–2.0 ft and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, TPH-GRO, PCBs, and cyanide.
- No sampling was conducted at SWMU 60-002 (central) and SWMU 60-002 (east) because the nature and extent of contamination have been defined (NMED 2006, 094614).
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 60-002 (west) are shown in Figure 7.2-1. Table 7.2-1 presents the samples collected and analyses requested at SWMU 60-002 (west), and Table 7.2-2 presents samples collected and analyses requested at SWMU 60-002 (central and east). 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 60-002 (west), a maximum concentration of greater than 1500 ppm was detected at a depth of 1.0–2.0 ft bgs. This sample (RE03-09-14102) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 60-002 (west) consist of 12 samples (7 soil and 5 tuff) collected from six locations.

**Inorganic Chemicals**

Twelve samples (seven soil and five tuff) were analyzed for TAL metals and cyanide. Table 7.2-3 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs for SWMU 60-002 (west). Table 7.2-4 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs for SWMU 60-002 (central and east). Plate 21 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-002 (west); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twelve samples (seven soil and five tuff) were analyzed for SVOCs, VOCs, PCBs, TPH-DRO, and TPH-GRO. Table 7.2-5 summarizes the analytical results for detected organic chemicals for SWMU 60-002 (west). Table 7.2-6 summarizes the analytical results for detected organic chemicals for SWMU 60-002 (central and east). Plate 22 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-002 (west); therefore, organic COPCs are not identified for the site.

#### 7.2.4.4 Nature and Extent of Contamination

SWMU 60-002 is made up of three former storage areas designated as east, central, and west. No sampling was proposed for the central and eastern areas because the nature and extent of contamination have been defined previously (LANL 2008, 103404; NMED 2008, 102721). TPH was detected at SWMU 60-002 (east and central) during previous investigations. TPH results were compared with, and were found to be below, NMED's TPH screening guidelines for industrial and residential land uses (NMED 2006, 094614).

This section presents a nature and extent discussion for the western area only. The nature and extent of inorganic chemicals at SWMU 60-002 (west) are not defined. The nature and extent of organic chemicals at SWMU 60-002 (west) are defined.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff samples at SWMU 60-002 (west) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in all five tuff samples at SWMU 60-002 (west). The maximum concentration of 16,000 mg/kg was detected at location 03-608394 at a depth of 4.0–5.0 ft bgs. Aluminum concentrations decreased laterally and downgradient of location 03-608394 and were not detected at downgradient locations 03-608395 and 03-608396. Aluminum was detected at higher concentrations in soil at a depth of 1.0–2.0 ft bgs but not at concentrations above the soil BV.

Concentrations increased with depth at locations 03-608394 and 03-608398.The lateral extent of aluminum is defined, and the vertical extent is not defined.

Antimony was not detected in soil or tuff at SWMU 60-002 (west) but had DLs (1.03 to 1.09 mg/kg) above BV (0.83 mg/kg) in seven soil samples and DLs (1.05 to 1.16 mg/kg) above BV (0.5 mg/kg) in all five tuff samples. Because it was not detected, the lateral and vertical extent of antimony are defined.

Barium was detected above BV (295 mg/kg) in one soil sample, and detected above BV (46 mg/kg) in five tuff samples at SWMU 60-002 (west). The maximum concentration of 331 mg/kg was detected at location 03-608398 at a depth of 1.0–2.0 ft bgs. The maximum concentration in tuff of 160 mg/kg was detected at location 03-608394 at a depth of 1.0–2.0 ft bgs. Barium was not detected above BV in the farthest downgradient (northeast) sampling location (03-608396). The lateral extent of barium is defined, but vertical extent is not defined.

Beryllium was detected above BV (1.21 mg/kg) in one tuff sample at SWMU 60-002 (west). The maximum concentration of 1.37 mg/kg was detected at location 03-608394 at a depth of 4.0–5.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed; however, none of the sampling results exceeded the maximum background concentration of beryllium in tuff (1.8 mg/kg) (Figure H-88). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 60-002 (west) but had DLs (0.514 to 0.544 mg/kg) above BV in five soil samples. Because there were less than 10 samples, statistical tests could not be performed; however, none of the sampling results exceeded the maximum background concentration of cadmium in soil (2.6 mg/kg) (Figure H-88). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in one soil sample, and detected above BV (2200 mg/kg) in four tuff samples at SWMU 60-002 (west). The maximum concentration of 11,200 mg/kg was detected at location 03-608398 at a depth of 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed; however, none of the soil sampling results exceeded the maximum background concentration of calcium in soil (14,000 mg/kg) (Figure H-89). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (7.14 mg/kg) in five tuff samples at SWMU 60-002 (west). The maximum concentration of 14.6 mg/kg was detected at location 03-608394 at a depth of 1.0–2.0 ft bgs. Chromium concentrations decreased laterally downgradient of location 03-608394, but increased with depth at locations 03-608393, 03-608397 and 03-608398. Concentrations are below the maximum background concentration of 13.0 mg/kg. Chromium was detected at higher concentrations in soil at depths of 1.0–2.0 ft, but below the soil BV. The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV (3.14 mg/kg) in three tuff samples at SWMU 60-002 (west). The maximum concentration of 7.24 mg/kg was detected at location 03-608394 at a depth of 1.0–2.0 ft bgs and decreased with depth at this location. Cobalt decreased from the maximum concentration at all lateral locations and to below BV at locations 03-608395, 03-608396, and 03-608397. However, cobalt increased with depth at the northwest and southwest locations (03-608393 and 03-608398). The lateral extent of cobalt is defined, but vertical extent is not defined.

Copper was detected above BV (4.66 mg/kg) in four tuff samples at SWMU 60-002 (west). The maximum concentration of 8.74 mg/kg was detected at location 03-608393 at a depth of 4.0–5.0 ft bgs. Concentrations also exceeded the maximum background concentration of copper in tuff (6.2 mg/kg) (Figure H-89). Copper concentrations increased with depth at two locations (03-608393 and 03-608398)

and was not detected above BV at locations 03-608395 and 03-608396. The lateral and vertical extent of copper are not defined.

Iron was detected above BV (14,500 mg/kg) in one tuff sample at SWMU 60-002 (west). The maximum concentration of 14,900 mg/kg was detected at location 03-608393 at a depth of 4.0–5.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed; however, none of the sampling results exceeded the maximum background concentration of iron in tuff (19500 mg/kg) (Figure H-90). The lateral and vertical extent of iron are defined.

Lead was detected above BV (11.2 mg/kg) in five tuff samples at SWMU 60-002 (west). The maximum concentration of 69.3 mg/kg was detected at location 03-608397 at a depth of 4.0–5.0 ft bgs. Lead concentrations increased with depth at four locations but decreased to below BV at the downgradient location 03-608396. The lateral extent of lead is defined, but vertical extent is not defined.

Magnesium was detected above BV (1690 mg/kg) in five tuff samples at SWMU 60-002 (west). The maximum concentration of 2820 mg/kg was detected at location 03-608394 at a depth of 4.0–5.0 ft bgs. All concentrations were equal to or less than the maximum background concentration of 2820 mg/kg. Magnesium concentrations decreased downgradient to the northeast and increased with depth at four locations (03-608393, 03-608394, 03-608397, and 03-608398). The lateral extent of magnesium is defined, and the vertical extent is not defined.

Manganese was detected above BV (482 mg/kg) in one tuff sample at SWMU 60-002 (west). The maximum concentration of 502 mg/kg was detected at location 03-608394 at a depth of 1.0–2.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed; however, none of the sampling results exceeded the maximum background concentration of manganese in tuff (752 mg/kg) (Figure H-90). The lateral and vertical extent of manganese are defined.

Nickel was detected above BV (6.58 mg/kg) in five tuff samples at SWMU 60-002 (west). The maximum concentration of 10.3 mg/kg was detected at location 03-608394 at a depth of 4.0–5.0 ft bgs. Nickel concentrations increased with depth at four locations but were below the maximum background concentration at location 03-608397. Nickel decreased laterally and downgradient to below BV (locations 03-608395 and 03-608396). The lateral extent of nickel is defined, but vertical extent is not defined.

Selenium was not detected in tuff at SWMU 60-002 (west) but had DLs (1.05 to 1.13 mg/kg) above BV (0.3 mg/kg) in five tuff samples. Because it was not detected, the lateral and vertical extent of selenium are defined.

Vanadium was detected above BV (17 mg/kg) in three tuff samples at SWMU 60-002 (west). The maximum concentration of 31.2 mg/kg was detected at location 03-608394 at a depth of 1.0–2.0 ft bgs. Vanadium increased with depth at locations 03-608393 and 03-608398, and decreased laterally at all downgradient locations to the north and east of location 03-608394. The lateral extent of vanadium is defined, and the vertical extent is not defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 60-002 (west) are acetone, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, pyrene, TPH-DRO, and TPH-GRO.

Acetone was detected in one sample at SWMU 60-002 (west). The maximum concentration of 0.0189 mg/kg was detected at location 03-608394 in a tuff sample from 1.0–2.0 ft bgs. Acetone was not detected at the deepest sampling interval at this location or at the downgradient locations 03-608393 and 03-608396. The lateral and vertical extent of acetone are defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, and indeno(1,2,3-cd)pyrene were detected in one sample at SWMU 60-002 (west) at location 03-608395 from a depth of 1.0–2.0 ft bgs. These organic chemicals were not detected in the deepest sampling interval at this location or at downgradient locations 03-608393 and 03-608396. The lateral and vertical extent of anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, and indeno(1,2,3-cd)pyrene are defined.

Fluoranthene, phenanthrene, and pyrene were detected in two samples at SWMU 60-002 (west). The maximum concentrations were detected at location 03-608395 at a depth of 1.0–2.0 ft bgs. These organic chemicals were also detected at location 03-608397 at a depth of 1.0–2.0 ft bgs. Concentrations decreased with depth at both locations and decreased at the downgradient locations 03-608393 and 03-608396. The lateral and vertical extent of fluoranthene, phenanthrene, and pyrene are defined.

TPH-DRO was detected in five samples at SWMU 60-002 (west). The maximum concentration of 90.5 mg/kg was detected at location 03-608397 in a tuff sample at a depth of 1.0–2.0 ft bgs. All other detections were at trace concentrations below EQLs. TPH-DRO was not detected in the deepest sampling interval at this location or at downgradient locations 03-608393 and 03-608396. The lateral and vertical extent of TPH-DRO are defined.

TPH-GRO was detected in 11 samples at SWMU 60-002 (west). The maximum concentration of 3.15 mg/kg was detected at location 03-608397 in a soil sample at a depth of 1.0–2.0 ft bgs. All other detections were at trace concentrations below, or slightly above, EQLs. TPH-GRO was not detected at downgradient location 03-608396. The lateral and vertical extent of TPH-GRO are defined.

#### 7.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 60-002 (west) because extent is not defined for the site.

#### 7.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 60-002 (west) because extent is not defined for the site.

### 7.3 AOC 60-004(b), Storage Area

#### 7.3.1 Site Description and Operational History

AOC 60-004(b) is a former storage area at TA-60 for 12 containers of diesel sludge removed from underground storage tanks at the TA-03 power plant. The containers were staged at this storage area in 1988. The storage area was located northeast of the geothermal well mud pit at the east end of Sigma Mesa and was contained within the boundary of AOC 60-004(d) (Figure 7.2-4).

### 7.3.2 Relationship to Other SWMUs and AOCs

This former storage area was located within the boundary of storage area AOC 60-004(d) and approximately 40 ft northwest of SWMU 60-007(a) and 200 ft east of the former SWMU 60-002 (east) storage area.

### 7.3.3 Summary of Previous Investigations

During the 1994 RFI conducted at AOC 60-004(b), two surface samples (0 to 1 ft bgs) were collected from two locations and submitted for laboratory analysis of TAL metals, SVOCs, PCBs, and pesticides (LANL1996, 052930, pp. 149–150). A third surface sample was collected south of and next to AOC 60-004(b) within the boundary of AOC 60-004(d) and submitted for analysis of VOCs and gross-alpha, -beta, and -gamma radiation. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.2 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Mercury was detected above the soil BV in one sample. Bis(2-ethylhexyl)phthalate, phenol, and Aroclor-1254 were detected in one sample. VOCs and radionuclides were not detected.

### 7.3.4 Site Contamination

#### 7.3.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 60-004(b). As a result, the following activities were completed as part of the 2009 investigation.

- Twenty-five samples were collected from five boreholes around AOCs 60-004(b) and 60-004(d). Samples were collected from 0.0–1.0 ft, 2.0–3.0 ft, 4.0–5.0 ft, 9.0–10.0 ft, and 14.0–15.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, VOCs, SVOCs, TPH-DRO, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 60-004(b) are shown in Figure 7.2-4. Table 7.3-1 presents the samples collected and analyses requested at AOC 60-004(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 AOC 60-004(b), a maximum concentration of 8.0 ppm was detected at a depth of 9.0–10.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.3.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 60-004(b) consist of 25 samples (7 soil and 18 tuff) collected from five locations.

**Inorganic Chemicals**

Twenty-five samples (7 soil and 18 tuff) were analyzed for TAL metals and cyanide. Table 7.3-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.3-1 shows the spatial distribution of inorganic chemicals detected or detected above BV. The nature and extent of contamination are defined at AOC 60-004(b); inorganic COPCs are identified below.

The inorganic chemicals identified as COPCs in soil at AOC 60-004(b) are antimony and barium. The inorganic chemicals identified as COPCs in tuff at AOC 60-004(b) are aluminum, antimony, barium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 23,700 mg/kg. The maximum concentration was above BV. Aluminum is identified as a COPC in tuff.

Antimony was detected above BV (0.83 mg/kg) in four soil samples at AOC 60-004(b), with a maximum concentration of 1.45 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. Antimony exceeded the maximum background concentration in soil (1 mg/kg). The box plot for antimony in soil is presented in Figure H-91. Antimony is identified as a COPC in soil.

Antimony was detected above BV (0.5 mg/kg) in ten tuff samples at AOC 60-004(b), with a maximum concentration of 2.73 mg/kg. Additionally, six DLs were above BV, with a maximum DL of 1.04 mg/kg. The maximum concentration was above BV (Figure H-91). Antimony is identified as a COPC in tuff.

Barium was detected above BV (295 mg/kg) in one soil sample at AOC 60-004(b), with a maximum concentration of 431 mg/kg. Because there were less than 10 samples, statistical tests could not be performed. This concentration exceeded the maximum background concentration of barium in soil (410 mg/kg). The box plot for barium in soil is presented in Figure H-92. Barium is identified as a COPC in soil.

Barium was detected above BV (46 mg/kg) in 10 tuff samples at AOC 60-004(b), with a maximum concentration of 265 mg/kg. The maximum concentration was above BV (Figure H-92). Barium is identified as a COPC in tuff.

Beryllium was detected above BV (1.21 mg/kg) in one tuff sample at AOC 60-004(b), with a maximum concentration of 1.44 mg/kg. Statistical tests were performed to determine if the site sampling results for beryllium in tuff are different than background. The statistical test results are presented in Table H-15. The results of both the Gehan test and the quantile test indicate site sampling results are not different than background. The box plot for beryllium in tuff is presented in Figure H-93. Beryllium is not identified as a COPC in tuff.

Cadmium was not detected above BV (0.4 mg/kg) in soil at AOC 60-004(b) but had DLs (0.51 to 0.567 mg/kg) above BV in six soil samples. No sampling results exceeded the maximum background concentration of cadmium in soil (2.6 mg/kg) (Figure H-93). Cadmium is not identified as a COPC in soil.

Calcium was detected above BV (2200 mg/kg) in six tuff samples at AOC 60-004(b), with a maximum concentration of 17,700 mg/kg. The maximum concentration was above BV. Calcium is identified as a COPC in tuff.

Chromium was detected above BV (7.14 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 13 mg/kg. Statistical tests were performed to determine if the site sampling results for chromium in tuff are different than background. The statistical test results are presented in Table H-15.

The results of the Gehan test indicate site sampling results may be different than background. The box plot for chromium in tuff is presented in Figure H-94. Chromium is identified as a COPC in tuff.

Cobalt was detected above BV (3.14 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 7.83 mg/kg. The maximum concentration was above BV, cobalt is identified as a COPC in tuff.

Copper was detected above BV (4.66 mg/kg) in five tuff samples at AOC 60-004(b), with a maximum concentration of 8.94 mg/kg. Statistical tests were performed to determine if the site sampling results for copper in tuff are different than background. The statistical test results are presented in Table H-15. The results of the Gehan test indicate site sampling results may be different than background. The box plot for copper in tuff is presented in Figure H-94. Copper is identified as a COPC in tuff.

Iron was detected above BV (14500 mg/kg) in two tuff samples at AOC 60-004(b), with a maximum concentration of 17,000 mg/kg. Statistical tests were performed to determine if the site sampling results for iron in tuff are different than background. The statistical test results are presented in Table H-15. The results of the Gehan test indicate site sampling results may be different than background. The box plot for iron in tuff is presented in Figure H-95. Iron is identified as a COPC in tuff.

Lead was detected above BV (11.2 mg/kg) in six tuff samples at AOC 60-004(b), with a maximum concentration of 23.9 mg/kg. The maximum concentration was above BV. Lead is identified as a COPC in tuff.

Magnesium was detected above BV (1690 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 2400 mg/kg. Statistical tests were performed to determine if the site sampling results for magnesium in tuff are different than background. The statistical test results are presented in Table H-15. The results of the Gehan test indicate site sampling results may be different than background. The box plot for magnesium in tuff is presented in Figure H-95. Magnesium is identified as a COPC in tuff.

Manganese was detected above BV (482 mg/kg) in three tuff samples at AOC 60-004(b), with a maximum concentration of 499 mg/kg. Statistical tests were performed to determine if the site sampling results for manganese in tuff are different than background. The statistical test results are presented in Table H-15. The results of the Gehan test indicate site sampling results are not different than background and the results of the quantile test indicated that the site sampling results may be different than background. The box plot for manganese in tuff is presented in Figure H-96. Manganese is identified as a COPC in tuff.

Nickel was detected above BV (6.58 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 10.5 mg/kg. Statistical tests were performed to determine if the site sampling results for nickel in tuff are different than background. The statistical test results are presented in Table H-15. Because the site or background dataset had more than 50% nondetections, the Gehan test could not be performed. The results of the quantile test indicate site sampling results may be different than background. The box plot for nickel in tuff is presented in Figure H-96. Nickel is identified as a COPC in tuff.

Selenium was detected above BV (0.3 mg/kg) in three tuff samples at AOC 60-004(b), with a maximum concentration of 0.613 mg/kg. Additionally, 15 DLs were above BV, with a maximum DL of 1.1 mg/kg. Selenium is identified as a COPC in tuff.

Vanadium was detected above BV (17 mg/kg) in four tuff samples at AOC 60-004(b), with a maximum concentration of 29.5 mg/kg. Statistical tests were performed to determine if the site sampling results for

vanadium in tuff are different than background. The statistical test results are presented in Table H-15. The results of the Gehan test indicate site sampling results may be different than background. The box plot for vanadium in tuff is presented in Figure H-97. Vanadium is identified as a COPC in tuff.

**Organic Chemicals**

Twenty-five samples (7 soil and 18 tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 7.3-3 summarizes the analytical results for detected organic chemicals. Figure 7.3-2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at AOC 60-004(b); organic COPCs are identified below.

The following organic chemicals were detected in tuff at AOC 60-004(b) and are identified as COPCs in tuff: acetone, 2-butanone, 2-hexanone, and TPH-DRO.

The following organic chemicals were detected in soil at AOC 60-004(b) and are identified as COPCs in soil: benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, naphthalene, phenanthrene, pyrene, and TPH-DRO.

#### 7.3.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals at AOC 60-004(b) are defined, as discussed below.

**Inorganic Chemicals**

The inorganic chemicals detected above BVs or having DLs above BVs at AOC 60-004(b) are aluminum, antimony, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, nickel, selenium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in tuff at locations 03-608400 and 03-608401. The maximum concentration of 23,700 mg/kg, was detected at location 03-608400 at a depth of 2.0–3.0 ft bgs. Aluminum was not detected above BV at the two deepest depths at either location. Aluminum concentrations decreased downgradient to the north. The lateral and vertical extent of aluminum are defined.

Antimony was detected above BV in soil (0.83 mg/kg) and in tuff (0.5 mg/kg) at five locations. The maximum concentration of 2.73 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs. No sampling results exceeded the maximum background concentration of antimony in soil (1.0 mg/kg). Antimony concentrations decreased with depth at all locations and decreased laterally downgradient to the north from location 03-608401. The lateral and vertical extent of antimony are defined.

Barium was detected above BV in soil (295 mg/kg) and in tuff (46 mg/kg) at four locations. The maximum concentration of 431 mg/kg was detected at location 04-608401 at a depth of 0.0–1.0 ft bgs. Barium concentrations decreased downgradient and with depth at all four locations. The lateral and vertical extent of barium are defined.

Beryllium concentrations are not different than background at AOC 60-004(b). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected in soils but had DLs above BV. Because cadmium was not detected, the lateral and vertical extent of cadmium are defined.

Calcium was detected above BV in tuff (2200 mg/kg) at three locations. The maximum concentration of 17,700 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs. Calcium concentrations decreased at downgradient locations to the east (03-608403) and south (03-608400) of location 03-608401. Calcium was not detected above BV in any samples to the north (03-608399). Calcium concentrations decreased with depth at all locations. The lateral and vertical extent of calcium are defined.

Chromium was detected above BV in tuff (7.14 mg/kg) at three locations. The maximum concentration of 13.0 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs. The concentrations of chromium in tuff are less than the maximum background concentration (13.0 mg/kg). Chromium concentrations decreased laterally of location 03-608401 and decreased with depth at all locations. The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV in tuff (3.14 mg/kg) at three locations. The maximum concentration of 7.83 mg/kg was detected at location 03-608403 at a depth of 4.0–5.0 ft bgs. Cobalt concentrations decreased laterally and with depth at all locations. The lateral and vertical extent of cobalt are defined.

Copper was detected above BV in tuff (4.66 mg/kg) at three locations. The maximum concentration of 8.94 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs. Copper concentrations decreased laterally from location 03-608401 and decreased with depth at all locations. The lateral and vertical extent of copper are defined.

Iron was detected above BV in tuff (14500 mg/kg) at two locations. The maximum concentration of 17,000 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs and was less than the maximum background concentration (19,500 mg/kg). Iron concentrations decreased laterally from location 03-608401 and decreased with depth to below BV at both locations. The lateral and vertical extent of iron are defined.

Lead was detected above BV in tuff (11.2 mg/kg) at three locations. The maximum concentration of 23.9 mg/kg was detected at location 03-608402 at a depth of 2.0–3.0 ft bgs. Lead concentrations decreased laterally at the other locations and decreased with depth to below BV. The lateral and vertical of lead are defined.

Magnesium was detected above BV in tuff (1690 mg/kg) at two locations. The maximum concentration of 2400 mg/kg was detected at location 03-608400 at a depth of 2.0–3.0 ft bgs and was less than the maximum background concentration (2820 mg/kg). Magnesium concentrations decreased laterally to below BV and with depth at both locations. The lateral and vertical extent of magnesium are defined.

Manganese was detected above BV in tuff (482 mg/kg) at three locations. The maximum concentration of 499 mg/kg was detected at location 03-608403 at a depth of 4.0–5.0 ft bgs and is lower than the maximum background (752 mg/kg) concentration. Manganese concentrations decreased laterally from location 03-608403 and decreased with depth at all locations. The lateral and vertical extent of manganese are defined.

Nickel was detected above BV in tuff (6.58 mg/kg) at two locations. The maximum concentration of 10.5 mg/kg was detected at location 03-608400 at a depth of 2.0–3.0 ft bgs. Nickel concentration decreased laterally and with depth to below BV at both locations. The lateral and vertical extent of nickel are defined.

Selenium was detected above BV in tuff (0.3 mg/kg) at three locations. The maximum concentration of 0.613 mg/kg was detected at location 03-608401 at a depth of 9.0–10.0 ft bgs. Selenium concentrations

decreased with depth, and was detected slightly above BV at the TD at location 03-608400. Selenium decreased laterally and was not detected in shallower samples. The lateral and vertical extent of selenium are defined.

Vanadium was detected above BV in tuff (17 mg/kg) at three locations. The maximum concentration of 29.5 mg/kg was detected at location 03-608401 at a depth of 4.0–5.0 ft bgs. Vanadium concentrations decreased laterally to the north, east, and south downgradient locations and decreased with depth to below BV at all locations. The lateral and vertical extent of vanadium are defined.

**Organic Chemicals**

The following organic chemicals were detected in soil and tuff at AOC 60-004(b): acetone, benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, 2-hexanone, naphthalene, phenanthrene, pyrene, and TPH-DRO.

Acetone was detected in tuff at three locations. The maximum concentration of 0.0147 mg/kg was detected in a sample collected from 2.0–3.0 ft bgs at location 03-608403. Acetone concentrations decreased laterally decreased with depth at all locations. The lateral and vertical extent of acetone are defined.

Benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, naphthalene, phenanthrene, and pyrene were detected in one sample at location 03-608399 at only one depth (0.0–1.0 ft bgs). All concentrations decreased with depth and are not detected at any other location. The lateral and vertical extent of benzo(a)anthracene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, naphthalene, phenanthrene, and pyrene are defined.

Butanone(2-) was detected in soil at three locations. The maximum concentration of 0.00792 mg/kg was detected in a sample collected from 2.0–3.0 ft bgs at location 03-608403 and is slightly above the EQL. Butanone(2-) concentrations decreased laterally and with depth at all locations. The lateral and vertical extent of 2-butanone are defined.

Hexanone(2-) was detected in one tuff sample at AOC 60-004(b) at location 03-608401, and at only one depth (9.0–10.0 ft bgs) at a concentration of 0.00202 mg/kg. Concentration decreased laterally and with depth. The lateral and vertical extent of 2-hexanone are defined.

TPH-DRO was detected at four locations at AOC 60-004(b). The maximum concentration of 24.8 mg/kg was in a soil sample from 0.0–1.0 ft bgs at location 03-608403. TPH-DRO concentrations decreased laterally to below the EQL and decreased with depth at all locations. The lateral and vertical extent of TPH-DRO are defined.

### 7.3.5 Summary of Human Health Risk Screening

AOCs 60-004(b) and 60-004(d) are combined for risk-screening purposes because the former is contained within the latter and the two sites are treated as one site. The human health risk-screening assessment for AOCs 60-004(b) and 60-004(d) are discussed in Appendix I, sections I-4.2 and I-4.4.

The total excess cancer risks for the industrial, construction worker and residential scenarios are $6 \times 10^{-8}$, $7 \times 10^{-9}$ and $2 \times 10^{-7}$, respectively, which are all less than the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). For the industrial, construction worker and residential scenarios, the HIs are 0.004, approximately 1, and 0.7, respectively, which are less than or equivalent to the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO was also identified as a COPC. New Mexico State screening

guidelines do not provide screening levels for the construction worker scenario; therefore, the construction worker scenario was evaluated using the industrial screening guideline (NMED 2006, 094614). The industrial, construction worker, and residential scenario HQs are 0.02, 0.007, and 0.02, respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

Based on the risk-screening assessment results, no potential unacceptable risks from COPCs exist for the industrial, construction worker ,and residential scenarios.

### 7.3.6 Summary of Ecological Risk Screening

The ecological risk-screening assessment is presented in Appendix I, section I-5.4. No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, and previous canyon studies.

## 7.4 AOC 60-004(d), Storage Area

### 7.4.1 Site Description and Operational History

AOC 60-004(d) is the former location of a storage area at TA-60 northeast of the geothermal well mud pit at the east end of Sigma Mesa (Figure 7.2-4). The storage area was formerly used to temporarily stage drums containing fluids removed from underground storage tanks. Decommissioned underground storage tanks were also dismantled at this location. The storage area was first used in 1979 during a drilling project for a geothermal well. The northern edge of the area was used to stage building rubble, concrete, and rebar fort reuse (LANL 1993, 020947, pp. 5-69, 5-70).

### 7.4.2 Relationship to Other SWMUs and AOCs

This former storage area was located about 40 ft northwest of, SWMU 60-007(a), the hydraulic fluid release site, and roughly 200 ft east of SWMU 60-002 (east) storage area. AOC 60-004(b), another storage area, is completely contained within the boundaries of AOC 60-004(d).

### 7.4.3 Summary of Previous Investigations

RFI activities conducted at AOC 60-004(d) in 1994 were the same as those at AOC 60-004(b), discussed in section 7.3.3.

Section 3.3 of the HIR provides the details of previous investigations at AOC 60-004(d) (LANL 2008, 100693).

### 7.4.4 Site Contamination

#### 7.4.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 60-004(d). As a result, the following activities were completed as part of the 2009 investigation.

- Sampling was conducted from around AOCs 60-004(b) and 60-004(d). Sampling activities are described in section 7.3.4 as part of AOC 60-004(b).
- All soil samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 60-004(d) are shown in Figure 7.2-4. Table 7.3-1 presents the samples collected and analyses requested at AOC 60-004(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 7.4.4.2 Soil, Rock, and Sediment Field-Screening Results

Sampling activities are described in section 7.3.4 as part of AOC 60-004(b).

#### 7.4.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 60-004(d) consist of 25 samples (7 soil and 18 tuff) collected from five locations. Sampling results are described in section 7.3.4 as part of AOC 60-004(b).

#### 7.4.4.4 Nature and Extent of Contamination

Nature and extent of contamination are evaluated in section 7.3.4 as part of AOC 60-004(b).

### 7.4.5 Summary of Human Health Risk Screening

Sampling at AOC 60-004(d) was conducted in conjunction with AOC 60-004(b) in 2009. A summary of the human health risk-screening assessment for AOC 60-004(b) is presented in section 7.3.5.

### 7.4.6 Summary of Ecological Risk Screening

Sampling at AOC 60-004(d) was conducted in conjunction with AOC 60-004(b). No historical data are associated with this site. A summary of the ecological risk screening for AOC 60-004(b) is presented in section 7.3.6.

## 7.5 AOC 60-004(f), Storage Area

### 7.5.1 Site Description and Operational History

AOC 60-004(f) consists of two formerly used unpaved bermed pads, Pad 2 and Pad 3, located at TA-60 southeast of building 60-2 (Figure 7.2-1). Pad 2 was 12 ft × 65 ft, and Pad 3 was 12 ft × 40 ft. Both pads stored 55-gal. containers that dispensed Stoddard solvent, antifreeze, motor oil, grease, transmission fluid, and window-washing fluid. The pads were constructed in 1978 when the maintenance warehouse (building 60-2) was built. In 1985, 6-in. asphalt berms were built at the open ends of both pads to mitigate rainfall run-on and runoff. In 1990, all containers were removed from the pads. Both pads were stained and had a petroleum odor (LANL 1993, 020947, pp. 5-15–5-16).

### 7.5.2 Relationship to Other SWMUs and AOCs

AOC 60-004(f) is not related to any other SWMUs or AOCs.

### 7.5.3 Summary of Previous Investigations

During the 1994 RFI conducted at AOC 60-004(f), 13 samples were collected from five locations at Pad 2, and 11 samples were collected from five locations at Pad 3. At Pad 2, four samples (one sediment, one soil, and two tuff) were collected from one location at depths ranging from 0.0–7 ft bgs; four samples (two soil and two tuff) were collected from a second location at depths ranging from 1.0–6.0 ft bgs; three soil

samples were collected from three locations at depths ranging from 1.0–2.0 ft bgs; and two sediment samples were collected from two locations at a depth of 0.0–1.5 ft bgs. At Pad 3, four samples (two soil and two tuff) were collected from depths ranging from 1.0–6.5 ft bgs; four samples (two soil and two tuff) were collected from a second location at depths ranging from 1.0–6 ft bgs; and three samples (two soil and one tuff) were collected from a third location at depths ranging from 2.0–6.0 ft bgs. All samples were analyzed for radionuclides. Approximately half the samples were submitted for laboratory analyses of TAL metals, VOCs, SVOCs, PCBs, and pesticides (LANL 1996, 052930, pp. 167–169).

Aluminum was detected above BV in four tuff samples; arsenic was detected above BVs in one sediment and one tuff sample; barium was detected above BVs in two sediment and five tuff samples; calcium was detected above BV in two tuff samples; chromium was detected above BV in four tuff samples; copper was detected above BVs in one sediment and one soil sample; lead was detected above BV in one tuff sample; magnesium was detected above BV in four tuff samples; manganese was detected above BV in one soil sample; mercury was detected above BV in four tuff samples; nickel was detected above BV in one tuff sample; zinc was detected above BVs in one sediment and three soil samples. Aroclor-1254 and Aroclor-1260 were detected in one tuff sample. Tritium was detected in one soil, one sediment, and eight tuff samples. VOCs, SVOCs, and pesticides were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.5.4, Site Contamination. Table 7.5-1 presents the samples collected and analyses requested at AOC 60-004(f).

### 7.5.4 Site Contamination

#### 7.5.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at AOC 60-004(f). As a result, the following activities were completed as part of the 2009 investigation.

- Twenty samples were collected from five locations. At each location, samples were collected from 0.0–1.0 ft, 2.0–3.0 ft, 4.0–5.0 ft, and 9.0–10.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, PCBs, VOCs, SVOCs, TPH-DRO, cyanide, and tritium.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC 60-004(f) are shown in Figure 7.2-1. Table 7.5-1 presents the samples collected and analyses requested at AOC 60-004(f). 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 AOC 60-004(f), a maximum concentration of 76.1 ppm was detected at a depth of 9.0–10.0 ft bgs. This sample (RE03-09-14227) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.5.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC 60-004(f) consist of 20 samples (14 soil and 6 tuff) collected from five locations.

**Inorganic Chemicals**

Twenty samples (14 soil and 6 tuff) were analyzed for TAL metals and cyanide. Table 7.5-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 21 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at AOC 60-004(f); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twenty samples (14 soil and 6 tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 7.5-3 summarizes the analytical results for detected organic chemicals. Plate 22 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC 60-004(f); therefore, organic COPCs are not identified for the site.

**Radionuclides**

Twenty samples (14 soil and 6 tuff) were analyzed for tritium. Table 7.5-4 summarizes the analytical results for radionuclides. Plate 23 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at AOC 60-004(f); therefore, radionuclide COPCs are not identified for the site.

#### 7.5.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals and organic chemicals at AOC 60-004(f) are not defined. The nature and extent of radionuclides are defined at AOC 60-004(f), as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in tuff samples at AOC 60-004(f) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals include aluminum, antimony, barium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, manganese, mercury, nickel, selenium, silver, thallium, vanadium, and zinc.

Aluminum was detected above BV for tuff (7340 mg/kg) in two samples. The maximum concentration of 13500 mg/kg was detected at location 03-608404 in a sample collected from a depth of 2.0–3.0 ft bgs. Aluminum decreased with depth to below BV, and was not detected above BV downgradient or at any other location. The lateral and vertical extent of aluminum are defined.

Antimony was not detected soil or tuff samples at AOC 60-004(f), but had DLs (1.01 to 1.21 mg/kg) above BVs in 19 soil and tuff samples. Because antimony was not detected at the site, the lateral and vertical extent are defined.

Barium was detected above BV for tuff (46 mg/kg) in four samples at AOC 60-004(f). The maximum concentration of 170 mg/kg was detected at location 04-608404, at a depth of 2.0–3.0 ft bgs. Barium concentrations decreased with depth, and decreased downgradient of location 04-608404 to below BV. The lateral and vertical extent of barium are defined.

Cadmium was detected above BV for soil (0.4 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 0.693 mg/kg was detected in a sample from a depth of 1.0–2.0 ft bgs at location 03-608407. Additionally, there were 13 DLs above BV with a maximum DL of 0.606 mg/kg. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum concentration (0.693 mg/kg) is less than the maximum background concentration (2.6 mg/kg) Figure H-98. Cadmium decreased with depth at location 03-608407. The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV for tuff (2200 mg/kg) in three samples at AOC 60-004(f). The maximum concentration of 3590 mg/kg was detected at location 03-608405 at a depth of 4.0–5.0 ft bgs. Calcium concentrations decreased laterally downgradient of location 03-608405 to below BV and decreased with depth. The lateral and vertical extent of calcium are defined.

Chromium was detected above BV for soil (19.3 mg/kg) in two samples and above BV for tuff (7.14 mg/kg) in four samples at AOC 60-004(f). The maximum concentration of 38.2 mg/kg was detected at location 03-608407 at a depth of 4.0–5.0 ft bgs. The maximum concentration detected is at the farthest downgradient location, but is only slightly above the maximum background concentration (36.5 mg/kg). Chromium concentrations decreased with depth at all locations. The lateral and vertical extent of chromium are defined.

Cobalt was detected above BV for soil (8.64 mg/kg) in one sample and above BV for tuff (3.14 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 9.79 mg/kg was detected at location 03-608406 at a depth of 1.0–2.0 ft bgs. Cobalt concentrations decreased laterally downgradient of location 03-608406 and decreased with depth at both locations. The lateral and vertical extent for cobalt are defined.

Copper was detected above BV for soil (14.7 mg/kg) in two samples, and above BV for tuff (4.66 mg/kg) in three samples at AOC 60-004(f). The maximum concentration of 65.3 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. The maximum concentration is at the farthest downgradient location. Copper concentrations decreased with depth at both locations. The lateral extent of copper is not defined, and the vertical extent is defined.

Iron was detected above BV for tuff (14,500 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 15,100 mg/kg was detected at location 03-608404 at a depth of 2.0–3.0 ft bgs. Because there were less than 10 samples, statistical tests could not be performed. No sampling results exceeded the maximum background concentration of iron in tuff (19,500 mg/kg) Figure H-98. The lateral and vertical extent of iron are defined.

Lead was detected above BV for soil (22.3 mg/kg) in two samples and above BV for tuff (11.2 mg/kg) in three samples at AOC 60-004(f). The maximum concentration of 61.1 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. Lead concentrations decreased with depth; however, the maximum concentration is at the farthest downgradient location. The lateral extent of lead is not defined, and the vertical extent is defined.

Magnesium was detected above BV for tuff (1690 mg/kg) in two samples at AOC 60-004(f) at location 03-608404. The maximum concentration of 2720 mg/kg was detected at a depth of 4.0–5.0 ft bgs.

Magnesium concentrations decreased with depth and were not detected above BV in any of the downgradient locations. The lateral and vertical extent of magnesium are defined.

Manganese was detected above BV for soil (671 mg/kg) in one sample at AOC 60-004(f) at location 03-608406. The maximum concentration of 839 mg/kg was detected at a depth of 1.0–2.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate that current site data are not different than background (Table H-16 and Figure H-99). The lateral and vertical extent of manganese are defined.

Mercury was detected above BV for soil (0.1 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 0.583 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. Concentrations decreased with depth but were above BV in the farthest downgradient sample. The vertical extent of mercury is defined, and the lateral extent is not defined.

Nickel was detected above BV for tuff (6.58 mg/kg) in two samples at AOC 60-004(f) from two locations. The maximum concentration of 8.1 mg/kg was detected at location 03-608404 at a depth of 2.0–3.0 ft bgs. Nickel concentrations decreased to below BV downgradient of location 03-608404 and decreased with depth to below BV at both locations. The lateral and vertical extent of nickel are defined.

Selenium was not detected in tuff at AOC 60-004(f), but had DLs (1.09 to 1.14 mg/kg) above BV (0.3 mg/kg) in six tuff samples. Because it was not detected in either soil or tuff, the lateral and vertical extent of selenium are defined.

Silver was detected above BV for soil (1 mg/kg) in one out of fourteen samples at AOC 60-004(f). The maximum concentration of 1.21 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. Silver concentration decreased with depth at this location and was not detected above BV at any other location. The lateral and vertical extent of silver are defined.

Thallium was detected above BV for soil (0.73 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 0.937 mg/kg was detected at location 03-608408 at a depth of 2.0–3.0 ft bgs. The applicable statistical tests (Gehan and slippage) indicate current site data are not different than background (Table H-16 and Figure H-99). Thallium decreased with depth at this location and is not detected above BV at any other location. The lateral and vertical extent of thallium are defined.

Vanadium was detected above BV for tuff (17 mg/kg) in one out of six samples at AOC 60-004(f). The maximum concentration of 25.6 mg/kg was detected at location 03-608404 at a depth of 2.0–3.0 ft bgs. Vanadium decreases with depth to below BV at this location and is not detected above BV at any downgradient location. The lateral and vertical extent of vanadium are defined.

Zinc was detected above BV for soil (48.8 mg/kg) in five samples, and above BV for tuff (63.5 mg/kg) in one sample at AOC 60-004(f). The maximum concentration of 183 mg/kg was detected at location 03-608407 at a depth of1.0–2.0 ft bgs. Zinc concentrations decreased with depth to below BV, but the maximum concentration detected is at the farthest downgradient location. The lateral extent for zinc is not defined, and the vertical extent is defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at AOC 60-004(f) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzene, 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, cis-1,2-dichloroethene, di-n-butylphthalate, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene,

methylene chloride, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, toluene, TPH-DRO, TCE, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene+1,4-xylene.

Organic chemicals detected at concentrations (near or below the EQL) include benzene, bis(2-ethylhexyl)phthalate, di-n-butylphthalate, dibenzofuran, cis-1,2-dichloroethene, methylene chloride, 2-methylnaphthalene, toluene, TCE,1,2,4- trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene+1,4-xylene. Concentrations generally decreased with depth, and the lateral and vertical extent of these organic chemicals are defined.

Acetone was detected in five samples at two locations within AOC 60-004(f). The maximum concentration of 0.00703 mg/kg was detected at location 03-608406 at a depth of 1.0–2.0 ft bgs. Acetone concentrations were not detected at the farthest downgradient location 03-608407 and decreased with depth at both locations. The lateral and vertical extent of acetone are defined.

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected in only one sample at AOC 60-004(f). The sample was collected from a depth of 1.0–2.0 ft bgs at location 03-608407. Concentrations increased downgradient and decreased with depth. Samples have not been collected farther downgradient. The lateral extent of these organic chemicals is not defined, and the vertical extent is defined.

Aroclor-1254 was detected in three samples at AOC 60-004(f). The maximum concentration of 0.116 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. Samples have not been collected farther downgradient to the northeast from location 03-608407. Aroclor-1254 concentrations decreased with depth at both locations. The lateral extent of Aroclor-1254 is not defined, and the vertical extent is defined.

Aroclor-1260 was detected in four samples at three locations at AOC 60-004(f). The maximum concentration of 0.153 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all three locations, but increased downgradient. Samples have not been collected farther downgradient to the northeast from location 03-608407. The lateral extent of Aroclor-1260 is not defined, and the vertical extent is defined.

TPH-DRO was detected in 11 samples at four locations at AOC 60-004(f). The maximum concentration of 20.1 mg/kg was detected at location 03-608407 at a depth of 1.0–2.0 ft bgs. TPH-DRO concentrations decreased with depth at all locations. Concentrations increased downgradient to location 03-608407. Samples have not been collected farther downgradient of location 03-608407. The lateral extent of TPH-DRO is not defined, and the vertical extent is defined.

**Radionuclides**

Tritium was detected in eight soil samples and six tuff samples at AOC 60-004(f). The maximum activity of 0.301163 pCi/g was detected at location 03-608405 at a depth of 4.0–5.0 ft bgs. Tritium activity decreased with depth at locations 03-608405 and 03-608407 and increased slightly at location 03-508404 and 03-608406. Tritium activities decreased at all sampling locations surrounding 03-608405. The lateral and vertical extent of tritium are defined.

### 7.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 60-006(f) 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 AOC 60-006(f) because extent is not defined for the site.

## 7.6 SWMU 60-006(a), Septic System

### 7.6.1 Site Description and Operational History

SWMU 60-006(a) is the former location of a decommissioned septic system located at TA-60 on Sigma Mesa near the northeast corner of the fence surrounding buildings 60-17 and 60-19 (Figure 7.2-3). The septic system consisted of a 1000-gal. septic tank and associated 4-ft-wide × 50-ft-deep seepage pit. No outfall is associated with this system. This septic system formerly served buildings 60-17 (NTS test rack fabrication facility) and 60-19 (NTS test tower). Building 60-17 began operating in 1986 to fabricate equipment for testing activities carried out at NTS. From 1986 to 1989, wastewater generated from facility bathrooms and seven floor drains, including one in a paint booth, discharged to the septic system. In 1989, building 60-17 was connected to the sanitary sewer.

### 7.6.2 Relationship to Other SWMUs and AOCs

SWMU 60-006(a) is located approximately 50 ft north of building 60-198 and 300 ft west of the former location of the SWMU 60-002 central storage area. SWMU 60-006(a) is not associated with any other SWMUs or AOCs.

### 7.6.3 Summary of Previous Investigations

During the 1994 RFI conducted at SWMU 60-006(a), the tank was found to be full; two sludge samples were collected for waste characterization purposes (LANL 1996, 052930, pp. 181–182). The sludge samples were submitted for analysis of TAL metals, SVOCs, gross-alpha, -beta, and -gamma radiation, and tritium (LANL 1996, 052930, pp. 183, 185). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.5 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Because there are no BVs for sludge (waste characterization samples only), only inorganic chemicals and tritium were reported as detected in both samples. SVOCs were not detected.

### 7.6.4 Site Contamination

#### 7.6.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 60-006(a). As a result, the following activities were completed as part of the 2009 investigation.

- The SWMU 60-006(a) septic tank was excavated in accordance with the approved work plan (LANL 2008, 100693; NMED 2008, 102721) (see section 3.2.9). Management of waste generated

from the excavation of the septic tank, outlet drainline, and associated IDW is described in Appendix D.

- Nine confirmation samples were collected from three locations at and near the inlet and outlet areas of the tank's former location to determine if a release to the environment has occurred. Samples were collected from the following depths below the tank: 5.0–6.0 ft, 9.0 –10.0 ft, and 14.0–15.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, cyanide, nitrate, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and tritium.
- Seven samples were collected from one borehole approximately 4 ft downgradient of the seepage pit and extended to 3 ft below the bottom of the pit to determine the nature and vertical extent of potential contamination (Appendix B) . Samples were collected from 10.0 –11.0 ft, 14.0–15.0 ft, 18.0–19.0 ft, 23.0–24.0 ft, 35.0–36.0 ft, 55.0–56.0 ft, and 60.0–61.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, cyanide, nitrate, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and tritium.
- An associated seepage pit was not removed as per the approved investigation work plan because of site conditions (see deviations in Appendix B).
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 60-006(a) are shown in Figure 7.2-3. Table 7.6-1 presents the samples collected and analyses requested at SWMU 60-006(a). 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 SWMU 60-006(a), a maximum concentration of 2.5 ppm was detected at a depth of 35.0–36.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.6.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 60-006(a) consist of 16 tuff samples collected from four locations.

**Inorganic Chemicals**

Sixteen tuff samples were analyzed for TAL metals, cyanide, nitrate, and perchlorate. Table 7.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.6-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-006(a); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Sixteen tuff samples were analyzed for SVOCs, VOCs, and PCBs. Table 7.6-3 summarizes the analytical results for detected organic chemicals. Figure 7.6-3 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-006(a); therefore, organic COPCs are not identified for the site.

**Radionuclides**

Sixteen tuff samples were analyzed for americium-241, isotopic plutonium, tritium, and isotopic uranium. Table 7.6-4 summarizes the analytical results for radionuclides. Figure 7.6-4 shows the spatial distribution of detected radionuclides. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-006(a).

### 7.6.4.4 Nature and Extent of Contamination

The nature and extent of inorganic and organic chemicals and radionuclides have not been defined at SWMU 60-006(a), as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in tuff samples at SWMU 60-006(a) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are aluminum, antimony, arsenic, beryllium, calcium, chromium, copper, lead, magnesium, nickel, nitrate, perchlorate, and selenium.

Aluminum was detected above BV (7340 mg/kg) in one sample at SWMU 60-006(a).The maximum concentration of 18300 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Aluminum concentrations decreased with depth, and decreased downgradient to below BV. The lateral and vertical extent of aluminum are defined.

Antimony was not detected in tuff at SWMU 60-006(a) but had DLs (0.981 to 1.26 mg/kg) above BV (0.5 mg/kg) in 15 tuff samples. Because antimony was not detected, the lateral and vertical extent of antimony are defined.

Arsenic was detected above BV (2.79 mg/kg) in one sample at SWMU 60-006(a).The maximum concentration of 3.11 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of arsenic in tuff are not different than background (Table H-17 and Figure H-100). The lateral and vertical extent of arsenic are defined.

Beryllium was detected above BV (1.21 mg/kg) in two samples at SWMU 60-006(a).The maximum concentration of 2.09 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. All detections were at this location and decreased with depth. No concentrations were above BV at the downgradient locations. The applicable statistical tests (Gehan and quantile) indicate site concentrations of beryllium are not different than background (Table H-17 and Figure H-100). The lateral and vertical extent of beryllium are defined.

Calcium was detected above BV (2200 mg/kg) in one sample at SWMU 60-006(a). The maximum concentration of 2970 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Concentrations decreased with depth and downgradient. The applicable statistical tests (Gehan and quantile) indicate site concentrations of calcium are not different than background (Table H-17 and Figure H-101). The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (7.14 mg/kg) in two samples at SWMU 60-006(a).The maximum concentration of 12 mg/kg was detected at location 03-608412 at a depth of 35.0–36.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of chromium are not different than background (Table H-17 and Figure H-101). The lateral and vertical extent of chromium are defined.

Copper was detected above BV (4.66 mg/kg) in two samples at SWMU 60-006(a). The maximum concentration of 7.27 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Concentrations decreased with depth and downgradient. The lateral and vertical extent of copper are defined.

Lead was detected above BV (11.2 mg/kg) in one sample at SWMU 60-006(a).The maximum concentration of 11.7 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Concentrations decreased with depth and downgradient. The applicable statistical tests (Gehan and quantile) indicate site concentrations of lead are not different than background (Table H-17 and Figure H-102). The lateral and vertical extent of lead are defined.

Magnesium was detected above BV (1690 mg/kg) in one sample at SWMU 60-006(a).The maximum concentration of 1810 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Concentrations decreased with depth and downgradient. The applicable statistical tests (Gehan and quantile) indicate site concentrations of magnesium are not different than background (Table H-17 and Figure H-103). The lateral and vertical extent of magnesium are defined.

Nickel was detected above BV (6.58 mg/kg) in three samples at SWMU 60-006(a).The maximum concentration of 13.2 mg/kg was detected at location 03-608411 at a depth of 22.0–23.0 ft bgs. Nickel concentrations decreased to below BV laterally downgradient and with depth. The lateral and vertical extent of nickel are defined.

Nitrate was detected in eight samples at SWMU 60-006(a).The maximum concentration of 65 mg/kg was detected at location 03-608412 at a depth of 60.0–61.0 ft bgs. Location 03-608412 is the farthest downgradient and the maximum concentration was detected at the TD. The lateral and vertical extent of nitrate are not defined.

Perchlorate was detected in six samples at SWMU 60-006(a).The maximum concentration of 0.00294 mg/kg was detected at location 03-608412 at a depth of 23.0–24.0 ft bgs. The concentration at the farthest downgradient location 03-608412 was slightly higher than the concentration at location 03-608411. Perchlorate decreased with depth at both locations. The lateral extent of perchlorate is not defined, and the vertical extent is defined.

Selenium was not detected in tuff at SWMU 60-006(a) but had DLs (1.02 to 1.29 mg/kg) above BV (0.3 mg/kg) in 16 tuff samples. Because selenium was not detected at the site, the lateral and vertical extent are defined.

**Organic Chemicals**

The following organic chemicals were detected in soil and tuff at SWMU 60-006(a): acetone, Aroclor-1242, Aroclor-1254, Aroclor-1260, and styrene.

Acetone was only detected at concentrations below the EQL at SWMU 60-006(a). Concentrations decreased laterally downgradient and with depth. The lateral and vertical extent of acetone are defined.

Aroclor-1242 was detected in one sample at SWMU 60-006(a). The maximum concentration of 0.0356 mg/kg was detected at location 03-608411 at a depth of 27.0–28.0 ft bgs, the deepest sampling interval. Aroclor-1242 was not detected downgradient of this location. The lateral extent of Aroclor-1242 is defined, and the vertical extent is not.

Aroclor-1254 was detected in one sample at SWMU 60-006(a). The maximum concentration of 0.0176 mg/kg was detected at location 03-608410 at a depth of 27.0–28.0 ft bgs, the deepest sampling interval. Aroclor-1254 was not detected downgradient of this location. The lateral extent of Aroclor-1254 is defined, and the vertical extent is not defined.

Aroclor-1260 was detected in one sample at SWMU 60-006(a). The maximum concentration of 0.0044 mg/kg was detected at location 03-608410 at a depth of 27.0–28.0 ft bgs, the deepest sampled interval. Aroclor-1260 was not detected downgradient of location 03-608410. The lateral extent of Aroclor-1260 is defined, and the vertical extent is not defined.

Styrene was only detected at concentrations below the EQL at SWMU 60-006(a). The lateral and vertical extent of styrene are defined.

**Radionuclides**

Tritium was detected in three samples at SWMU 60-006(a). The maximum activity of 0.0682411 pCi/g was detected at location 03-608411 in the deepest sampling interval (27.0–28.0 ft bgs). Tritium was not detected downgradient of location 03-608411. The lateral extent of tritium is defined, and the vertical extent is not defined.

Uranium-235-236 was detected slightly above BV (0.09 pCi/g) in one sample at SWMU 60-006(a). The maximum activity of 0.0922 pCi/g was detected at location 03-608412 at a depth of 35.0–36.0 ft bgs. Uranium-235-236 activities decreased with depth. Although location 03-608412 is the farthest downgradient location sampled at SWMU 60-006(a), the activity is similar to background. The lateral and vertical extent of Uranium-235-236 are defined.

### 7.6.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 60-006(a) because extent is not defined for the site.

### 7.6.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 60-006(a) because extent is not defined for the site.

## 7.7 SWMU 60-007(a), Release

### 7.7.1 Site Description and Operational History

SWMU 60-007(a) is a 50-ft × 100-ft former storage area located at TA-60 near the east end of Sigma Mesa (Figure-7.2-4). This storage area was used to store equipment for the drilling of a geothermal well. Small spills of oil, hydraulic fluid, and similar materials were released. In 1992, areas of stained soil were removed, placed in containers, and disposed of by the user group. The remediated areas were covered with gravel. No sampling was conducted by the user group to confirm removal of the contamination (LANL 1996, 052930, pp. 189–190).

### 7.7.2 Relationship to Other SWMUs and AOCs

This former storage area was located about 40 ft southeast of AOCs 60-004(b) and 60-004(d), and roughly 200 ft west of SWMU 60-002 (east) storage area. SWMU 60-007(a) is not associated with any other SWMUs or AOCs.

### 7.7.3 Summary of Previous Investigations

During the 1994 RFI conducted at SWMU 60-007(a), 11 soil samples were collected from eight locations and field screened for PCBs and organic chemicals. With the exception of one sample, field test kits did not detect PCBs. Organic chemicals were detected at elevated readings, but moisture interference was suspected as the cause (LANL1996, 052930, pp. 192–194). One fill and five soil samples were collected from five locations at depths of 0 to 1 ft bgs. Two samples were analyzed for TAL metals, five were analyzed for VOCs, two were analyzed for SVOCs, and three were analyzed for PCBs. Five additional soil and fill samples were collected from four locations art depths of 0 to 1 ft bgs and analyzed for gross-alpha, -beta, and -gamma radiation.

Barium was detected above BV in one sample. Toluene was detected in one sample. SVOCs and PCBs were not detected.

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

Thallium was detected above BV in one sample. TPH-DRO and TPH-LRO were detected in two and three samples, respectively. No PCBs were detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 7.7.4. Table 7.7-1 presents the samples collected and analyses requested at SWMU 60-007(a).

### 7.7.4 Site Contamination

#### 7.7.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 60-007(a). As a result, the following activities were completed as part of the 2009 investigation.

- Twelve samples were collected from four locations to confirm the results of the previous investigation. At each location, samples were collected from 0.0–1.0 ft , 2.0–3.0 ft, and 4.0–5.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 60-007(a) are shown in Figure 7.2-4. Table 7.7-1 presents the samples collected and analyses requested at SWMU 60-007(a). 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 SWMU 60-007(a), a maximum concentration of 4.7 ppm was detected at a depth of 0.0–1.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.7.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 60-007(a) consist of 24 soil samples collected from 15 locations.

**Inorganic Chemicals**

Twenty soil samples were analyzed for TAL metals, and 12 soil samples were analyzed for cyanide. Table 7.7-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 7.3-1 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-007(a); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Fourteen soil samples were analyzed for SVOCs, 17 soil samples were analyzed for VOCs, 21 soil samples were analyzed for PCBs, and 18 samples were analyzed for TPH-DRO. Table 7.7-3 summarizes the analytical results for detected organic chemicals. Figure 7.3-2 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-007(a); therefore, organic COPCs are not identified for the site.

#### 7.7.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals have not been defined at SWMU 60-007(a). The nature and extent of organic chemicals have been defined at SWMU 60-007(a).

**Inorganic Chemicals**

Inorganic chemicals in tuff samples at SWMU 60-007(a) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are antimony, barium, cadmium, calcium, and thallium.

Antimony was detected above BV (0.83 mg/kg) in 11 soil samples at SWMU 60-007(a). The maximum concentration of 1.9 mg/kg was detected at location 03-608416 at a depth of 2.0–3.0 ft bgs. Concentrations decreased with depth at this location and at 03-608414. Antimony concentrations decreased slightly downgradient at location 03-608413 and increased with depth at locations 03-608413 and 03-608415. The lateral extent of antimony is defined, and the vertical extent is not defined.

Barium was detected above BV (295 mg/kg) in one soil sample at SWMU 60-007(a). The detection of 331 mg/kg was detected at location 60-01025 at a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of barium are not different than background (Table H-18 and Figure H-104. The lateral and vertical extent of barium are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at SWMU 60-007(a) but had DLs (0.504 to 0.555 mg/kg) above BV in nine soil samples. The applicable statistical test (slippage) indicate site sampling results are not different than background (Table H-18). Further, the maximum concentration (0.18 mg/kg) was less than the maximum background concentration (2.6 mg/kg) (Figure H-104). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in one soil sample at SWMU 60-007(a). The maximum concentration of 6900 mg/kg, was detected at location 03-608415 at a depth of 4.0–5.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate site concentrations of calcium are not different than background (Table H-18 and Figure H-105). The lateral and vertical extent of calcium are defined.

Thallium was detected above BV (0.73 mg/kg) in one soil sample at SWMU 60-007(a), with a maximum concentration of 0.75 mg/kg. The maximum concentration of 0.75 mg/kg was detected in a sample collected from 0.0–0.5 ft bgs at location 60-10001. The applicable statistical test (slippage) indicate the site sampling results are not different than background Table H-18. Further, the maximum concentration (0.75 mg/kg) was less than the maximum background concentration (1 mg/kg) (Figure H-105). The lateral and vertical extent of thallium are defined.

**Organic Chemicals**

Organic chemicals detected in soil at SWMU 60-007(a) are toluene, TPH-DRO, and TPH-LRO.

Toluene was detected in one sample. The estimated concentration of 0.001 mg/kg was in a sample collected from a depth of 0.0–1.0 ft bgs at location 60-01024. Toluene was not detected laterally in samples from equivalent depths or at the TD (4.0–5.0 ft bgs) at a downgradient location. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in 13 samples at SWMU 60-007(a). The maximum concentration of 1100 mg/kg was detected at location 60-10004 at a depth of 0.0–0.5 ft bgs within the SWMU area. TPH-DRO concentrations decreased at the same depth in all surrounding locations to the west (60-01025), north (60-10005), east (60-10006), and south (03-608416). TPH-DRO concentrations decreased with depth at all 2009 downgradient locations but not at locations 60-10004 and 60-10005 where only one depth was sampled. The lateral extent of TPH-DRO is defined, but vertical is extent is not defined.

TPH-LRO was detected in three samples at SWMU 60-007(a) and was not sampled for in 2009. The maximum concentration of 160 mg/kg was detected at location 60-10005 at a depth 0.0–0.25 ft bgs. TPH-LRO concentrations decreased laterally at the same depth but were detected only at the depths sampled in 2001: locations 60-10001, 60-10005, and 60-10006. The lateral extent of TPH-LRO is defined, but vertical extent is not defined.

### 7.7.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 60-007(a) because extent is not defined for the site.

### 7.7.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 60-007(a) because extent is not defined for the site.

## 7.8 SWMU 60-007(b), Release

### 7.8.1 Site Description and Operational History

SWMU 60-007(b) is a storm drainage ditch at TA-60 that starts approximately 600 ft from a paved area directly north of the motor pool building (building 60-1) and extends to the bottom of Sandia Canyon (Figure 7.2-2). Two parking lots located east of building 60-1 drain to a ditch that eventually joins the SWMU 60-007(b) drainage ditch. Other former sources of potential contamination to the ditch are a steam-cleaning pad, a used-oil storage tank, and an oil/water separator. In addition, equipment that used PCB-containing oil was stored on an asphalt area east of building 60-1 (LANL 1993, 020947, pp. 5-14–5-15). In 1986, the user group removed stained soil from the ditch (LANL 1996, 052930, p. 195).

### 7.8.2 Relationship to Other SWMUs and AOCs

This channel system drains stormwater from areas surrounding the motor pool building, 60-1. It is located in the drainage areas northwest of buildings 60-2 and 60-3, and northwest and west of the motor pool building.

### 7.8.3 Summary of Previous Investigations

During the 1994 RFI conducted at SWMU 60-007(b), eight samples were collected from seven locations in the east/west drainage ditch north of building 60-1 and field-tested for PCBs; PCBs were not detected. In the north-south drainage ditch east of building 60-1, seven locations were field screened for organic chemicals. No organic chemicals were detected. Six soil and sediment samples were collected from four locations at depths ranging from 0.0–1.5 ft bgs. Two sediment samples were analyzed for metals; one soil and one sediment sample were analyzed for VOCs; two sediment samples were analyzed for SVOCs; and two samples were analyzed for PCBs. All samples were analyzed for gross-alpha and -beta radiation, and tritium (LANL 1996, 052930, pp. 195–199). Data from the 1994 RFI are screening-level data and are summarized below. The HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium was detected above BV in one sample. Bis(2-ethylhexyl)phthalate was detected in one sample. Tritium was detected in three samples. VOCs and PCBs were not detected.

### 7.8.4 Site Contamination

#### 7.8.4.1 Soil, Rock, and Sediment Sampling

Based on previous investigation results, further characterization was required to assess potential contamination at SWMU 60-007(b). As a result, the following activities were completed as part of the 2009 investigation.

- Twenty samples were collected from 12 locations within the drainage. At each location, samples were collected from 0.0–1.0 ft and 1.0–2.0 ft bgs. At locations 03-608417, 03-608418, 03-608419, and 03-608420, tuff was encountered before 1 ft bgs, so sediment samples were collected from one depth only (see deviations in Appendix B). All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, TPH-DRO, PCBs, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at SWMU 60-007(b) are shown in Figure 7.2-2. Table 7.8-1 presents the samples collected and analyses requested at SWMU 60-007(b). 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 60-007(b), a maximum concentration of 930 ppm was detected at a depth of 0.0–1.0 ft bgs. This sample (RE03-09-14277) was submitted for organic chemical analysis. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 7.8.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 60-007(b) consist of 20 samples (13 soil and 7 tuff) collected from 12 locations.

**Inorganic Chemicals**

Twenty samples (13 soil and 7 tuff) were analyzed for TAL metals and cyanide. Table 7.8-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 21 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-007(b); therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Twenty samples (13 soil and 7 tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 7.8-3 summarizes the analytical results for detected organic chemicals. Plate 22 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at SWMU 60-007(b); therefore, organic COPCs are not identified for the site.

#### 7.8.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals have not been defined at SWMU 60-007(b). The nature and extent of organic chemicals have been defined at SWMU 60-007(b).

**Inorganic Chemicals**

Inorganic chemicals in tuff samples at SWMU 60-007(b) were detected at concentrations above BVs, were detected but corresponding BVs have not been established, or were not detected but have analytical DLs above BVs. These inorganic chemicals are aluminum, antimony, barium, cadmium, calcium, chromium, copper, lead, potassium, selenium, sodium, and zinc.

Aluminum was detected above BV (7340 mg/kg) in one tuff sample in SWMU 60-007(b). The maximum concentration of 8660 mg/kg was in a sample collected from 1.0–2.0 ft bgs at location 03-608424 and was only slightly above the maximum background concentration (8370 mg/kg). Aluminum was not detected above BV at any downgradient location associated with SWMU 60-007(b). The lateral and vertical extent of aluminum are defined.

Antimony was not detected at SWMU 60-007(b), but had DLs (1.03 to 1.21 mg/kg) above BVs for soil (0.83 mg/kg) and tuff (0.5 mg/kg). Because antimony was not detected at SWMU 60-007(b), the lateral and vertical extent are defined.

Barium was detected above BV (46 mg/kg) in one tuff sample within SWMU 60-007(b). The maximum concentration of 93.7 mg/kg was in a sample collected from 1.0–2.0 ft bgs at location 03-608424. This concentration was detected in the deepest depth sampled; however, barium was not detected above BV at any downgradient location associated with SWMU 60-007(b). The lateral extent of barium is defined, and the vertical extent is not defined.

Cadmium was detected above BV (0.4 mg/kg) in one soil sample within SWMU 60-007(b). The maximum concentration of 0.42 mg/kg was detected in a sample collected from 0.0–1.0 ft bgs at location 03-608423. Additionally, nine DLs above were BV, with a maximum DL of 0.572 mg/kg. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, the maximum detection (0.42 mg/kg) is less than the maximum background concentration (2.6 mg/kg) (Figure H-106). The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one soil sample and above the tuff BV (2200 mg/kg) in one tuff sample at SWMU 60-007(b). The maximum concentration of 7330 mg/kg was detected at location 03-608423 at a depth of 0.0–1.0 ft bgs and was below the maximum background concentration (14,000 mg/kg). Calcium concentrations decreased with depth to below BV at location 03-608423. The maximum concentration in tuff of 2370 mg/kg was detected at location 03-608424 in the deepest depth sampled (1.0–2.0 ft bgs) and was slightly upgradient of location 03-608423. This concentration was slightly above the maximum background concentration for tuff (2230 mg/kg). Calcium is not detected above BV downgradient of location 03-608424. The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (7.14 mg/kg) in two tuff samples at SWMU 60-007(b). The maximum concentration of 23.5 mg/kg was detected at location 03-608425 at a depth of 1.0–2.0 ft bgs. Chromium was detected in the deepest samples at locations 60-608424 and 60-508425. Chromium was not detected at any downgradient locations to the north of location 03-608425. The lateral extent of chromium is defined, and the vertical extent is not.

Copper was detected above the soil BV (14.7 mg/kg) and the tuff BV (4.66 mg/kg) within SWMU 60-007(b). The maximum concentration of 38.9 mg/kg was detected at location 03-608418 at a depth of 0.0–0.5 ft bgs (a proposed deeper sample was not collected from this location, as noted in Appendix B). The tuff concentration above BV at location 03-608424 did not exceed the maximum background concentration (6.2 mg/kg). Copper was not detected in any downgradient locations. The lateral extent of copper is defined, and the vertical extent is not defined.

Lead was detected above BVs for soil (22.3 mg/kg) in one soil sample and tuff (11.2 mg/kg) in one tuff sample at SWMU 60-007(b). The maximum concentration of 22.6 mg/kg was detected at location 03-608422 at a depth of 0.0–1.0 ft bgs. The applicable statistical tests (Gehan and quantile) indicate current site data for lead in soil are not different than background (Table H-19 and Figure H-106). The concentration in tuff (12.5 mg/kg) is less than the maximum background concentration of lead in tuff (15.5 mg/kg). The lateral and vertical extent of lead are defined.

Potassium was detected above BV (3460 mg/kg) in one soil sample at SWMU 60-007(b). The maximum concentration of 3630 mg/k was detected in a sample collected from 0.0–0.5 ft bgs at location 03-608420. The applicable statistical tests (Gehan and quantile) indicate current site data for potassium in soil are not

different than background (Table H-19 and Figure H-107). The lateral and vertical extent of potassium are defined.

Selenium was not detected in either soil or tuff at any of the 12 locations associated with SWMU 60-007(b). Because selenium was not detected at SWMU 60-007(b), the lateral and vertical extent of selenium are defined.

Sodium was detected above BV (915 mg/kg) in four soil samples at SWMU 60-007(b). The maximum concentration of 9420 mg/kg was detected at location 03-608420 at a depth of 0.0–0.5 ft bgs. The four locations (03-608417, 03-608418, 03-608419, and 03-608420) with sodium concentrations above BV are in a shallow north-trending drainage between two parking lots. The drainage receives stormwater runoff from a heavily trafficked road as well as surrounding parking areas. These locations are probably impacted by road salts and not by Laboratory processes. The lateral and vertical extent of sodium are defined.

Zinc was detected above BV (48.8 mg/kg) in six soil samples and above BV (63.5 mg/kg) in one tuff sample at SWMU 60-007(b). The maximum concentration of 130 mg/kg was detected in soil at location 03-608418 at a depth of 0.0–0.5 ft bgs. The zinc concentration in tuff did not exceed the maximum background concentration (75.5 mg/kg). Zinc concentrations decreased with depth at locations 60-608422, 60-608423, and 60-608424. Deeper samples that were proposed were not collected in the tuff from the three drainage locations (see deviations in Appendix B). Zinc decreased laterally downgradient of location 03-608418. The lateral extent of zinc is defined, and the vertical extent is not defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at SWMU 60-007(b) are acenaphthene, acetone, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chloromethane, chrysene, DDT(4,4-), fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, toluene, TPH-DRO, and 1,2,4-trimethylbenzene.

Acetone, bis(2-ethylhexyl)phthalate, 4,4-DDT, 4-isopropyltoluene, toluene, and 1,2,4-trimethylbenzene were detected in one to four samples at or below EQLs. The lateral and vertical extent of these organic chemicals are defined.

Acenaphthene was detected in two samples at SWMU 60-007(b). The maximum concentration of 0.0394 mg/kg was detected in a sample collected in soil from 1.0–2.0 ft bgs at location 03-608423 in the deepest sample. The maximum concentration was only slightly above the EQL (0.037 mg/kg). Acenaphthene was not detected at any downgradient locations at SWMU 60-007(b). The lateral and vertical extent of acenaphthene are defined.

Anthracene was detected in five samples at SWMU 60-007(b). The maximum concentration of 0.0748 mg/kg was detected at location 03-608423 at a depth of 1.0–2.0 ft bgs. Concentration increased with depth at this location. Anthracene concentrations decreased laterally at all downgradient locations. The lateral extent of anthracene is defined, and the vertical extent is not defined.

Aroclor-1254 was detected in one sample at SWMU 60-007(b). The sampling location where Aroclor-1254 was detected (03-608428) is the farthest downgradient location in the SWMU 60-007(b) drainage, approximately 100 ft from the main Sandia Canyon drainage. The maximum concentration of

0.0033 mg/kg was below the EQL and was detected at a depth interval of 0.0–1.0 ft bgs. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in two samples at SWMU 60-007(b). The maximum concentration of 0.0038 mg/kg was detected at location 03-608421 at a depth of 0.0–1.0 ft bg. Aroclor-1260 decreased with depth and decreased downgradient to estimated values below the EQL. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene and benzo(a)pyrene were detected in eight samples at SWMU 60-007(b). The maximum concentrations were detected at the same depth (0.0–1.0 ft bgs) at locations 03-608422 and 03-608423. Concentrations decreased laterally downgradient to below EQLs. and decreased with depth, except at location 60-608418 where only one sample was collected (se deviations in Appendix B). The lateral and vertical extent of benzo(a)anthracene and benzo(a)pyrene are defined.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in nine samples at SWMU 60-007(b). The maximum concentrations were detected at the same depth (0.0–1.0 ft bgs) at locations 03-608423, 03-608422 and 03-608423, respectively. Concentrations decreased laterally downgradient to below EQLs and decreased with depth, except at location 60-608418 where only one sample was collected (see deviations in Appendix B). The lateral and vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene are defined.

Benzo(g,h,i)perylene and benzo(k)fluoranthene were detected in six samples at SWMU 60-007(b). The maximum concentrations were detected at the same depth (between 0.0–1.0 ft bgs) at locations 03-608423, and 03-608422, respectively. Concentrations decreased laterally downgradient to near or below EQLs and decreased with depth, except at location 60-608418 where only one sample was collected (see deviations in Appendix B). The lateral and vertical extent of benzo(g,h,i)perylene and benzo(k)fluoranthene are defined.

Chloromethane was detected in one sample at SWMU 60-007(b). The maximum concentration of 0.0418 mg/kg (near the EQL) was detected at location 03-608421 at a depth of 0.0–1.0 ft bgs. Chloromethane was not detected in any downgradient location and decreased with depth. The lateral and vertical extent of chloromethane are defined.

Chrysene was detected in eight samples associated with SWMU 60-007(b). The maximum concentration of 0.258 mg/kg was detected at location 03-608423 at a depth of 0.0–1.0 ft bgs. Chrysene concentrations decreased laterally downgradient to near or below EQLs and decreased with depth, except at location 60-608418 where only one sample was collected (see deviations in Appendix B). The lateral and vertical extent of chrysene are defined.

Fluorene was detected in three samples associated with SWMU 60-007(b). The maximum concentration of 0.0426 mg/kg was detected at location 03-608423 at a depth of 1.0–2.0 ft bgs. The maximum concentration was only slightly above the EQL (0.037 mg/kg). Fluorene concentrations decreased to below the EQL laterally and were not detected at any location downgradient. The lateral and vertical extent of fluorene are defined.

Indeno(1,2,3-cd)pyrene was detected in 7 of 20 samples from four locations at SWMU 60-007(b). The maximum concentration of 0.254 mg/kg was detected at location 03-608422 at a depth of 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased laterally and downgradient to near or below EQLs and with depth to near EQLs. The lateral and vertical extent for indeno(1,2,3-cd)pyrene are defined.

Phenanthrene was detected in seven samples at SWMU 60-007(b). The maximum concentration of 0.393 mg/kg was detected at location 03-608422 at a depth of 0.0–1.0 ft bgs. Phenanthrene concentrations decreased laterally downgradient and decreased with depth, except at location 60-608418 where only one sample was collected (see deviations in Appendix B). The lateral and vertical extent of phenanthrene are defined.

TPH-DRO was detected in 16 samples associated with SWMU 60-007(b). The maximum concentration of 136 mg/kg was detected at location 03-608418 at a depth of 0.0–0.5 ft bgs. The four locations (03-608417, 03-608418, 03-608419, and 03-608420) with the highest TPH-DRO concentrations were in a shallow north-trending drainage between two parking lots that receive stormwater runoff from a heavily trafficked road as well as from neighboring parking areas. These locations are probably impacted by runoff from vehicle traffic and not by Laboratory processes. Concentrations decreased with depth at all other locations and decreased laterally downgradient. The lateral and vertical extent of TPH-DRO are defined.

### 7.8.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 60-007(b) because extent is not defined for the site.

### 7.8.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 60-007(b) because extent is not defined for the site.

## 8.0 TA-61 BACKGROUND AND FIELD-INVESTIGATION RESULTS

Three SWMUs and one AOC located in TA-61 are addressed in this investigation report (Table 1.1-1). Each site is described separately in sections 8.2 through 8.5, including site description and operational history; relationship to other SWMUs and AOCs; and, if applicable: historical and 2009 investigation activities conducted; site contamination results based on qualified data (decision-level data from the current and previous investigations); and summaries of human health assessment and ecological risk screening.

### 8.1 Background of TA-61

TA-61 was created from a portion of TA-03 and is bounded on the north by Los Alamos Canyon and on the south by Sandia Canyon (LANL 1999, 064617, p. 2-27). TA-61 contains physical support and infrastructure facilities, including the Los Alamos County landfill, sewer pump stations, a radio shop, general storage sheds, a blower house, a private batch concrete batch plant, a Laboratory-operated asphalt batch plant, and general warehouse storage for maintenance activities. A small parcel of private property, the Royal Crest Manufactured Home Community, is surrounded by TA-61. The Los Alamos County landfill occupies most of TA-61. The landfill was created in 1974 when large trenches and disposal areas were excavated from the north wall of Sandia Canyon.

### 8.1.1 Operational History

TA-61 was created in 1989 when the Laboratory redefined its TAs and designated a portion of TA-03 to TA-61. TA-61 contains the Los Alamos County landfill, which accepts nonhazardous waste from County

residents and the Laboratory. This landfill is currently being closed under RCRA Subtitle D, but some active cells continue to accept waste.

### 8.1.2 Summary of Releases

Potential contaminants at TA-61 may have been released into the environment through drainages, outfalls, liquid spills, leaks, or operational releases.

### 8.1.3 Current Site Usage and Status

TA-61 is located on Sigma Mesa, which is bounded by Los Alamos Canyon on the north and Sandia Canyon on the south. It includes physical support and infrastructure facilities, such as a sanitary landfill, sewer pump stations, a radio repair shop, general storage sheds, and general warehouse storage for maintenance activities performed throughout the Laboratory.

## 8.2 SWMU 61-002, Transformer Storage Area–PCB Site

As proposed in the approved investigation work plan, no sampling was conducted at SWMU 61-002 (LANL 2008, 103404; NMED 2008, 102721). The site was investigated and remediated, and the results were presented in a remedy completion report (LANL 2007, 100722).

## 8.3 SWMU 61-005, Landfill

### 8.3.1 Site Description and Operational History

SWMU 61-005 is the Los Alamos County landfill, located at TA-61 on the rim of Sandia Canyon near East Jemez Road (Figure 6.8-1). The County landfill consists of 400-$ft^2$ pits excavated into tuff. The pits were designed to ensure stormwater runoff did not enter the canyon. Waste was deposited into pits and covered with soil daily. When full, each pit was capped and a new pit put into service.

The landfill was established in 1974 and was owned by DOE and operated by Los Alamos County for use by the public, Los Alamos County, and the Laboratory. The landfill was permitted to manage nonhazardous solid waste (LANL 1993, 020947, p. 6-9). In 2009, after nearly 30 yr of operation, the Los Alamos County landfill reached its capacity and was replaced by the Los Alamos County Eco Station. Solid waste from Los Alamos County is now shipped to the landfill at Rio Rancho.

### 8.3.2 Relationship to Other SWMUs and AOCs

SWMU 61-005 is not associated with any other SWMUs or AOCs.

### 8.3.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 61-005.

### 8.3.4 Current Site Status

Based on the approved work plan, no sampling was conducted at SWMU 61-005 during the 2009 investigation (LANL 2008, 103404; NMED 2008, 102721). SWMU 61-005 is regulated under RCRA

Subtitle D and is currently being closed under RCRA Subtitle D. Since this site is being addressed under another regulatory program, no additional actions under the Consent Order are required.

## 8.4 SWMU 61-006, Used Oil Storage Tank

### 8.4.1 Site Description and Operational History

SWMU 61-006 is an active 2500-gal. used-oil storage tank located at the Los Alamos County landfill (SWMU 61-005) (Figure 6.8-1). The used oil storage tank is located within an open, lined containment pit measuring approximately 10 ft × 20 ft × 7 ft deep. Historically, used oil was collected in three underground waste oil storage tanks at different locations at the landfill. In 1989, all three underground waste oil storage tanks were removed (LANL 1990, 007514, p. 61-006), and the area where the former tanks were located was excavated for use as a disposal pit at the landfill (LANL 1993, 020947, p. 6-10). One of the storage tanks was moved to its current location in the open, lined containment pit. In 2000, the used oil storage tank was equipped with a leak detection system, and the containment pit was relined with an improved liner and covered (LANL 1993, 020947, p. 6-10).

### 8.4.2 Relationship to Other SWMUs and AOCs

The used oil storage tank is located at the western end of the Los Alamos County landfill, SWMU 61-005.

### 8.4.3 Summary of Previous Investigations

No previous investigations have been conducted at SMWU 61-006.

### 8.4.4 Current Site Status

Based on the approved investigation work plan, no sampling was conducted at SWMU 61-006 during the 2009 investigation (LANL 2008, 103404; NMED 2008, 102721). SWMU 61-006 is an active RCRA-regulated unit under 40 CFR 279 and 20.4.1.1002 New Mexico Administrative Code, Standards for the Management of Used Oil. The used oil tank is equipped with a leak-detection system. Because this site is addressed under another regulatory program, no additional actions under the Consent Order are required.

## 8.5 AOC C-61-002, Subsurface Contamination

### 8.5.1 Site Description and Operational History

AOC C-61-002 is an area of subsurface contamination located in TA-61, approximately 15 ft north of building 61-16, a former storage building (Figure 6.8-1). The subsurface contamination was found in 1995 during a drill rig test. During the drilling test, a petroleum odor was noted, and diesel contamination was detected at 7 to 8 ft bgs. A tuff sample was collected and submitted for analysis of TPH-DRO. The results showed the presence of diesel contamination. Interviews conducted with site personnel after the drilling was completed indicated that the source of the diesel may have been the previous road maintenance work performed in the area (LANL 1995, 049550, p. 2).

### 8.5.2 Relationship to Other SWMUs and AOCs

AOC C-61-002 is not related to any other SWMUs or AOCs.

### 8.5.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-61-002.

### 8.5.4 Site Contamination

#### 8.5.4.1 Soil, Rock, and Sediment Sampling

As part of the 2009 investigation, the following characterization efforts were completed at AOC C-61-002 to assess potential contamination:

- Thirty samples were collected from five boreholes to define the nature and extent of contamination. At each location, samples were collected from 3.0–4.0 ft, 5.0–6.0 ft, 7.0–8.0 ft, 9.0–10.0 ft, 11.0–12.0 ft, and 14.0–15.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, VOCs, SVOCs, PCBs, TPH-DRO, and cyanide.
- All investigation samples were field screened for VOCs and gross-alpha, -beta, and -gamma radiation. Field-screening results were recorded in the SCLs (Appendix G).

The 2009 sampling locations at AOC C-61-002 are shown in Figure 6.8-1. Table 8.5-1 presents the samples collected and analyses requested at AOC C-61-002. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

#### 8.5.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC C-61-002, a maximum concentration of 3.1 ppm was detected at a depth of 3.0–4.0 ft bgs. No radiological screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. There were no changes to sampling or other activities because of the field-screening results.

#### 8.5.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at AOC C-61-002 consist of 30 samples (19 soil and 11 tuff) collected from five locations.

**Inorganic Chemicals**

Thirty samples (19 soil and 11 tuff) were analyzed for TAL metals and cyanide. Table 8.5-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 9 shows the spatial distribution of inorganic chemicals detected or detected above BV. The existing site data are not sufficient to characterize the extent of contamination at AOC C-61-002; therefore, inorganic COPCs are not identified for the site.

**Organic Chemicals**

Thirty samples (19 soil and 11 tuff) were analyzed for SVOCs, VOCs, PCBs, and TPH-DRO. Table 8.5-3 summarizes the analytical results for detected organic chemicals. Plate 10 shows the spatial distribution of detected organic chemicals. The existing site data are not sufficient to characterize the extent of contamination at AOC C-61-002; therefore, organic COPCs are not identified for the site.

#### 8.5.4.4 Nature and Extent of Contamination

The nature and extent of inorganic chemicals and organic chemicals at AOC C-61-002 are not defined, as discussed below.

**Inorganic Chemicals**

Inorganic chemicals in soil and tuff at AOC C-61-002 were detected at concentrations above BVs or were not detected but the analytical DLs were above BVs. These inorganic chemicals are aluminum, antimony, arsenic, barium, beryllium, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, selenium, thallium, and vanadium.

Aluminum was detected above BV (7340 mg/kg) in three tuff samples at AOC C-61-002. The maximum concentration of 19,900 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth but increased laterally from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of aluminum is not defined to the east, and the vertical extent is defined.

Antimony was detected above BV (0.83 mg/kg) in three soil samples at AOC C-61-002. The maximum concentration of 1.75 mg/kg was detected at location 03-608433 from 5.0–6.0 ft bgs. Additionally, 15 DLs were above BV, with a maximum DL of 1.27 mg/kg. Antimony was detected above BV (0.5 mg/kg) in seven tuff samples at AOC C-61-002. The maximum concentration of 1.54 mg/kg was detected at location 03-608433 from 9.0–10.0 ft bgs. Additionally, four DLs were above BV, with a maximum DL of 1.17 mg/kg. Antimony was slightly above BV at the TD at location 03-608431 and decreased with depth at all other locations. Concentrations increased from inside the AOC boundary at location 03-608431 to the eastern and southern locations 03-608433 and 03-608432, respectively. The vertical extent of antimony is defined, and the lateral extent is not defined.

Arsenic was detected above BV (2.79 mg/kg) in one tuff sample at AOC C-61-002. The maximum concentration of 4.61 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. The concentration decreased with depth and was less than the maximum background concentration (5 mg/kg). The lateral and vertical extent of arsenic are defined.

Barium was detected above BV (295 mg/kg) in two soil samples at AOC C-61-002. The maximum concentration of 992 mg/kg was detected at location 03-608431 in a sample collected from 7.0–8.0 ft bgs. Barium was detected above BV (46 mg/kg) in seven tuff samples at AOC C-61-002. The maximum concentration of 288 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth at all locations. Barium concentrations also decreased from inside the AOC boundary at location 03-608431 to locations 03-608430, 03-608432, and 03-608433. The lateral and vertical extent of barium are defined.

Beryllium was detected above BV (1.83 mg/kg) in four soil samples at AOC C-61-002. The maximum concentration of 2.22 mg/kg was detected at location 03-608433 in a sample collected from 5.0–6.0 ft bgs. Beryllium was detected above BV (1.21 mg/kg) in three tuff samples at AOC C-61-002. The maximum concentration of 1.83 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth at all locations. Beryllium concentrations increased slightly from inside the AOC boundary at location 03-608431 to location 03-608433; however, the concentrations were less than or equivalent to the maximum soil and tuff background concentrations. The lateral and vertical extent of beryllium are defined.

Cadmium was not detected above BV (0.4 mg/kg) in soil at AOC C-61-002 but had DLs (0.532 to 0.659 mg/kg) above BV in 15 soil samples. Because the combined site and background dataset had more than 80% nondetections, statistical analyses could not be performed; however, maximum concentration (0.201 mg/kg) was less than the maximum background concentration for cadmium in soil (Figure H-108). The lateral and vertical extent of cadmium are defined.

Calcium was detected above BV (6120 mg/kg) in four soil samples at AOC C-61-002. The maximum concentration of 13100 mg/kg was detected at location 03-608433 in a sample collected from 5.0–6.0 ft bgs. Calcium was detected above BV (2200 mg/kg) in six tuff samples at AOC C-61-002. The maximum concentration of 10,200 mg/kg was detected at location 03-608433 in a sample collected from 9.0–1.00 ft bgs. Concentrations decreased with depth at all locations. Calcium concentrations increased from inside the AOC boundary at location 03-608431 to location 03-608433; however, the concentrations were less than the maximum soil background concentrations at 5.0–6.0 ft. The lateral and vertical extent of calcium are defined.

Chromium was detected above BV (7.14 mg/kg) in one tuff sample at AOC C-61-002. The maximum concentration of 13.5 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Chromium concentrations decreased with depth. Chromium concentrations increased from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of chromium is not defined to the east, and the vertical extent is defined.

Cobalt was detected above BV (8.64 mg/kg) in three soil samples at AOC C-61-002. The maximum concentration of 20.9 mg/kg was detected at location 03-608430 in a sample collected from 3.0–4.0 ft bgs. Cobalt was detected above BV (3.14 mg/kg) in one tuff sample at AOC C-61-002. The maximum concentration of 5.69 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth at all locations. Cobalt concentrations increased from inside the AOC boundary at location 03-608431 to the northern, western, and eastern locations 03-608429, 03-608430, and 03-608433, respectively. The lateral extent of cobalt is not defined, and the vertical extent is defined.

Copper was detected above BV (4.66 mg/kg) in four tuff samples at AOC C-61-002. The maximum concentration of 14 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth. Copper concentrations increased from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of copper is not defined to the east, and the vertical extent is defined.

Iron was detected above BV (14,500 mg/kg) in three tuff samples at AOC C-61-002. The maximum concentration of 25,600 mg/kg was detected at location 03-608432 in a sample collected from 5.0–6.0 ft bgs. Concentrations decreased with depth at all locations. Iron concentrations increased from inside the AOC boundary at location 03-608431 to the eastern and southern locations 03-608432 and 03-608433, respectively. The lateral extent of iron is not defined, and the vertical extent is defined.

Lead was detected above BVs for soil (22.3 mg/kg) in three samples and tuff (11.2 mg/kg) in one sample at AOC C-61-002. The maximum concentration of 27.6 mg/kg was detected at location 03-608432 in a sample collected from 3.0–4.0 ft bgs. Concentrations decreased with depth at all locations. Lead concentrations increased from inside the AOC boundary at location 03-608431 to the eastern and southern locations 03-608432 and 03-608433, respectively. The lateral extent of lead is not defined, and the vertical extent is defined.

Magnesium was detected above BV (1690 mg/kg) in two tuff samples at AOC C-61-002. The maximum concentration of 4430 mg/kg was detected at location 03-608433 in a sample collected from 7.0–

8.0 ft bgs. Magnesium was detected at a concentration of 1860 mg/kg inside the AOC boundary at location 03-608431 from 14.0–15.0 ft bgs which is below the maximum background concentration (2820 mg/kg). Magnesium concentrations increased from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of magnesium is not defined, and the vertical extent is defined.

Mercury was detected above BV (0.1 mg/kg) in two tuff samples at AOC C-61-002. The maximum concentration of 0.123 mg/kg was detected at location 03-608433 in a sample collected from 9.0–10.0 ft bgs. Concentrations decreased with depth at their locations. Mercury concentrations increased from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of mercury is not defined, and the vertical extent is defined.

Nickel was detected above BV (15.4 mg/kg) in two soil samples at AOC C-61-002. The maximum concentration of 19.8 mg/kg was detected at location 03-608433 in a sample collected from 5.0–6.0 ft bgs. Nickel was detected above BV (6.58 mg/kg) in three tuff samples at AOC C-61-002. The maximum concentration of 17.6 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth at both locations, and the concentrations in soil are less than the maximum soil background concentration (29.6 mg/kg). Nickel concentrations increased from inside the AOC boundary at location 03-608431 to eastern location 03-608433, respectively. The lateral extent of nickel is not defined, and the vertical extent is defined.

Selenium was not detected in soil at AOC C-61-002 but had DLs (2.32 to 2.56 mg/kg) above BV (1.52 mg/kg) in three soil samples. Selenium was not detected above BV in tuff at AOC C-61-002 but had DLs (1.07 to 1.34 mg/kg) above BV (0.3 mg/kg) in 11 tuff samples. Because selenium was not detected at AOC C-61-002, the lateral and vertical extent of selenium are defined.

Thallium was detected above BV (0.73 mg/kg) in two soil samples at AOC C-61-002. The maximum concentration of 1.27 mg/kg was detected at location 03-608432 in a sample collected from 3.0–4.0 ft bgs. Concentrations decreased with depth at location 60-608432 and 60-608433. Thallium concentrations increased from inside the AOC boundary at location 03-608431 to the western location 03-608430. The lateral extent of thallium is not defined, and the vertical extent is defined.

Vanadium was detected above BV (17 mg/kg) in one tuff sample at AOC C-61-002. The maximum concentration of 26.4 mg/kg was detected at location 03-608433 in a sample collected from 7.0–8.0 ft bgs. Concentrations decreased with depth. Vanadium concentrations increased from inside the AOC boundary at location 03-608431 to the eastern location 03-608433. The lateral extent of vanadium is not defined and the vertical extent is defined.

**Organic Chemicals**

Organic chemicals detected in soil and tuff at AOC C-61-002 are acetone, Aroclor-1254, benzoic acid, and TPH-DRO.

Acetone was detected in seven samples at AOC C-61-002. The maximum concentration of 0.006 mg/kg was detected at location 03-608433 in a tuff sample from 9.0–10.0 ft bgs. Concentrations decreased with depth at all locations. Acetone concentrations increased slightly from inside the AOC boundary at location 03-608431 to location 03-608433; however all concentrations were below the EQL. The lateral and vertical extent of acetone are defined.

Aroclor-1254 was detected in one sample at AOC C-61-002. A maximum concentration of 0.0021 mg/kg was detected at location 03-608429 in a soil sample from 14.0–15.0 ft bgs. Because the concentration was below the EQL, the lateral and vertical extent of Aroclor-1254 are defined.

Benzoic acid was detected in one sample at AOC C-61-002. The maximum concentration of 0.445 mg/kg was detected at location 03-608429 in a soil sample from 5.0–6.0 ft bgs and decreased with depth. Because the concentration was below the EQL, the lateral and vertical extent of benzoic acid are defined.

TPH-DRO was detected in 14 samples at AOC C-61-002. The maximum concentration of 1450 mg/kg was detected at location 03-608433 in a soil sample from 3.0–4.0 ft bgs. Concentrations decreased with depth at all locations. TPH-DRO concentrations increased slightly from the AOC boundary at location 03-608431 to locations 03-608429, 03-608430, and 03-608432 and increased to location 03-608433. The lateral extent of TPH-DRO is not defined, and the vertical extent of TPH-DRO is defined.

### 8.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-61-002 because extent is not defined for the site.

### 8.5.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-61-002 because extent is not defined for the site.

## 9.0 CONCLUSIONS

### 9.1 Nature and Extent of Contamination

The nature and extent of contamination have been defined for 25 sites previously investigated or investigated during the 2009 Upper Sandia Canyon Aggregate Area investigation. The nature and extent of contamination have not been defined for 40 sites. A total of 22 sites are proposed for delayed characterization and investigation pending D&D of certain buildings and structures within the aggregate area. Two additional sites are addressed under other regulatory programs and require no further action. Summaries of the nature and extent of contamination and remaining characterization requirements for the sites at TA-3, TA-60, and TA-61 are presented below.

#### 9.1.1 TA-03

The nature and extent of contamination have been defined for the following 22 sites in TA-03:

- SWMUs 03-003(c), Equipment storage area—PCB site
- AOC 03-003(n), One-time spill—PCB only site
- AOC 03-003(o), Former non-PCB capacitor bank
- SWMU 03-014(q), Holding tank
- AOC 03-014(v), Drain associated with former WWTP
- AOC 03-027, Lift wells
- SWMU 03-028, Surface impoundment

- SWMU 03-036(a), Potential soil contamination associated with aboveground tanks
- AOC 03-036(b), Former aboveground storage tanks
- SWMU 03-036(c), Potential soil contamination associated with aboveground tank
- SWMU 03-036(d), Potential soil contamination associated with aboveground tank
- AOC 03-038(c), Waste lines
- AOC 03-043(a), Aboveground storage tank [duplicate of SWMUs 03-036(c) and 03-036(d)]
- AOC 03-043(b), Aboveground storage tank
- AOC 03-043(d), Aboveground storage tank [duplicate of SWMU 03-036(a)]
- AOC 03-043(f), Aboveground storage tank [duplicate of SWMUs 03-036(c) and 03-036(d)]
- AOC 03-043(g), Aboveground storage tank [duplicate of SWMUs 03-036(c) and 03-036(d)]
- AOC 03-043(h), Aboveground storage tank [duplicate of SWMU 03-036(a)]
- AOC 03-047(d), Storage area
- SWMU 03-056(c), Transformer storage area—PCB site
- SWMU 03-056(l), Storage area
- AOC C-03-016, Oil metal bin

The nature and extent of contamination have not been defined for 34 sites in TA-03. Additional sampling is needed to define the extent of contamination for one or more inorganic chemical, organic chemical, or radionuclide at the following sites:

- SWMU 03-002(c)—lateral and vertical extent of lead and sodium
- AOC 03-003(d)—vertical extent of Aroclor-1260
- SWMU 03-009(a)—lateral and vertical extent of chromium, lead, selenium, SVOCs, and TPH-DRO; lateral extent of PCBs
- SWMU 03-009(i)—lateral extent of antimony, calcium, PCBs, and TPH-DRO; lateral and vertical extent of chromium, cobalt, copper, cyanide, nickel, and vanadium; vertical extent of lead
- SWMU 03-012(b)—lateral extent of calcium and mercury; lateral and vertical extent of cadmium, chromium, hexavalent chromium, PCBs, silver, and zinc
- SWMU 03-013(i)—lateral extent of antimony; vertical extent of TPH-DRO
- AOC 03-014(b2)—lateral and vertical extent of cyanide; vertical extent of chromium, perchlorate, PCBs, TPH-DRO, and VOCs
- AOC 03-014(c2)—lateral extent of PCBs; vertical extent of chromium, copper, cyanide, mercury, PCBs, silver, TPH-DRO, VOCs, and americium-241
- SWMUs 03-014(k,l,m,n)—lateral uranium-234, uranium-235/236, uranium-238, and VOCs; lateral and vertical extent of cyanide, PCBs, and tritium; vertical extent of copper, lead, silver, and TPH-DRO
- SWMU 03-014(o)—lateral and vertical extent of PCBs; vertical extent of chromium
- SWMU 03-014(u)—vertical extent of cyanide, lead, PCBs, and TPH-DRO

- SWMU 03-015—vertical extent of chromium, cobalt, lead, manganese, PCBs, SVOCs, and TPH-DRO
- SWMU 03-021—vertical extent of chromium, lead, PCBs, and VOCs
- SWMU 03-029—lateral and vertical extent of chromium; vertical extent of copper and PCBs
- AOC 03-038(d)—vertical extent of antimony
- SWMU 03-045(a)—lateral extent of copper, mercury, silver, and VOCs; lateral and vertical extent of PCBs; vertical extent of chromium and TPH-DRO
- SWMU 03-045(b)—lateral extent because only one location was sampled at the outfall; future sampling will include hexavalent chromium
- SWMU 03-045(c)—lateral extent because only one location was sampled at the outfall; vertical extent of SVOCs; future sampling will include hexavalent chromium
- SWMU 03-045(f)—vertical extent of antimony and PCBs
- SWMU 03-045(g)—vertical extent of cadmium and chromium
- SWMU 03-045(h)—vertical extent of aluminum, barium, calcium, chromium, cobalt, copper, and nickel
- AOC 03-047(g)—lateral and vertical extent of lead and PCBs
- AOC 03-051(c)—lateral extent of zinc; lateral and vertical extent of cobalt, PCBs, and SVOCs
- AOC 03-052(b)—lateral and vertical extent of SVOCs; vertical extent of aluminum, barium, beryllium, calcium, cobalt, copper, PCBs, and VOCs
- SWMU 03-052(f)—lateral extent of Aroclor-1254; lateral and vertical extent of SVOCs; vertical extent of barium, chromium, copper, lead, Aroclor-1260, and TPH-DRO
- AOC 03-053—vertical extent of chromium, cobalt, lead, manganese, PCBs, SVOCs and TPH-DRO
- SWMU 03-056(a)—lateral and vertical extent of PCBs and TPH-DRO
- SWMU 03-056(d)—lateral and vertical extent of copper, cyanide, mercury, PCBs, silver, and TPH-DRO
- AOC 03-056(k)—lateral extent of lead; vertical extent of PCBs, SVOCs, and VOCs
- SWMU 03-059—vertical extent of PCBs, SVOCs, TPH-DRO, and tritium
- AOC C-03-022—lateral and vertical extent of calcium and TPH-DRO

Delayed investigations are proposed for the following 22 sites in TA-03:

- AOC 03-003(f), Transformer area—PCB only site
- AOC 03-003(g), Transformer—PCB only site
- SWMU 03-013(a), Storm drain
- AOC 03-013(b), Floor drains
- SWMU 03-014(a,b,c,d,e,f,g,h,i,j,p,r,s), Structures associated with former WWTP
- AOC 03-014(y), Drain associated with former WWTP
- SWMU 03-037, Underground storage tanks

- SWMU 03-045(e), Outfall
- SWMU 03-054(c), Outfall
- AOC 03-056(h), Container storage area

### 9.1.2 TA-60

The nature and extent of contamination have been defined for the following two sites in TA-60:

- AOC 60-004(b), Storage area
- AOC 60-004(d), Storage area

The nature and extent of contamination have not been defined for five sites in TA-60. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following sites:

- SWMU 60-002 (west)—lateral and vertical extent of copper; vertical extent of aluminum, barium, cobalt, lead, magnesium, nickel, and vanadium
- AOC 60-004(f)—lateral extent of copper, lead, mercury, zinc, PCBs, SVOCs, and TPH-DRO
- SWMU 60-006(a)—lateral extent of perchlorate; lateral and vertical extent of nitrate; vertical extent of PCBs and tritium
- SWMU 60-007(a)—vertical extent of antimony, TPH-DRO, and TPH-LRO
- SWMU 60-007(b)—vertical extent of barium, chromium, copper, zinc, and SVOCs

### 9.1.3 TA-61

The nature and extent of contamination have been defined for the following site in TA-61:

- SWMU 61-002, Transformer storage area—PCB site

The nature and extent of contamination have not been defined for one site in TA-61. Additional sampling is needed to define the extent of contamination for one or more inorganic chemicals, organic chemicals, or radionuclides at the following site:

- AOC C-61-002—lateral extent of aluminum, antimony, chromium, cobalt, copper, iron, lead, magnesium, mercury, nickel, thallium, TPH-DRO, and vanadium

No further action under the Consent Order is proposed for the following two sites at TA-61 that are addressed under other regulatory programs:

- SWMU 61-005, Landfill
- SWMU 61-006, Used oil storage tank

## 9.2 Summary of Risk-Screening Assessments

Fifteen sites (plus five duplicate sites) for which the nature and extent of contamination are defined were evaluated for human health and ecological risk-screening.

- Human health risk-screening assessments were performed for 14 of these sites (plus 5 duplicate sites). An assessment was not performed for one site because samples were collected at depths greater than 10 ft bgs where no complete pathways to receptors are present.
- Ecological risk-screening assessments were performed for eight of the sites (plus five duplicate sites). Assessments were not performed for seven of the sites because samples were collected at depths greater than 5 ft bgs where no complete pathways to receptors are present.

The last 5 of the 25 sites for which the nature and extent of contamination are defined were determined to pose no potential unacceptable risk to human health or the environment based on previous investigations. The sites were recommended for no further action, and risk-screening assessments were not performed.

### 9.2.1 Human Health Risk Screening Assessment

The human health risk-screening assessments are presented in Appendix I, section I-4.

The risk-screening assessment results indicated no potential unacceptable risks from COPCs exist for the industrial, construction worker, and residential scenarios at 15 sites. For these sites, no samples were collected from the applicable depth interval, no COPCs were detected, the total excess cancer risks were below the NMED target risk level of $1 \times 10^{-5}$, or the HIs were below the NMED target HI of 1.0. These sites include SWMUs 03-014(q); 03-028; 03-036(a,c,d); and 03-056(l); and AOCs 03-003(n); 03-014(v); 03-027; 03-036(b); 03-038(c); 03-043(b); C-03-016, 60-004(b); and 60-004(d).

### 9.2.2 Ecological Risk Screening Assessment

The ecological risk-screening assessments are presented in Appendix I, section I-5.

No potential ecological risk was found for any receptor following evaluations based on minimum ESL, HI analyses, potential effects to populations (individuals for T&E species), and previous canyon studies for the following sites: SWMU 03-014(q) and AOCs 03-003(n), 60-004(b), and 60-004(d).

Complete exposure pathways to receptors are not present at many sites where the potential contamination associated with former structures has been removed to 5 ft bgs or deeper or where the sites are covered in asphalt pavement. Therefore, ecological risk-screening assessments were not conducted for the following sites: SWMUs 03-028; and 03-036(a,c,d); and 03-056(l); and AOCs 03-014(v); 03-027; 03-036(b); 03-038(c); 03-043(b); and C-03-016.

## 10.0 RECOMMENDATIONS

The determination of site status is based on the results of the risk-screening assessments and the nature and extent evaluation. Depending upon the decision scenario used, the sites are recommended as corrective actions complete either with or without controls or for additional action. The residential scenario is the only scenario under which corrective action complete without controls is applicable; that is, no additional corrective actions or conditions are necessary. The other decision scenarios (industrial, construction worker, and recreational) result in corrective action complete with controls; that is, some type of institutional controls must be in place to ensure that the land use remains consistent with site cleanup levels. The current and reasonably foreseeable future land use for the Upper Sandia Canyon Aggregate Area is industrial.

## 10.1 Additional Field Characterization Activities

The extent of contamination has not been defined for 40 sites investigated in the Upper Sandia Canyon Aggregate Area (Table 10.1-1). 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 03-002(c); 03-009(a); 03-009(i); 03-012(b); 03-013(i); 03-014(k,l,m,n,o,u); 03-015; 03-021; 03-029; 03-045(a,b,c,f,g,h); 03-052(f); 03-056(a); 03-056(d); 03-059; 60-002 (west); 60-006(a); 60-007(a); and 60-007(b); and AOCs 03-003(d); 03-014(b2); 03-014(c2); 03-038(d); 03-047(g); 03-051(c); 03-052(b); 03-053; 03-056(k); C-03-022; 60-004(f); and C-61-002

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 those sites. Upon completion of the proposed Phase II sampling, 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 all remaining sites. The results will be presented in a Phase II investigation report for the Upper Sandia Canyon Aggregate Area.

## 10.2 Recommendations for Corrective Actions Complete

Twenty sites for which the nature and extent of contamination are defined do not pose a potential unacceptable risk or dose under the industrial, construction worker, and/or residential scenarios. At these sites, the Laboratory recommends no further investigation or remediation activities are warranted.

These sites (including five duplicate sites) have been found to pose no potential unacceptable risks to human health under the residential scenario and are appropriate for corrective actions complete without controls. They include the following:

- AOC 03-003(n), One-time spill—PCB only site
- SWMU 03-014(q), Holding tank
- AOC 03-014(v), Drain associated with former WWTP
- AOC 03-027, Lift wells
- SWMU 03-028, Surface impoundment
- SWMU 03-036(a), Potential soil contamination associated with aboveground tanks [duplicate AOCs 03-043(d), 03-043(h)]
- AOC 03-036(b), Former above ground tanks
- SWMU 03-036(c), Potential soil contamination associated with aboveground tank [duplicate AOCs 03-043(a), 03-043(f), 03-043(g)]
- SWMU 03-036(d), Potential soil contamination associated with aboveground tank [duplicate AOCs 03-043(a), 03-043(f), 03-043(g)]
- AOC 03-038(c), Waste lines
- AOC 03-043(b), Aboveground tank
- SWMU 03-056(l), Storage area
- AOC C-03-016, Oil metal bin
- AOC 60-004(b), Storage area

- AOC 60-004(d), Storage area

In addition, five sites were recommended for no further action during previous investigations and remediation. Nature and extent of contamination has been previously defined. As proposed in the approved investigation work plan, no additional sampling was conducted in 2009 (LANL 2008, 103404; NMED 2008, 102721). These sites are appropriate for corrective actions complete without controls.

- SWMU 03-003(c) and AOC 03-003(o) were characterized before D&D activities were undertaken; sampling activities showed low concentrations of Aroclor-1254 in an asphalt sample. However, the areas were later excavated and buried under approximately 10 ft of clean fill. Nature and extent of contamination were defined at the sites (LANL 2008, 099214).
- AOC 03-047(d) was characterized following a VCA. Nature and extent of contamination were defined at this site, and no additional sampling was proposed. The VCA conducted in 1995 demonstrated that contaminants posed no potential unacceptable risk to human health and ecological receptors (LANL 2002, 073868.138, p.19).
- SWMU 03-056(c) was characterized following a VCA. Confirmation sampling results indicated the site met the EPA cleanup criterion for PCBs of less than 1 ppm (LANL 2001, 071259, pp. iii–iv, 58). Results of final VCA activities are presented in the VCA report (LANL 2001, 071259).
- SWMU 61-002 was previously investigated and remediated, and the results were presented in a remedy completion report (LANL 2007, 100722).

The following two sites do not require any further actions under the Consent Order because they are being addressed under other regulatory programs:

- SWMU 61-005 is a solid waste landfill that is currently being closed under the New Mexico Solid Waste Regulations
- SWMU 61-006 is a waste oil tank that is regulated under 40 CFR 279 and 20.4.1.1002 New Mexico Administrative Code, Standards for the Management of Used Oil

### 10.3 Recommendations for Delayed Characterization

Twenty-two sites are recommended for delayed characterization and investigation pending D&D of buildings and structures within the Upper Sandia Canyon Aggregate Area. These sites are SWMUs 03-013(a); 03-014(a,b,c,d,e,f,g,h,i,j,p,r,s); 03-037; 03-045(e); and 03-054(c); and AOCs 03-003(f); 03-003(g); 03-013(b); 03-014(y); and 03-056(h).

### 10.4 Schedule for Recommended Activities

A Phase II investigation work plan will be developed and submitted to NMED 6 months after this investigation report is approved. The Phase II work plan will provide details and a schedule for implementing sampling activities and submitting a Phase II investigation report.

## 11.0 REFERENCES AND MAP DATA SOURCES

### 11.1 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 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.*

Abeele, W.V., M.L. Wheeler, and B.W. Burton, October 1981. "Geohydrology of Bandelier Tuff," Los Alamos National Laboratory report LA-8962-MS, Los Alamos, New Mexico. (Abeele et al. 1981, 006273)

Bailey, R.A., R.L. Smith, and C.S. Ross, 1969. "Stratigraphic Nomenclature of Volcanic Rocks in the Jemez Mountains, New Mexico," in *Contributions to Stratigraphy*, U.S. Geological Survey Bulletin 1274-P, Washington, D.C. (Bailey at el. 1969, 021498)

Broxton, D.E., G.H. Heiken, S.J. Chipera, and F.M. Byers, Jr., June 1995. "Stratigraphy, Petrography, and Mineralogy of Bandelier Tuff and Cerro Toledo Deposits," in *Earth Science Investigation for Environmental Restoration—Los Alamos National Laboratory, Technical Area 21*, Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico, pp. 33-63. (Broxton et al. 1995, 050121)

Broxton, D.E., P.A. Longmire, P.G. Eller, and D. Flores, June 1995. "Preliminary Drilling Results for Boreholes LADP-3 and LADP-4," in *Earth Science Investigation for Environmental Restoration—Los Alamos National Laboratory, Technical Area 21*, Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico, pp. 93-109. (Broxton et al. 1995, 050119)

Broxton, D.E., and S.L. Reneau, August 1995. "Stratigraphic Nomenclature of the Bandelier Tuff for the Environmental Restoration Project at Los Alamos National Laboratory," Los Alamos National Laboratory report LA-13010-MS, Los Alamos, New Mexico. (Broxton and Reneau 1995, 049726)

Broxton, D.E., and S.L. Reneau, 1996. "Buried Early Pleistocene Landscapes Beneath the Pajarito Plateau, Northern New Mexico," New Mexico Geological Society Guidebook: 47th Field Conference, Jemez Mountains Region, New Mexico, pp. 325-334. (Broxton and Reneau 1996, 055429)

Caporuscio, F., January 29, 2003. "Soil Characterization Report for the Installation of a New Gas Turbine Generator and Utilities at the TA-3 Power Plant," report prepared for Los Alamos National Laboratory by KSL Services and Eberline Services, Albuquerque, New Mexico. (Caporuscio 2003, 088444)

Collins, K.A., A.M. Simmons, B.A. Robinson, and C.I. Nylander (Eds.), December 2005. "Los Alamos National Laboratory's Hydrogeologic Studies of the Pajarito Plateau: A Synthesis of Hydrogeologic Workplan Activities (1998–2004)," Los Alamos National Laboratory report LA-14263-MS, Los Alamos, New Mexico. (Collins et al. 2005, 092028)

Crowe, B.M., G.W. Linn, G. Heiken, and M.L. Bevier, April 1978. "Stratigraphy of the Bandelier Tuff in the Pajarito Plateau, Applications to Waste Management," Los Alamos Scientific Laboratory report LA-7225-MS, Los Alamos, New Mexico. (Crowe et al. 1978, 005720)

DOE (U.S. Department of Energy), June 13, 2000. "Procedure for the Release of Residual Radioactive Material from Real Property," U.S. Department of Energy memorandum to D. Glenn, I.R. Triay, M. Zamorski, E. Sellers, D. Gurule, and D. Bergman-Tabbert from C.L. Soden, Albuquerque, New Mexico. (DOE 2000, 067489)

EPA (U.S. Environmental Protection Agency), November 28, 2001. "Approval of the VCA Report under the Toxic Substance and Control Act (TSCA) 761.61(c) for PCB Site 3-056(c) at Los Alamos National Laboratory (LANL)," U.S. Environmental Protection Agency letter to M. Johansen (DOE-LAAO) from D. Neleigh (EPA Region 6), Dallas, Texas. (EPA 2001, 072810)

EPA (U.S. Environmental Protection Agency), June 8, 2007. "Authorization to Discharge under the National Pollutant Discharge Elimination System, NPDES Permit No. NM 0028355," Region 6, Dallas, Texas. (EPA 2007, 099009)

Faulk, D., June 19, 1995. "Archaeological Status Report for Site Remediation Activities at SWMU 3-056(c)," ERM/Golder memorandum to B. Larson (LANL) from D. Faulk (ERM/Golder), Los Alamos, New Mexico. (Faulk 1995, 055741)

Gehan, E.A., June 1965. "A Generalized Wilcoxon Test for Comparing Arbitrarily Singly-Censored Samples," *Biometrika,* Vol. 52, No. 1 and 2, pp. 203–223. (Gehan 1965, 055611)

Gilbert, R.O., and J.C. Simpson, November 1990. "Statistical Sampling and Analysis Issues and Needs for Testing Attainment of Background-Based Cleanup Standards at Superfund Sites," Proceedings of The Workshop on Superfund Hazardous Waste: Statistical Issues in Characterizing a Site: Protocols, Tools, and Research Needs, U.S. Environmental Protection Agency, Arlington, Virginia. (Gilbert and Simpson 1990, 055612)

Gilbert, R.O., and J.C. Simpson, December 1992. "Statistical Methods for Evaluating the Attainment of Cleanup Standards, Volume 3: Reference-Based Standards for Soils and Solid Media," document prepared for the U.S. Environmental Protection Agency, Pacific Northwest Laboratory, Richland, Washington. (Gilbert and Simpson 1992, 054952)

Goff, F., June 1995. "Geologic Map of Technical Area 21," in *Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory, Technical Area 21*, Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico, pp. 7–18. (Goff 1995, 049682)

Griggs, R.L., and J.D. Hem, 1964. "Geology and Ground-Water Resources of the Los Alamos Area, New Mexico," U.S. Geological Survey Water Supply Paper 1753, Washington, D.C. (Griggs and Hem 1964, 092516)

Heiken, G., F.E. Goff, J. Stix, S. Tamanyu, M. Shafiqullah, S.R. Garcia, and R.C. Hagan, February 10, 1986. "Intracaldera Volcanic Activity, Toledo Caldera and Embayment, Jemez Mountains, New Mexico," *Journal of Geophysical Research,* Vol. 91, No. B2, pp. 1799-1816. (Heiken et al. 1986, 048638)

Hollis, D., E. Vold, R. Shuman, K.H. Birdsell, K. Bower, W.R. Hansen, D. Krier, P.A. Longmire, B. Newman, D.B. Rogers, and E.P. Springer, March 27, 1997. "Performance Assessment and Composite Analysis for Los Alamos National Laboratory Material Disposal Area G," Rev. 2.1, Los Alamos National Laboratory document LA-UR-97-85, Los Alamos, New Mexico. (Hollis et al. 1997, 063131)

Izett, G.A., and J.D. Obradovich, February 10, 1994. "$^{40}Ar/^{39}Ar$ Age Constraints for the Jaramillo Normal Subchron and the Matuyama-Brunhes Geomagnetic Boundary," *Journal of Geophysical Research,* Vol. 99, No. B2, pp. 2925–2934. (Izett and Obradovich 1994, 048817)

Kearl, P.M., J.J. Dexter, and M. Kautsky, December 1986. "Vadose Zone Characterization of Technical Area 54, Waste Disposal Areas G and L, Los Alamos National Laboratory, New Mexico, Report 4: Preliminary Assessment of the Hydrologic System through Fiscal Year 1986," UNC Technical Services report GJ-54, Grand Junction, Colorado. (Kearl et al. 1986, 015368)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007511)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. IV of IV (TA-51 through TA-74), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007514)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1114," Los Alamos National Laboratory document LA-UR-93-1000, Los Alamos, New Mexico. (LANL 1993, 020947)

LANL (Los Alamos National Laboratory), August 1993. "Environmental Surveillance at Los Alamos During 1991," Los Alamos National Laboratory report LA-12572-ENV, Los Alamos, New Mexico. (LANL 1993, 023249)

LANL (Los Alamos National Laboratory), August 1994. "Los Alamos National Laboratory Environmental Restoration Chain of Custody/Request for Analysis Forms for PRS 3-056(c)," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1994, 040397)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1114, Addendum 1," Los Alamos National Laboratory document LA-UR-95-731, Los Alamos, New Mexico. (LANL 1995, 057590)

LANL (Los Alamos National Laboratory), August 3, 1995. "Notification of Two New Solid Waste Management Units (SWMUs)," Los Alamos National Laboratory letter to W.K. Honker (EPA Region 6) from J. Jansen (LANL ER Project Manager) and T. Taylor (DOE-LAAO), Los Alamos, New Mexico. (LANL 1995, 049550)

LANL (Los Alamos National Laboratory), September 1995. "Request for Permit Modification, Units Proposed for NFA," Los Alamos National Laboratory document LA-UR-95-3319, Los Alamos, New Mexico. (LANL 1995, 051878)

LANL (Los Alamos National Laboratory), February 1996. "RFI Report for 53 Potential Release Sites in TA-3, TA-59, TA-60, TA-61," Los Alamos National Laboratory document LA-UR-96-726, Los Alamos, New Mexico. (LANL 1996, 052930)

LANL (Los Alamos National Laboratory), February 26, 1996. "Voluntary Corrective Action Completion Report for Potential Release Sites 03-003(p), 03-047(d), 03-051(c), Revision 1," Los Alamos National Laboratory document LA-UR-96-431, Los Alamos, New Mexico. (LANL 1996, 053780)

LANL (Los Alamos National Laboratory), September 1996. "Request for Permit Modification, Units Proposed for NFA," Vol. I, Los Alamos National Laboratory document LA-UR-96-3357, Los Alamos, New Mexico. (LANL 1996, 055035)

LANL (Los Alamos National Laboratory), April 1997. "Core Document for Canyons Investigations," Los Alamos National Laboratory document LA-UR-96-2083, Los Alamos, New Mexico. (LANL 1997, 055622)

LANL (Los Alamos National Laboratory), September 1997. "RFI Report for TA-3 for Potential Release Sites 3-004(c,d), 3-007, 3-014(k,l,o), 3-021, 3-049(a), 3-052(b), 3-056(k), C-3-014," Los Alamos National Laboratory document LA-UR-97-3571, Los Alamos, New Mexico. (LANL 1997, 056660.4)

LANL (Los Alamos National Laboratory), June 1998. "RFI Work Plan and SAP for Potential Release Sites 53-002(a), 53-002(b), and Associated Piping and Drainages at TA-53," Los Alamos National Laboratory document LA-UR-98-2547, Los Alamos, New Mexico. (LANL 1998, 058841)

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

LANL (Los Alamos National Laboratory), September 1999. "Work Plan for Sandia Canyon and Cañada del Buey," Los Alamos National Laboratory document LA-UR-99-3610, Los Alamos, New Mexico. (LANL 1999, 064617)

LANL (Los Alamos National Laboratory), March 2000. "Installation Work Plan for Environmental Restoration Project, Revision 8," Los Alamos National Laboratory document LA-UR-00-1336, Los Alamos, New Mexico. (LANL 2000, 066802)

LANL (Los Alamos National Laboratory), July 10, 2001. "Sampling Notification," Los Alamos National Laboratory letter (ER2001-00574) to J. Young (NMED-HWB) from D. McInroy (ER Project), Los Alamos, New Mexico. (LANL 2001, 070937)

LANL (Los Alamos National Laboratory), July 16, 2001. "Sampling Notification," Los Alamos National Laboratory letter (ER2001-0584) to J. Young (NMED-HWB) from D. McInroy (ER Project), Los Alamos, New Mexico. (LANL 2001, 071214)

LANL (Los Alamos National Laboratory), September 2001. "Voluntary Corrective Action Completion Report for Potential Release Site 03-056(c)," Los Alamos National Laboratory document LA-UR-01-5349, Los Alamos, New Mexico. (LANL 2001, 071259)

LANL (Los Alamos National Laboratory), July 23, 2001–March 13, 2002. "Field Notebook for SWMUs 03-001(k), 03-003(c), 03-011, 03-049(e), 03-056(a), 27-003, 39-007(a), 60-002, 60-007(a), and C-09-001," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2001–2002, 100703)

LANL (Los Alamos National Laboratory), September 2002. "RFI Report for Area of Concern 03-047(d) at Technical Area 03 (Former Container Storage Area)," Los Alamos National Laboratory document LA-UR-02-6158, Los Alamos, New Mexico. (LANL 2002, 073868.138)

LANL (Los Alamos National Laboratory), September 2002. "Voluntary Corrective Action Completion Report for Area of Concern C-03-020 at Technical Area 03 (Inactive Underground Storage Tanks)," Los Alamos National Laboratory document LA-UR-02-5963, Los Alamos, New Mexico. (LANL 2002, 073868.4)

LANL (Los Alamos National Laboratory), March 27, 2003. "Sampling Notification," Los Alamos National Laboratory letter (ER2003-0257) to J. Young (NMED-HWB) from R. Bohn (LANL), Los Alamos, New Mexico. (LANL 2003, 075992)

LANL (Los Alamos National Laboratory), August 29, 2003. "Sampling Notification," Los Alamos National Laboratory letter (ER2003-0562) to J. Young (NMED-HWB) from R. Bohn (LANL), Los Alamos, New Mexico. (LANL 2003, 079741)

LANL (Los Alamos National Laboratory), September 2003. "Field Implementation Plan for Asphalt Batch Plant Solid Waste Management Units and Areas of Concern at Technical Areas 3 and 60," Los Alamos National Laboratory document LA-UR-03-6161, Los Alamos, New Mexico. (LANL 2003, 080912)

LANL (Los Alamos National Laboratory), September 3, 2003. "Revision of August 29, 2003 (ER2003-0562) Sampling Notification," Los Alamos National Laboratory letter (ER2003-0568) to J. Young (NMED-HWB) from R. Bohn (LANL), Los Alamos, New Mexico. (LANL 2003, 079747)

LANL (Los Alamos National Laboratory), November 2003. "Sample Collection Logs and Chain-of-Custody Forms for Consolidated Unit 03-012(b)-00," Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2003, 100705)

LANL (Los Alamos National Laboratory), November 12, 2003. "Sampling Notification," Los Alamos National Laboratory letter (ER2003-0721) to J. Young (NMED-HWB) from R. Bohn (LANL), Los Alamos, New Mexico. (LANL 2003, 080102)

LANL (Los Alamos National Laboratory), September 2004. "Solid Waste Management Unit (SWMU) Assessment Plan for SWMU 03-013(i)," Los Alamos National Laboratory document LA-UR-04-6783, Los Alamos, New Mexico. (LANL 2004, 087406)

LANL (Los Alamos National Laboratory), November 2004. "Accelerated Corrective Action Work Plan for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002," Los Alamos National Laboratory document LA-UR-04-7879, Los Alamos, New Mexico. (LANL 2004, 087474)

LANL (Los Alamos National Laboratory), December 2004. "Screening-Level Ecological Risk Assessment Methods, Revision 2," Los Alamos National Laboratory document LA-UR-04-8246, Los Alamos, New Mexico. (LANL 2004, 087630)

LANL (Los Alamos National Laboratory), October 2005. "Solid Waste Management Unit (SWMU) Assessment Report for SWMU 03-013(i)," Los Alamos National Laboratory document LA-UR-05-7420, Los Alamos, New Mexico. (LANL 2005, 091540)

LANL (Los Alamos National Laboratory), October 2005. "Solid Waste Management Unit (SWMU) Assessment Report for SWMU 03-003(c)" and "Solid Waste Management Unit (SWMU) Assessment Report for SWMU 60-002," 70% Drafts, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2005, 100704)

LANL (Los Alamos National Laboratory), December 2005. "Remedy Completion Report for the Investigation and Remediation of Area of Concern 03-001(i) and Solid Waste Management Units 03-029 and 61-002," Los Alamos National Laboratory document LA-UR-05-8863, Los Alamos, New Mexico. (LANL 2005, 091150)

LANL (Los Alamos National Laboratory), April 2006. "Investigation Work Plan for Upper Los Alamos Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-06-2464, Los Alamos, New Mexico. (LANL 2006, 091916)

LANL (Los Alamos National Laboratory), May 2007. "2007 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-07-3271, Los Alamos, New Mexico. (LANL 2007, 096665)

LANL (Los Alamos National Laboratory), November 2007. "Remedy Completion Report for the Investigation and Remediation of Solid Waste Management Unit 61-002 at Technical Area 61, Revision 1," Los Alamos National Laboratory document LA-UR-07-7695, Los Alamos, New Mexico. (LANL 2007, 100722)

LANL (Los Alamos National Laboratory), November 2007. "Investigation Work Plan for Upper Mortandad Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-07-7696, Los Alamos, New Mexico. (LANL 2007, 098954)

LANL (Los Alamos National Laboratory), March 2008. "Historical Investigation Report for Upper Sandia Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-08-1851, Los Alamos, New Mexico. (LANL 2008, 100693)

LANL (Los Alamos National Laboratory), March 21, 2008. "Structure Searches for 3-287, 3-2422, and 3-36," online search results from the MOADS internal database at Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 099214)

LANL (Los Alamos National Laboratory), July 2008. "Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-4798, Los Alamos, New Mexico. (LANL 2008, 103404)

LANL (Los Alamos National Laboratory), May 2009. "2009 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-09-1340, Los Alamos, New Mexico. (LANL 2009, 106115)

LANL (Los Alamos National Laboratory), September 2009. "Investigation Report for Upper Mortandad Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-09-6081, Los Alamos, New Mexico. (LANL 2009, 107495)

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico. (LANL 2009, 107453)

LANL (Los Alamos National Laboratory), December 2009. "Ecorisk Database (Release 2.4)," on CD, LA-UR-09-7834, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2009, 107524)

LANL (Los Alamos National Laboratory), December 2009. "Radionuclide Screening Action Levels (SALs) from RESRAD, Version 6.5," Los Alamos National Laboratory document LA-UR-09-8111, Los Alamos, New Mexico. (LANL 2009, 107655)

LANL (Los Alamos National Laboratory), January 2010. "Investigation Work Plan for Twomile Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-10-0385, Los Alamos, New Mexico. (LANL 2010, 108329)

LANL (Los Alamos National Laboratory), April 2010. "Investigation Report for Upper Mortandad Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-10-2046, Los Alamos, New Mexico. (LANL 2010, 109206)

LASL (Los Alamos Scientific Laboratory), September 11, 1947. "A Technical Maintenance Group Report on General Background Data Concerning the Los Alamos Scientific Laboratory Required for Planning Purposes," Los Alamos Scientific Laboratory report LAB-A-5, Los Alamos, New Mexico. (LASL 1947, 005581)

Millard, W.P., and S.J. Deverel, December 1988. "Nonparametric Statistical Methods for Comparing Two Sites Based on Data with Multiple Nondetect Limits," *Water Resources Research,* Vol. 24, No. 12, pp. 2087–2098. (Millard and Deverel 1988, 054953)

NMED (New Mexico Environment Department), September 20, 2002. "Approval of VCA Completion Report for PRS 3-056(c)," New Mexico Environment Department letter to J.C. Browne (LANL Director) and E. Trollinger (DOE-OLASO) from J.E. Young (NMED-HWB), Santa Fe, New Mexico. (NMED 2002, 073363)

NMED (New Mexico Environment Department), October 2006. "New Mexico Environment Department TPH Screening Guidelines," Santa Fe, New Mexico. (NMED 2006, 094614)

NMED (New Mexico Environment Department), August 12, 2008. "Approval with Modifications Upper Sandia Canyon Aggregate Area Investigation Work Plan," 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 2008, 102721)

NMED (New Mexico Environment Department), December 2009. "Technical Background Document for Development of Soil Screening Levels, Revision 5.0," with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

Nyhan, J.W., L.W. Hacker, T.E. Calhoun, and D.L. Young, June 1978. "Soil Survey of Los Alamos County, New Mexico," Los Alamos Scientific Laboratory report LA-6779-MS, Los Alamos, New Mexico. (Nyhan et al. 1978, 005702)

Purtymun, W.D., December 1975. "Geohydrology of the Pajarito Plateau with Reference to Quality of Water, 1949-1972," Informal Report, Los Alamos Scientific Laboratory document LA-UR-02-4726, Los Alamos, New Mexico. (Purtymun 1975, 011787)

Purtymun, W.D., January 1984. "Hydrologic Characteristics of the Main Aquifer in the Los Alamos Area: Development of Ground Water Supplies," Los Alamos National Laboratory report LA-9957-MS, Los Alamos, New Mexico. (Purtymun 1984, 006513)

Purtymun, W.D., January 1995. "Geologic and Hydrologic Records of Observation Wells, Test Holes, Test Wells, Supply Wells, Springs, and Surface Water Stations in the Los Alamos Area," Los Alamos National Laboratory report LA-12883-MS, Los Alamos, New Mexico. (Purtymun 1995, 045344)

Purtymun, W.D., J.R. Buchholz, and T.E. Hakonson, 1977. "Chemical Quality of Effluents and Their Influence on Water Quality in a Shallow Aquifer," *Journal of Environmental Quality,* Vol. 6, No. 1, pp. 29-32. (Purtymun et al. 1977, 011846)

Purtymun, W.D., and A.K. Stoker, September 1990. "Perched Zone Monitoring Well Installation," Los Alamos National Laboratory document LA-UR-90-3230, Los Alamos, New Mexico. (Purtymun and Stoker 1990, 007508)

Santa Fe Engineering Ltd., July 1993. "Wastewater Stream Characterization for TA 53 at Los Alamos National Laboratory, Environmental Study, Characterization Report #72," report prepared for Los Alamos National Laboratory, Santa Fe, New Mexico. (Santa Fe Engineering, Ltd. 1993, 064050)

Self, S., F.E. Goff, J.N. Gardner, J.V. Wright, and W.M. Kite, February 10, 1986. "Explosive Rhyolitic Volcanism in the Jemez Mountains: Vent Locations, Caldera Development, and Relation to Regional Structure," *Journal of Geophysical Research,* Vol. 91, No. B2, pp. 1779-1798. (Self et al. 1986, 021579)

Shaw Environmental Inc., October 7, 2003. "Field Summary Report, TA-3 and TA-60 Asphalt Batch Plant RCRA Facility Investigation," report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (Shaw Environmental, Inc., 2003, 085517)

Smith, R.L., and R.A. Bailey, 1966. "The Bandelier Tuff: A Study of Ash-Flow Eruption Cycles from Zoned Magma Chambers," *Bulletin Volcanologique,* Vol. 29, pp. 83-103. (Smith and Bailey 1966, 021584)

Smith, R.L., R.A. Bailey, and C.S. Ross, 1970. "Geologic Map of the Jemez Mountains, New Mexico," U.S. Geological Survey Miscellaneous Investigations Series, Map I-571, Washington, D.C. (Smith et al. 1970, 009752)

Spell, T.L., I. McDougall, and A.P. Doulgeris, December 1996. "Cerro Toledo Rhyolite, Jemez Volcanic Field, New Mexico: $^{40}Ar/^{39}Ar$ Geochronology of Eruptions between Two Caldera-Forming Events," *Geological Society of America Bulletin,* Vol. 108, No. 12, pp. 1549-1566. (Spell et al. 1996, 055542)

Stix, J., F.E. Goff, M.P. Gorton, G. Heiken, and S.R. Garcia, June 10, 1988. "Restoration of Compositional Zonation in the Bandelier Silicic Magma Chamber Between Two Caldera-Forming Eruptions: Geochemistry and Origin of the Cerro Toledo Rhyolite, Jemez Mountains, New Mexico," *Journal of Geophysical Research,* Vol. 93, No. B6, pp. 6129-6147. (Stix et al. 1988, 049680)

Stoker, A.K., March 31, 1993. "Direct Testimony of Alan K. Stoker on Behalf of Petitioners before the New Mexico Water Quality Control Commission," Los Alamos, New Mexico. (Stoker 1993, 056021)

Tucker, K., August 10, 2001. "Sampling Activities at PRS 3-054(c)," Washington Group International, Inc., PMC Environmental, Science and Engineering Associates, Inc. (WGII/PMC/SEA), Los Alamos Team memorandum to file from K. Tucker (SEA), Los Alamos, New Mexico. (Tucker 2001, 100702)

Vaniman, D., July 29, 1991. "Revisions to report EES1-SH90-17," Los Alamos National Laboratory memorandum (EES1-SH91-12) to J.L. Gardner (EES-1) from D. Vaniman (EES-1), Los Alamos, New Mexico. (Vaniman 1991, 009995.1)

Wohletz, K., June 1995. "Measurement and Analysis of Rock Fractures in the Tshirege Member of the Bandelier Tuff Along Los Alamos Canyon Adjacent to Technical Area-21," in *Earth Science Investigations for Environmental Restoration—Los Alamos National Laboratory, Technical Area 21*, Los Alamos National Laboratory report LA-12934-MS, Los Alamos, New Mexico. (Wohletz 1995, 054404)

## 11.2 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; 06 January 2004; as published 28 May 2009. |
| Paved parking | Paved Parking; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| Dirt roads | Dirt Road Arcs; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |

| Legend Item/Type | Data Source |
|---|---|
| Drainages | WQH Drainage Arcs; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003. |
| Inferred USCAA area drainages | Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1; LANL ERID 103404; LA-UR-08-4798; July 2008 |
| LANL structures | Structures; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| Los Alamos County structures | Structures; County of Los Alamos, Information Services; as published 29 October 2007. |
| LANL fence lines | Security and Industrial Fences and Gates; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| LANL communications lines | Communication Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 08 August 2002; as published 28 May 2009. |
| LANL electric lines | Primary Electric Grid; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| LANL gas lines | Primary Gas Distribution Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| LANL sewer lines | Sewer Line System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| LANL steam lines | Steam Line Distribution System; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| LANL water lines | Water Lines; Los Alamos National Laboratory, KSL Site Support Services, Planning, Locating and Mapping Section; 06 January 2004; as published 28 May 2009. |
| Other LANL drainlines in USCAA area | Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1; LANL ERID 103404; LA-UR-08-4798; July 2008<br>Figure 5-14-2; appearing in RFI Work Plan for OU 1114, Addendum 1; LANL ERID 020947; June 1993<br>Liquid and Compressed Gas Facility Mechanical Bldg. SM-170; LASL engineering drawing ENG-C-31087, last revision 05 March 1965. |
| Former LANL USCAA area structures | Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1; LANL ERID 103404; LA-UR-08-4798; July 2008 |
| LANL PRS boundaries | Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 1:2,500 Scale Data; 13 March 2009. |
| Additional USCAA area LANL PRS boundaries | Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1; LANL ERID 103404; LA-UR-08-4798; July 2008 |
| USCAA 2009/10 area sampling 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, 12 April 2010. |
| LANL historical sampling locations | Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 21 January 2010. |
| Contours | Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991. |

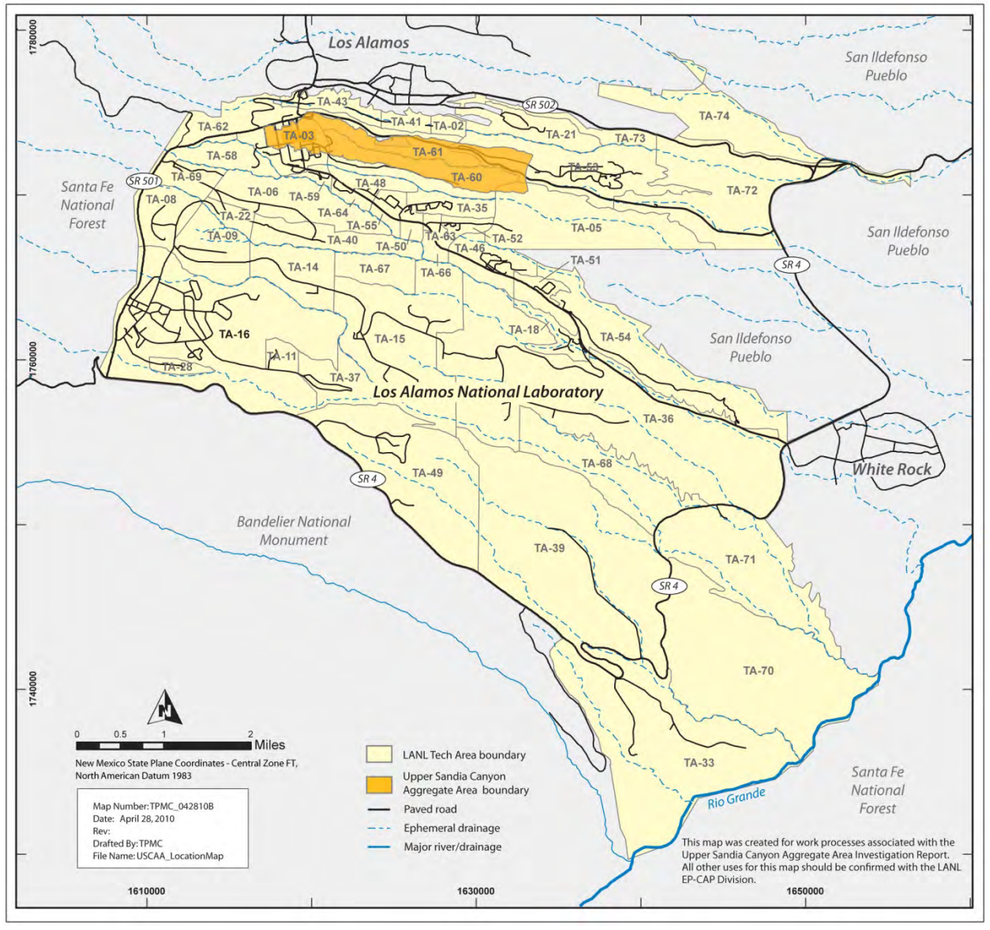



**Figure 1.1-1 Location of Upper Sandia Canyon Aggregate Area with respect to Laboratory technical areas**

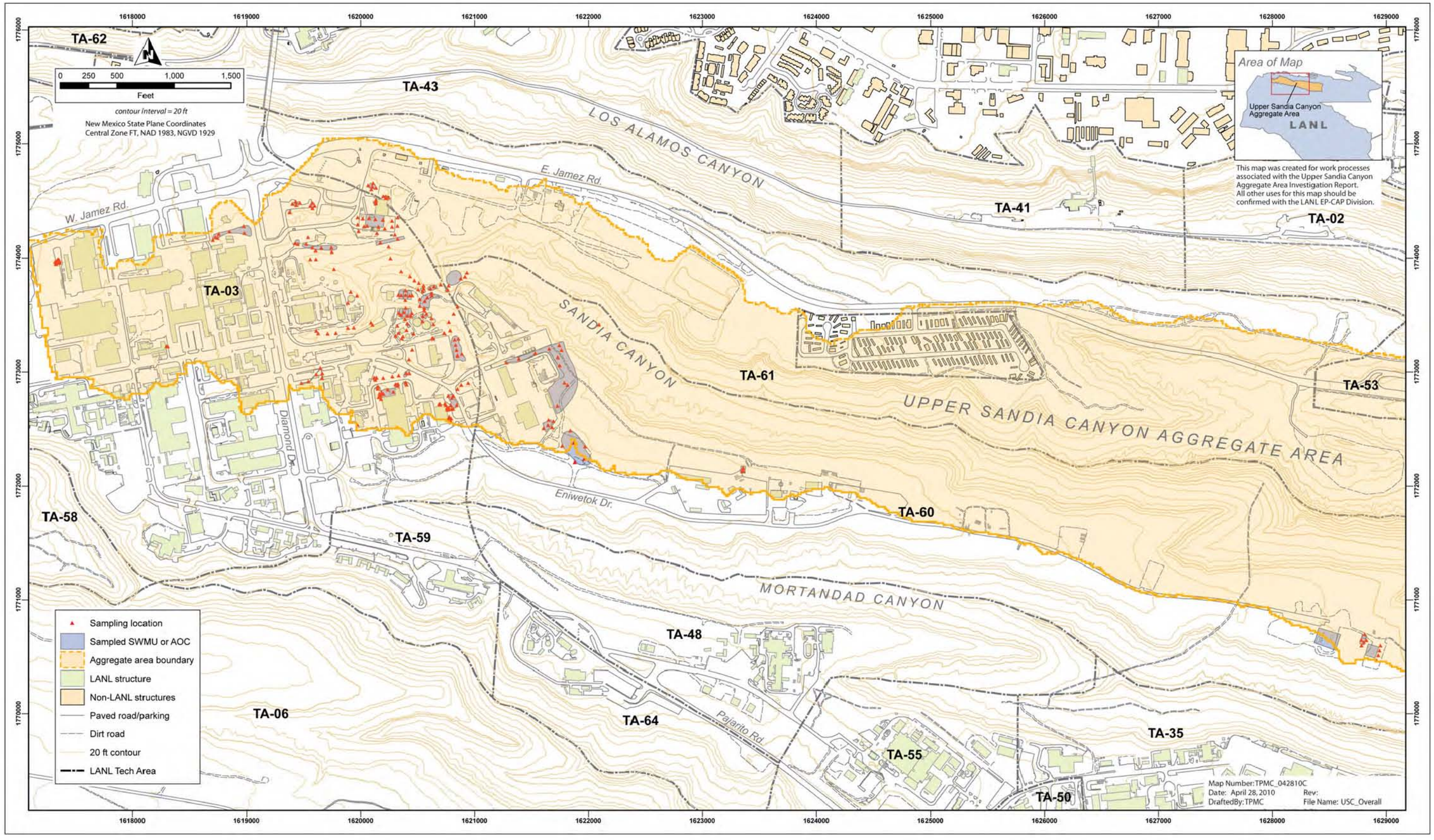



**Figure 2.1-1 Location of Upper Sandia Canyon Aggregate Area and its surrounding land holdings**

| | | | |
|---|---|---|---|
| **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) | |

Adapted from (LANL 1999, 064617).

**Figure 2.2-1 Generalized stratigraphy of bedrock geologic units of the Pajarito Plateau**

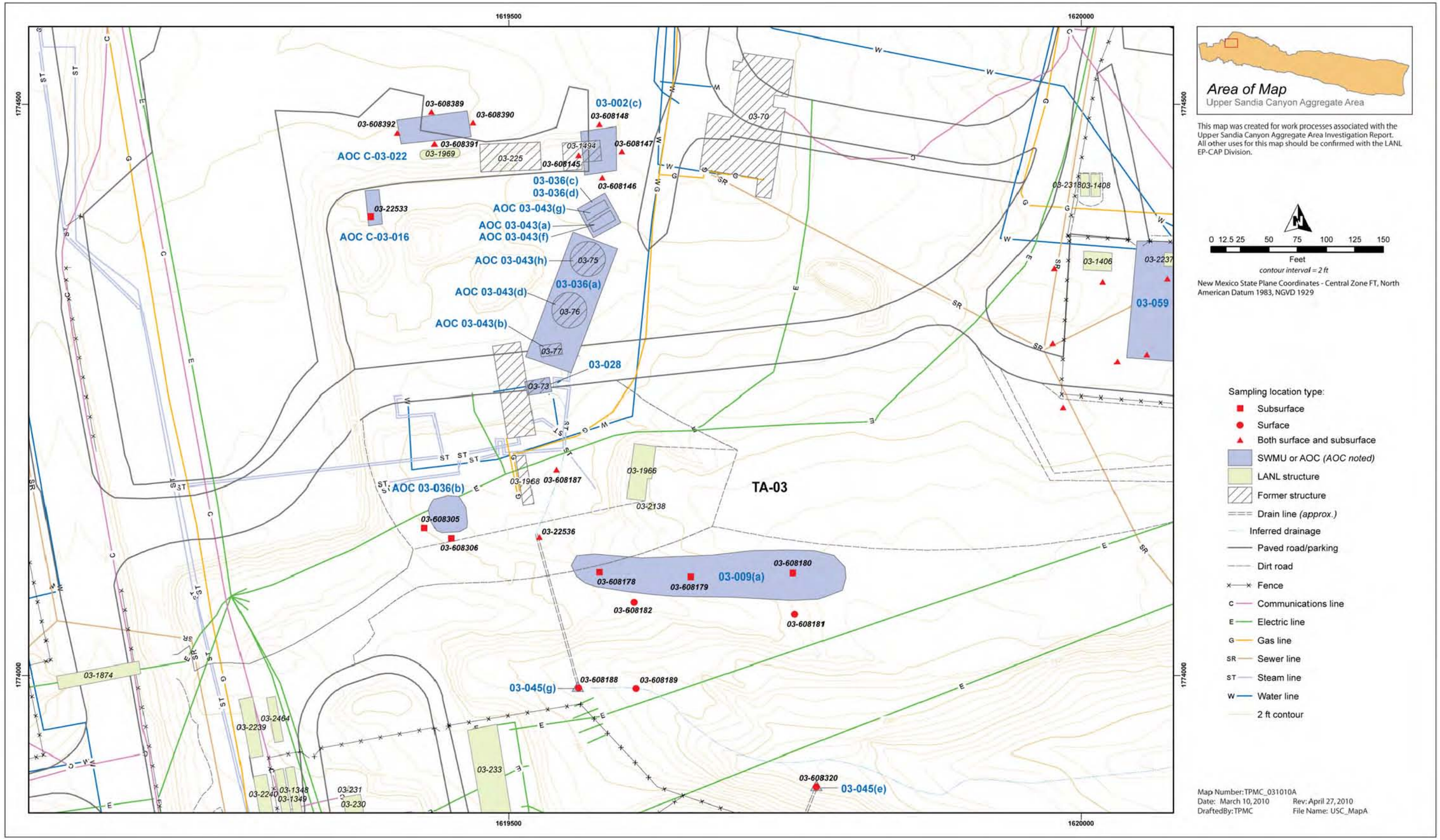



**Figure 6.2-1 Site map of SWMUs 03-002(c), 03-009(a), 03-028, 03-036(a,c,d), 03-045(e), 03-045(g) and AOCs C-03-016, C-03-022, 03-036(b), and 03-043(a,b,d,f,g,h)**

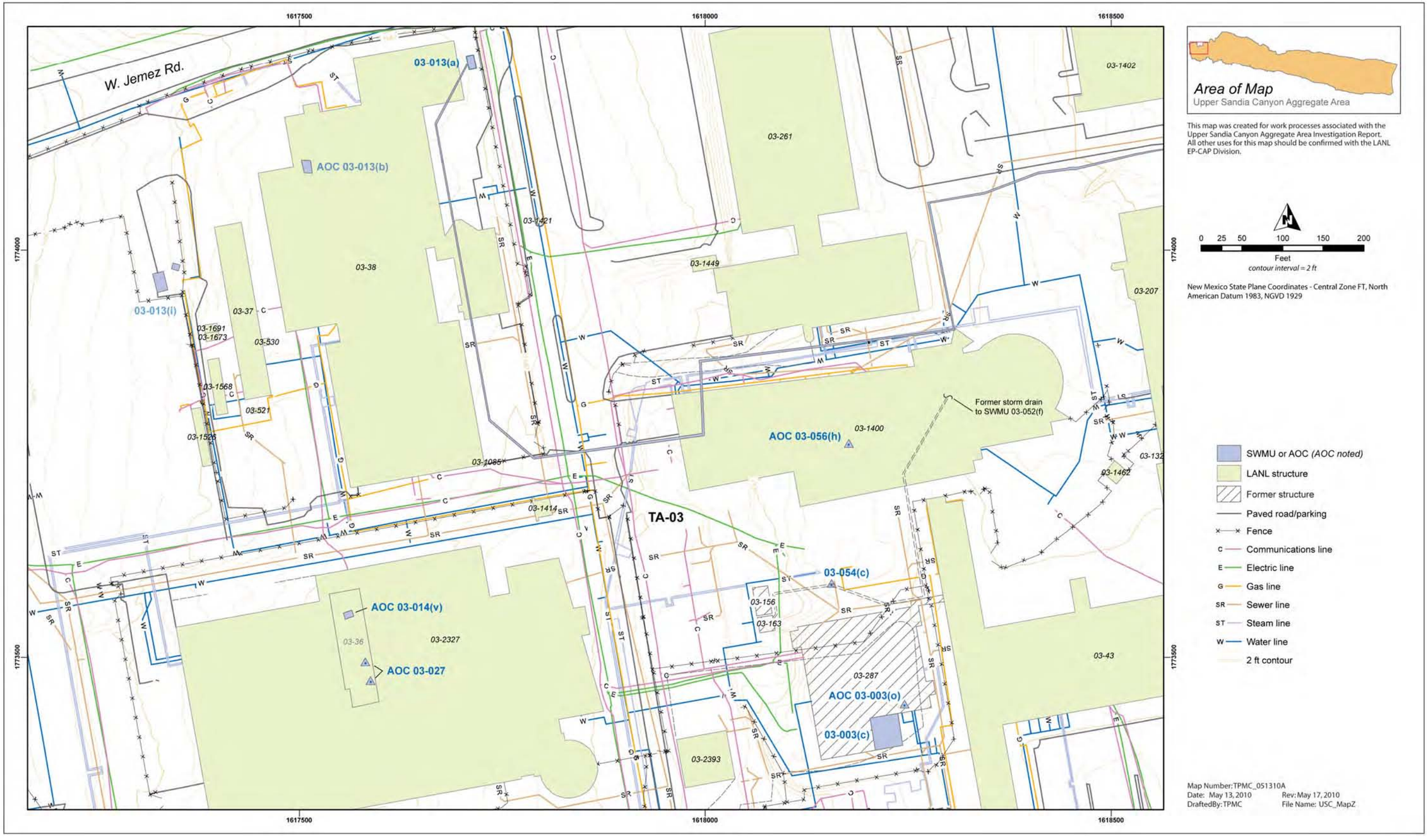



**Figure 6.3-1 Site map of SWMUs 03-003(c), 03-013(a), and 03-054(c) and AOCs 03-003(o), 03-014(v), 03-027 and 03-056(h)**

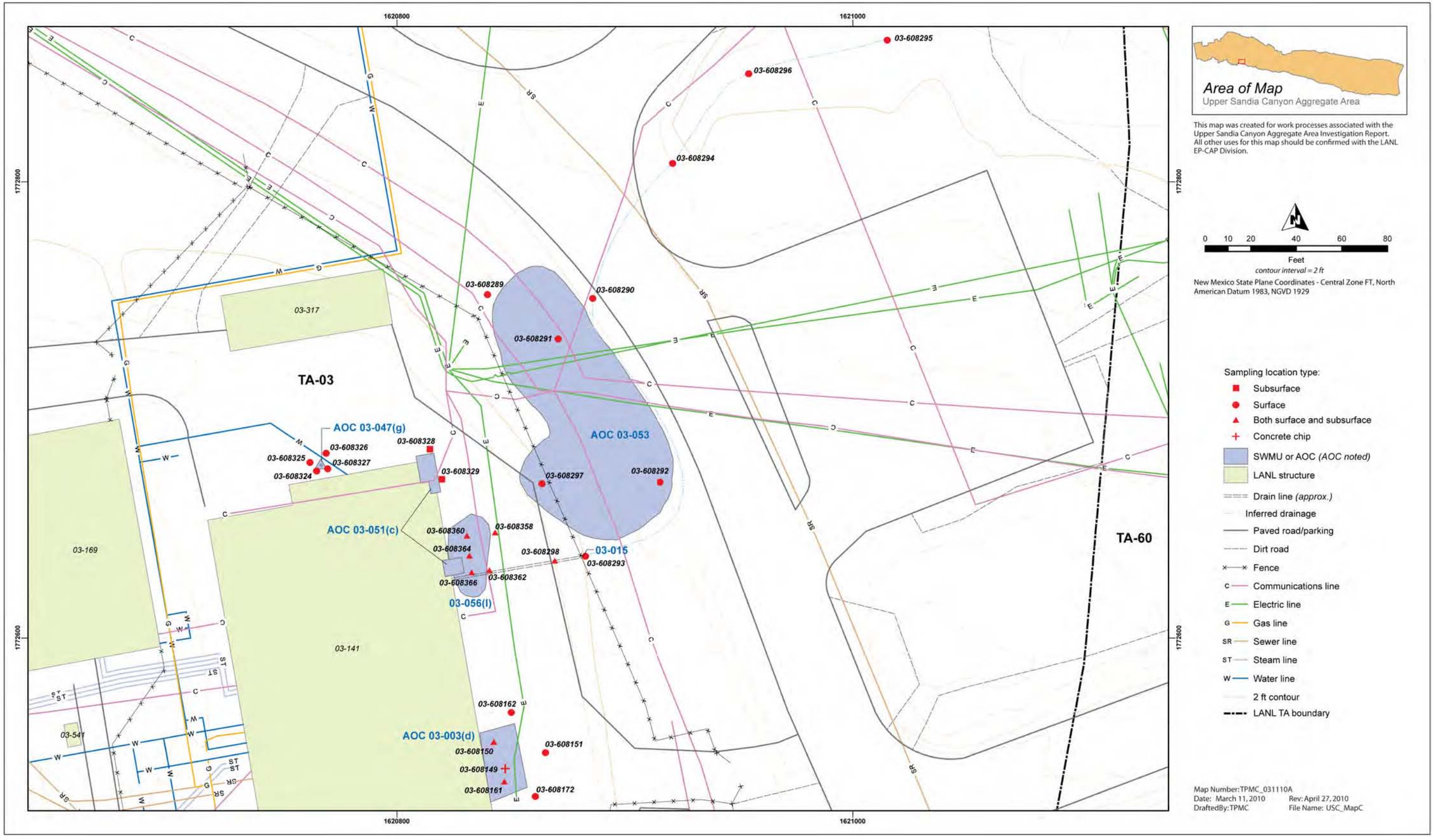



**Figure 6.4-1 Site map of SWMUs 03-015 and 03-056(l) and AOCs 03-003(d), 03-047(g), 03-051(c), and 03-053**

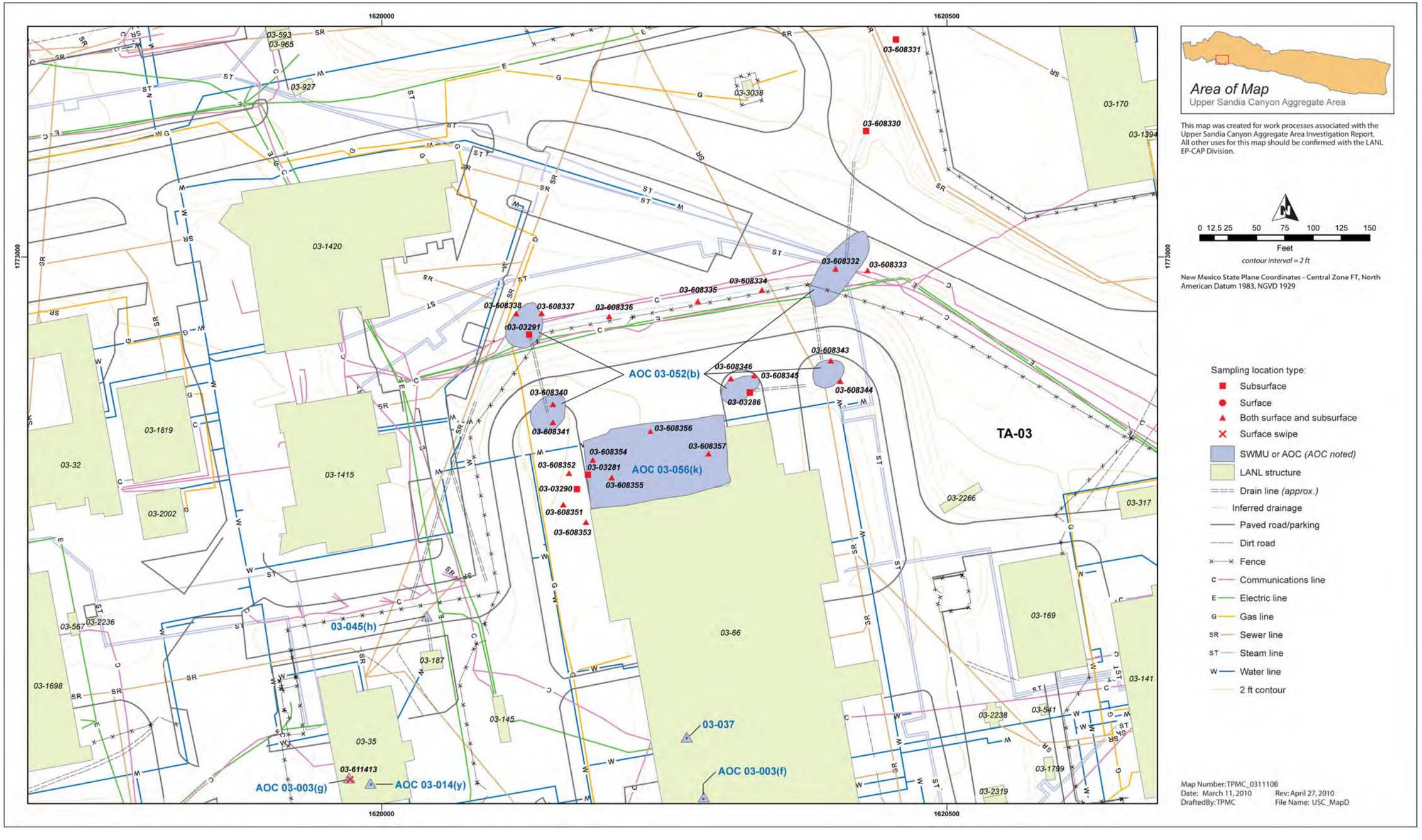



**Figure 6.5-1 Site map of SWMUs 03-037 and 03-045(h) and AOCs 03-003(f), 03-003(g), 03-014(y), 03-052(b), and 03-056(k)**

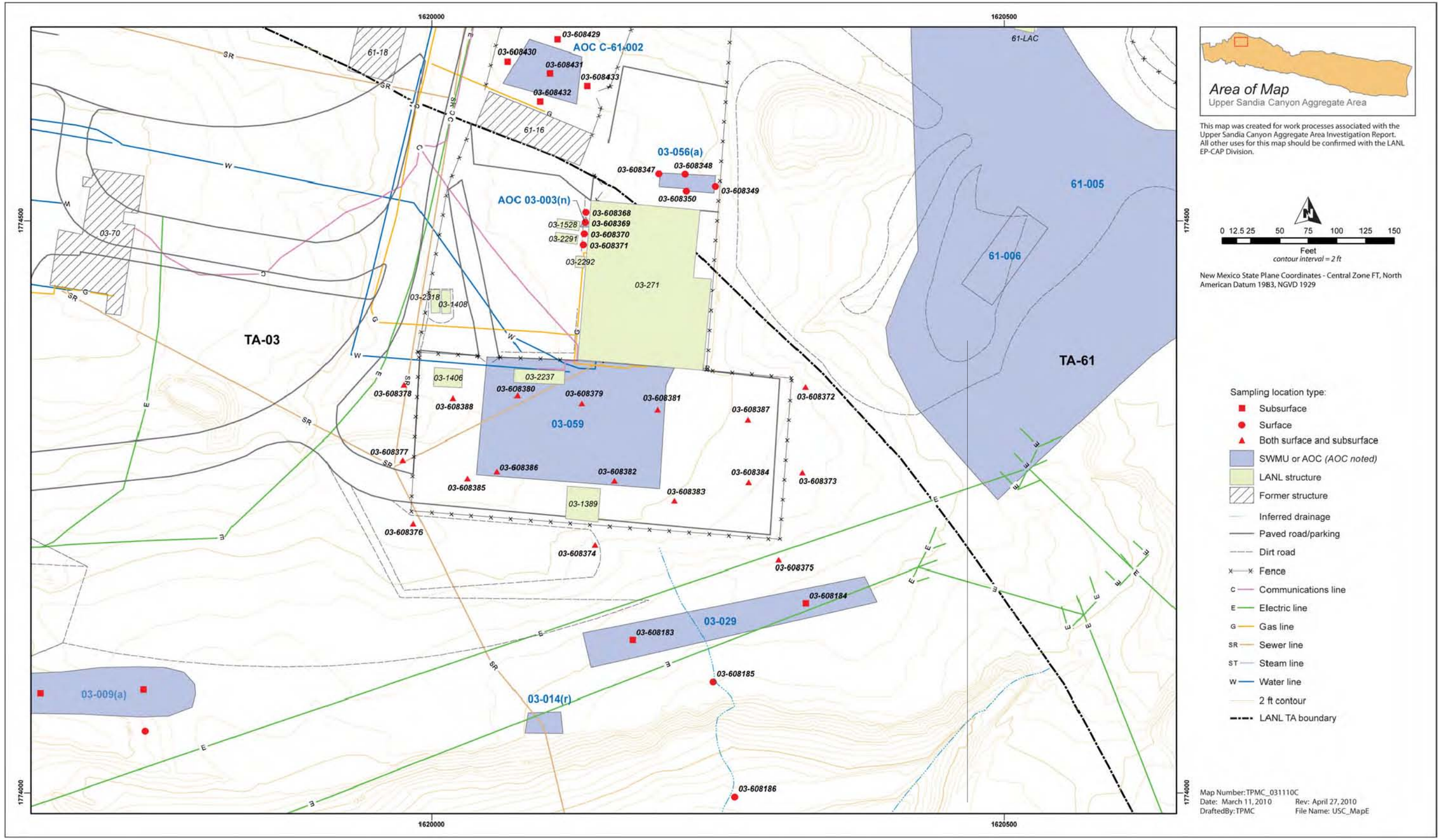



**Figure 6.8-1 Site map of SWMUs 03-014(r), 03-029, 03-056(a), 03-059, 61-005, and 61-006 and AOCs 03-003(n) and C-61-002**

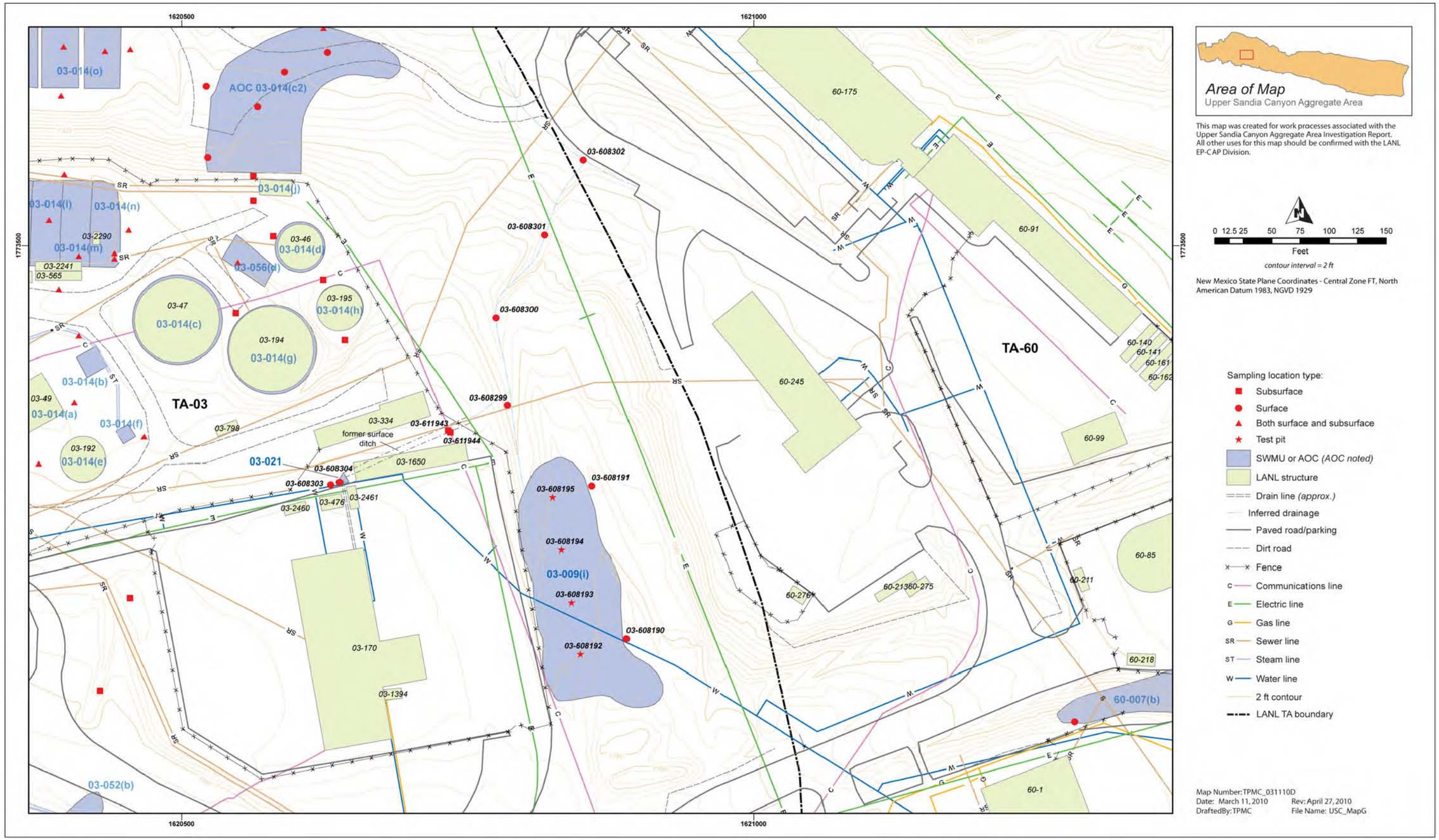



**Figure 6.9-1 Site map of SWMUs 03-009(i) and 03-021**

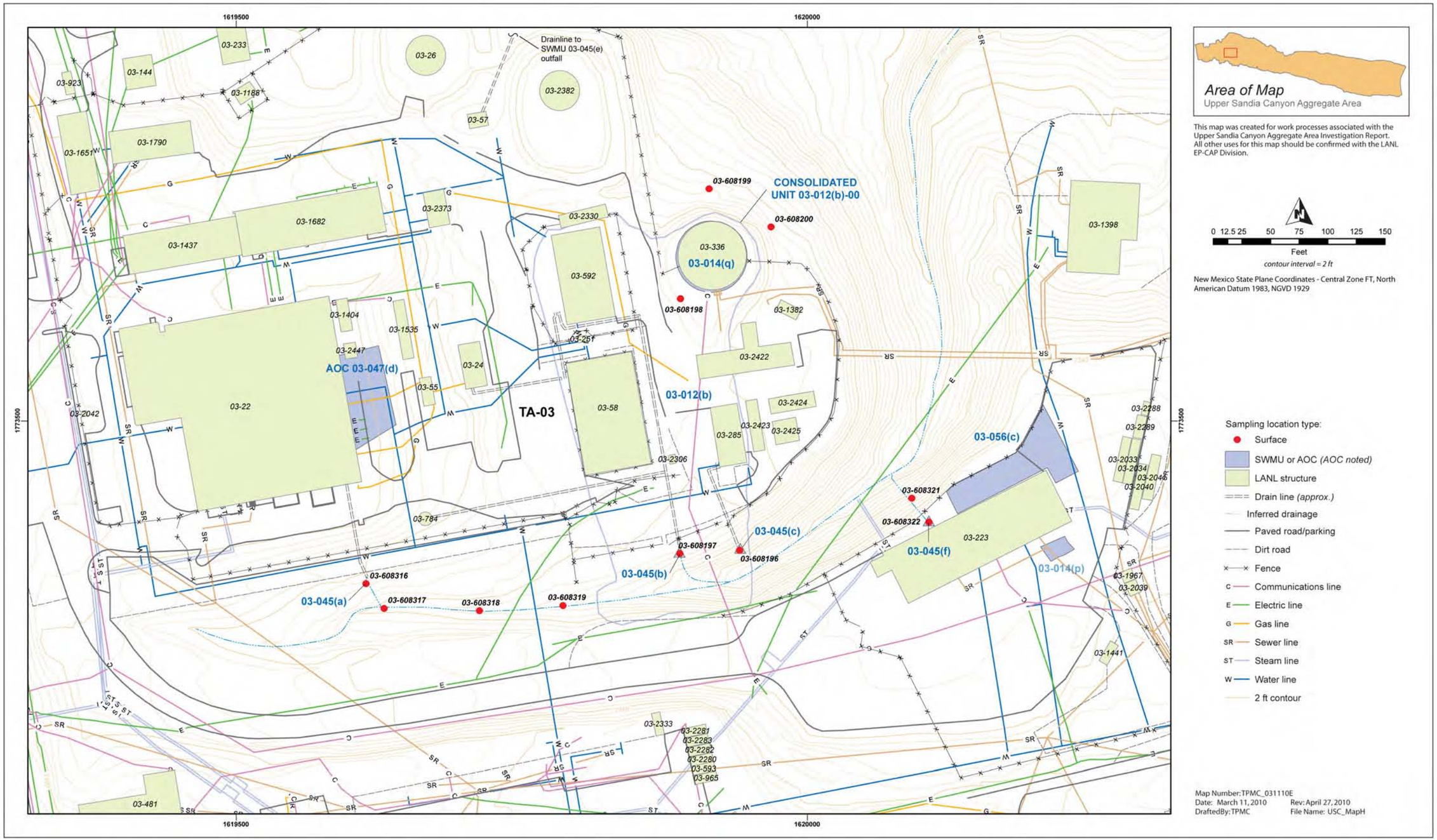



**Figure 6.10-1 Site map of SWMUs 03-012(b), 03-014(q), 03-045(a,b,c,f), and 03-056(c) and AOC 03-047(d)**

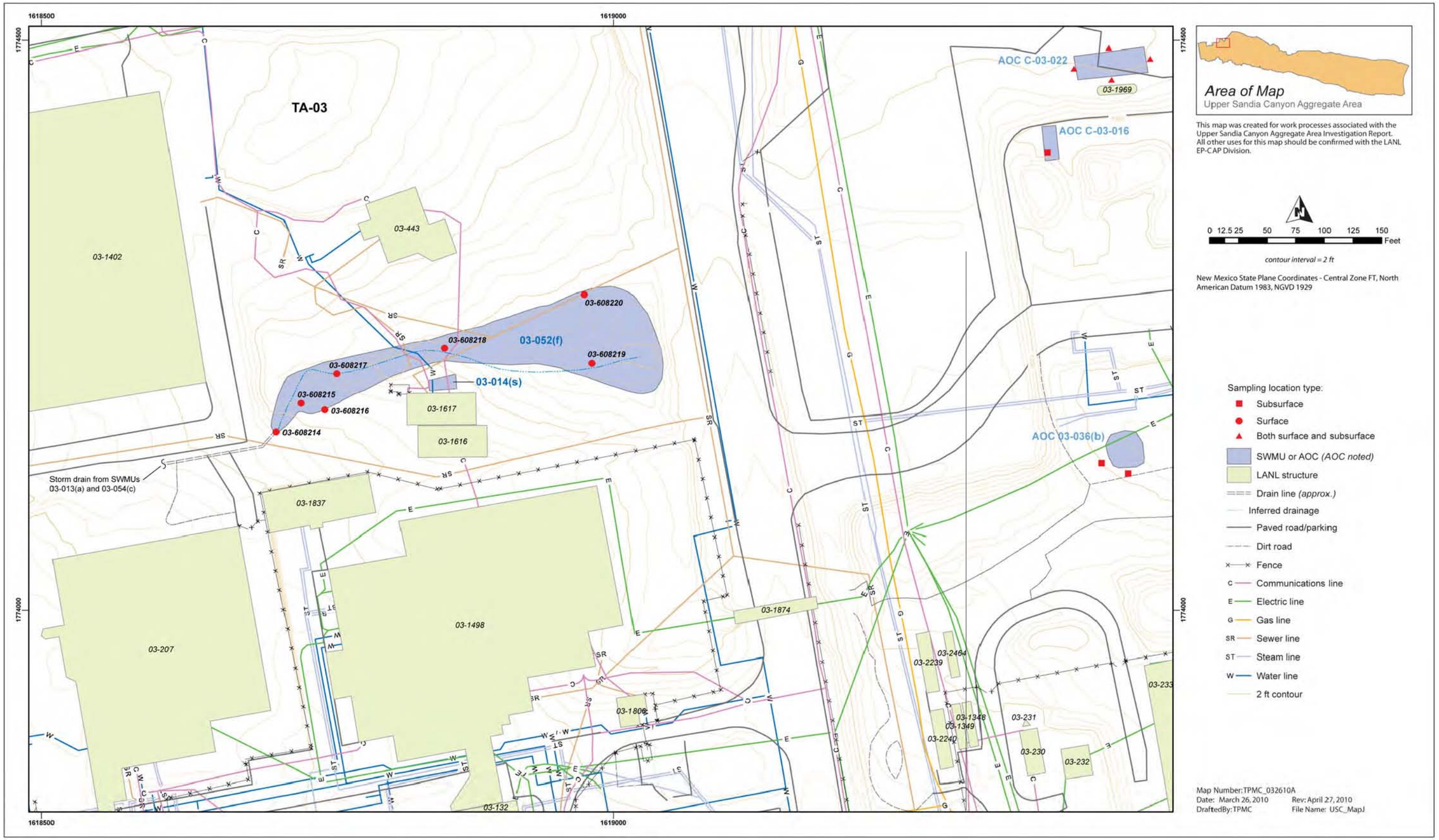



**Figure 6.11-1 Site map of SWMUs 03-014(s) and 03-052(f)**

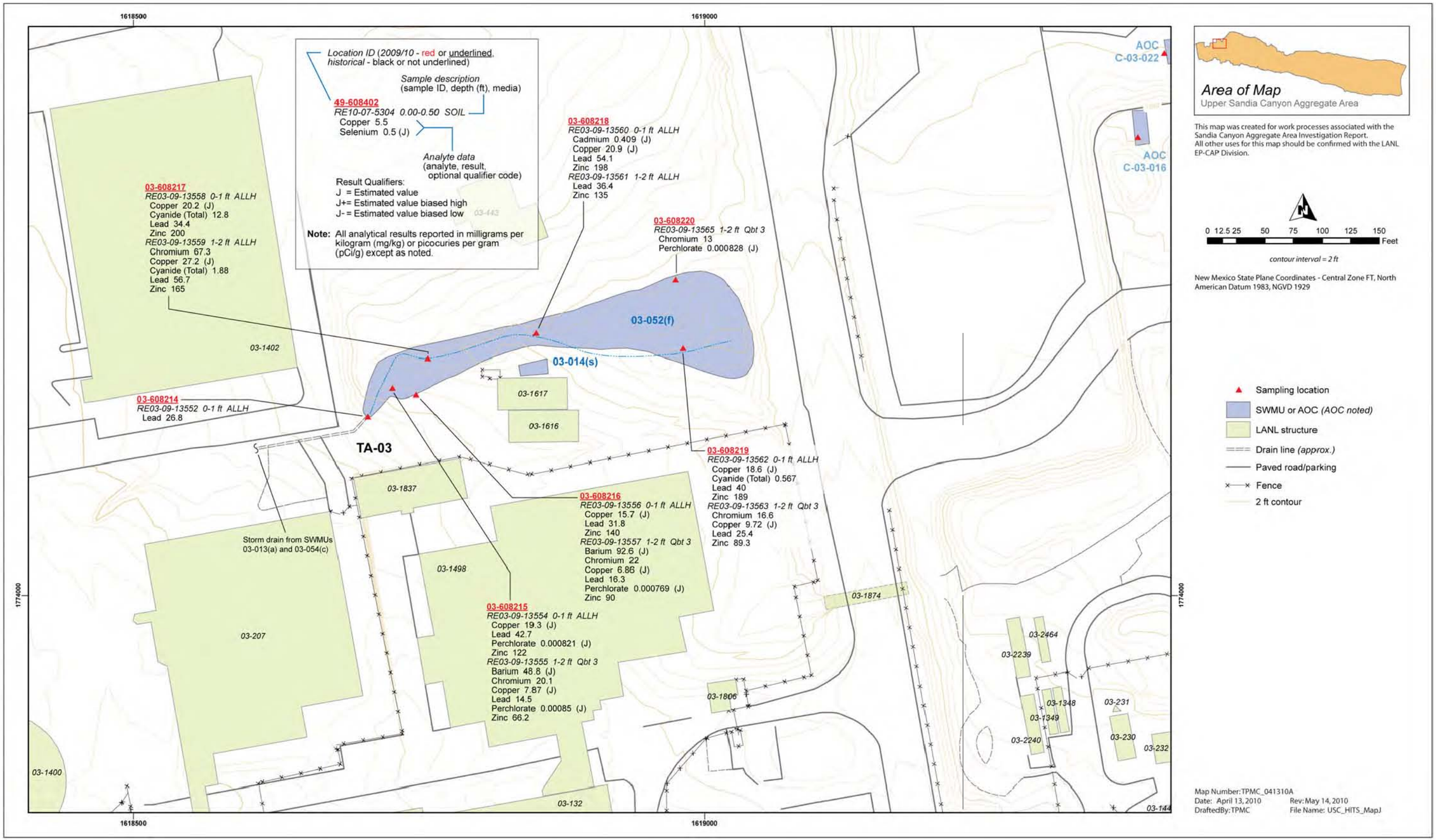



**Figure 6.11-2 Inorganic chemical concentrations detected or detected above BVs at SWMU 03-052(f)**

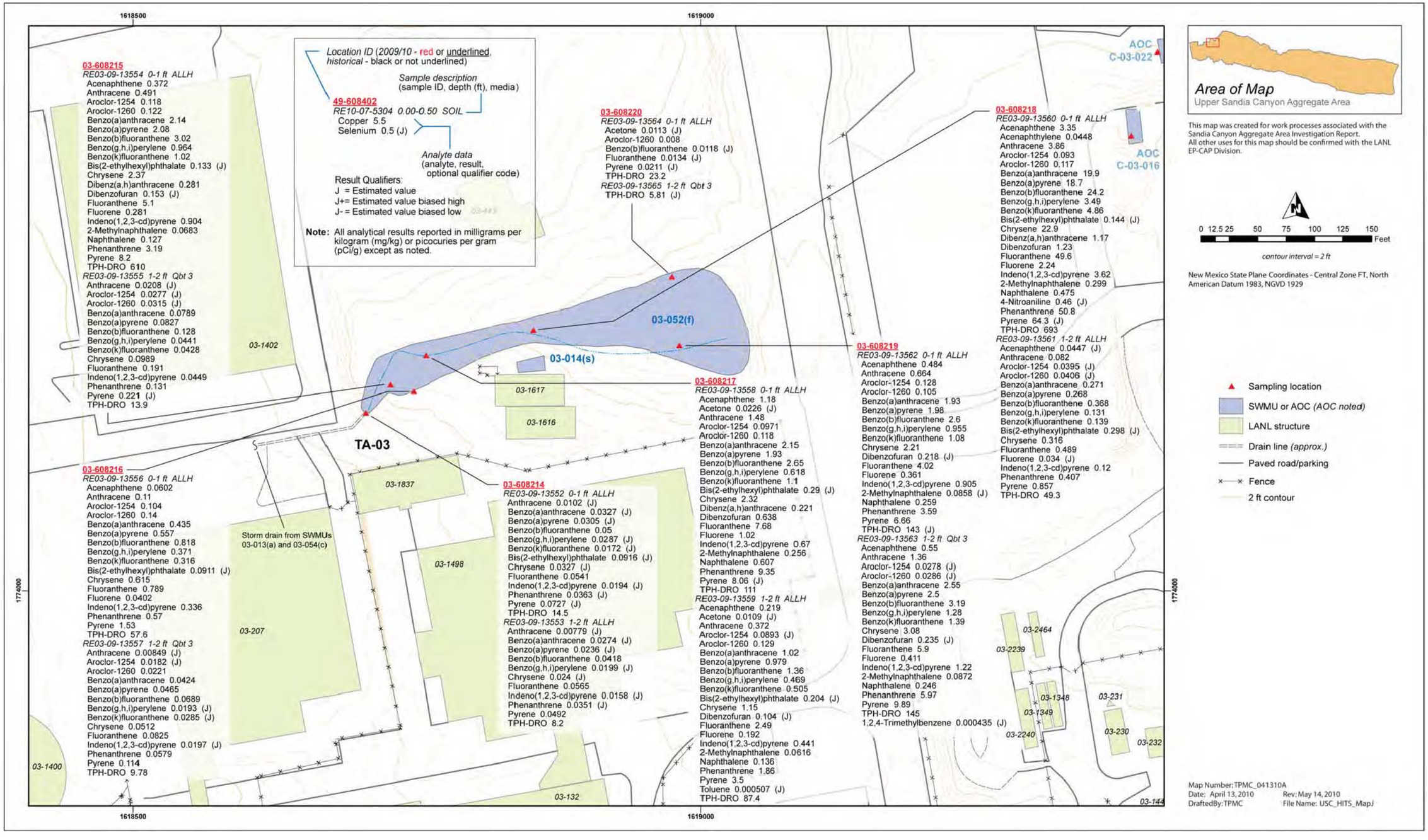



**Figure 6.11-3 Organic chemical concentrations detected at SWMU 03-052(f)**

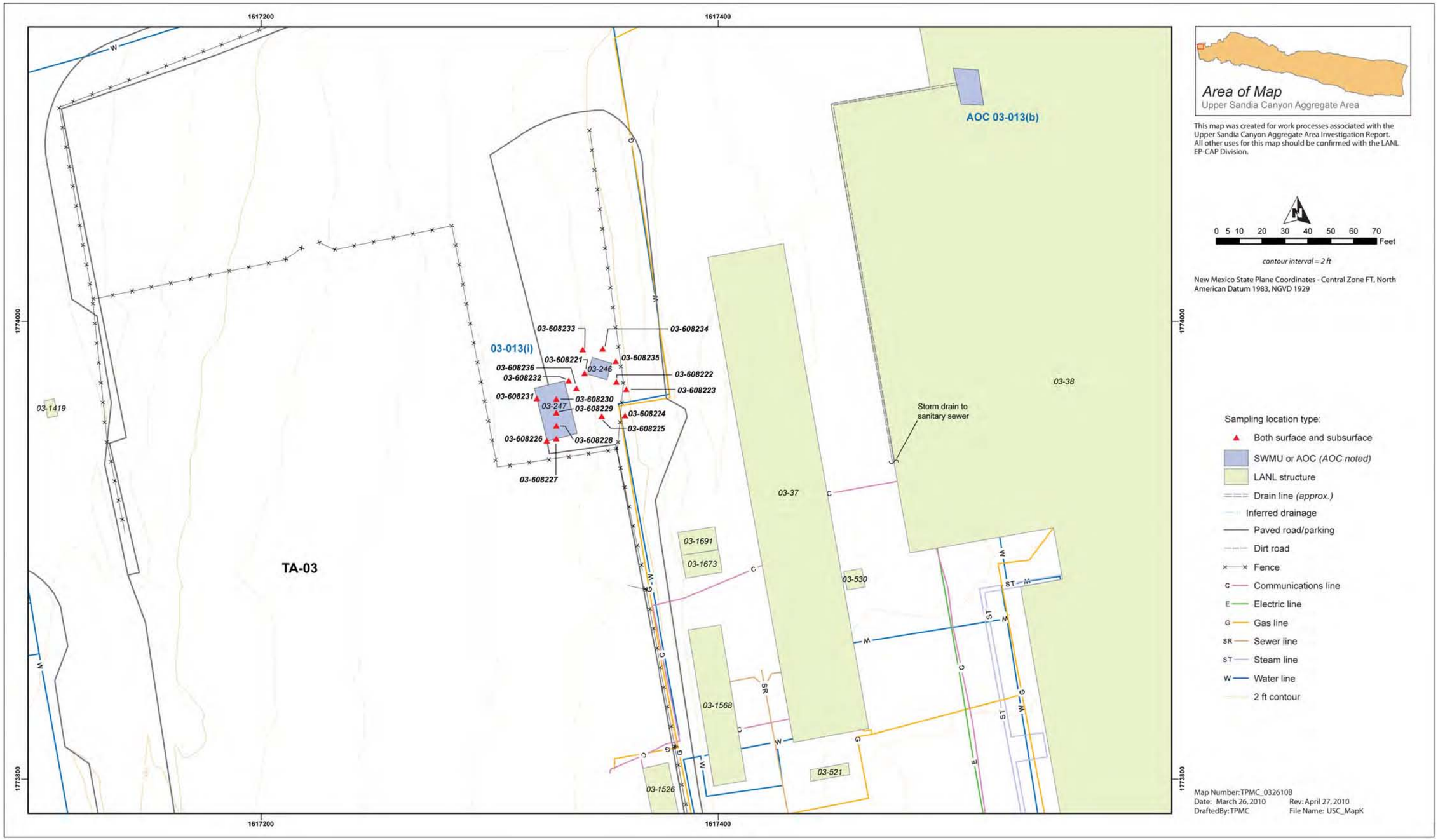



**Figure 6.12-1 Site map of SWMU 03-013(i) and AOC 03-013(b)**

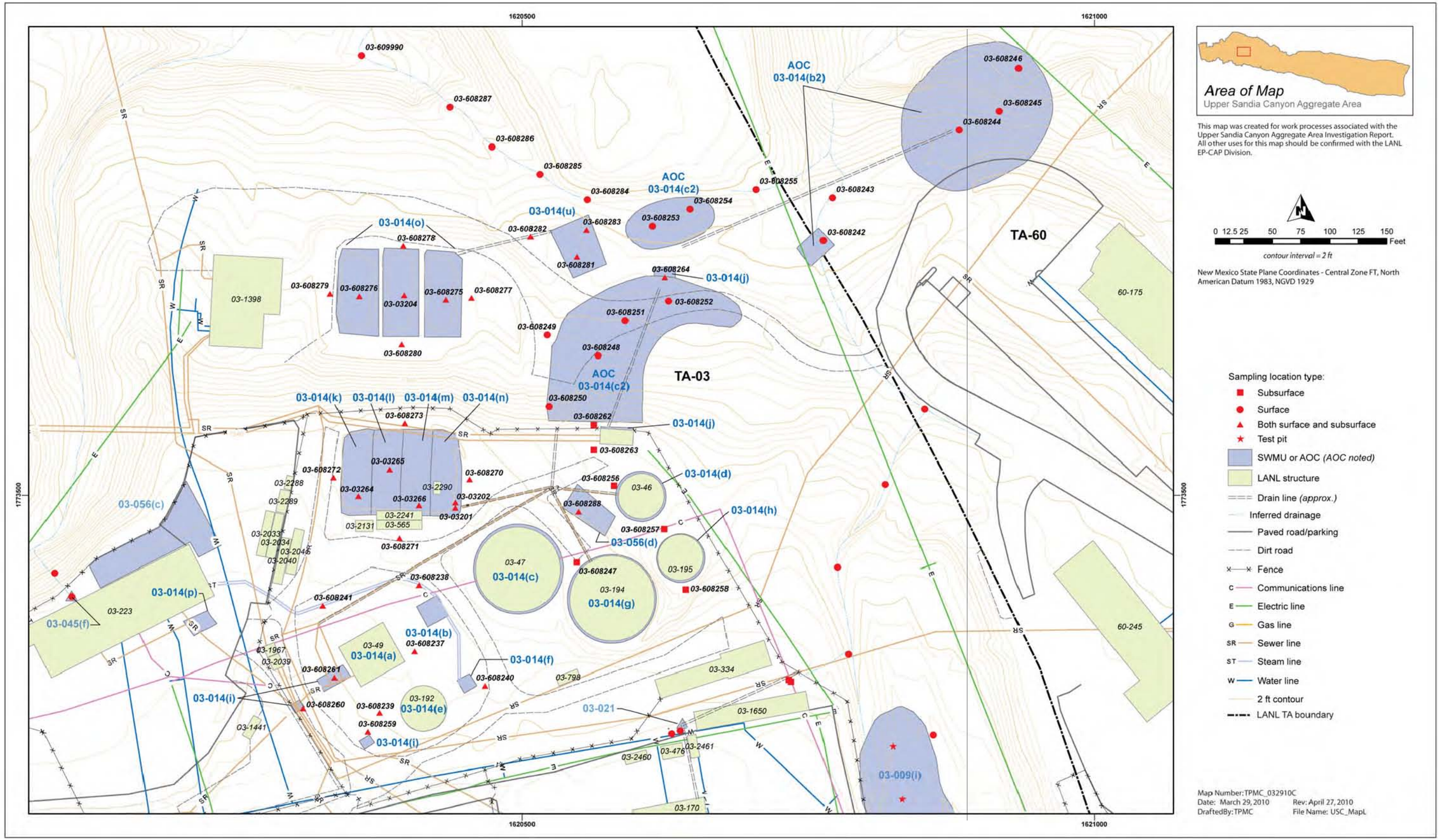



**Figure 6.14-1 Site map of SWMUs 03-014 (a–p,u) and 03-056(d) and AOCs 03-014(b2) and 03-014(c2)**

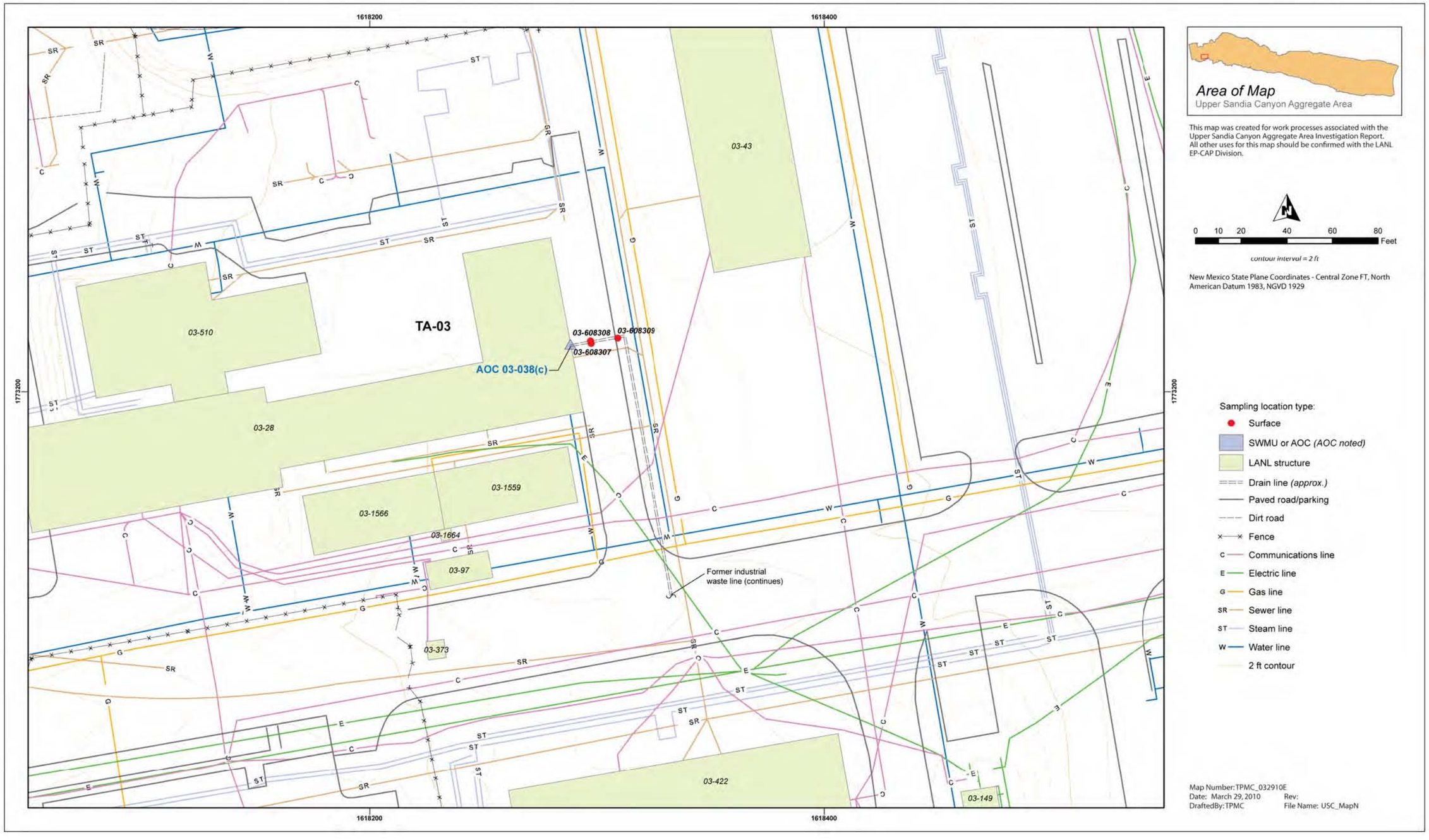



**Figure 6.25-1 Site map of AOC 03-038(c)**

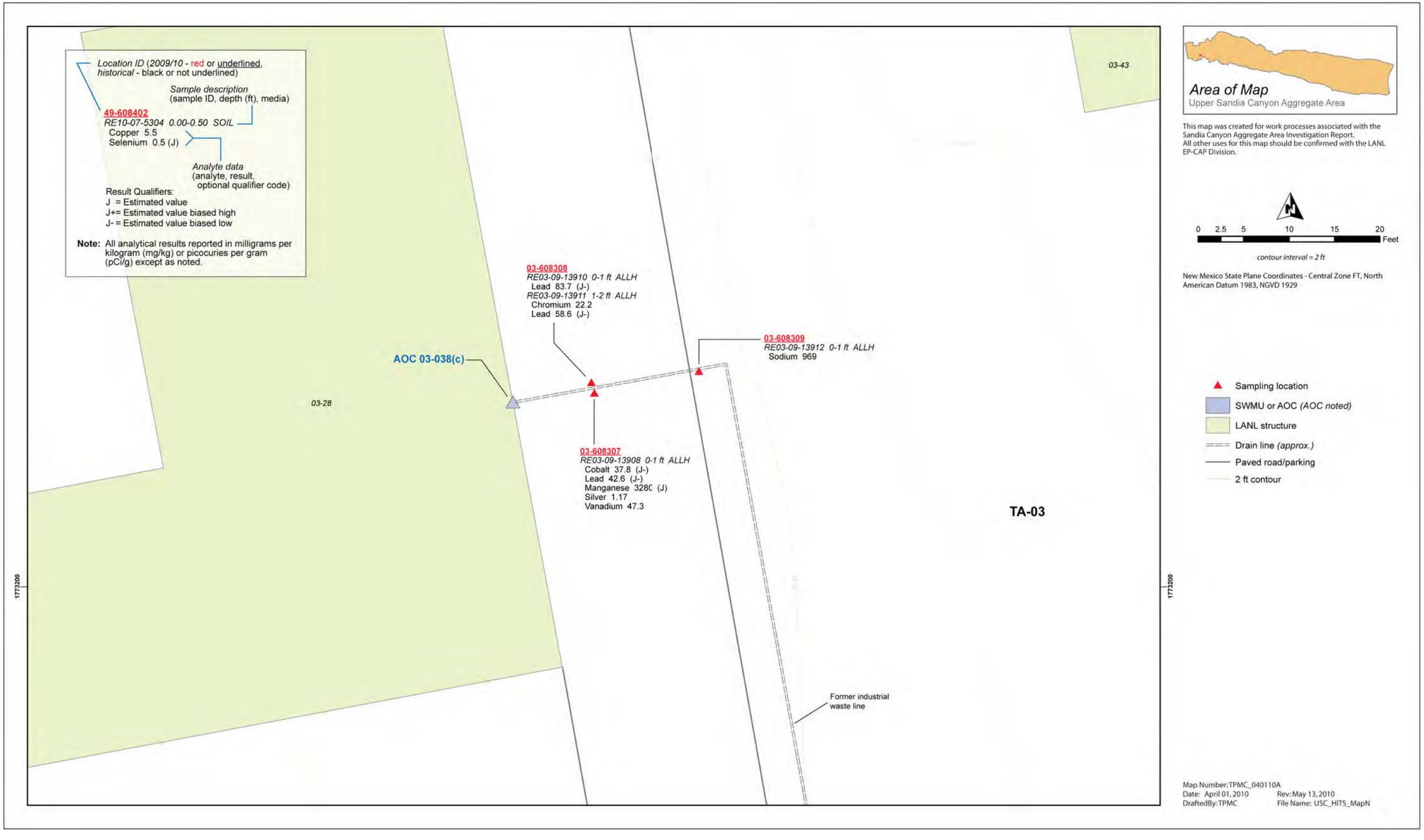



**Figure 6.25-2 Inorganic chemical concentrations detected or detected above BVs at AOC 03-038(c)**

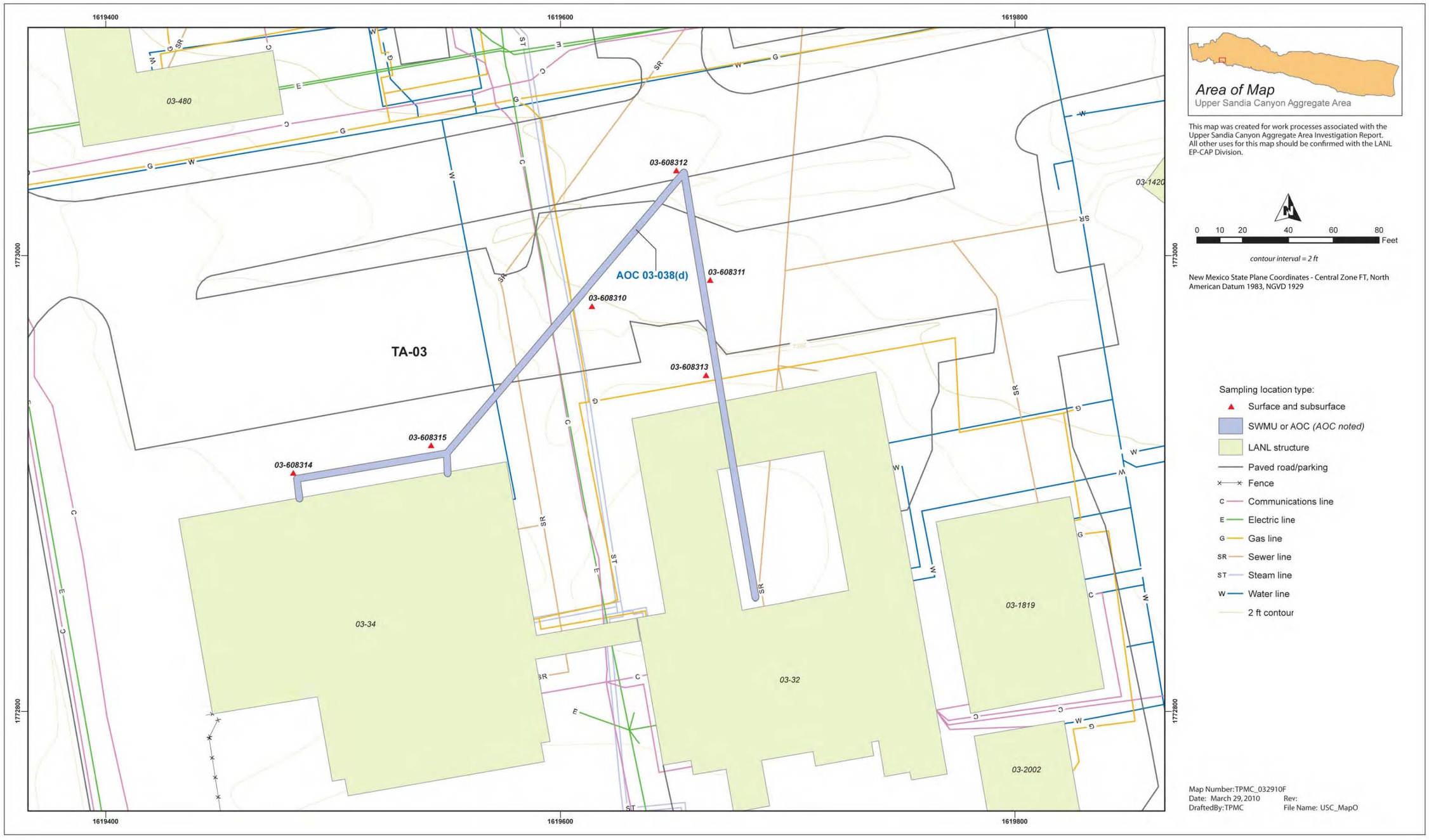



**Figure 6.26-1 Site map of AOC 03-038(d)**

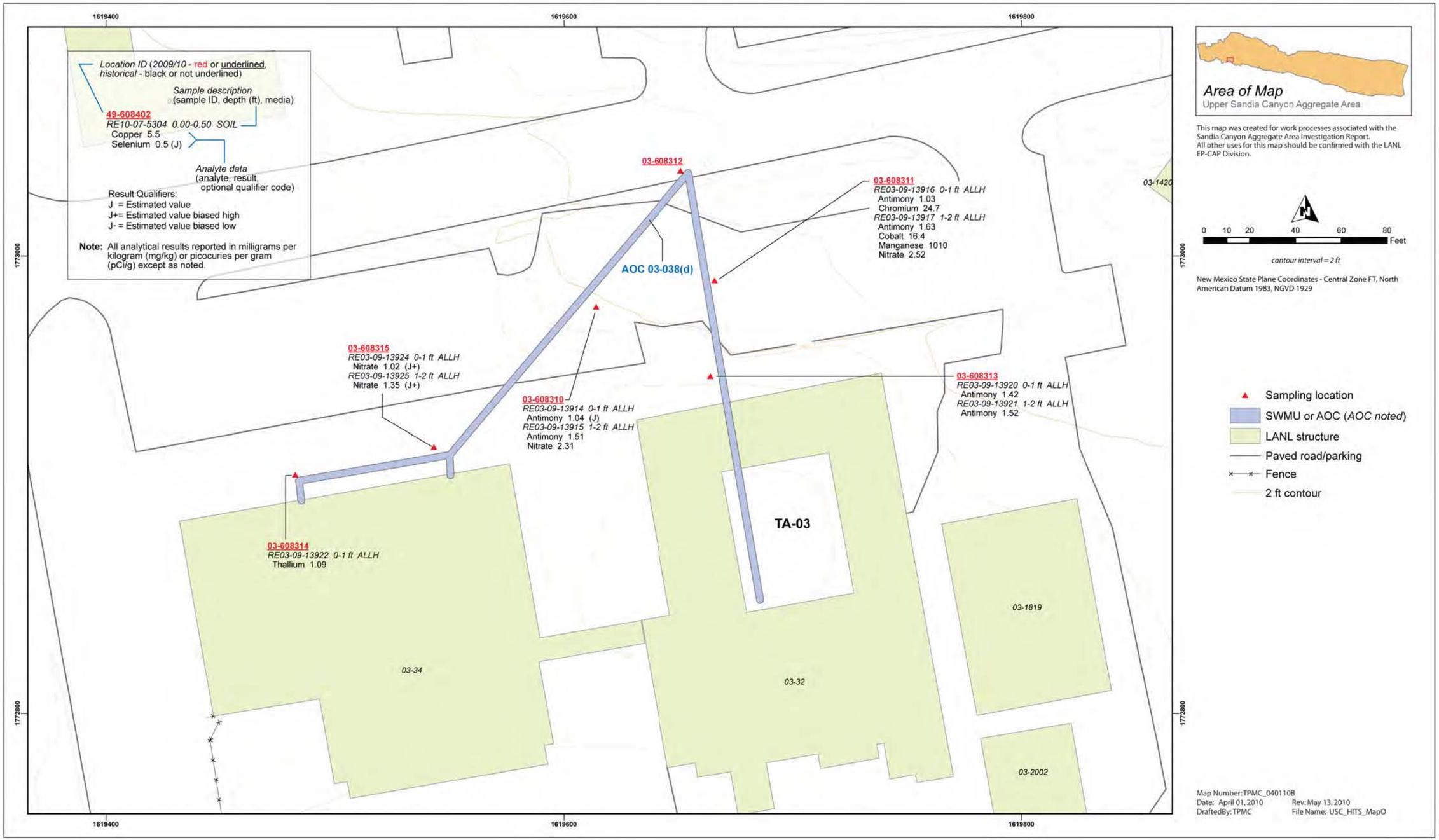



**Figure 6.26-2 Inorganic chemical concentrations detected or detected above BVs at AOC 03-038(d)**

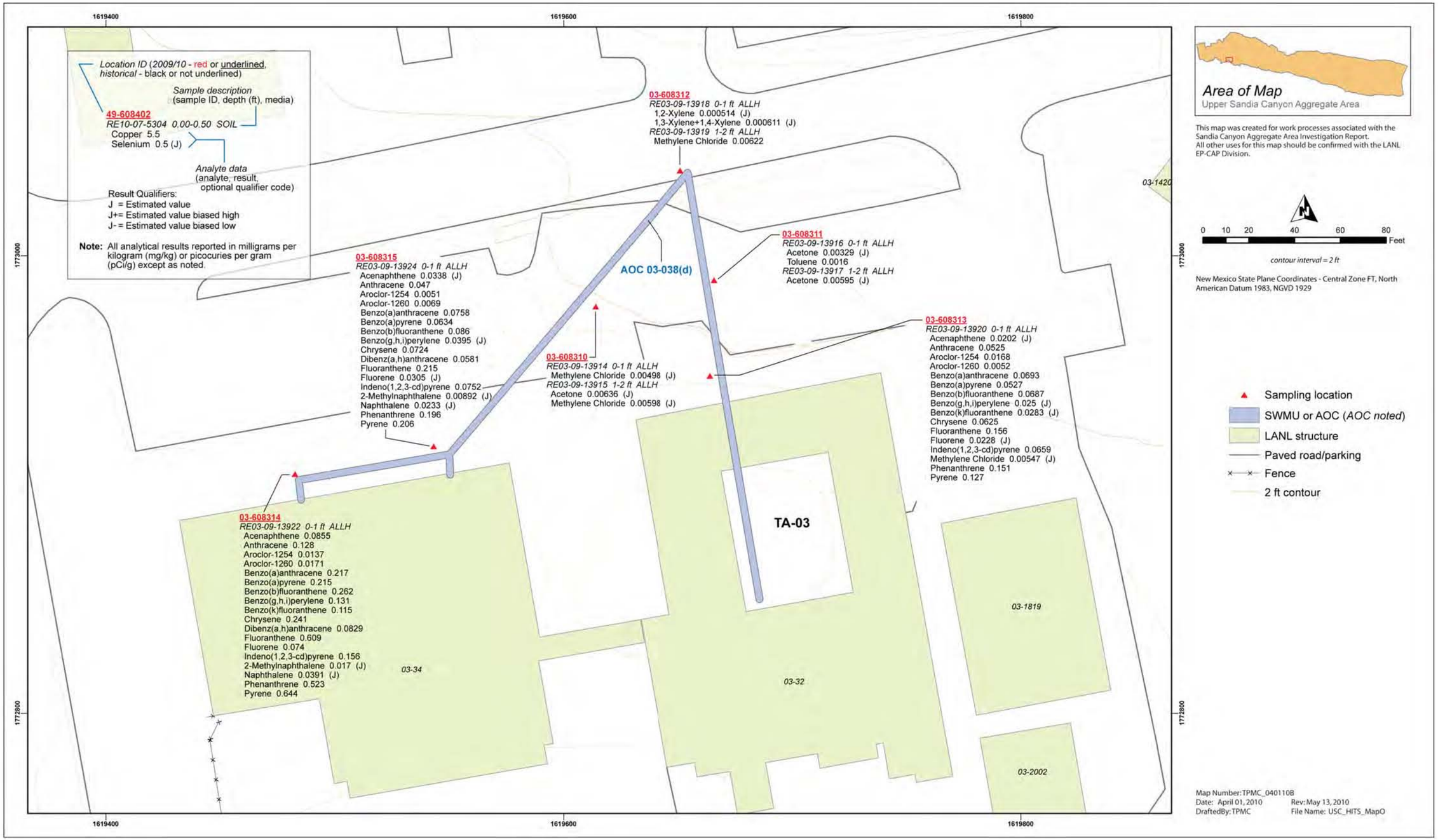



**Figure 6.26-3 Organic chemical concentrations detected at AOC 03-038(d)**

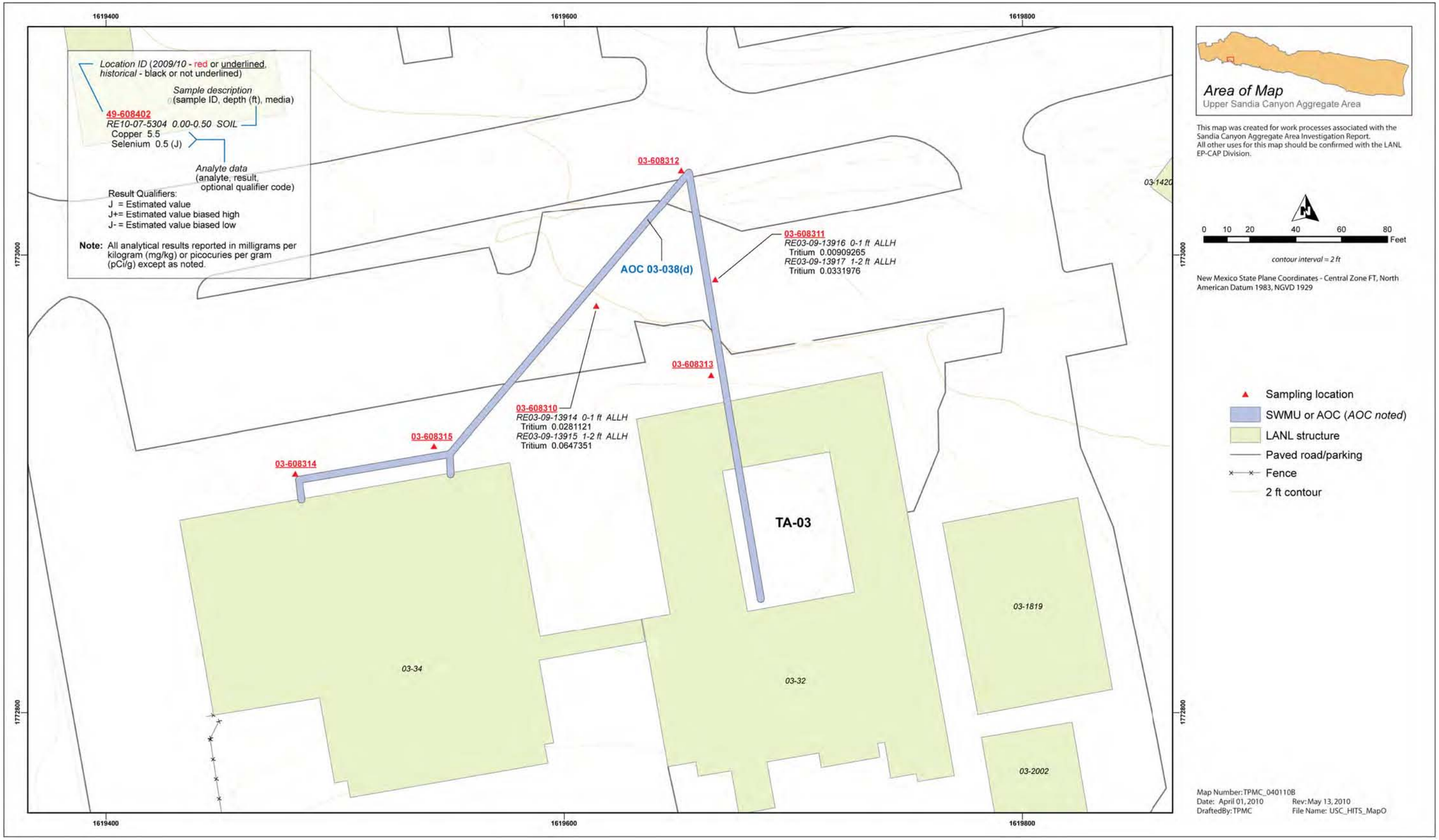



**Figure 6.26-4 Radionuclides detected or detected above BVs/FVs at AOC 03-038(d)**

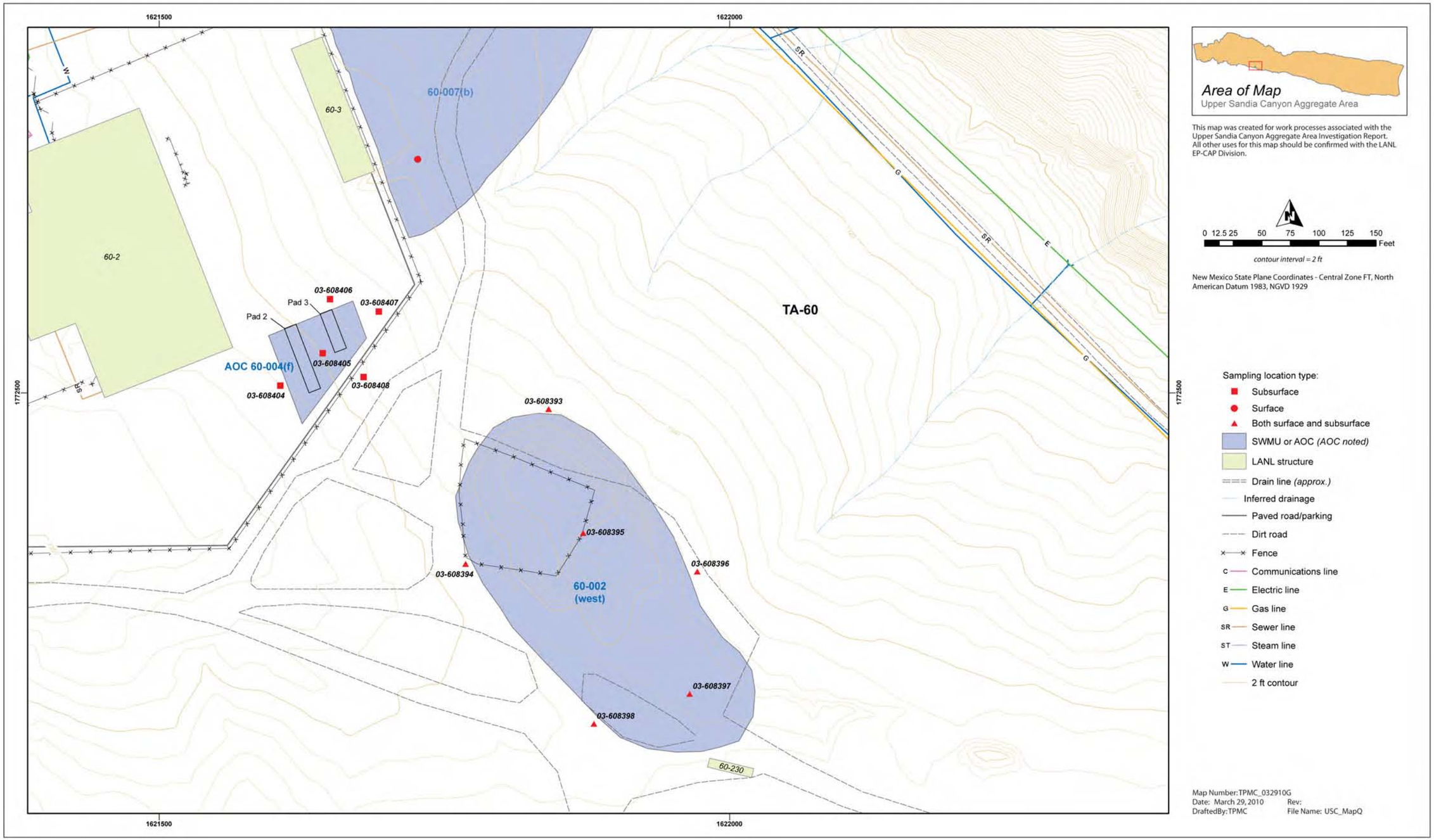



**Figure 7.2-1 Site map of SWMU 60-002 (west) and AOC 60-004(f)**

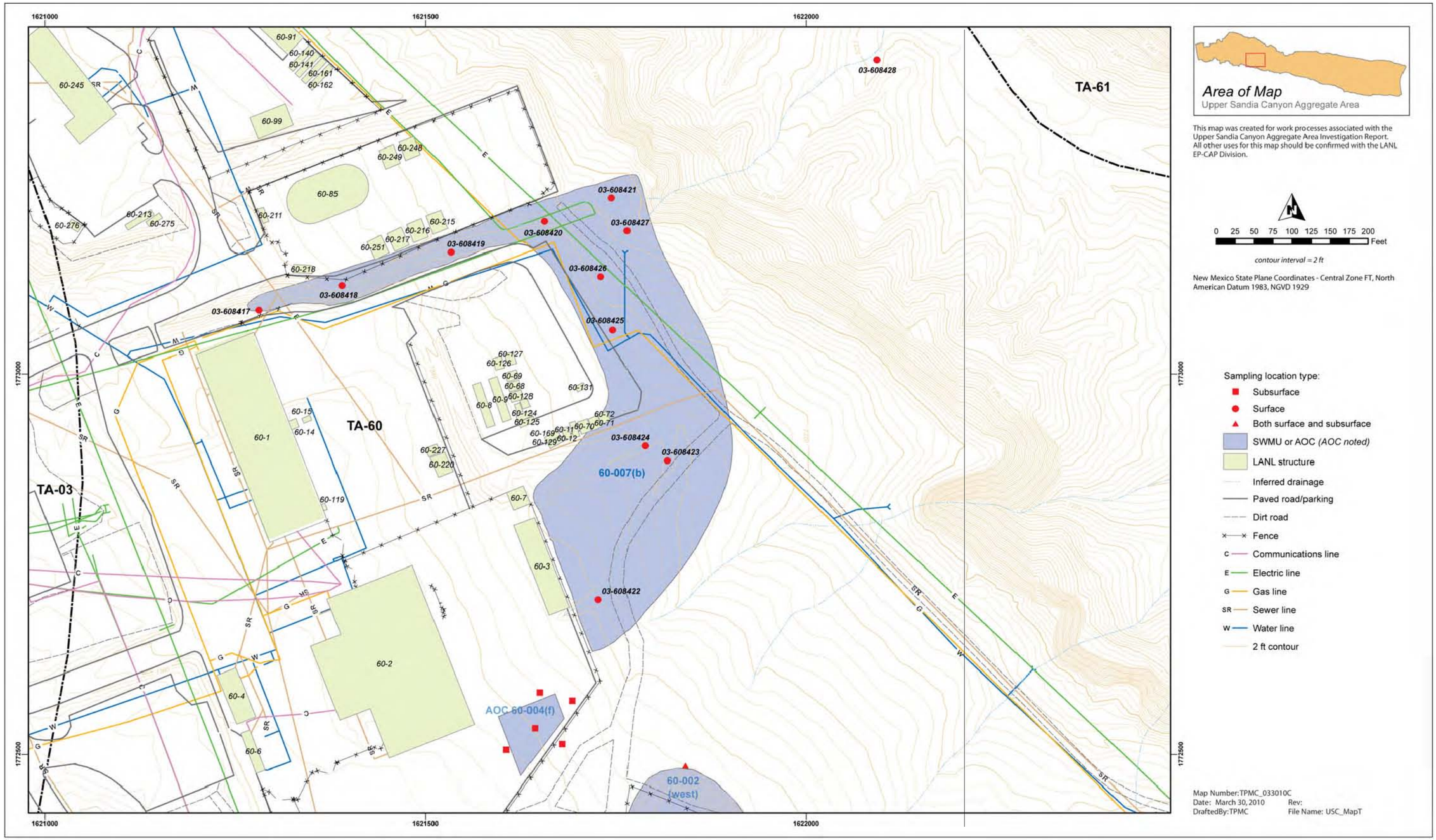



**Figure 7.2-2 Site map of SWMU 60-007(b)**

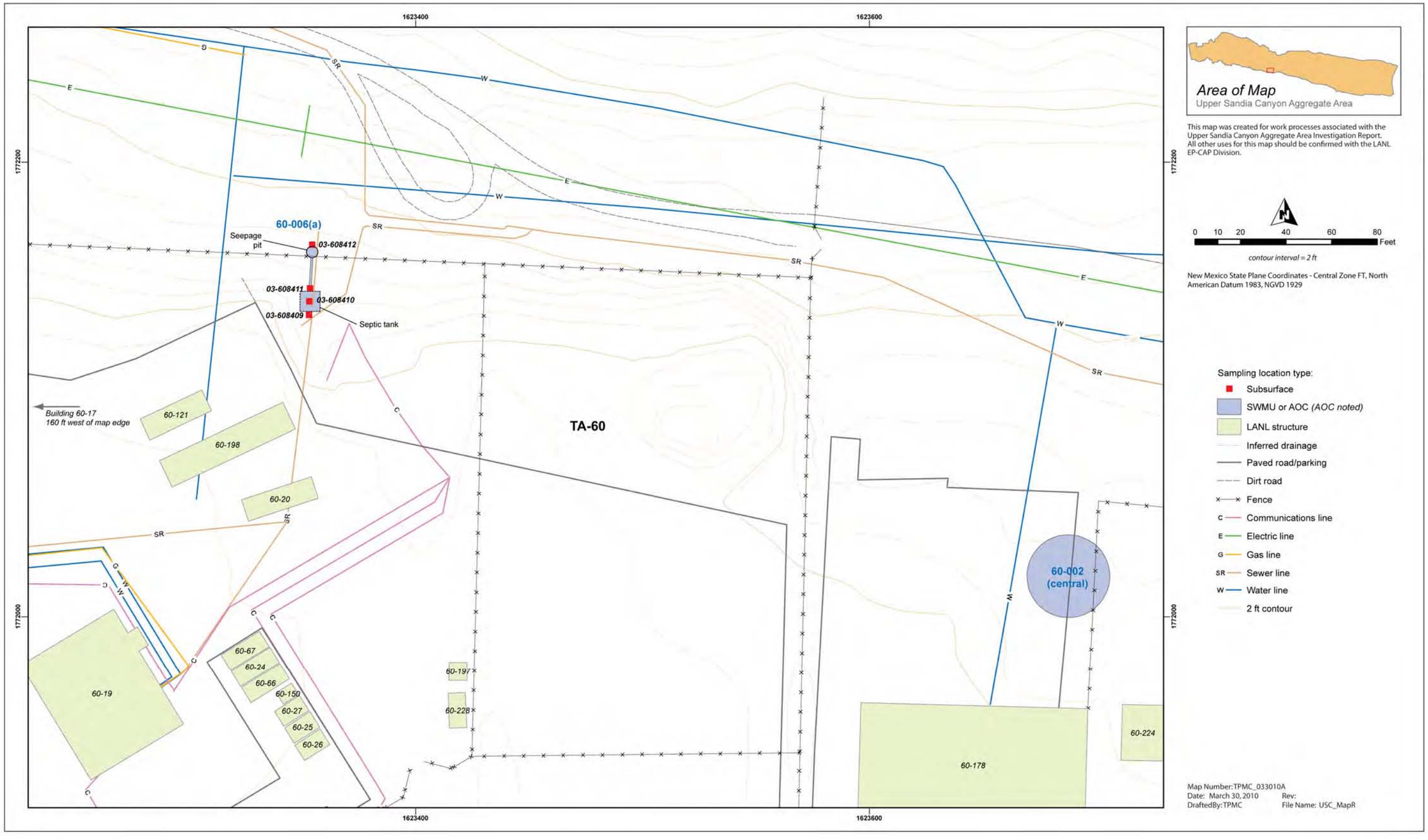



**Figure 7.2-3 Site map of SWMUs 60-002 (central) and 60-006(a)**

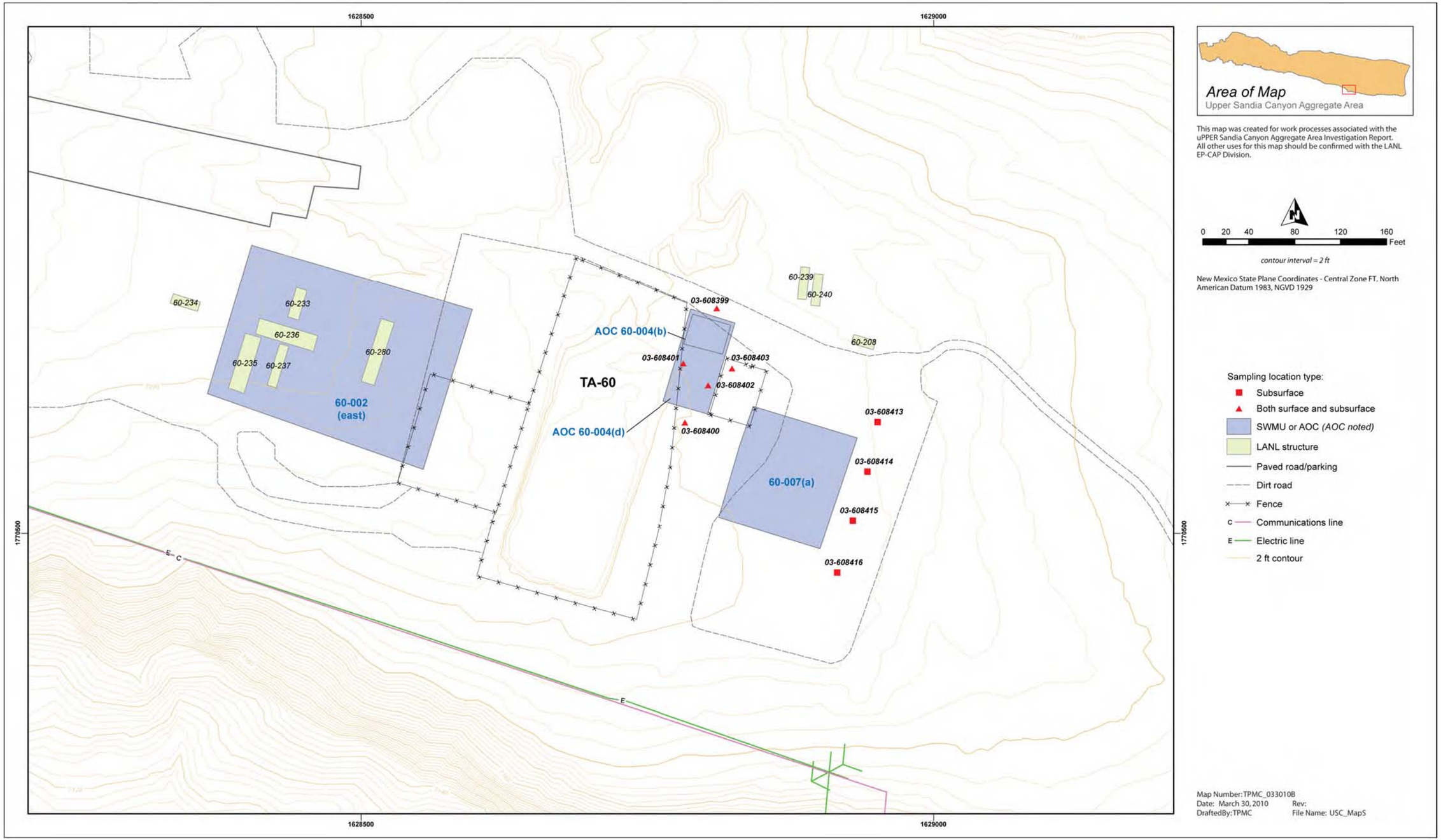



**Figure 7.2-4 Site map of SWMUs 60-002 (east) and 60-007(a) and AOCs 60-004(b) and 60-004(d)**

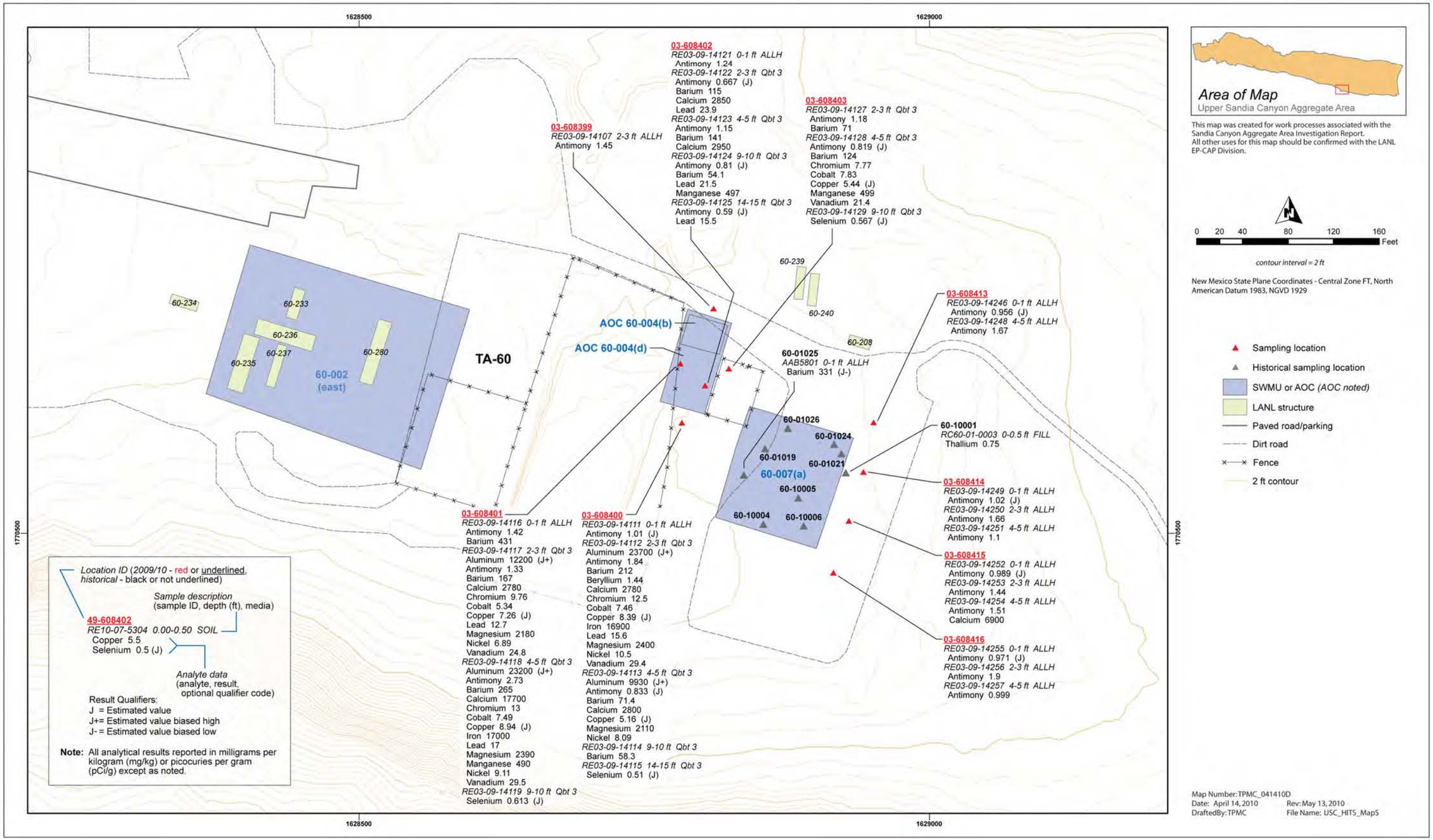



**Figure 7.3-1 Inorganic chemical concentrations detected or detected above BVs at SWMU 60-007(a) and AOCs 60-004(b) and 60-004(d)**

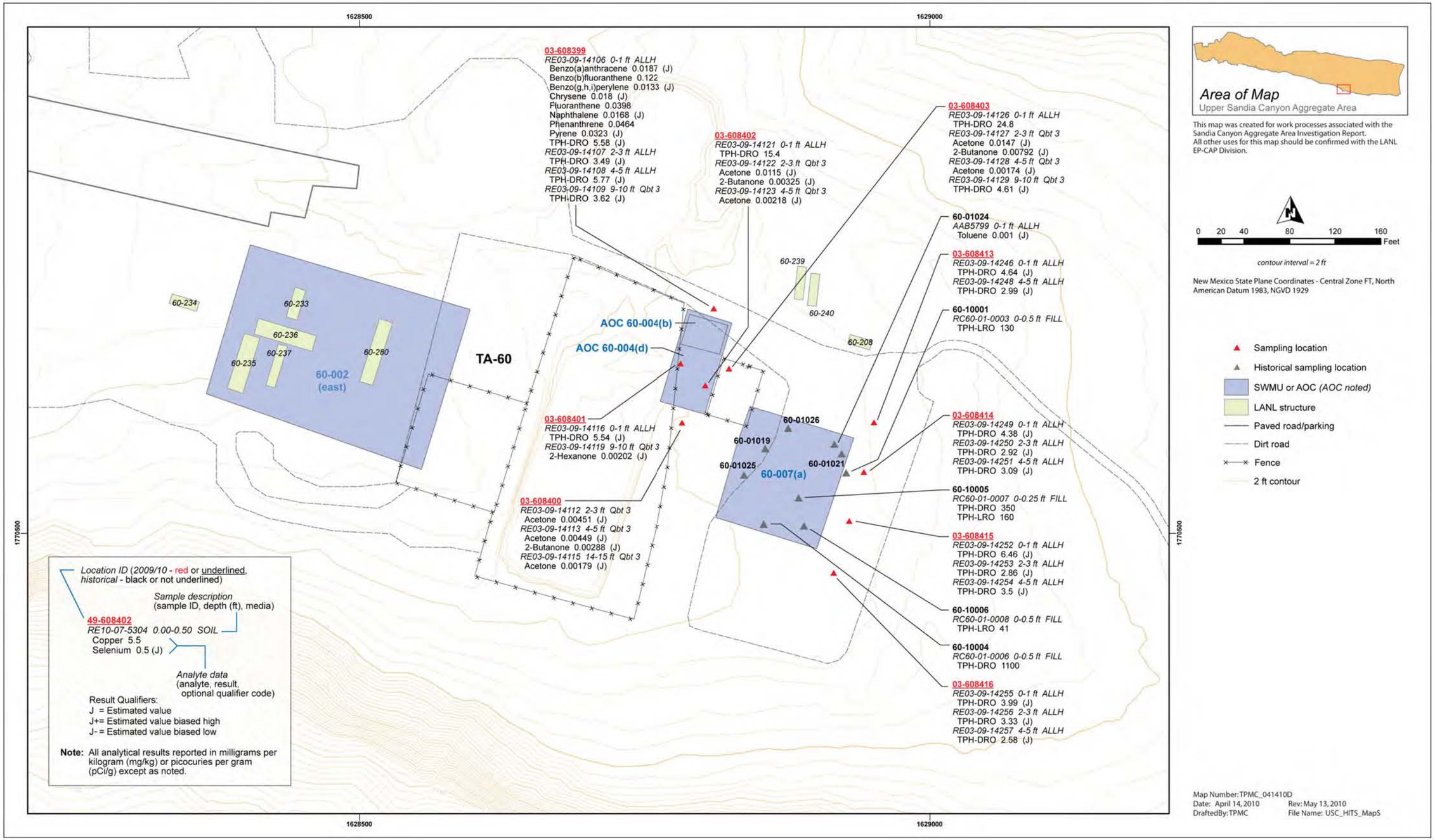



**Figure 7.3-2 Organic chemical concentrations detected at SWMU 60-007(a) and AOCs 60-004(b) and 60-004(d)**

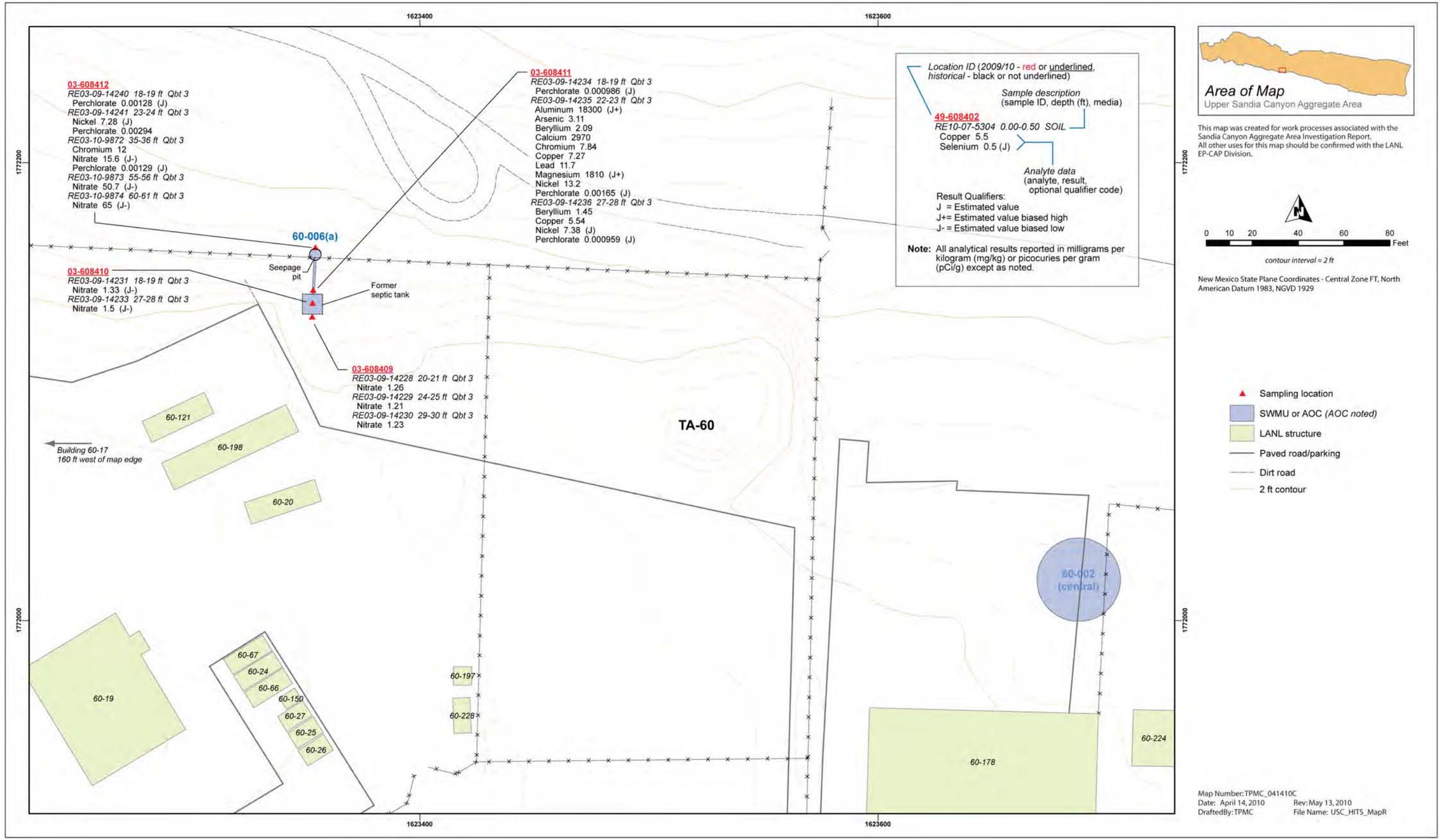



**Figure 7.6-2 Inorganic chemical concentrations detected or detected above BVs at SWMU 60-006(a)**

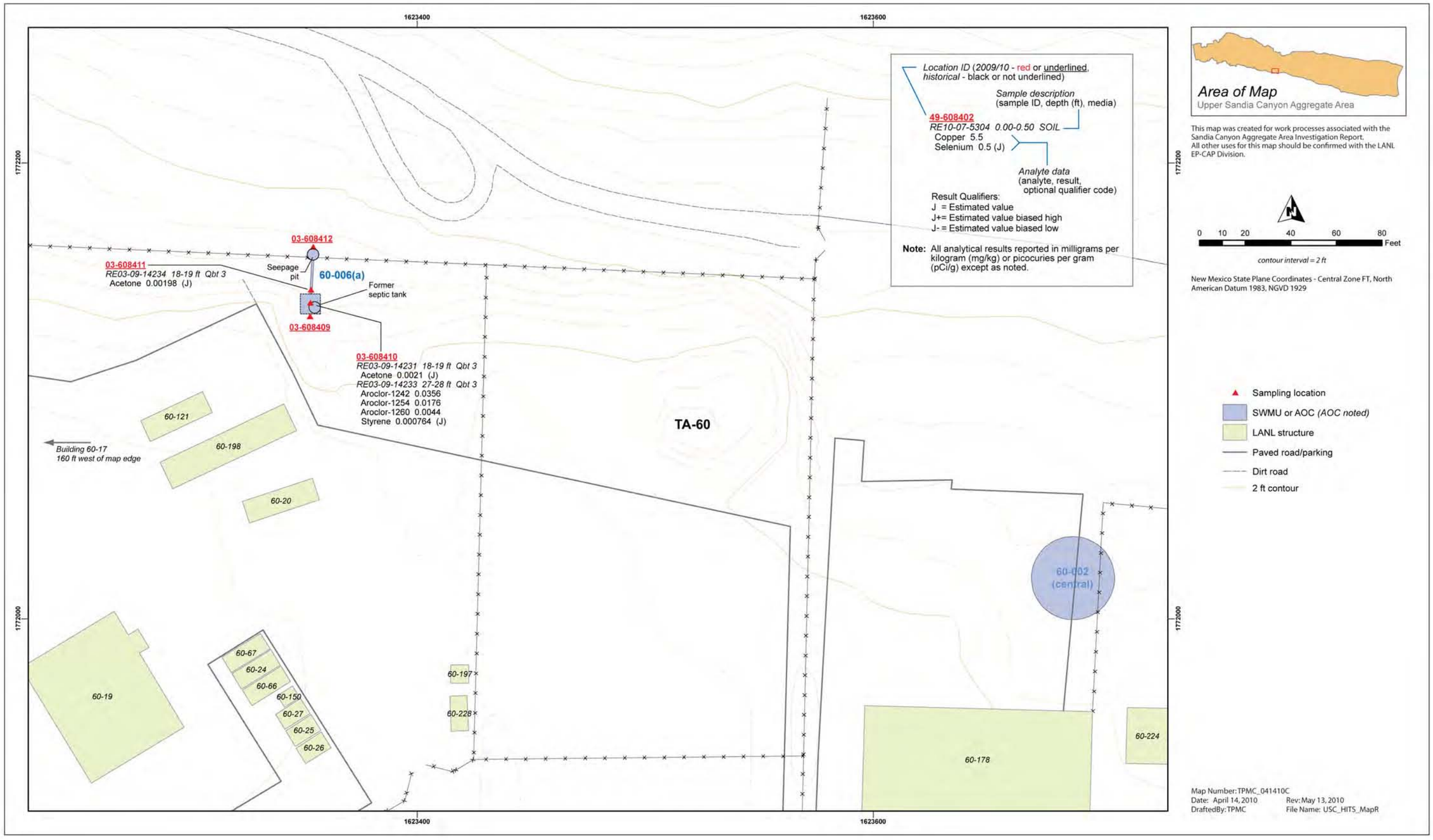



**Figure 7.6-3 Organic chemical concentrations detected at SWMU 60-006(a)**

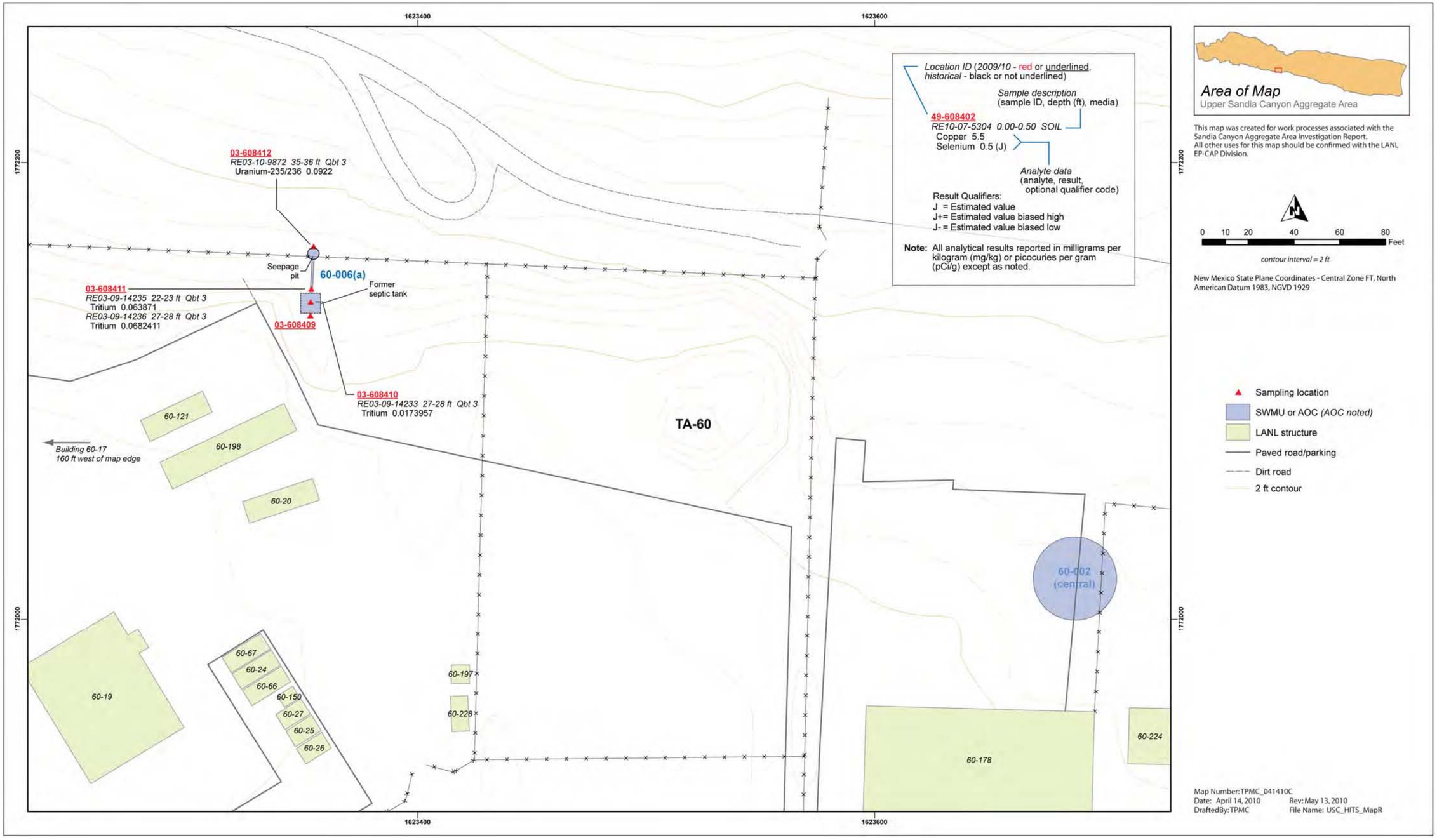



**Figure 7.6-4 Radionuclides detected or detected above BVs/FVs at SWMU 60-006(a)**

**Table 1.1-1**
**Sites under Investigation in Upper Sandia Canyon Aggregate Area**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| **TA-03** | | | | |
| | SWMU 03-002(c) | Former storage area used to store pesticides and herbicides | 1994 RFI | Sampled |
| | SWMU 03-003(c) | Equipment storage area—PCB only site—used to temporarily store used dielectric oils/capacitors | Samples collected 2001 | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-003(d) | Transformer pad—PCB only site—a concrete pad that formerly housed transformers | No RFI activity | Sampled |
| | AOC 03-003(f) | Transformer—PCB only site—an area of potential soil contamination | Samples collected 1995 | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-003(g) | Transformer area—PCB only storage site | No RFI activity | Swipes only; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-003(o) | Former non-PCB capacitor bank for Scyllac experiment | No RFI activity | None; nature and extent per the investigation work plan (LANL 2008, 103404) |
| Consolidated Unit 03-009(a)-00 | SWMU 03-009(a) | Surface disposal (soil fill) located at the canyon rim south of asphalt plant | 2003 RFI | Sampled |
| | SWMU 03-028 | Surface impoundment holding pond near asphalt plant | 2003 RFI | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-029 | Landfill near rim of Sandia Canyon south of building 03-0271 | No RFI activity | Sampled |
| | SWMU 03-036(a) | Potential soil contamination associated with aboveground tanks—two former product tanks at asphalt plant | No RFI activity | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-036(c) | Potential soil contamination associated with aboveground tank—former tank for cooled asphalt storage | Samples collected 2003 | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| Consolidated Unit 03-009(a)-00 (continued) | SWMU 03-036(d) | Potential soil contamination associated with aboveground tank—hot emulsion storage tank | Samples collected 2003 | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-043(b) | Aboveground tank, asphalt emulsion storage | Samples collected 2003 | None; nature and extent defined per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-043(d) | Duplicate of SWMU 03-036(a) | n/a* | n/a |
| | AOC 03-043(h) | Duplicate of SWMU 03-036(a) | n/a | n/a |
| | SWMU 03-045(g) | Storm drain, closed and locked formerly permitted outfall | Samples collected 2003 | Sampled |
| | SWMU 03-009(i) | Surface disposal site for construction debris | No RFI activity | Sampled |
| Consolidated Unit 03-012(b)-00 | SWMU 03-012(b) | Operational release and outfall associated with the power plant | 1994 RFI | Sampled |
| | SWMU 03-014(q) | Holding tank, former effluent tank | Soil and fill samples collected in the vicinity in 2002 and 2004 | Sampled |
| | SWMU 03-045(b) | Outfall currently NPDES permitted, receives effluent from cooling tower and other discharges from the TA-03 power plant | No RFI activity | Sampled |
| | SWMU 03-045(c) | Outfall currently NPDES permitted, receives effluent from cooling tower | No RFI activity | Sampled |
| Consolidated Unit 03-013(a)-00 | SWMU 03-013(a) | Storm drain, corrugated metal pipe | 1994 RFI | None; delayed until after D&D of building 03-0038 |
| | SWMU 03-052(f) | Outfall received wastewater from building 03-0038 | 1994 RFI | Sampled |
| | AOC 03-013(b) | Floor drains in basement of building 03-0038 | 1994 RFI | None; delayed until after D&D of building 03-0038 |
| | SWMU 03-013(i) | Operational release, oil contaminated soil and gravel | Samples collected 2005 | Sampled |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| Consolidated Unit 03-014(a)-99 | SWMU 03-014(a) | Structure associated with former WWTP, Imhoff tank | 1994 RFI | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(b) | Structure associated with former WWTP, the dosing siphon | Soil and fill samples collected in the vicinity during 1994 RFI | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-014(b2) | Outfall formerly permitted, received effluent from flow-measurement weir | 1994 RFI | Sampled |
| | SWMU 03-014(c) | Structure associated with former WWTP, trickling filter | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-014(c2) | Outfall, abandoned overflow, received effluent from WWTP | 1994 RFI | Sampled |
| | SWMU 03-014(d) | Structure associated with former WWTP, secondary clarifier | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(e) | Structure associated with former WWTP, Imhoff tank | 1994 RFI | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(f) | Structure associated with former WWTP, dosing siphon | Soil and fill samples collected in the vicinity during 1994 RFI | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(g) | Structure associated with former WWTP, trickling filter | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(h) | Structure associated with former WWTP, secondary clarifier | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| Consolidated Unit 03-014(a)-99 continued | SWMU 03-014(i) | Structure associated with former WWTP, splitter box, a comminutor, and bar screen | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(j) | Structure associated with former WWTP, chlorination system | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(k) | Structure associated with former WWTP, unlined sludge-drying bed | 1997 RFI | Sampled |
| | SWMU 03-014(l) | Structure associated with former WWTP, unlined sludge-drying bed | 1997 RFI | Sampled |
| | SWMU 03-014(m) | Structure associated with former WWTP, unlined sludge-drying bed | 1997 RFI | Sampled |
| | SWMU 03-014(n) | Structure associated with former WWTP, unlined sludge-drying bed | 1997 RFI | Sampled |
| | SWMU 03-014(o) | Structure associated with former WWTP, three lined sludge-drying bed | 1997 RFI | Sampled |
| | SWMU 03-014(p) | Structure associated with former WWTP, active lift station | No RFI activity | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(u) | Structure associated with former WWTP, former holding tank | No RFI activity | Sampled |
| | SWMU 03-056(d) | Drum storage, active site on northeast side of Plant 1 trickling filter | No RFI activity | Sampled |
| | SWMU 03-014(r) | Active lift station associated with former WWTP | No RFI activity | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-014(s) | Active lift station associated with former WWTP | No RFI activity | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-014(v) | Drain associated with former WWTP in former garage (building 03-0036) | Samples collected 1999 | None; nature and extent defined (LANL 2008, 103404) |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| | AOC 03-014(y) | Drain associated with former WWTP in basement of press building (03-0035) | No RFI activity | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| Consolidated Unit 03-015-00 | SWMU 03-015 | Outfall located between Eniwetok Drive and security fence northeast of building 03-0141 | 1994 RFI | Sampled |
| | AOC 03-053 | Operational facility, basement area of building 03-0141 | 1994 RFI | Sampled |
| | AOC C-03-016 | Oil metal bin, cleanout bin | Samples collected 2003 | Sampled |
| | SWMU 03-021 | Outfall located 60 ft north of building 03-0170 | 1997 RFI | Sampled |
| | AOC 03-027 | Lift wells, two concrete block-lined lift wells | Samples collected 1999 | None; nature and extent defined per investigation work plan (LANL 2008, 103404) |
| | AOC 03-036(b) | Former aboveground tanks that contained diesel fuel | Samples collected 2003 | Sampled |
| | SWMU 03-037 | Underground tanks, active concrete tank in basement of Sigma Building | 1991 interim action reconnaissance survey | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-038(c) | Waste lines, cast-iron piped rinse solution from copper electroplating | No RFI activity | Sampled |
| | AOC 03-038(d) | Waste lines, industrial line associated with liquid waste treatment system | No RFI activity | Sampled |
| | AOC 03-043(a) | Aboveground tank stored asphalt emulsion [duplicate of SWMUs 03-036(c) and 03-036(d)] | Soil and fill samples collected in the vicinity in 2003 | None; nature and extent defined per investigation work plan (LANL 2008, 103404) |
| | AOC 03-043(f) | Duplicate of SWMUs 03-036(c) and 03-036(d) | n/a | n/a |
| | AOC 03-043(g) | Duplicate of SWMUs 03-036(c) and 03-036(d) | n/a | n/a |
| | SWMU 03-045(a) | Outfall from building 03-0022 | No RFI activity | Sampled |
| | SWMU 03-045(e) | Outfall from drain in an oil pump house, 03-0057 | No RFI activity | Sampled; delayed characterization per the investigation work plan (LANL 2008, 103404) |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| | SWMU 03-045(f) | Outfall from sink in utilities control center building 03-0223 | No RFI activity | Sampled |
| | SWMU 03-045(h) | Outfall located at north perimeter of Sigma Complex | Soil and fill samples collected in the vicinity in 1997 RFI | Sampled; investigated under Upper Mortandad Canyon Aggregate Area Investigation (LANL 2009, 107495) |
| | AOC 03-047(d) | Storage area for containers for steam plant | 1995 VCA | None; nature and extent defined in a VCA report (LANL 1996, 053780) |
| | AOC 03-047(g) | Drum storage for three drums | No RFI activity | Sampled |
| | AOC 03-051(c) | Soil contamination from vacuum pump leaking | 1995 VCA | Sampled |
| | AOC 03-052(b) | Storm drainage 20 ft north and west of Sigma Building (03-0066) | 1997 RFI | Sampled |
| | SWMU 03-054(c) | Outfall, former cooling tower, and pump house | Samples collected 1992, 1993, 2001, 2004 | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | SWMU 03-056(a) | Storage area, inactive, used for oil accumulation | Samples collected 2001 | Sampled |
| | SWMU 03-056(c) | Transformer storage area—PCB only site north of utilities shop, building 03-0223 | Samples collected 1994, 1995, 1999, 2000, 2001 | None; nature and extent defined in a VCA report (LANL 2001, 071259) and approved by NMED (2002, 073363) |
| | AOC 03-056(h) | Container storage area near buildings 03-0105 and 03-0287 | No RFI activity | None; delayed characterization per the investigation work plan (LANL 2008, 103404) |
| | AOC 03-056(k) | Container storage area north side of loading dock at Sigma building 03-0066 | 1997 RFI | Sampled |
| | SWMU 03-056(l) | Storage area outside building 03-0141 | Samples collected 2003 | Sampled |
| Consolidated Unit 03-059-00 | AOC 03-003(n) | One-time spill—PCB only site | Samples collected 1994 | Sampled |
| | SWMU 03-059 | Storage area—PCB only site—former salvage yard | Samples collected 1994 | Sampled |
| | AOC C-03-022 | Kerosene tanker trailer used to store and distribute kerosene for asphalt plant | No RFI activity | Sampled |

**Table 1.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Previous Investigation(s) | 2009 Investigation |
|---|---|---|---|---|
| **TA-60** | | | | |
| | SWMU 60-002 | Storage areas on Sigma Mesa (west, central, east) | Samples collected 2003, 2004 | Sampled |
| | AOC 60-004(b) | Storage area for 12 containers of diesel sludge | 1994 RFI | Sampled |
| | AOC 60-004(d) | Storage area for dismantled underground storage tanks and contents | 1994 RFI | Sampled |
| | AOC 60-004(f) | Storage area bermed and used for new product storage | 1994 RFI | Sampled |
| | SWMU 60-006(a) | Septic system on Sigma Mesa | 1994 RFI | Sampled |
| | SWMU 60-007(a) | Release, equipment stored leaked oil | 1994 RFI, Samples collected 2001 | Sampled |
| | SWMU 60-007(b) | Release, storm drainage from motor pool building 03-0001 | 1994 RFI | Sampled |
| **TA-61** | | | | |
| | SWMU 61-002 | Transformer storage area—PCB only site located east of Radio Repair Shop 61-0023 | 1994 RFI, Samples collected 1997, 2005, 2006 | None; remediation completed (LANL 2007, 100722) |
| | SWMU 61-005 | Landfill, County Subtitle D | No RFI activity | None; closure under RCRA Subtitle D |
| | SWMU 61-006 | Waste oil tank, active, used oil recycling | No RFI activity | None; Regulated under 40 CFR 279 and 20.4.1.1002 NMAC |
| | AOC C-61-002 | Subsurface contamination, potentially petroleum-based | No RFI activity | Sampled |

Note: Shading denotes consolidated unit.

*n/a = Not applicable.

**Table 3.2-1**
**Surveyed Coordinates for Locations Sampled in 2009**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| **TA-03** | | | |
| SWMU 03-002(c) | 03-608145 | 1619560.793 | 1774455.771 |
| SWMU 03-002(c) | 03-608146 | 1619581.642 | 1774436.173 |
| SWMU 03-002(c) | 03-608147 | 1619598.739 | 1774459.107 |
| SWMU 03-002(c) | 03-608148 | 1619579.14 | 1774482.875 |
| SWMU 03-003(d) | 03-608149 | 1620775.689 | 1772584.634 |
| AOC 03-003(d) | 03-608150 | 1620770.765 | 1772596.511 |
| AOC 03-003(d) | 03-608151 | 1620793.324 | 1772591.777 |
| AOC 03-003(d) | 03-608161 | 1620775.243 | 1772579.053 |
| AOC 03-003(d) | 03-608162 | 1620778.368 | 1772609.411 |
| AOC 03-003(d) | 03-608172 | 1620788.86 | 1772572.58 |
| AOC 03-003(g) | 03-611413 | 1619972.092 | 1772537.801 |
| AOC 03-003(n) | 03-608368 | 1620135.155 | 1774507.804 |
| AOC 03-003(n) | 03-608369 | 1620134.424 | 1774498.848 |
| AOC 03-003(n) | 03-608370 | 1620133.693 | 1774488.978 |
| AOC 03-003(n) | 03-608371 | 1620132.962 | 1774479.291 |
| SWMU 03-009(a) | 03-608178 | 1619579.14 | 1774090.246 |
| SWMU 03-009(a) | 03-608179 | 1619658.784 | 1774086.493 |
| SWMU 03-009(a) | 03-608180 | 1619748.017 | 1774089.829 |
| SWMU 03-009(a) | 03-608181 | 1619749.685 | 1774053.969 |
| SWMU 03-009(a) | 03-608182 | 1619609.163 | 1774064.393 |
| SWMU 03-009(i) | 03-608190 | 1620888.9 | 1773156.838 |
| SWMU 03-009(i) | 03-608191 | 1620858.68 | 1773290.671 |
| SWMU 03-009(i) | 03-608192 | 1620848.606 | 1773143.167 |
| SWMU 03-009(i) | 03-608193 | 1620840.691 | 1773188.497 |
| SWMU 03-009(i) | 03-608194 | 1620832.057 | 1773234.547 |
| SWMU 03-009(i) | 03-608195 | 1620824.142 | 1773280.598 |
| SWMU 03-013(i) | 03-608221 | 1617341.478 | 1773977.533 |
| SWMU 03-013(i) | 03-608222 | 1617355.29 | 1773973.757 |
| SWMU 03-013(i) | 03-608223 | 1617359.662 | 1773970.578 |
| SWMU 03-013(i) | 03-608224 | 1617359.066 | 1773959.053 |
| SWMU 03-013(i) | 03-608225 | 1617348.931 | 1773958.854 |
| SWMU 03-013(i) | 03-608226 | 1617324.887 | 1773948.123 |
| SWMU 03-013(i) | 03-608227 | 1617329.06 | 1773949.117 |
| SWMU 03-013(i) | 03-608228 | 1617329.06 | 1773954.58 |
| SWMU 03-013(i) | 03-608229 | 1617329.06 | 1773960.265 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| SWMU 03-013(i) | 03-608230 | 1617329.06 | 1773966.309 |
| SWMU 03-013(i) | 03-608231 | 1617320.604 | 1773966.582 |
| SWMU 03-013(i) | 03-608232 | 1617334.519 | 1773974.403 |
| SWMU 03-013(i) | 03-608233 | 1617337.793 | 1773971.038 |
| SWMU 03-013(i) | 03-608234 | 1617349.329 | 1773988.189 |
| SWMU 03-013(i) | 03-608235 | 1617355.091 | 1773982.898 |
| SWMU 03-014(a) | 03-608237 | 1620405.974 | 1773363.576 |
| SWMU 03-014(a) | 03-608238 | 1620409.905 | 1773421.753 |
| SWMU 03-014(a) | 03-608239 | 1620375.313 | 1773310.116 |
| SWMU 03-014(a) | 03-608240 | 1620467.296 | 1773333.701 |
| SWMU 03-014(a) | 03-608241 | 1620325.784 | 1773403.671 |
| AOC 03-014(b2) | 03-608242 | 1620762.899 | 1773722.387 |
| AOC 03-014(b2) | 03-608243 | 1620770.761 | 1773760.124 |
| AOC 03-014(b2) | 03-608244 | 1620881.612 | 1773819.087 |
| AOC 03-014(b2) | 03-608245 | 1620916.99 | 1773835.597 |
| AOC 03-014(b2) | 03-608246 | 1620933.5 | 1773873.334 |
| SWMU 03-014(c) | 03-608247 | 1620547.486 | 1773441.171 |
| AOC 03-014(c2) | 03-608248 | 1620566.354 | 1773621.914 |
| AOC 03-014(c2) | 03-608249 | 1620521.542 | 1773639.996 |
| AOC 03-014(c2) | 03-608250 | 1620523.115 | 1773577.888 |
| AOC 03-014(c2) | 03-608251 | 1620589.94 | 1773652.575 |
| AOC 03-014(c2) | 03-608252 | 1620627.676 | 1773669.871 |
| AOC 03-014(c2) | 03-608253 | 1620613.525 | 1773735.123 |
| AOC 03-014(c2) | 03-608254 | 1620646.544 | 1773750.061 |
| AOC 03-014(c2) | 03-608255 | 1620703.936 | 1773767.357 |
| SWMU 03-014(d) | 03-608256 | 1620580.052 | 1773508.33 |
| SWMU 03-014(d) | 03-608257 | 1620623.745 | 1773470.26 |
| SWMU 03-014(d) | 03-608258 | 1620642.614 | 1773417.586 |
| SWMU 03-014(i) | 03-608259 | 1620364.86 | 1773293.298 |
| SWMU 03-014(i) | 03-608260 | 1620308.655 | 1773313.814 |
| SWMU 03-014(i) | 03-608261 | 1620336.004 | 1773340.776 |
| SWMU 03-014(j) | 03-608262 | 1620562.396 | 1773561.068 |
| SWMU 03-014(j) | 03-608263 | 1620562.396 | 1773539.365 |
| SWMU 03-014(j) | 03-608264 | 1620624.221 | 1773690.6 |
| SWMU 03-014(k) | 03-03201 | 1620441.352 | 1773489.128 |
| SWMU 03-014(k) | 03-03202 | 1620441.352 | 1773493.845 |
| SWMU 03-014(k) | 03-03264 | 1620356.44 | 1773499.35 |
| SWMU 03-014(k) | 03-03265 | 1620383.96 | 1773522.93 |
| SWMU 03-014(k) | 03-03266 | 1620409.9 | 1773491.49 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| SWMU 03-014(k) | 03-608270 | 1620441.352 | 1773489.128 |
| SWMU 03-014(k) | 03-608271 | 1620392.609 | 1773462.398 |
| SWMU 03-014(k) | 03-608272 | 1620335.218 | 1773515.858 |
| SWMU 03-014(k) | 03-608273 | 1620441.352 | 1773493.845 |
| SWMU 03-014(o) | 03-03204 | 1620396.73 | 1773674.66 |
| SWMU 03-014(o) | 03-608275 | 1620396.729 | 1773674.66 |
| SWMU 03-014(o) | 03-608276 | 1620357.399 | 1773673.918 |
| SWMU 03-014(o) | 03-608277 | 1620455.353 | 1773672.434 |
| SWMU 03-014(o) | 03-608278 | 1620395.987 | 1773717.7 |
| SWMU 03-014(o) | 03-608279 | 1620332.169 | 1773676.144 |
| SWMU 03-014(o) | 03-608280 | 1620394.503 | 1773631.62 |
| SWMU 03-014(q) | 03-608198 | 1619889.188 | 1773606.512 |
| SWMU 03-014(q) | 03-608199 | 1619914.231 | 1773702.639 |
| SWMU 03-014(q) | 03-608200 | 1619968.303 | 1773669.262 |
| SWMU 03-014(u) | 03-608281 | 1620547.815 | 1773708.721 |
| SWMU 03-014(u) | 03-608282 | 1620507.001 | 1773725.789 |
| SWMU 03-014(u) | 03-608283 | 1620555.978 | 1773731.725 |
| SWMU 03-014(u) | 03-608284 | 1620556.72 | 1773758.44 |
| SWMU 03-014(u) | 03-608285 | 1620515.164 | 1773780.702 |
| SWMU 03-014(u) | 03-608286 | 1620473.608 | 1773804.449 |
| SWMU 03-014(u) | 03-608287 | 1620436.504 | 1773839.326 |
| SWMU 03-014(u) | 03-609990 | 1620359.328 | 1773884.593 |
| SWMU 03-015 | 03-608289 | 1620767.976 | 1772792.516 |
| SWMU 03-015 | 03-608290 | 1620814.009 | 1772790.929 |
| SWMU 03-015 | 03-608291 | 1620798.929 | 1772773.071 |
| SWMU 03-015 | 03-608292 | 1620843.773 | 1772710.37 |
| SWMU 03-015 | 03-608293 | 1620810.835 | 1772677.829 |
| SWMU 03-015 | 03-608294 | 1620849.328 | 1772849.265 |
| SWMU 03-015 | 03-608295 | 1620943.38 | 1772902.441 |
| SWMU 03-015 | 03-608296 | 1620882.663 | 1772887.758 |
| SWMU 03-015 | 03-608297 | 1620791.786 | 1772709.577 |
| SWMU 03-015 | 03-608298 | 1620797.342 | 1772675.845 |
| AOC C-03-016 | 03-22533 | 1619378.99 | 1774401.56 |
| SWMU 03-021 | 03-611943 | na | na |
| SWMU 03-021 | 03-611944 | na* | na |
| SWMU 03-021 | 03-608299 | 1620784.911 | 1773361.207 |
| SWMU 03-021 | 03-608300 | 1620775.063 | 1773437.311 |
| SWMU 03-021 | 03-608301 | 1620817.144 | 1773509.834 |
| SWMU 03-021 | 03-608302 | 1620851.167 | 1773575.642 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| SWMU 03-021 | 03-608303 | 1620630.465 | 1773291.674 |
| SWMU 03-021 | 03-608304 | 1620638.075 | 1773294.057 |
| AOC C-03-022 | 03-608389 | 1619432.363 | 1774493.716 |
| AOC C-03-022 | 03-608390 | 1619468.641 | 1774484.125 |
| AOC C-03-022 | 03-608391 | 1619434.865 | 1774465.778 |
| AOC C-03-022 | 03-608392 | 1619402.336 | 1774475.606 |
| SWMU 03-029 | 03-608183 | 1620175.575 | 1774133.441 |
| SWMU 03-029 | 03-608184 | 1620326.776 | 1774165.5 |
| SWMU 03-029 | 03-608185 | 1620245.76 | 1774096.615 |
| SWMU 03-029 | 03-608186 | 1620264.823 | 1773996.58 |
| AOC 03-036(b) | 03-608305 | 1619426.109 | 1774129.275 |
| AOC 03-036(b) | 03-608306 | 1619449.46 | 1774120.102 |
| AOC 03-038(c) | 03-608307 | 1618288.942 | 1773219.247 |
| AOC 03-038(c) | 03-608308 | 1618288.518 | 1773221.297 |
| AOC 03-038(c) | 03-608309 | 1618308.99 | 1773223.689 |
| AOC 03-038(d) | 03-608310 | 1619614.055 | 1772977.967 |
| AOC 03-038(d) | 03-608311 | 1619666.01 | 1772989.409 |
| AOC 03-038(d) | 03-608312 | 1619651.166 | 1773037.343 |
| AOC 03-038(d) | 03-608313 | 1619664.154 | 1772947.657 |
| AOC 03-038(d) | 03-608314 | 1619482.623 | 1772904.674 |
| AOC 03-038(d) | 03-608315 | 1619543.236 | 1772916.734 |
| SWMU 03-045(a) | 03-608316 | 1619613.591 | 1773357.571 |
| SWMU 03-045(a) | 03-608317 | 1619629.471 | 1773336.031 |
| SWMU 03-045(a) | 03-608318 | 1619712.581 | 1773334.028 |
| SWMU 03-045(a) | 03-608319 | 1619785.678 | 1773338.534 |
| SWMU 03-045(b) | 03-608197 | 1619888.643 | 1773383.981 |
| SWMU 03-045(c) | 03-608196 | 1619940.813 | 1773386.727 |
| SWMU 03-045(e) | 03-608320 | 1619768.866 | 1773903.439 |
| SWMU 03-045(f) | 03-608321 | 1620091.2 | 1773432.35 |
| SWMU 03-045(f) | 03-608322 | 1620106.196 | 1773411.651 |
| SWMU 03-045(g) | 03-22536 | 1619526.184 | 1774121.52 |
| SWMU 03-045(g) | 03-608187 | 1619541.195 | 1774180.314 |
| SWMU 03-045(g) | 03-608188 | 1619526.184 | 1774121.52 |
| AOC 03-047(g) | 03-608324 | 1620693.097 | 1772715.219 |
| AOC 03-047(g) | 03-608325 | 1620690.136 | 1772718.895 |
| AOC 03-047(g) | 03-608326 | 1620697.234 | 1772722.927 |
| AOC 03-047(g) | 03-608327 | 1620698.008 | 1772716.112 |
| AOC 03-051(c) | 03-608328 | 1620742.652 | 1772724.595 |
| AOC 03-051(c) | 03-608329 | 1620748.01 | 1772711.424 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| AOC 03-052(b) | 03-03286 | 1620325.6 | 1772879.5 |
| AOC 03-052(b) | 03-03291 | 1620130.16 | 1772930.75 |
| AOC 03-052(b) | 03-608330 | 1620428.521 | 1773111.142 |
| AOC 03-052(b) | 03-608331 | 1620454.912 | 1773192.19 |
| AOC 03-052(b) | 03-608332 | 1620401.63 | 1772989.484 |
| AOC 03-052(b) | 03-608333 | 1620429.771 | 1772988.256 |
| AOC 03-052(b) | 03-608334 | 1620336.429 | 1772970.338 |
| AOC 03-052(b) | 03-608335 | 1620279.758 | 1772960.337 |
| AOC 03-052(b) | 03-608336 | 1620201.001 | 1772947.003 |
| AOC 03-052(b) | 03-608337 | 1620141.413 | 1772949.919 |
| AOC 03-052(b) | 03-608338 | 1620118.77 | 1772949.642 |
| AOC 03-052(b) | 03-608340 | 1620151.413 | 1772869.496 |
| AOC 03-052(b) | 03-608341 | 1620151.413 | 1772853.661 |
| AOC 03-052(b) | 03-608343 | 1620397.268 | 1772907.833 |
| AOC 03-052(b) | 03-608344 | 1620405.602 | 1772889.914 |
| AOC 03-052(b) | 03-608345 | 1620308.927 | 1772891.998 |
| AOC 03-052(b) | 03-608346 | 1620329.762 | 1772894.915 |
| SWMU 03-052(f) | 03-608214 | 1618705.028 | 1774157.067 |
| SWMU 03-052(f) | 03-608215 | 1618726.645 | 1774182.009 |
| SWMU 03-052(f) | 03-608216 | 1618747.43 | 1774176.189 |
| SWMU 03-052(f) | 03-608217 | 1618757.822 | 1774207.782 |
| SWMU 03-052(f) | 03-608218 | 1618852.186 | 1774230.23 |
| SWMU 03-052(f) | 03-608219 | 1618981.053 | 1774216.928 |
| SWMU 03-052(f) | 03-608220 | 1618974.401 | 1774277.204 |
| SWMU 03-056(a) | 03-608347 | 1620198.76 | 1774541.068 |
| SWMU 03-056(a) | 03-608348 | 1620221.79 | 1774540.886 |
| SWMU 03-056(a) | 03-608349 | 1620247.743 | 1774530.65 |
| SWMU 03-056(a) | 03-608350 | 1620222.704 | 1774526.264 |
| SWMU 03-056(d) | 03-608288 | 1620549.058 | 1773485.984 |
| AOC 03-056(k) | 03-03281 | 1620182.11 | 1772807.16 |
| AOC 03-056(k) | 03-03290 | 1620172.52 | 1772794.38 |
| AOC 03-056(k) | 03-608351 | 1620160.442 | 1772781.044 |
| AOC 03-056(k) | 03-608352 | 1620165.442 | 1772808.824 |
| AOC 03-056(k) | 03-608353 | 1620180.444 | 1772765.487 |
| AOC 03-056(k) | 03-608354 | 1620186.555 | 1772820.492 |
| AOC 03-056(k) | 03-608355 | 1620203.223 | 1772804.935 |
| AOC 03-056(k) | 03-608356 | 1620237.671 | 1772846.049 |
| AOC 03-056(k) | 03-608357 | 1620289.342 | 1772826.048 |
| SWMU 03-056(l) | 03-608358 | 1620771.225 | 1772688.209 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| SWMU 03-056(l) | 03-608360 | 1620758.948 | 1772686.87 |
| SWMU 03-056(l) | 03-608362 | 1620768.77 | 1772671.691 |
| SWMU 03-056(l) | 03-608364 | 1620760.064 | 1772678.164 |
| SWMU 03-056(l) | 03-608366 | 1620760.957 | 1772670.798 |
| SWMU 03-059 | 03-608372 | 1620326.343 | 1774354.826 |
| SWMU 03-059 | 03-608373 | 1620323.743 | 1774280.309 |
| SWMU 03-059 | 03-608374 | 1620143.082 | 1774216.623 |
| SWMU 03-059 | 03-608375 | 1620303.381 | 1774203.626 |
| SWMU 03-059 | 03-608376 | 1619984.083 | 1774235.252 |
| SWMU 03-059 | 03-608377 | 1619974.985 | 1774291.14 |
| SWMU 03-059 | 03-608378 | 1619976.285 | 1774356.559 |
| SWMU 03-059 | 03-608379 | 1620131.385 | 1774340.529 |
| SWMU 03-059 | 03-608380 | 1620075.064 | 1774347.461 |
| SWMU 03-059 | 03-608381 | 1620197.67 | 1774334.897 |
| SWMU 03-059 | 03-608382 | 1620159.545 | 1774272.944 |
| SWMU 03-059 | 03-608383 | 1620212.401 | 1774255.614 |
| SWMU 03-059 | 03-608384 | 1620276.953 | 1774271.644 |
| SWMU 03-059 | 03-608385 | 1620031.306 | 1774275.11 |
| SWMU 03-059 | 03-608386 | 1620057.175 | 1774281.024 |
| SWMU 03-059 | 03-608387 | 1620276.52 | 1774326.232 |
| SWMU 03-059 | 03-608388 | 1620018.742 | 1774344.862 |
| **TA-60** | | | |
| SWMU 60-002 | 03-608393 | 1621841.361 | 1772485.915 |
| SWMU 60-002 | 03-608394 | 1621768.735 | 1772350.75 |
| SWMU 60-002 | 03-608395 | 1621871.718 | 1772377.648 |
| SWMU 60-002 | 03-608396 | 1621971.819 | 1772344.025 |
| SWMU 60-002 | 03-608397 | 1621965.095 | 1772237.103 |
| SWMU 60-002 | 03-608398 | 1621881.037 | 1772210.877 |
| AOC 60-004(b) | 03-608399 | 1628810.707 | 1770696.618 |
| AOC 60-004(b) | 03-608400 | 1628782.982 | 1770596.897 |
| AOC 60-004(b) | 03-608401 | 1628781.641 | 1770648.77 |
| AOC 60-004(b) | 03-608402 | 1628803.105 | 1770629.541 |
| AOC 60-004(b) | 03-608403 | 1628824.123 | 1770644.298 |
| AOC 60-004(f) | 03-608404 | 1621606.038 | 1772506.392 |
| AOC 60-004(f) | 03-608405 | 1621643.486 | 1772534.478 |
| AOC 60-004(f) | 03-608406 | 1621649.869 | 1772581.926 |
| AOC 60-004(f) | 03-608407 | 1621692.636 | 1772571.075 |
| AOC 60-004(f) | 03-608408 | 1621679.231 | 1772513.839 |
| SWMU 60-006(a) | 03-608409 | 1623353.091 | 1772132.922 |

**Table 3.2-1 (continued)**

| SWMU/AOC | Location ID | Easting (ft) | Northing (ft) |
|---|---|---|---|
| SWMU 60-006(a) | 03-608410 | 1623353.222 | 1772138.828 |
| SWMU 60-006(a) | 03-608411 | 1623353.485 | 1772144.602 |
| SWMU 60-006(a) | 03-608412 | 1623354.534 | 1772160.713 |
| SWMU 60-007(a) | 03-608413 | 1628951.121 | 1770597.344 |
| SWMU 60-007(a) | 03-608414 | 1628942.178 | 1770553.968 |
| SWMU 60-007(a) | 03-608415 | 1628929.21 | 1770511.039 |
| SWMU 60-007(a) | 03-608416 | 1628915.794 | 1770465.874 |
| SWMU 60-007(b) | 03-608417 | 1621280.87 | 1773084.262 |
| SWMU 60-007(b) | 03-608418 | 1621390.308 | 1773116.842 |
| SWMU 60-007(b) | 03-608419 | 1621533.575 | 1773160.315 |
| SWMU 60-007(b) | 03-608420 | 1621656.168 | 1773200.866 |
| SWMU 60-007(b) | 03-608421 | 1621744.404 | 1773231.601 |
| SWMU 60-007(b) | 03-608422 | 1621726.773 | 1772704.438 |
| SWMU 60-007(b) | 03-608423 | 1621817.572 | 1772886.918 |
| SWMU 60-007(b) | 03-608424 | 1621788.481 | 1772906.312 |
| SWMU 60-007(b) | 03-608425 | 1621746.167 | 1773057.937 |
| SWMU 60-007(b) | 03-608426 | 1621730.299 | 1773128.461 |
| SWMU 60-007(b) | 03-608427 | 1621764.679 | 1773188.406 |
| SWMU 60-007(b) | 03-608428 | 1622093.301 | 1773413.4 |
| **TA-61** | | | |
| AOC-C-61-002 | 03-608429 | 1620110.168 | 1774658.649 |
| AOC-C-61-002 | 03-608430 | 1620066.633 | 1774639.43 |
| AOC-C-61-002 | 03-608431 | 1620103.368 | 1774629.094 |
| AOC-C-61-002 | 03-608432 | 1620094.737 | 1774604.378 |
| AOC-C-61-002 | 03-608433 | 1620136.061 | 1774618.109 |
| AOC-C-61-002 | 03-608429 | 1620110.168 | 1774658.649 |
| AOC-C-61-002 | 03-608430 | 1620066.633 | 1774639.43 |

*na = Not available.

**Table 3.2-2**
**Field-Screening Results for Samples Collected in 2009**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| **TA-03** | | | | | | |
| SWMU 03-002(c) | 03-608148 | 0.0–1.0 | RE03-09-13312 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608148 | 4.5–5.0 | RE03-09-13313 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608145 | 0.0–1.0 | RE03-10-4000 | 2.3 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608145 | 0.0–1.0 | RE03-09-13306 | 2.3 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608145 | 5.0–5.8 | RE03-09-13307 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608146 | 0.0–1.0 | RE03-09-13308 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608146 | 1.5–2.0 | RE03-09-13309 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608147 | 0.0–1.0 | RE03-09-13310 | 0.0 | 25.6 | 1860 |
| SWMU 03-002(c) | 03-608147 | 3.5–4.0 | RE03-09-13311 | 0.0 | 25.6 | 1860 |
| AOC 03-003(d) | 03-608149 | 0.0–0.0 | RE03-09-13314 | NC[a] | 19 | 1664 |
| AOC 03-003(d) | 03-608150 | 0.0–1.0 | RE03-09-13315 | 4.1 | 19 | 1664 |
| AOC 03-003(d) | 03-608150 | 0.0–1.0 | RE03-10-7696 | 4.1 | 19 | 1664 |
| AOC 03-003(d) | 03-608150 | 1.0–2.0 | RE03-09-13316 | 6.7 | 19 | 1664 |
| AOC 03-003(d) | 03-608161 | 0.0–1.0 | RE03-09-13387 | 0.5 | 19 | 1664 |
| AOC 03-003(d) | 03-608161 | 0.0–1.0 | RE03-10-7695 | 0.5 | 19 | 1664 |
| AOC 03-003(d) | 03-608161 | 1.0–2.0 | RE03-09-13388 | 4.6 | 19 | 1664 |
| AOC 03-003(d) | 03-608172 | 0.0–1.0 | RE03-09-13417 | 1.0 | 19 | 1664 |
| AOC 03-003(d) | 03-608172 | 1.0–2.0 | RE03-09-13418 | 8.4 | 19 | 1664 |
| AOC 03-003(d) | 03-608151 | 0.0–1.0 | RE03-09-13317 | 2.6 | 19 | 1664 |
| AOC 03-003(d) | 03-608151 | 1.0–2.0 | RE03-09-13318 | 1.6 | 19 | 1664 |
| AOC 03-003(d) | 03-608162 | 0.0–1.0 | RE03-09-13389 | 0.4 | 19 | 1664 |
| AOC 03-003(d) | 03-608162 | 1.0–2.0 | RE03-09-13390 | 2.7 | 19 | 1664 |
| AOC 03-003(g) | 03-611413 | n/a[b] | RE03-10-12113 | NC | 12 | 1551 |
| AOC 03-003(g) | 03-611413 | n/a | RE03-10-12114 | NC | 12 | 1551 |
| AOC 03-003(g) | 03-611413 | n/a | RE03-10-12115 | NC | 12 | 1551 |
| AOC 03-003(n) | 03-608368 | 0.0–1.0 | RE03-09-14040 | 1.7 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608368 | 1.0–2.0 | RE03-09-14041 | 1.9 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608369 | 0.0–1.0 | RE03-09-14042 | 1.1 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608369 | 1.0–2.0 | RE03-09-14043 | 6.1 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608370 | 0.0–1.0 | RE03-09-14044 | 0.0 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608370 | 1.0–2.0 | RE03-09-14045 | 14.2 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608371 | 0.0–1.0 | RE03-10-1986 | 1.1 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608371 | 0.0–1.0 | RE03-09-14046 | 1.1 | 25.1 | 1678 |
| AOC 03-003(n) | 03-608371 | 1.0–2.0 | RE03-09-14047 | 0.9 | 25.1 | 1678 |
| SWMU 03-009(a) | 03-608178 | 11.5–12.0 | RE03-09-13426 | 9.2 | 24 | 1662 |
| SWMU 03-009(a) | 03-608178 | 9.0–10 | RE03-09-13427 | 35.6 | 24 | 1662 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-009(a) | 03-608178 | 14.0–15.0 | RE03-09-13428 | 8.0 | 24 | 1662 |
| SWMU 03-009(a) | 03-608178 | 19.0–20.0 | RE03-09-13429 | 2.0 | 24 | 1662 |
| SWMU 03-009(a) | 03-608179 | 9.0–10.0 | RE03-09-13430 | 1.1 | 24 | 1662 |
| SWMU 03-009(a) | 03-608179 | 9.0–10.0 | RE03-10-2002 | 1.1 | 24 | 1662 |
| SWMU 03-009(a) | 03-608179 | 11.0–12.0 | RE03-09-13431 | 0.5 | 24 | 1662 |
| SWMU 03-009(a) | 03-608179 | 14.0–15.0 | RE03-09-13432 | 1.5 | 24 | 1662 |
| SWMU 03-009(a) | 03-608179 | 19.0–20.0 | RE03-09-13433 | 5.3 | 24.2 | 1655 |
| SWMU 03-009(a) | 03-608180 | 9.0–10.0 | RE03-09-13434 | 3.3 | <MDA[c] | <MDA |
| SWMU 03-009(a) | 03-608180 | 14.0–15.0 | RE03-09-13436 | 4.1 | <MDA | <MDA |
| SWMU 03-009(a) | 03-608180 | 19.0–20.0 | RE03-09-13437 | 4.0 | <MDA | <MDA |
| SWMU 03-009(a) | 03-608180 | 19.0–20.0 | RE03-10-2001 | 4.0 | <MDA | <MDA |
| SWMU 03-009(a) | 03-608182 | 0.0–1.0 | RE03-09-13440 | 11.7 | 25.6 | 1860 |
| SWMU 03-009(a) | 03-608182 | 1.0–2.0 | RE03-09-13441 | 0.0 | 25.6 | 1860 |
| SWMU 03-009(a) | 03-608181 | 0.0–1.0 | RE03-09-13438 | 0.0 | 25.6 | 1860 |
| SWMU 03-009(a) | 03-608181 | 1.0–2.0 | RE03-09-13439 | 5.1 | 25.6 | 1860 |
| SWMU 03-009(i) | 03-608195 | 4.0–5.0 | RE03-09-13471 | 0.0 | 44 | 1130 |
| SWMU 03-009(i) | 03-608195 | 9.0–10.0 | RE03-09-13472 | 0.0 | 44 | 1130 |
| SWMU 03-009(i) | 03-608194 | 4.0–5.0 | RE03-09-13469 | 5.6 | 44 | 1130 |
| SWMU 03-009(i) | 03-608194 | 9.0–10.0 | RE03-09-13470 | 9.9 | 44 | 1130 |
| SWMU 03-009(i) | 03-608193 | 4.0–5.0 | RE03-09-13467 | 450 | 67 | 1447 |
| SWMU 03-009(i) | 03-608193 | 9.0–10.0 | RE03-09-13468 | 0.2 | 67 | 1447 |
| SWMU 03-009(i) | 03-608192 | 4.0–5.0 | RE03-09-13465 | 56.5 | 67 | 1447 |
| SWMU 03-009(i) | 03-608192 | 4.0–5.0 | RE03-10-2003 | 56.5 | 67 | 1447 |
| SWMU 03-009(i) | 03-608192 | 9.0–10.0 | RE03-09-13466 | 5.0 | 67 | 1447 |
| SWMU 03-009(i) | 03-608190 | 0.0–1.0 | RE03-09-13461 | 0.0 | 16 | 1352 |
| SWMU 03-009(i) | 03-608190 | 1.0–2.0 | RE03-09-13462 | 0.0 | 16 | 1352 |
| SWMU 03-009(i) | 03-608191 | 0.0–1.0 | RE03-09-13463 | 0.0 | 16 | 1352 |
| SWMU 03-009(i) | 03-608191 | 1.0–2.0 | RE03-09-13464 | 0.0 | 16 | 1352 |
| SWMU 03-013(i) | 03-608221 | 0.0–1.0 | RE03-09-13566 | 9.1 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608221 | 4.0–5.0 | RE03-09-13567 | 2.4 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608227 | 0.0–1.0 | RE03-09-13578 | 0.8 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608227 | 4.0–5.0 | RE03-09-13579 | 0.4 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608228 | 0.0–1.0 | RE03-09-13580 | 2.1 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608228 | 4.0–5.0 | RE03-09-13581 | 1.6 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608229 | 0.0–1.0 | RE03-09-13582 | 2.4 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608229 | 4.0–5.0 | RE03-09-13583 | 0.0 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608230 | 0.0–1.0 | RE03-09-13584 | 0.3 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608230 | 4.0–5.0 | RE03-09-13586 | 0.0 | 52.3 | 1726 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-013(i) | 03-608231 | 0.0–1.0 | RE03-09-13585 | 0.3 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608231 | 4.0–5.0 | RE03-09-13587 | 0.1 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608232 | 0.0–1.0 | RE03-09-13588 | 2.5 | 11 | 1723 |
| SWMU 03-013(i) | 03-608232 | 0.0–1.0 | RE03-10-5327 | 2.5 | 11 | 1723 |
| SWMU 03-013(i) | 03-608232 | 4.0–5.0 | RE03-09-13589 | 3.6 | 11 | 1723 |
| SWMU 03-013(i) | 03-608233 | 0.0–1.0 | RE03-09-13591 | 3.2 | 11 | 1723 |
| SWMU 03-013(i) | 03-608233 | 4.0–5.0 | RE03-09-13595 | 2.3 | 11 | 1723 |
| SWMU 03-013(i) | 03-608233 | 0.0–1.0 | RE03-09-13590 | 2.3 | 11 | 1723 |
| SWMU 03-013(i) | 03-608233 | 4.0–5.0 | RE03-09-13592 | 3.5 | 11 | 1723 |
| SWMU 03-013(i) | 03-608234 | 0.0–1.0 | RE03-09-13593 | 3.8 | 11 | 1723 |
| SWMU 03-013(i) | 03-608234 | 0.0–1.0 | RE03-10-5328 | 3.8 | 11 | 1723 |
| SWMU 03-013(i) | 03-608234 | 4.0–5.0 | RE03-09-13596 | 4.7 | 11 | 1723 |
| SWMU 03-013(i) | 03-608235 | 0.0–1.0 | RE03-09-13594 | 7.4 | 11 | 1723 |
| SWMU 03-013(i) | 03-608235 | 4.0–5.0 | RE03-09-13597 | 4.9 | 11 | 1723 |
| SWMU 03-013(i) | 03-608222 | 0.0–1.0 | RE03-09-13568 | 43.4 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608222 | 4.0–5.0 | RE03-09-13569 | 4.0 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608222 | 0.0–1.0 | RE03-10-5325 | 43.4 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608223 | 0.0–1.0 | RE03-09-13570 | 7.1 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608223 | 4.0–5.0 | RE03-09-13571 | 4.1 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608224 | 0.0–1.0 | RE03-09-13572 | NC | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608224 | 4.0–5.0 | RE03-09-13573 | 0.5 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608225 | 0.0–1.0 | RE03-09-13574 | 13.2 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608225 | 0.0–1.0 | RE03-10-5326 | 13.2 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608225 | 4.0–5.0 | RE03-09-13575 | 0.5 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608226 | 0.0–1.0 | RE03-09-13576 | 0.6 | 52.3 | 1726 |
| SWMU 03-013(i) | 03-608226 | 4.0–5.0 | RE03-09-13577 | 0.6 | 52.3 | 1726 |
| SWMU 03-014(a) | 03-608241 | 0.0–1.0 | RE03-09-13610 | 5.5 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608241 | 1.0–2.0 | RE03-09-13611 | 0.5 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608241 | 2.0–3.0 | RE03-09-13609 | 0.0 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608238 | 0.0–1.0 | RE03-09-13601 | 0.8 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608238 | 1.0–2.0 | RE03-09-13602 | 0.7 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608237 | 0.0–1.0 | RE03-09-13598 | 0.8 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608237 | 0.0–1.0 | RE03-10-5456 | 0.8 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608237 | 1.0–2.0 | RE03-09-13599 | 0.2 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608237 | 2.0–3.0 | RE03-09-13600 | 0.8 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608240 | 0.0–1.0 | RE03-09-13607 | 0.4 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608240 | 1.0–2.0 | RE03-09-13608 | 0.1 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608239 | 0.0–1.0 | RE03-09-13604 | 0.6 | <MDA | <MDA |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-014(a) | 03-608239 | 1.0–2.0 | RE03-09-13605 | 0.3 | <MDA | <MDA |
| SWMU 03-014(a) | 03-608239 | 6.9–7.9 | RE03-09-13606 | 0.0 | <MDA | <MDA |
| AOC 03-014(b2) | 03-608242 | 0.0–1.0 | RE03-09-13618 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608242 | 0.0–1.0 | RE03-10-6084 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608242 | 1.0–2.0 | RE03-09-13619 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608243 | 0.0–1.0 | RE03-09-13620 | 4.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608243 | 1.0–2.0 | RE03-09-13621 | 2.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608243 | 1.0–2.0 | RE03-10-6085 | 2.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608244 | 0.0–1.0 | RE03-09-13622 | 0.5 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608244 | 1.0–2.0 | RE03-09-13623 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608245 | 0.0–1.0 | RE03-09-13624 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608245 | 1.0–2.0 | RE03-09-13625 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608246 | 0.0–1.0 | RE03-09-13626 | 0.0 | 26.7 | 1776 |
| AOC 03-014(b2) | 03-608246 | 1.0–2.0 | RE03-09-13627 | 0.0 | 26.7 | 1776 |
| SWMU 03-014(c) | 03-608247 | 0.0–1.0 | RE03-09-13628 | 1.9 | 41 | 1874 |
| SWMU 03-014(c) | 03-608247 | 5.5–6.5 | RE03-09-13629 | 0.9 | 41 | 1874 |
| SWMU 03-014(c) | 03-608247 | 8.5–9.5 | RE03-09-13630 | 3.8 | 41 | 1874 |
| AOC 03-014(c2) | 03-608250 | 0.0–1.0 | RE03-09-13635 | 0.8 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608250 | 1.0–2.0 | RE03-09-13636 | 8.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608248 | 0.0–1.0 | RE03-09-13631 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608248 | 1.0–2.0 | RE03-09-13632 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608248 | 1.0–2.0 | RE03-10-4796 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608249 | 0.0–1.0 | RE03-09-13633 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608249 | 1.0–2.0 | RE03-09-13634 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608251 | 0.0–1.0 | RE03-09-13637 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608251 | 1.0–2.0 | RE03-09-13638 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608252 | 0.0–1.0 | RE03-09-13639 | 0.2 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608252 | 1.0–2.0 | RE03-09-13640 | 0.0 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608253 | 0.0–1.0 | RE03-09-13641 | 1.6 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608253 | 2.0–3.0 | RE03-09-13642 | 96.5 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608254 | 0.0–1.0 | RE03-09-13643 | 12.3 | 80 | 2690 |
| AOC 03-014(c2) | 03-608254 | 0.0–1.0 | RE03-10-5458 | 12.3 | 80 | 2690 |
| AOC 03-014(c2) | 03-608254 | 2.0–3.0 | RE03-09-13644 | 0.9 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608255 | 0.0–1.0 | RE03-09-13645 | 0.2 | <MDA | <MDA |
| AOC 03-014(c2) | 03-608255 | 2.0–3.0 | RE03-09-13646 | 1.3 | <MDA | <MDA |
| SWMU 03-014(d) | 03-608257 | 2.0–3.0 | RE03-09-13650 | 0.0 | 71 | 1597 |
| SWMU 03-014(d) | 03-608257 | 2.0–3.0 | RE03-10-5455 | 0.0 | 71 | 1597 |
| SWMU 03-014(d) | 03-608257 | 7.0–8.0 | RE03-09-13651 | 4.8 | 71 | 1597 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-014(d) | 03-608257 | 10.0–11.0 | RE03-09-13652 | 4.9 | 71 | 1597 |
| SWMU 03-014(d) | 03-608258 | 0.5–1.5 | RE03-09-13653 | 13.6 | 71 | 1597 |
| SWMU 03-014(d) | 03-608258 | 5.5–6.5 | RE03-09-13654 | 1.2 | 71 | 1597 |
| SWMU 03-014(d) | 03-608258 | 10.0–11.0 | RE03-09-13655 | 1.3 | 71 | 1597 |
| SWMU 03-014(d) | 03-608256 | 0.0–1.0 | RE03-09-13647 | 0.0 | <MDA | <MDA |
| SWMU 03-014(d) | 03-608256 | 6.0–7.0 | RE03-09-13648 | 0.0 | <MDA | <MDA |
| SWMU 03-014(d) | 03-608256 | 14.0–15.0 | RE03-09-13649 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608260 | 0.0–1.0 | RE03-09-13660 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608260 | 3.0–4.0 | RE03-09-13661 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608260 | 8.0–9.0 | RE03-09-13662 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608260 | 8.0–9.0 | RE03-10-4956 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608261 | 0.0–1.0 | RE03-09-13664 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608261 | 2.0–3.0 | RE03-09-13665 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608261 | 7.0–8.0 | RE03-09-13666 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608259 | 0.0–1.0 | RE03-09-13656 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608259 | 3.0–4.0 | RE03-09-13657 | 0.0 | <MDA | <MDA |
| SWMU 03-014(i) | 03-608259 | 8.0–9.0 | RE03-09-13658 | 0.0 | <MDA | <MDA |
| SWMU 03-014(j) | 03-608263 | 2.0–3.0 | RE03-09-13721 | 0.0 | <MDA | <MDA |
| SWMU 03-014(j) | 03-608263 | NC | RE03-09-13722 | NC | na[d] | na |
| SWMU 03-014(j) | 03-608263 | 8.0–9.0 | RE03-09-13723 | 0.0 | <MDA | <MDA |
| SWMU 03-014(j) | 03-608262 | 0.5–1.5 | RE03-09-13718 | 7.1 | 41 | 1874 |
| SWMU 03-014(j) | 03-608262 | 4.0–5.0 | RE03-09-13719 | 2.4 | 41 | 1874 |
| SWMU 03-014(j) | 03-608262 | 9.0–10.0 | RE03-09-13720 | 1.7 | 41 | 1874 |
| SWMU 03-014(j) | 03-608264 | 0.0–1.0 | RE03-09-13724 | 1.2 | 80 | 2690 |
| SWMU 03-014(j) | 03-608264 | 2.0–3.0 | RE03-09-13725 | 1.8 | 80 | 2690 |
| SWMU 03-014(k) | 03-608270 | 0.0–1.0 | RE03-09-13726 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608270 | 3.0–4.0 | RE03-09-13727 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608270 | 8.0–9.0 | RE03-09-13728 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608273 | 0.0–1.0 | RE03-09-13729 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608273 | 3.0–4.0 | RE03-09-13730 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-03201 | 4.0–5.0 | RE03-09-13747 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03201 | 6.0–7.0 | RE03-09-13739 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03202 | 4.0–5.0 | RE03-09-13746 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03202 | 4.0–5.0 | RE03-10-5397 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03202 | 6.0–7.0 | RE03-09-13743 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03264 | 4.0–5.0 | RE03-09-13740 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03264 | 6.0–7.0 | RE03-09-13741 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03265 | 4.0–5.0 | RE03-09-13744 | 0.0 | 11 | 1723 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-014(k) | 03-03265 | 6.0–7.0 | RE03-09-13745 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03266 | 4.0–5.0 | RE03-09-13748 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-03266 | 6.0–7.0 | RE03-09-13749 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-608271 | 0.0–1.0 | RE03-09-13736 | 3.8 | 11 | 1723 |
| SWMU 03-014(k) | 03-608271 | 6.0–7.0 | RE03-09-13737 | 0.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-608271 | 11.0–12.0 | RE03-09-13738 | 1.0 | 11 | 1723 |
| SWMU 03-014(k) | 03-608272 | 0.0–1.0 | RE03-09-13732 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608272 | 3.0–4.0 | RE03-09-13733 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608272 | 8.0–9.0 | RE03-09-13734 | 0.0 | <MDA | <MDA |
| SWMU 03-014(k) | 03-608272 | 8.0–9.0 | RE03-10-4964 | 0.0 | <MDA | <MDA |
| SWMU 03-014(o) | 03-03204 | 5.0–6.0 | RE03-09-13755 | 1.3 | 67 | 1447 |
| SWMU 03-014(o) | 03-03204 | 3.0–4.0 | RE03-09-13754 | 0.5 | 67 | 1447 |
| SWMU 03-014(o) | 03-608276 | 5.0–6.0 | RE03-09-13757 | 0.6 | 67 | 1447 |
| SWMU 03-014(o) | 03-608276 | 3.0–4.0 | RE03-09-13756 | 0.8 | 67 | 1447 |
| SWMU 03-014(o) | 03-608275 | 5.0–6.0 | RE03-09-13753 | 0.0 | 67 | 1447 |
| SWMU 03-014(o) | 03-608275 | 3.0–4.0 | RE03-09-13752 | 0.3 | 67 | 1447 |
| SWMU 03-014(o) | 03-608275 | 3.0–4.0 | RE03-10-5525 | 0.3 | 67 | 1447 |
| SWMU 03-014(o) | 03-608277 | 0.0–1.0 | RE03-09-13758 | 2.9 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608277 | 1.0–2.0 | RE03-09-13759 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608277 | 0.0–1.0 | RE03-10-5523 | 2.9 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608277 | 4.0–5.0 | RE03-09-13760 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608277 | 6.0–7.0 | RE03-09-13761 | 2.8 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608280 | 0.0–1.0 | RE03-09-13766 | 5.0 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608280 | 1.0–2.0 | RE03-09-13767 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608280 | 6.0–7.0 | RE03-09-13770 | 0.0 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608280 | 4.0–5.0 | RE03-09-13771 | 2.0 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608279 | 0.0–1.0 | RE03-09-13768 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608279 | 0.0–1.0 | RE03-10-5524 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608279 | 1.0–2.0 | RE03-09-13769 | 3.1 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608279 | 4.0–5.0 | RE03-09-13772 | 5.0 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608279 | 6.0–7.0 | RE03-10-5897 | 0.0 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608278 | 0.0–1.0 | RE03-09-13762 | 2.7 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608278 | 1.0–2.0 | RE03-09-13763 | 3.2 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608278 | 4.0–5.0 | RE03-09-13764 | 2.1 | 64.9 | 1943 |
| SWMU 03-014(o) | 03-608278 | 6.0–7.0 | RE03-09-13765 | 2.8 | 64.9 | 1943 |
| SWMU 03-014(q) | 03-608199 | 0.0–1.0 | RE03-09-13484 | 9.2 | 25.1 | 1678 |
| SWMU 03-014(q) | 03-608199 | 1.0–2.0 | RE03-09-13485 | 24.1 | 25.1 | 1678 |
| SWMU 03-014(q) | 03-608200 | 0.0–1.0 | RE03-09-13486 | 0.0 | 25.1 | 1678 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-014(q) | 03-608200 | 1.0–2.0 | RE03-09-13487 | 0.0 | 25.1 | 1678 |
| SWMU 03-014(q) | 03-608198 | 0.0–1.0 | RE03-09-13482 | NC | 25.1 | 1678 |
| SWMU 03-014(q) | 03-608198 | 1.0–2.0 | RE03-09-13483 | 0.0 | 25.1 | 1678 |
| SWMU 03-014(q) | 03-608198 | 0.0–1.0 | RE03-10-4793 | NC | 25.1 | 1678 |
| SWMU 03-014(u) | 03-608281 | 0.0–1.0 | RE03-10-5491 | 0.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608281 | 1.0–2.0 | RE03-09-13779 | 0.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608281 | NC | RE03-09-13780 | NC | na | na |
| SWMU 03-014(u) | 03-608282 | 0.0–1.0 | RE03-09-13781 | 0.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608282 | NC | RE03-09-13782 | NC | na | na |
| SWMU 03-014(u) | 03-608282 | 3.5–4.5 | RE03-10-5490 | 0.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608283 | 0.0–1.0 | RE03-09-13783 | 2.7 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-608284 | 0.0–1.0 | RE03-09-13799 | 162 | 80 | 2690 |
| SWMU 03-014(u) | 03-608284 | 0.0–1.0 | RE03-10-5399 | 162 | 80 | 2690 |
| SWMU 03-014(u) | 03-608284 | 1.0–2.0 | RE03-09-13800 | 13.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608285 | 0.0–1.0 | RE03-09-13801 | 0.0 | 80 | 2690 |
| SWMU 03-014(u) | 03-608285 | 1.0–2.0 | RE03-09-13802 | 0.5 | 80 | 2690 |
| SWMU 03-014(u) | 03-608286 | 0.0–1.0 | RE03-09-13803 | 8.4 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-608286 | 0.0–1.0 | RE03-10-5493 | 8.4 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-608286 | 1.0–2.0 | RE03-09-13804 | 6.9 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-608287 | 0.0–1.0 | RE03-09-13805 | 35.3 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-608287 | 1.0–2.0 | RE03-09-13806 | 7.5 | 64.9 | 1943 |
| SWMU 03-014(u) | 03-609990 | 0.0–1.0 | RE03-10-5487 | 0.8 | 80 | 2690 |
| SWMU 03-014(u) | 03-609990 | 1.0–2.0 | RE03-10-5488 | 0.0 | 80 | 2690 |
| SWMU 03-015 | 03-608298 | 2.5–3.5 | RE03-09-13880 | 0.1 | 21 | 1884 |
| SWMU 03-015 | 03-608298 | 5.5–6.5 | RE03-09-13881 | 0.0 | 21 | 1884 |
| SWMU 03-015 | 03-608295 | 0.0–1.0 | RE03-09-13874 | 125 | 16 | 1352 |
| SWMU 03-015 | 03-608295 | 0.0–1.0 | RE03-10-6903 | 125 | 16 | 1352 |
| SWMU 03-015 | 03-608295 | 1.0–2.0 | RE03-09-13875 | 7.0 | 16 | 1352 |
| SWMU 03-015 | 03-608293 | 0.0–1.0 | RE03-09-13870 | 5.5 | 16 | 1352 |
| SWMU 03-015 | 03-608293 | 1.0–2.0 | RE03-09-13871 | 7.1 | 16 | 1352 |
| SWMU 03-015 | 03-608297 | 0.0–1.0 | RE03-09-13878 | 5.8 | 21 | 1884 |
| SWMU 03-015 | 03-608297 | 0.0–1.0 | RE03-10-6936 | 5.8 | 21 | 1884 |
| SWMU 03-015 | 03-608297 | 1.0–2.0 | RE03-09-13879 | 5.6 | 21 | 1884 |
| SWMU 03-015 | 03-608292 | 0.0–1.0 | RE03-09-13868 | 1.4 | 16 | 1352 |
| SWMU 03-015 | 03-608292 | 1.0–2.0 | RE03-09-13869 | 0.0 | 16 | 1352 |
| SWMU 03-015 | 03-608291 | 0.0–1.0 | RE03-09-13866 | 0.0 | 16 | 1352 |
| SWMU 03-015 | 03-608291 | 0.0–1.0 | RE03-10-6902 | 0.0 | 16 | 1352 |
| SWMU 03-015 | 03-608291 | 1.0–2.0 | RE03-09-13867 | 0.0 | 16 | 1352 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-015 | 03-608289 | 0.0–1.0 | RE03-09-13862 | 14.4 | 16 | 1352 |
| SWMU 03-015 | 03-608289 | 1.0–2.0 | RE03-09-13863 | 44.6 | 16 | 1352 |
| SWMU 03-015 | 03-608290 | 0.0–1.0 | RE03-09-13864 | 27.2 | 16 | 1352 |
| SWMU 03-015 | 03-608290 | 1.0–2.0 | RE03-09-13865 | 4.7 | 16 | 1352 |
| SWMU 03-015 | 03-608294 | 0.0–1.0 | RE03-09-13872 | 90.2 | 16 | 1352 |
| SWMU 03-015 | 03-608294 | 1.0–2.0 | RE03-09-13873 | 6.1 | 16 | 1352 |
| SWMU 03-015 | 03-608296 | 0.0–1.0 | RE03-09-13876 | 6.3 | 16 | 1352 |
| SWMU 03-015 | 03-608296 | 1.0–2.0 | RE03-09-13877 | 9.7 | 16 | 1352 |
| AOC-C-03-016 | 03-22533 | 4.0–5.0 | RE03-09-13882 | 0.0 | 14 | 1987 |
| AOC-C-03-016 | 03-22533 | 10.0–11.0 | RE03-09-13883 | 0.0 | 14 | 1987 |
| AOC-C-03-016 | 03-22533 | 19.0–20.0 | RE03-09-13884 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-03329 | 4.0–5.0 | RE03-09-13888 | 0.0 | 14 | 1828 |
| SWMU 03-021 | 03-03329 | 5.0–6.0 | RE03-09-13889 | 0.0 | 14 | 1828 |
| SWMU 03-021 | 03-03331 | 4.0–5.0 | RE03-09-13886 | 0.0 | 14 | 1828 |
| SWMU 03-021 | 03-03331 | 5.0–6.0 | RE03-09-13887 | 0.0 | 14 | 1828 |
| SWMU 03-021 | 03-608303 | 0.0–1.0 | RE03-10-4952 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608303 | 0.0–1.0 | RE03-09-13898 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608303 | 1.0.2.0 | RE03-09-13899 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608304 | 0.0–1.0 | RE03-09-13900 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608304 | 1.0–2.0 | RE03-09-13901 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608299 | 0.0–1.0 | RE03-09-13890 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608299 | 1.0–2.0 | RE03-09-13891 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608300 | 0.0–1.0 | RE03-09-13892 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608300 | 1.0–2.0 | RE03-09-13893 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608301 | 0.0–1.0 | RE03-09-13894 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608301 | 1.0–2.0 | RE03-09-13895 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608302 | 0.0–1.0 | RE03-09-13896 | 0.0 | 14 | 1987 |
| SWMU 03-021 | 03-608302 | 1.0–2.0 | RE03-09-13897 | 0.0 | 14 | 1987 |
| AOC-C-03-022 | 03-608389 | 1.0–2.0 | RE03-09-14082 | 0.0 | 18 | 1018 |
| AOC-C-03-022 | 03-608389 | 4.0–5.0 | RE03-09-14083 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608390 | 1.0–2.0 | RE03-10-1985 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608390 | 1.0–2.0 | RE03-09-14084 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608390 | 4.0–5.0 | RE03-09-14085 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608391 | 1.0–2.0 | RE03-09-14086 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608391 | 4.0–5.0 | RE03-09-14087 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608392 | 1.0–2.0 | RE03-09-14088 | NC | 0 | 88 |
| AOC-C-03-022 | 03-608392 | 4.0–5.0 | RE03-09-14089 | NC | 0 | 88 |
| SWMU 03-029 | 03-608183 | 0.5–1.0 | RE03-09-13442 | NC | 32.3 | 2190 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-029 | 03-608183 | 4.0–5.0 | RE03-09-13443 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608183 | 9.0–10.0 | RE03-09-13444 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608184 | 1.5–2.0 | RE03-09-13445 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608184 | 4.0–5.0 | RE03-09-13446 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608184 | 9.0–10.0 | RE03-09-13447 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608185 | 0.0–1.0 | RE03-09-13448 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608185 | 1.0–2.0 | RE03-09-13449 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608186 | 0.0–1.0 | RE03-09-13450 | NC | 32.3 | 2190 |
| SWMU 03-029 | 03-608186 | 1.0–2.0 | RE03-09-13451 | NC | 32.3 | 2190 |
| AOC 03-036(b) | 03-608305 | 14.0–15.0 | RE03-09-13902 | 0.0 | 12 | 1690 |
| AOC 03-036(b) | 03-608305 | 19.0–20.0 | RE03-09-13903 | 0.5 | 12 | 1690 |
| AOC 03-036(b) | 03-608305 | 24.0–25.0 | RE03-09-13904 | 0.0 | 12 | 1690 |
| AOC 03-036(b) | 03-608306 | 14.0–15.0 | RE03-09-13905 | 3.7 | 12 | 1690 |
| AOC 03-036(b) | 03-608306 | 19.0–20.0 | RE03-09-13906 | 0.8 | 12 | 1690 |
| AOC 03-036(b) | 03-608306 | 24.0–25.0 | RE03-09-13907 | 3.1 | 12 | 1690 |
| AOC 03-038(c) | 03-608307 | 0.0–1.0 | RE03-09-13908 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608307 | 0.0–1.0 | RE03-10-7041 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608307 | 1.0–2.0 | RE03-09-13909 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608308 | 0.0–1.0 | RE03-09-13910 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608308 | 1.0–2.0 | RE03-09-13911 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608309 | 0.0–1.0 | RE03-09-13912 | NC | 58 | 1736 |
| AOC 03-038(c) | 03-608309 | 1.0–2.0 | RE03-09-13913 | NC | 58 | 1736 |
| AOC 03-038(d) | 03-608314 | 0.0–1.0 | RE03-09-13922 | 0.6 | 51 | 1038 |
| AOC 03-038(d) | 03-608314 | 0.0–1.0 | RE03-10-7034 | 0.6 | 51 | 1038 |
| AOC 03-038(d) | 03-608314 | 1.0–2.0 | RE03-09-13923 | 3.8 | 51 | 1038 |
| AOC 03-038(d) | 03-608315 | 0.0–1.0 | RE03-09-13924 | 0.0 | 51 | 1038 |
| AOC 03-038(d) | 03-608315 | 1.0–2.0 | RE03-09-13925 | 0.0 | 51 | 1038 |
| AOC 03-038(d) | 03-608313 | 0.0–1.0 | RE03-09-13920 | 1.1 | 24 | 1567 |
| AOC 03-038(d) | 03-608313 | 0.0–1.0 | RE03-10-7033 | 1.1 | 24 | 1567 |
| AOC 03-038(d) | 03-608313 | 1.0–2.0 | RE03-09-13921 | 0.9 | 24 | 1567 |
| AOC 03-038(d) | 03-608310 | 0.0–1.0 | RE03-09-13914 | 2.8 | 24 | 1567 |
| AOC 03-038(d) | 03-608310 | 1.0–2.0 | RE03-09-13915 | 1.7 | 24 | 1567 |
| AOC 03-038(d) | 03-608311 | 0.0–1.0 | RE03-09-13916 | 4.8 | 24 | 1567 |
| AOC 03-038(d) | 03-608311 | 1.0–2.0 | RE03-09-13917 | 1.7 | 24 | 1567 |
| AOC 03-038(d) | 03-608312 | 0.0–1.0 | RE03-09-13918 | 1.1 | 24 | 1567 |
| AOC 03-038(d) | 03-608312 | 1.0–2.0 | RE03-09-13919 | 1.3 | 24 | 1567 |
| SWMU 03-45(a) | 03-608316 | 0.0–1.0 | RE03-10-4801 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608316 | 0.0–1.0 | RE03-09-13932 | 0.0 | 12 | 1690 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-45(a) | 03-608316 | 1.0–2.0 | RE03-09-13933 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608317 | 0.0–1.0 | RE03-09-13934 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608317 | 1.0–2.0 | RE03-09-13935 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608318 | 0.0–1.0 | RE03-09-13936 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608318 | 1.0–2.0 | RE03-09-13937 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608319 | 0.0–1.0 | RE03-09-13938 | 0.0 | 12 | 1690 |
| SWMU 03-45(a) | 03-608319 | 1.0–2.0 | RE03-09-13939 | 0.0 | 12 | 1690 |
| SWMU 03-45(b) | 03-608197 | 0.0–1.0 | RE03-09-13480 | 0.0 | 14 | 1987 |
| SWMU 03-45(b) | 03-608197 | 1.0–2.0 | RE03-09-13481 | 0.0 | 14 | 1987 |
| SWMU 03-45(b) | 03-608197 | 0.0–1.0 | RE03-10-4851 | 0.0 | 14 | 1987 |
| SWMU 03-45(c) | 03-608196 | 0.0–1.0 | RE03-09-13478 | 0.0 | 14 | 1987 |
| SWMU 03-45(c) | 03-608196 | 1.0–2.0 | RE03-09-13479 | 0.0 | 14 | 1987 |
| SWMU 03-45(e) | 03-608320 | 0.0–1.0 | RE03-09-13940 | 222 | 0 | 2150 |
| SWMU 03-45(e) | 03-608320 | 1.0–2.0 | RE03-09-13941 | 134 | 0 | 2150 |
| SWMU 03-45(f) | 03-608322 | 0.0–1.0 | RE03-09-13944 | 0.0 | 14 | 1828 |
| SWMU 03-45(f) | 03-608322 | 1.0–2.0 | RE03-09-13945 | 0.0 | 14 | 1828 |
| SWMU 03-45(f) | 03-608322 | 0.0–1.0 | RE03-10-4990 | 0.0 | 14 | 1828 |
| SWMU 03-45(f) | 03-608321 | 0.0–1.0 | RE03-09-13942 | 0.0 | 14 | 1828 |
| SWMU 03-45(f) | 03-608321 | 1.0–2.0 | RE03-09-13943 | 0.0 | 14 | 1828 |
| SWMU 03-045(g) | 03-608187 | 1.0–2.0 | RE03-09-13453 | 2.7 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608187 | 1.0–2.0 | RE03-10-2004 | 2.7 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608187 | 4.0–5.0 | RE03-09-13454 | 5.6 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-22536 | 1.0–2.0 | RE03-09-13455 | 4.3 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-22536 | 4.0–5.0 | RE03-09-13456 | 3.6 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608188 | 0.0–1.0 | RE03-09-13457 | 32.4 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608188 | 1.0–2.0 | RE03-09-13458 | 30.6 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608189 | 0.0–1.0 | RE03-09-13459 | 109 | 24.2 | 1655 |
| SWMU 03-045(g) | 03-608189 | 1.0–2.0 | RE03-09-13460 | 28.8 | 24.2 | 1655 |
| AOC 03-047(g) | 03-608324 | 0.0–1.0 | RE03-09-13946 | 39.3 | 21 | 1884 |
| AOC 03-047(g) | 03-608324 | 1.0–2.0 | RE03-09-13947 | 0.3 | 21 | 1884 |
| AOC 03-047(g) | 03-608325 | 0.0–1.0 | RE03-09-13948 | 141 | 21 | 1884 |
| AOC 03-047(g) | 03-608325 | 1.0–2.0 | RE03-09-13949 | 133 | 21 | 1884 |
| AOC 03-047(g) | 03-608326 | 0.0–1.0 | RE03-09-13950 | 144 | 21 | 1884 |
| AOC 03-047(g) | 03-608326 | 0.0–1.0 | RE03-10-3918 | 144 | 21 | 1884 |
| AOC 03-047(g) | 03-608326 | 1.0–2.0 | RE03-09-13951 | 196 | 21 | 1884 |
| AOC 03-047(g) | 03-608327 | 0.0–1.0 | RE03-09-13952 | 2.5 | 21 | 1884 |
| AOC 03-047(g) | 03-608327 | 1.0–2.0 | RE03-09-13953 | 39.3 | 21 | 1884 |
| AOC 03-051(c) | 03-608328 | 2.5–3.5 | RE03-09-13954 | 2.6 | 21 | 1884 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC 03-051(c) | 03-608328 | 2.5–3.5 | RE03-10-3919 | 2.6 | 21 | 1884 |
| AOC 03-051(c) | 03-608328 | 4.5–5.5 | RE03-09-13955 | 3.3 | 21 | 1884 |
| AOC 03-051(c) | 03-608329 | 2.5–3.5 | RE03-09-13956 | 1.7 | 21 | 1884 |
| AOC 03-051(c) | 03-608329 | 4.5–5.5 | RE03-09-13957 | 1.6 | 21 | 1884 |
| AOC 03-052(b) | 03-03286 | 7.0–8.0 | RE03-09-13982 | 0.2 | 21 | 1884 |
| AOC 03-052(b) | 03-03286 | 10.0–11.0 | RE03-09-13983 | 21.8 | 21 | 1884 |
| AOC 03-052(b) | 03-608344 | 1.0–2.0 | RE03-09-13986 | 0.6 | 21 | 1884 |
| AOC 03-052(b) | 03-608344 | 4.0–5.0 | RE03-09-13987 | 0.5 | 21 | 1884 |
| AOC 03-052(b) | 03-608346 | 1.0–2.0 | RE03-10-3915 | 0.5 | 21 | 1884 |
| AOC 03-052(b) | 03-608346 | 1.0–2.0 | RE03-09-13990 | 0.5 | 21 | 1884 |
| AOC 03-052(b) | 03-608346 | 4.0–5.0 | RE03-09-13991 | 0.8 | 21 | 1884 |
| AOC 03-052(b) | 03-608345 | 1.0–2.0 | RE03-09-13988 | 1.1 | 21 | 1884 |
| AOC 03-052(b) | 03-608345 | 4.0–5.0 | RE03-09-13989 | 3.1 | 21 | 1884 |
| AOC 03-052(b) | 03-608336 | 1.0–2.0 | RE03-09-13970 | 2.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608336 | 4.0–5.0 | RE03-09-13971 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608335 | 1.0–2.0 | RE03-09-13968 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608335 | 4.0–5.0 | RE03-09-13969 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608334 | 1.0–2.0 | RE03-09-13966 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608334 | 4.0–5.0 | RE03-09-13967 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608330 | 5.0–6.0 | RE03-10-3913 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608330 | 3.0–4.0 | RE03-09-13958 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608330 | 5.0–6.0 | RE03-09-13959 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608331 | 3.0–4.0 | RE03-09-13960 | 30.4 | 60 | 1273 |
| AOC 03-052(b) | 03-608331 | 5.0–6.0 | RE03-09-13961 | 694 | 60 | 1273 |
| AOC 03-052(b) | 03-03291 | 1.0–2.0 | RE03-09-13976 | 0.0 | 16 | 1352 |
| AOC 03-052(b) | 03-03291 | 4.0–5.0 | RE03-09-13977 | 0.0 | 16 | 1352 |
| AOC 03-052(b) | 03-03291 | 7.0–8.0 | RE03-10-12247 | NC | 18 | 978 |
| AOC 03-052(b) | 03-03291 | 10.0–11.0 | RE03-10-12248 | NC | 18 | 978 |
| AOC 03-052(b) | 03-608341 | 4.0–5.0 | RE03-09-13980 | 0.8 | 73.3 | 1780 |
| AOC 03-052(b) | 03-608341 | 1.0–2.0 | RE03-09-13981 | 1.4 | 73.3 | 1780 |
| AOC 03-052(b) | 03-608340 | 1.0–2.0 | RE03-09-13978 | 1.2 | 73.3 | 1780 |
| AOC 03-052(b) | 03-608340 | 1.0–2.0 | RE03-10-7831 | 1.2 | 73.3 | 1780 |
| AOC 03-052(b) | 03-608340 | 4.0–5.0 | RE03-09-13979 | 1.0 | 73.3 | 1780 |
| AOC 03-052(b) | 03-608338 | 1.0–2.0 | RE03-09-13974 | 0.8 | 16 | 1352 |
| AOC 03-052(b) | 03-608338 | 4.0–5.0 | RE03-09-13975 | 0.0 | 16 | 1352 |
| AOC 03-052(b) | 03-608337 | 1.0–2.0 | RE03-09-13972 | 21.7 | 16 | 1352 |
| AOC 03-052(b) | 03-608337 | 4.0–5.0 | RE03-09-13973 | 3.8 | 16 | 1352 |
| AOC 03-052(b) | 03-608337 | 4.0–5.0 | RE03-10-3915 | 3.8 | 16 | 1352 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC 03-052(b) | 03-608332 | 1.0–2.0 | RE03-10-3914 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608332 | 1.0–2.0 | RE03-09-13962 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608332 | 4.0–5.0 | RE03-09-13963 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608333 | 1.0–2.0 | RE03-09-13964 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608333 | 4.0–5.0 | RE03-09-13965 | 0.0 | 60 | 1273 |
| AOC 03-052(b) | 03-608343 | 1.0–2.0 | RE03-09-13984 | 15.7 | 21 | 1884 |
| AOC 03-052(b) | 03-608343 | 4.0–5.0 | RE03-09-13985 | 0.7 | 21 | 1884 |
| SWMU 03-052(f) | 03-608214 | 0.0–1.0 | RE03-09-13552 | 1.6 | 0 | 2150 |
| SWMU 03-052(f) | 03-608214 | 1.0–2.0 | RE03-09-13553 | 0.3 | 0 | 2150 |
| SWMU 03-052(f) | 03-608215 | 0.0–1.0 | RE03-09-13554 | 1.5 | 0 | 2150 |
| SWMU 03-052(f) | 03-608215 | 1.0–2.0 | RE03-09-13555 | 1.9 | 0 | 2150 |
| SWMU 03-052(f) | 03-608216 | 0.0–1.0 | RE03-09-13556 | 21.1 | 0 | 2150 |
| SWMU 03-052(f) | 03-608216 | 1.0–2.0 | RE03-09-13557 | 57.9 | 0 | 2150 |
| SWMU 03-052(f) | 03-608217 | 0.0–1.0 | RE03-09-13558 | 0.9 | 0 | 2150 |
| SWMU 03-052(f) | 03-608217 | 1.0–2.0 | RE03-09-13559 | 4.0 | 0 | 2150 |
| SWMU 03-052(f) | 03-608218 | 0.0–1.0 | RE03-09-13560 | 9.0 | 0 | 2150 |
| SWMU 03-052(f) | 03-608218 | 1.0–2.0 | RE03-09-13561 | 9.1 | 0 | 2150 |
| SWMU 03-052(f) | 03-608219 | 0.0–1.0 | RE03-09-13562 | 41.2 | 0 | 2150 |
| SWMU 03-052(f) | 03-608219 | 1.0–2.0 | RE03-09-13563 | 13.4 | 0 | 2150 |
| SWMU 03-052(f) | 03-608220 | 0.0–1.0 | RE03-10-4682 | 50.2 | 0 | 2150 |
| SWMU 03-052(f) | 03-608220 | 0.0–1.0 | RE03-09-13564 | 50.2 | 0 | 2150 |
| SWMU 03-052(f) | 03-608220 | 1.0–2.0 | RE03-09-13565 | 61.4 | 0 | 2150 |
| SWMU 03-056(a) | 03-608347 | 0.0–1.0 | RE03-09-13992 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608347 | 1.0–2.0 | RE03-09-13993 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608347 | 0.0–1.0 | RE03-10-3920 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608348 | 0.0–1.0 | RE03-09-13994 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608348 | 1.0–2.0 | RE03-09-13995 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608349 | 0.0–1.0 | RE03-09-13996 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608349 | 1.0–2.0 | RE03-09-13997 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608350 | 0.0–1.0 | RE03-09-13998 | NC | 32.3 | 2190 |
| SWMU 03-056(a) | 03-608350 | 1.0–2.0 | RE03-09-13999 | NC | 32.3 | 2190 |
| SWMU 03-056(d) | 03-608288 | 0.0–1.0 | RE03-09-13811 | 0.0 | 60 | 1273 |
| SWMU 03-056(d) | 03-608288 | 3.0–4.0 | RE03-09-13812 | 0.0 | 60 | 1273 |
| AOC 03-056(k) | 03-03281 | 6.0–7.0 | RE03-10-3917 | 0.7 | 73.3 | 1780 |
| AOC 03-056(k) | 03-03281 | 3.0–4.0 | RE03-09-14011 | 1.6 | 73.3 | 1780 |
| AOC 03-056(k) | 03-03281 | 6.0–7.0 | RE03-09-14012 | 0.7 | 73.3 | 1780 |
| AOC 03-056(k) | 03-03290 | 3.0–4.0 | RE03-09-14009 | 0.7 | 73.3 | 1780 |
| AOC 03-056(k) | 03-03290 | 3.0–4.0 | RE03-10-7368 | 0.7 | 73.3 | 1780 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC 03-056(k) | 03-03290 | 6.0–7.0 | RE03-09-14010 | 0.8 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608353 | 0.0–1.0 | RE03-09-14006 | 0.5 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608353 | 3.0–4.0 | RE03-09-14007 | 0.4 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608353 | 6.0–7.0 | RE03-09-14008 | 0.2 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608351 | 0.0–1.0 | RE03-09-14000 | 1.1 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608351 | 3.0–4.0 | RE03-09-14001 | 0.6 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608351 | 6.0–7.0 | RE03-09-14002 | 1.7 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608352 | 0.0–1.0 | RE03-09-14003 | 1.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608352 | 0.0–1.0 | RE03-10-7367 | 0.2 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608352 | 3.0–4.0 | RE03-09-14004 | 0.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608352 | 6.0–7.0 | RE03-09-14005 | 0.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608354 | 1.0–2.0 | RE03-09-14013 | 1.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608354 | 3.0–4.0 | RE03-09-14014 | 0.7 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608356 | 3.0–4.0 | RE03-10-3916 | 0.3 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608356 | 1.0–2.0 | RE03-09-14017 | 0.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608356 | 3.0–4.0 | RE03-09-14018 | 0.3 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608357 | 1.0–2.0 | RE03-09-14019 | 0.0 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608357 | 3.0–4.0 | RE03-09-14020 | 8.9 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608355 | 1.0–2.0 | RE03-09-14015 | 0.3 | 73.3 | 1780 |
| AOC 03-056(k) | 03-608355 | 3.0–4.0 | RE03-09-14016 | 0.5 | 73.3 | 1780 |
| SWMU 03-056(l) | 03-608366 | 0.0–0.4 | RE03-09-14029 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608366 | 2.0–3.0 | RE03-09-14030 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608364 | 0.0–0.4 | RE03-09-14027 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608364 | 2.0–3.0 | RE03-09-14028 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608360 | 0.0–0.4 | RE03-09-14023 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608360 | 2.0–3.0 | RE03-09-14024 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608358 | 0.0–0.4 | RE03-09-14021 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608358 | 0.0–0.4 | RE03-10-3921 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608358 | 2.0–3.0 | RE03-09-14022 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608362 | 0.0–0.4 | RE03-09-14025 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608362 | 2.0–3.0 | RE03-09-14026 | NC | 19 | 1664 |
| SWMU 03-056(l) | 03-608360 | 2.0–3.0 | RE03-09-14024 | NC | 19 | 1664 |
| SWMU 03-059 | 03-608385 | 0.0–1.0 | RE03-09-14074 | NC | na | na |
| SWMU 03-059 | 03-608385 | 2.0–3.0 | RE03-09-14075 | NC | na | na |
| SWMU 03-059 | 03-608387 | 2.0–3.0 | RE03-09-14078 | NC | na | na |
| SWMU 03-059 | 03-608387 | 0.0–1.0 | RE03-09-14079 | NC | na | na |
| SWMU 03-059 | 03-608372 | 0.0–1.0 | RE03-09-14048 | NC | na | na |
| SWMU 03-059 | 03-608372 | 2.0–3.0 | RE03-10-2707 | NC | na | na |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 03-059 | 03-608373 | 0.0–1.0 | RE03-09-14050 | NC | na | na |
| SWMU 03-059 | 03-608373 | 2.0–3.0 | RE03-10-2708 | NC | na | na |
| SWMU 03-059 | 03-608375 | 0.0–1.0 | RE03-09-14055 | NC | na | na |
| SWMU 03-059 | 03-608375 | 2.0–3.0 | RE03-10-2709 | NC | na | na |
| SWMU 03-059 | 03-608374 | 0.0–1.0 | RE03-09-14053 | NC | na | na |
| SWMU 03-059 | 03-608374 | 2.0–3.0 | RE03-10-2710 | NC | na | na |
| SWMU 03-059 | 03-608376 | 0.0–1.0 | RE03-09-14056 | NC | na | na |
| SWMU 03-059 | 03-608376 | 2.0–3.0 | RE03-09-14057 | NC | na | na |
| SWMU 03-059 | 03-608377 | 0.0–1.0 | RE03-09-14058 | NC | na | na |
| SWMU 03-059 | 03-608377 | 2.0–3.0 | RE03-10-1983 | NC | na | na |
| SWMU 03-059 | 03-608377 | 2.0–3.0 | RE03-10-2711 | NC | na | na |
| SWMU 03-059 | 03-608378 | 0.0–1.0 | RE03-09-14060 | NC | na | na |
| SWMU 03-059 | 03-608378 | 2.0–3.0 | RE03-10-2712 | NC | na | na |
| SWMU 03-059 | 03-608388 | 0.0–1.0 | RE03-09-14080 | NC | na | na |
| SWMU 03-059 | 03-608388 | 2.0–3.0 | RE03-09-14081 | NC | na | na |
| SWMU 03-059 | 03-608380 | 2.0–3.0 | RE03-09-14064 | NC | na | na |
| SWMU 03-059 | 03-608380 | 0.0–1.0 | RE03-09-14065 | NC | na | na |
| SWMU 03-059 | 03-608386 | 0.0–1.0 | RE03-09-14076 | NC | na | na |
| SWMU 03-059 | 03-608386 | 2.0–3.0 | RE03-09-14077 | NC | na | na |
| SWMU 03-059 | 03-608382 | 2.0–3.0 | RE03-09-14069 | NC | na | na |
| SWMU 03-059 | 03-608383 | 0.0–1.0 | RE03-09-14070 | NC | na | na |
| SWMU 03-059 | 03-608383 | 2.0–3.0 | RE03-09-14071 | NC | na | na |
| SWMU 03-059 | 03-608383 | 0.0–1.0 | RE03-10-1984 | NC | na | na |
| SWMU 03-059 | 03-608384 | 2.0–3.0 | RE03-09-14072 | NC | na | na |
| SWMU 03-059 | 03-608384 | 0.0–1.0 | RE03-09-14073 | NC | na | na |
| SWMU 03-059 | 03-608382 | 2.0–3.0 | RE03-09-14069 | NC | na | na |
| SWMU 03-059 | 03-608383 | 0.0–1.0 | RE03-09-14070 | NC | na | na |
| **TA-60** | | | | | | |
| SWMU 60-002 | 03-608393 | 1.0–2.0 | RE03-09-14094 | 6.7 | 32.8 | 1427 |
| SWMU 60-002 | 03-608393 | 1.0–2.0 | RE03-10-2730 | 6.7 | 32.8 | 1427 |
| SWMU 60-002 | 03-608393 | 4.0–5.0 | RE03-09-14095 | 3.3 | 32.8 | 1427 |
| SWMU 60-002 | 03-608394 | 1.0–2.0 | RE03-09-14096 | 27.9 | 32.8 | 1427 |
| SWMU 60-002 | 03-608394 | 4.0–5.0 | RE03-09-14097 | 2.8 | 32.8 | 1427 |
| SWMU 60-002 | 03-608394 | 4.0–5.0 | RE03-10-8299 | 2.8 | 32.8 | 1427 |
| SWMU 60-002 | 03-608395 | 1.0–2.0 | RE03-09-14098 | 5.1 | 32.8 | 1427 |
| SWMU 60-002 | 03-608395 | 4.0–5.0 | RE03-09-14099 | 2.3 | 32.8 | 1427 |
| SWMU 60-002 | 03-608396 | 1.0–2.0 | RE03-09-14100 | 2.4 | 32.8 | 1427 |
| SWMU 60-002 | 03-608396 | 4.0–5.0 | RE03-09-14101 | 1.1 | 32.8 | 1427 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 60-002 | 03-608397 | 1.0–2.0 | RE03-09-14102 | >1500 | 32.8 | 1427 |
| SWMU 60-002 | 03-608397 | 4.0–5.0 | RE03-09-14103 | 35.6 | 32.8 | 1427 |
| SWMU 60-002 | 03-608398 | 1.0–2.0 | RE03-09-14104 | 10.4 | 32.8 | 1427 |
| SWMU 60-002 | 03-608398 | 4.0–5.0 | RE03-09-14105 | 7.1 | 32.8 | 1427 |
| AOC 60-004(b) | 03-608400 | 0.0–1.0 | RE03-09-14111 | 0.0 | 17 | 1557 |
| AOC 60-004(b) | 03-608400 | 2.0–3.0 | RE03-09-14112 | 1.7 | 17 | 1557 |
| AOC 60-004(b) | 03-608400 | 4.0–5.0 | RE03-09-14113 | 0.2 | 17 | 1557 |
| AOC 60-004(b) | 03-608400 | 9.0–10.0 | RE03-09-14114 | 0.7 | 17 | 1557 |
| AOC 60-004(b) | 03-608400 | 14.0–15.0 | RE03-09-14115 | 1.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608400 | 14.0–15.0 | RE03-10-2732 | 1.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608402 | 0.0–1.0 | RE03-09-14121 | 1.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608402 | 2.0–3.0 | RE03-09-14122 | 0.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608402 | 4.0–5.0 | RE03-09-14123 | 1.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608402 | 9.0–10.0 | RE03-09-14124 | 1.9 | 17 | 1557 |
| AOC 60-004(b) | 03-608402 | 14.0–15.0 | RE03-09-14125 | 0.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608403 | 0.0–1.0 | RE03-09-14126 | 1.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608403 | 2.0–3.0 | RE03-09-14127 | 1.5 | 17 | 1557 |
| AOC 60-004(b) | 03-608403 | 4.0–5.0 | RE03-09-14128 | 1.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608403 | 9.0–10.0 | RE03-09-14129 | 1.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608403 | 14.0–15.0 | RE03-09-14130 | 1.2 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 0.0–1.0 | RE03-09-14116 | 0.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 2.0–3.0 | RE03-09-14117 | 0.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 4.0–5.0 | RE03-09-14118 | 0.3 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 9.0–10.0 | RE03-09-14119 | 0.5 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 14.0–15.0 | RE03-09-14120 | 0.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608401 | 14.0–15.0 | RE03-10-2733 | 0.1 | 17 | 1557 |
| AOC 60-004(b) | 03-608399 | 0.0–1.0 | RE03-09-14106 | 2.8 | 24 | 1567 |
| AOC 60-004(b) | 03-608399 | 0.0–1.0 | RE03-10-2729 | 2.8 | 24 | 1567 |
| AOC 60-004(b) | 03-608399 | 2.0–3.0 | RE03-09-14107 | 2.6 | 24 | 1567 |
| AOC 60-004(b) | 03-608399 | 4.0–5.0 | RE03-09-14108 | 3.1 | 24 | 1567 |
| AOC 60-004(b) | 03-608399 | 9.0–10.0 | RE03-09-14109 | 8.0 | 17 | 1557 |
| AOC 60-004(b) | 03-608399 | 14.0–15.0 | RE03-09-14110 | 5.0 | 17 | 1557 |
| AOC 60-004(b) | 03-608399 | 14.0–15.0 | RE03-10-2731 | 5.0 | 17 | 1557 |
| AOC 60-004(f) | 03-608404 | 1.0–2.0 | RE03-09-14208 | 2.8 | 17 | 1461 |
| AOC 60-004(f) | 03-608404 | 2.0–3.0 | RE03-09-14209 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608404 | 4.0–5.0 | RE03-09-14210 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608404 | 9.0–10.0 | RE03-09-14211 | 0.5 | 17 | 1461 |
| AOC 60-004(f) | 03-608405 | 1.0–2.0 | RE03-09-14212 | 0.7 | 17 | 1561 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC 60-004(f) | 03-608405 | 2.0–3.0 | RE03-09-14213 | 12.3 | 17 | 1561 |
| AOC 60-004(f) | 03-608405 | 4.0–5.0 | RE03-09-14214 | 1.3 | 17 | 1561 |
| AOC 60-004(f) | 03-608405 | 4.0–5.0 | RE03-10-2735 | 1.3 | 17 | 1561 |
| AOC 60-004(f) | 03-608405 | 9.0–10.0 | RE03-09-14215 | 0.0 | 17 | 1561 |
| AOC 60-004(f) | 03-608406 | 1.0–2.0 | RE03-09-14216 | 21.8 | 17 | 1561 |
| AOC 60-004(f) | 03-608406 | 2.0–3.0 | RE03-09-14217 | 0.0 | 17 | 1561 |
| AOC 60-004(f) | 03-608406 | 4.0–5.0 | RE03-09-14218 | 0.5 | 17 | 1561 |
| AOC 60-004(f) | 03-608406 | 9.0–10.0 | RE03-09-14219 | 0.0 | 17 | 1561 |
| AOC 60-004(f) | 03-608407 | 1.0–2.0 | RE03-09-14220 | 1.3 | 17 | 1461 |
| AOC 60-004(f) | 03-608407 | 2.0–3.0 | RE03-09-14221 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608407 | 4.0–5.0 | RE03-09-14222 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608407 | 4.0–5.0 | RE03-10-2734 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608407 | 9.0–10.0 | RE03-09-14223 | 0.0 | 17 | 1461 |
| AOC 60-004(f) | 03-608408 | 1.0–2.0 | RE03-09-14224 | 2.9 | 74 | 1494 |
| AOC 60-004(f) | 03-608408 | 2.0–3.0 | RE03-09-14225 | 46.9 | 74 | 1494 |
| AOC 60-004(f) | 03-608408 | 4.0–5.0 | RE03-09-14226 | NC | 74 | 1494 |
| AOC 60-004(f) | 03-608408 | 9.0–10.0 | RE03-09-14227 | 76.1 | 74 | 1494 |
| SWMU 60-006(a) | 03-608409 | 20.0–21.0 | RE03-09-14228 | 0.5 | 39 | 26.90 |
| SWMU 60-006(a) | 03-608409 | 24.0–25.0 | RE03-09-14229 | 0.5 | 39 | 26.90 |
| SWMU 60-006(a) | 03-608409 | 29.0–30.0 | RE03-09-14230 | 0.4 | 39 | 26.90 |
| SWMU 60-006(a) | 03-608410 | 18.0–19.0 | RE03-09-14231 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608410 | 22.0–23.0 | RE03-09-14232 | 0.3 | 78 | 1356 |
| SWMU 60-006(a) | 03-608410 | 27.0–28.0 | RE03-09-14233 | 0.3 | 78 | 1356 |
| SWMU 60-006(a) | 03-608410 | 27.0–28.0 | RE03-10-2736 | 0.3 | 78 | 1356 |
| SWMU 60-006(a) | 03-608411 | 18.0–19.0 | RE03-09-14234 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608411 | 22.0–23.0 | RE03-09-14235 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608411 | 27.0–28.0 | RE03-09-14236 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608411 | 35.0–36.0 | RE03-10-9872 | 2.5 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 60.0–61.0 | RE03-09-14237 | 0.1 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 10.0–11.0 | RE03-09-14238 | 0.5 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 14.0–15.0 | RE03-09-14239 | 0.5 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 18.0–19.0 | RE03-09-14240 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 23.0–24.0 | RE03-09-14241 | 0.0 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 55.0–56.0 | RE03-10-9873 | 0.5 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 60.0–61.0 | RE03-10-9874 | 0.1 | 78 | 1356 |
| SWMU 60-006(a) | 03-608412 | 60.0–61.0 | RE03-10-2737 | 0.1 | 78 | 1356 |
| SWMU 60-007(a) | 03-608413 | 0.0–1.0 | RE03-09-14246 | 4.7 | 24 | 1567 |
| SWMU 60-007(a) | 03-608413 | 2.0–3.0 | RE03-09-14247 | 2.8 | 24 | 1567 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| SWMU 60-007(a) | 03-608413 | 4.0–5.0 | RE03-09-14248 | 3.8 | 24 | 1567 |
| SWMU 60-007(a) | 03-608414 | 0.0–1.0 | RE03-09-14249 | 1.3 | 24 | 1567 |
| SWMU 60-007(a) | 03-608414 | 2.0–3.0 | RE03-09-14250 | 0.6 | 24 | 1567 |
| SWMU 60-007(a) | 03-608414 | 4.0–5.0 | RE03-09-14251 | 1.5 | 24 | 1567 |
| SWMU 60-007(a) | 03-608415 | 0.0–1.0 | RE03-09-14252 | NC | 24 | 1567 |
| SWMU 60-007(a) | 03-608415 | 2.0–3.0 | RE03-09-14253 | NC | 24 | 1567 |
| SWMU 60-007(a) | 03-608415 | 4.0–5.0 | RE03-09-14254 | NC | 24 | 1567 |
| SWMU 60-007(a) | 03-608415 | 4.0–5.0 | RE03-10-6969 | NC | 24 | 1567 |
| SWMU 60-007(a) | 03-608416 | 0.0–1.0 | RE03-09-14255 | NC | 24 | 1567 |
| SWMU 60-007(a) | 03-608416 | 2.0–3.0 | RE03-09-14256 | 0.3 | 24 | 1567 |
| SWMU 60-007(a) | 03-608416 | 4.0–5.0 | RE03-09-14257 | 0.0 | 24 | 1567 |
| SWMU 60-007(b) | 03-608417 | 0.0–1.0 | RE03-09-14265 | 1.7 | 74 | 1494 |
| SWMU 60-007(b) | 03-608426 | 0.0–1.0 | RE03-09-14283 | 1.6 | 74 | 1494 |
| SWMU 60-007(b) | 03-608426 | 1.0–2.0 | RE03-09-14284 | 0.0 | 74 | 1494 |
| SWMU 60-007(b) | 03-608427 | 0.0–1.0 | RE03-09-14285 | 2.6 | 74 | 1494 |
| SWMU 60-007(b) | 03-608427 | 1.0–2.0 | RE03-09-14286 | 4.1 | 74 | 1494 |
| SWMU 60-007(b) | 03-608428 | 0.0–1.0 | RE03-09-14287 | 6.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608428 | 1.0–2.0 | RE03-09-14288 | 26.6 | 74 | 1494 |
| SWMU 60-007(b) | 03-608418 | 0.0–0.5 | RE03-09-14267 | 0.3 | 74 | 1494 |
| SWMU 60-007(b) | 03-608419 | 0.0–0.4 | RE03-09-14269 | 0.8 | 74 | 1494 |
| SWMU 60-007(b) | 03-608420 | 0.0–0.5 | RE03-09-14271 | 0.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608421 | 0.0–1.0 | RE03-09-14273 | 8.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608421 | 0.0–1.0 | RE03-10-2741 | 8.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608421 | 1.0–2.0 | RE03-09-14274 | 9.8 | 74 | 1494 |
| SWMU 60-007(b) | 03-608422 | 0.0–1.0 | RE03-09-14275 | 9.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608422 | 0.0–1.0 | RE03-10-2739 | 9.9 | 74 | 1494 |
| SWMU 60-007(b) | 03-608422 | 1.0–2.0 | RE03-09-14276 | 6.5 | 74 | 1494 |
| SWMU 60-007(b) | 03-608423 | 0.0–1.0 | RE03-09-14277 | 930 | 74 | 1494 |
| SWMU 60-007(b) | 03-608423 | 0.0–1.0 | RE03-10-2740 | 930 | 74 | 1494 |
| SWMU 60-007(b) | 03-608423 | 1.0–2.0 | RE03-09-14278 | 107 | 74 | 1494 |
| SWMU 60-007(b) | 03-608424 | 0.0–1.0 | RE03-09-14279 | 29.2 | 32.8 | 1427 |
| SWMU 60-007(b) | 03-608424 | 1.0–2.0 | RE03-09-14280 | 15.4 | 32.8 | 1427 |
| SWMU 60-007(b) | 03-608425 | 0.0–1.0 | RE03-09-14281 | 1.0 | 74 | 1494 |
| SWMU 60-007(b) | 03-608425 | 1.0–2.0 | RE03-09-14282 | 4.3 | 74 | 1494 |
| **TA-61** | | | | | | |
| AOC-C-61-002 | 03-608432 | 3.0–4.0 | RE03-09-14318 | 0.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608432 | 5.0–6.0 | RE03-09-14319 | 1.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608432 | 7.0–8.0 | RE03-09-14320 | 0.3 | <MDA | <MDA |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC-C-61-002 | 03-608432 | 9.0–10.0 | RE03-09-14321 | 0.5 | <MDA | <MDA |
| AOC-C-61-002 | 03-608432 | 11.0–12.0 | RE03-09-14322 | 1.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608432 | 14.0–15.0 | RE03-09-14323 | 0.7 | <MDA | <MDA |
| AOC-C-61-002 | 03-608430 | 3.0–4.0 | RE03-09-14306 | 1.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 5.0–6.0 | RE03-09-14307 | 0.0 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 7.0–8.0 | RE03-09-14308 | 0.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 9.0–10.0 | RE03-09-14309 | 0.0 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 11.0–12.0 | RE03-09-14310 | 0.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 14.0–15.0 | RE03-09-14311 | 0.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608431 | 3.0–4.0 | RE03-09-14312 | 0.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 5.0–6.0 | RE03-09-14313 | 0.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 7.0–8.0 | RE03-09-14314 | 0.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 9.0–10.0 | RE03-09-14315 | 0.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 9.0–10.0 | RE03-10-2721 | 0.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 11.0–12.0 | RE03-09-14316 | 0.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608431 | 14.0–15.0 | RE03-09-14317 | 1.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 3.0–4.0 | RE03-09-14324 | 0.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 5.0–6.0 | RE03-09-14325 | 1.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 7.0–8.0 | RE03-09-14326 | 1.3 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 9.0–10.0 | RE03-09-14327 | 1.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 9.0–10.0 | RE03-10-2722 | 1.1 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 11.0–12.0 | RE03-09-14328 | 0.6 | <MDA | <MDA |
| AOC-C-61-002 | 03-608433 | 14.0–15.0 | RE03-09-14329 | 0.0 | <MDA | <MDA |
| AOC-C-61-002 | 03-608429 | 3.0–4.0 | RE03-09-14300 | 3.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 3.0–4.0 | RE03-10-2760 | 3.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 5.0–6.0 | RE03-09-14301 | 1.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 7.0–8.0 | RE03-09-14302 | 3.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 9.0–10.0 | RE03-09-14303 | 1.7 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 11.0–12.0 | RE03-09-14304 | 1.9 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 14.0–15.0 | RE03-09-14305 | 3.0 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 3.0–4.0 | RE03-09-14306 | 1.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 5.0–6.0 | RE03-09-14307 | 0.0 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 7.0–8.0 | RE03-09-14308 | 0.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 9.0–10.0 | RE03-09-14309 | 0.0 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 11.0–12.0 | RE03-09-14310 | 0.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 14.0–15.0 | RE03-09-14311 | 0.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608430 | 3.0–4.0 | RE03-10-2720 | 3.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 3.0–4.0 | RE03-09-14300 | 3.1 | 12 | 1690 |

**Table 3.2-2 (continued)**

| SWMU/AOC | Location ID | Depth (ft) | Sample ID | PID (ppm) | Alpha (dpm) | Beta/Gamma (dpm) |
|---|---|---|---|---|---|---|
| AOC-C-61-002 | 03-608429 | 5.0–6.0 | RE03-09-14301 | 1.1 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 7.0–8.0 | RE03-09-14302 | 3.3 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 9.0–10.0 | RE03-09-14303 | 1.7 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 11.0–12.0 | RE03-09-14304 | 1.9 | 12 | 1690 |
| AOC-C-61-002 | 03-608429 | 14.0–15.0 | RE03-09-14305 | 3.0 | 12 | 1690 |

[a] NC= Not collected.

[b] n/a = Not applicable (swipe sample).

[c] MDA = Minimum detectable activity.

[d] na = Historical reading not available or 2009 readings unavailable from LANL RCT.

**Table 3.2-3**
**Crosswalk of Proposed and Sampled Locations**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| **TA-03** | | |
| SWMU 03-002(c) | 2c-1 | 03-608148 |
| SWMU 03-002(c) | 2c-2 | 03-608145 |
| SWMU 03-002(c) | 2c-3 | 03-608146 |
| SWMU 03-002(c) | 2c-4 | 03-608147 |
| AOC 03-003(d) | 3d-1 | 03-608149 |
| AOC 03-003(d) | 3d-2 | 03-608150 |
| AOC 03-003(d) | 3d-3 | 03-608161 |
| AOC 03-003(d) | 3d-4 | 03-608172 |
| AOC 03-003(d) | 3d-5 | 03-608151 |
| AOC 03-003(d) | 3d-6 | 03-608162 |
| AOC 03-003(g) | 3g-1 | 03-611413 |
| AOC 03-003(n) | 3n-1 | 03-608368 |
| AOC 03-003(n) | 3n-2 | 03-608369 |
| AOC 03-003(n) | 3n-3 | 03-608370 |
| AOC 03-003(n) | 3n-4 | 03-608371 |
| SWMU 03-009(a) | 9a-1 | 03-608178 |
| SWMU 03-009(a) | 9a-2 | 03-608179 |
| SWMU 03-009(a) | 9a-3 | 03-608180 |
| SWMU 03-009(a) | 9a-4 | 03-608182 |
| SWMU 03-009(a) | 9a-5 | 03-608181 |
| SWMU 03-009(i) | 9i-1 | 03-608195 |
| SWMU 03-009(i) | 9i-2 | 03-608194 |
| SWMU 03-009(i) | 9i-3 | 03-608193 |
| SWMU 03-009(i) | 9i-4 | 03-608192 |
| SWMU 03-009(i) | 9i-5 | 03-608190 |
| SWMU 03-009(i) | 9i-6 | 03-608191 |
| SWMU 03-012(b) | 12b-1 | 03-608197 |
| SWMU 03-013(i) | 13i-1 | 03-608221 |
| SWMU 03-013(i) | 13i-2 | 03-608233 |
| SWMU 03-013(i) | 13i-3 | 03-608234 |
| SWMU 03-013(i) | 13i-4 | 03-608235 |
| SWMU 03-013(i) | 13i-5 | 03-608222 |
| SWMU 03-013(i) | 13i-6 | 03-608223 |
| SWMU 03-013(i) | 13i-7 | 03-608224 |
| SWMU 03-013(i) | 13i-8 | 03-608225 |
| SWMU 03-013(i) | 13i-9 | 03-608226 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| **TA-03** | | |
| SWMU 03-013(i) | 13i-10 | 03-608227 |
| SWMU 03-013(i) | 13i-11 | 03-608228 |
| SWMU 03-013(i) | 13i-12 | 03-608229 |
| SWMU 03-013(i) | 13i-13 | 03-608230 |
| SWMU 03-013(i) | 13i-14 | 03-608231 |
| SWMU 03-013(i) | 13i-15 | 03-608232 |
| SWMU 03-013(i) | 13i-16 | 03-608236 |
| SWMU 03-014(a) | 14a-1 | 03-608241 |
| SWMU 03-014(a) | 14a-2 | 03-608238 |
| SWMU 03-014(a) | 14a-3 | 03-608237 |
| SWMU 03-014(a) | 14a-4 | 03-608240 |
| SWMU 03-014(a) | 14a-5 | 03-608239 |
| AOC 03-014(b2) | 14b2-1 | 03-608242 |
| AOC 03-014(b2) | 14b2-2 | 03-608243 |
| AOC 03-014(b2) | 14b2-3 | 03-608244 |
| AOC 03-014(b2) | 14b2-4 | 03-608245 |
| AOC 03-014(b2) | 14b2-5 | 03-608246 |
| SWMU 03-014(c) | 14c-1 | 03-608247 |
| AOC 03-014(c2) | 14c2-1 | 03-608250 |
| AOC 03-014(c2) | 14c2-2 | 03-608248 |
| AOC 03-014(c2) | 14c2-3 | 03-608249 |
| AOC 03-014(c2) | 14c2-4 | 03-608251 |
| AOC 03-014(c2) | 14c2-5 | 03-608252 |
| AOC 03-014(c2) | 14c2-6 | 03-608253 |
| AOC 03-014(c2) | 14c2-7 | 03-608254 |
| AOC 03-014(c2) | 14c2-8 | 03-608255 |
| SWMU 03-014(d) | 14d-1 | 03-608256 |
| SWMU 03-014(d) | 14d-2 | 03-608257 |
| SWMU 03-014(d) | 14d-3 | 03-608258 |
| SWMU 03-014(i) | 14i-1 | 03-608260 |
| SWMU 03-014(i) | 14i-2 | 03-608261 |
| SWMU 03-014(i) | 14i-3 | 03-608259 |
| SWMU 03-014(j) | 14j-1 | 03-608263 |
| SWMU 03-014(j) | 14j-2 | 03-608262 |
| SWMU 03-014(j) | 14j-3 | 03-608264 |
| SWMU 03-014(k) | 14k-1 | 03-03201 |
| SWMU 03-014(k) | 14k-2 | 03-03202 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| SWMU 03-014(k) | 14k-3 | 03-03264 |
| SWMU 03-014(k) | 14k-4 | 03-03265 |
| SWMU 03-014(k) | 14k-5 | 03-03266 |
| SWMU 03-014(k) | 14k-6 | 03-608270 |
| SWMU 03-014(k) | 14k-7 | 03-608271 |
| SWMU 03-014(k) | 14k-8 | 03-608272 |
| SWMU 03-014(k) | 14k-9 | 03-608273 |
| SWMU 03-014(o) | 14o-1 | 03-03204 |
| SWMU 03-014(o) | 14o-2 | 03-608276 |
| SWMU 03-014(o) | 14o-3 | 03-608275 |
| SWMU 03-014(o) | 14o-4 | 03-608277 |
| SWMU 03-014(o) | 14o-5 | 03-608280 |
| SWMU 03-014(o) | 14o-6 | 03-608279 |
| SWMU 03-014(o) | 14o-7 | 03-608278 |
| SWMU 03-014(q) | 14q-1 | 03-608199 |
| SWMU 03-014(q) | 14q-2 | 03-608200 |
| SWMU 03-014(q) | 14q-3 | 03-608198 |
| SWMU 03-014(u) | 14u-1 | 03-608281 |
| SWMU 03-014(u) | 14u-2 | 03-608282 |
| SWMU 03-014(u) | 14u-3 | 03-608283 |
| SWMU 03-014(u) | 14u-4 | 03-608284 |
| SWMU 03-014(u) | 14u-5 | 03-608285 |
| SWMU 03-014(u) | 14u-6 | 03-608286 |
| SWMU 03-014(u) | 14u-7 | 03-608287 |
| SWMU 03-014(u) | 14u-8 | 03-609990 |
| SWMU 03-015 | 15-1 | 03-608298 |
| SWMU 03-015 | 15-2 | 03-608293 |
| SWMU 03-015 | 15-3 | 03-608297 |
| SWMU 03-015 | 15-4 | 03-608292 |
| SWMU 03-015 | 15-5 | 03-608291 |
| SWMU 03-015 | 15-6 | 03-608289 |
| SWMU 03-015 | 15-7 | 03-608290 |
| SWMU 03-015 | 15-8 | 03-608294 |
| SWMU 03-015 | 15-9 | 03-608296 |
| SWMU 03-015 | 15-10 | 03-608295 |
| SWMU 03-021 | 21-1 | 03-03329 |
| SWMU 03-021 | 21-2 | 03-03331 |
| SWMU 03-021 | 21-3 | 03-608303 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| SWMU 03-021 | 21-4 | 03-608304 |
| SWMU 03-021 | 21-5 | 03-608299 |
| SWMU 03-021 | 21-6 | 03-608300 |
| SWMU 03-021 | 21-7 | 03-608301 |
| SWMU 03-021 | 21-8 | 03-608302 |
| AOC C-03-022 | C22-1 | 03-608389 |
| AOC C-03-022 | C22-2 | 03-608390 |
| AOC C-03-022 | C22-3 | 03-608391 |
| AOC C-03-022 | C22-4 | 03-608392 |
| SWMU 03-029 | 29-1 | 03-608183 |
| SWMU 03-029 | 29-2 | 03-608184 |
| SWMU 03-029 | 29-3 | 03-608185 |
| SWMU 03-029 | 29-4 | 03-608186 |
| AOC 03-036(b) | 36b-1 | 03-608305 |
| AOC 03-036(b) | 36b-2 | 03-608306 |
| AOC 03-038(c) | 38c-1 | 03-608307 |
| AOC 03-038(c) | 38c-2 | 03-608308 |
| AOC 03-038(c) | 38c-3 | 03-608309 |
| AOC 03-038(d) | 38d-1 | 03-608314 |
| AOC 03-038(d) | 38d-2 | 03-608315 |
| AOC 03-038(d) | 38d-3 | 03-608313 |
| AOC 03-038(d) | 38d-4 | 03-608310 |
| AOC 03-038(d) | 38d-5 | 03-608311 |
| AOC 03-038(d) | 38d-6 | 03-608312 |
| SWMU 03-045(a) | 45a-1 | 03-608316 |
| SWMU 03-045(a) | 45a-2 | 03-608317 |
| SWMU 03-045(a) | 45a-3 | 03-608318 |
| SWMU 03-045(a) | 45a-4 | 03-608319 |
| SWMU 03-045(c) | 45c-1 | 03-608196 |
| SWMU 03-045(e) | 45e-1 | 03-608320 |
| SWMU 03-045(f) | 45f-1 | 03-608322 |
| SWMU 03-045(f) | 45f-2 | 03-608321 |
| SWMU 03-045g | 45g-1 | 03-608187 |
| SWMU 03-045g | 45g-2 | 03-22536 |
| SWMU 03-045g | 45g-3 | 03-608188 |
| SWMU 03-045g | 45g-4 | 03-608189 |
| AOC 03-047(g) | 47g-1 | 03-608324 |
| AOC 03-047(g) | 47g-2 | 03-608325 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| AOC 03-047(g) | 47g-3 | 03-608326 |
| AOC 03-047(g) | 47g-4 | 03-608327 |
| AOC 03-051(c) | 51c-1 | 03-608328 |
| AOC 03-051(c) | 51c-2 | 03-608329 |
| AOC 03-052(b) | 52b-1 | 03-03286 |
| AOC 03-052(b) | 52b-2 | 03-03291 |
| AOC 03-052(b) | 52b-3 | 03-608341 |
| AOC 03-052(b) | 52b-4 | 03-608340 |
| AOC 03-052(b) | 52b-5 | 03-608338 |
| AOC 03-052(b) | 52b-6 | 03-608337 |
| AOC 03-052(b) | 52b-7 | 03-608332 |
| AOC 03-052(b) | 52b-8 | 03-608333 |
| AOC 03-052(b) | 52b-9 | 03-608343 |
| AOC 03-052(b) | 52b-10 | 03-608344 |
| AOC 03-052(b) | 52b-11 | 03-608346 |
| AOC 03-052(b) | 52b-12 | 03-608345 |
| AOC 03-052(b) | 52b-13 | 03-608336 |
| AOC 03-052(b) | 52b-14 | 03-608335 |
| AOC 03-052(b) | 52b-15 | 03-608334 |
| AOC 03-052(b) | 52b-15 | 03-608334 |
| AOC 03-052(b) | 52b-16 | 03-608330 |
| AOC 03-052(b) | 52b-17 | 03-608331 |
| SWMU 03-052(f) | 52f-1 | 03-608214 |
| SWMU 03-052(f) | 52f-2 | 03-608215 |
| SWMU 03-052(f) | 52f-3 | 03-608216 |
| SWMU 03-052(f) | 52f-4 | 03-608217 |
| SWMU 03-052(f) | 52f-5 | 03-608218 |
| SWMU 03-052(f) | 52f-6 | 03-608219 |
| SWMU 03-052(f) | 52f-7 | 03-608220 |
| SWMU 03-056(a) | 56a-1 | 03-608347 |
| SWMU 03-056(a) | 56a-2 | 03-608348 |
| SWMU 03-056(a) | 56a-3 | 03-608349 |
| SWMU 03-056(a) | 56a-4 | 03-608350 |
| SWMU 03-056(d) | 56d-1 | 03-608288 |
| AOC 03-056(k) | 56k-1 | 03-03281 |
| AOC 03-056(k) | 56k-2 | 03-03290 |
| AOC 03-056(k) | 56k-3 | 03-608353 |
| AOC 03-056(k) | 56k-4 | 03-608351 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| AOC 03-056(k) | 56k-5 | 03-608352 |
| AOC 03-056(k) | 56k-6 | 03-608354 |
| AOC 03-056(k) | 56k-7 | 03-608356 |
| AOC 03-056(k) | 56k-8 | 03-608357 |
| AOC 03-056(k) | 56k-9 | 03-608355 |
| SWMU 03-056(l) | 56l-1 | 03-608366 |
| SWMU 03-056(l) | 56l-2 | 03-608364 |
| SWMU 03-056(l) | 56l-3 | 03-608360 |
| SWMU 03-056(l) | 56l-4 | 03-608358 |
| SWMU 03-056(l) | 56l-5 | 03-608362 |
| SWMU 03-056(l) | 56l-5 | 03-608362 |
| SWMU 03-059 | 59-1 | 03-608385 |
| SWMU 03-059 | 59-2 | 03-608388 |
| SWMU 03-059 | 59-3 | 03-608380 |
| SWMU 03-059 | 59-4 | 03-608386 |
| SWMU 03-059 | 59-5 | 03-608379 |
| SWMU 03-059 | 59-6 | 03-608381 |
| SWMU 03-059 | 59-7 | 03-608382 |
| SWMU 03-059 | 59-8 | 03-608383 |
| SWMU 03-059 | 59-9 | 03-608384 |
| SWMU 03-059 | 59-10 | 03-608387 |
| SWMU 03-059 | 59-11 | 03-608372 |
| SWMU 03-059 | 59-12 | 03-608373 |
| SWMU 03-059 | 59-13 | 03-608375 |
| SWMU 03-059 | 59-14 | 03-608374 |
| SWMU 03-059 | 59-15 | 03-608376 |
| SWMU 03-059 | 59-16 | 03-608377 |
| SWMU 03-059 | 59-17 | 03-608378 |
| **TA-60** | | |
| SWMU 60-002 | 60-2-1 | 03-608393 |
| SWMU 60-002 | 60-2-2 | 03-608394 |
| SWMU 60-002 | 60-2-3 | 03-608395 |
| SWMU 60-002 | 60-2-4 | 03-608396 |
| SWMU 60-002 | 60-2-5 | 03-608397 |
| SWMU 60-002 | 60-2-6 | 03-608398 |
| AOC 60-004(b) | 4b-1 | 03-608400 |
| AOC 60-004(b) | 4b-2 | 03-608402 |
| AOC 60-004(b) | 4b-3 | 03-608403 |

**Table 3.2-3 (continued)**

| SWMU or AOC | Proposed Location | Location ID |
|---|---|---|
| AOC 60-004(b) | 4b-4 | 03-608401 |
| AOC 60-004(b) | 4b-5 | 03-608399 |
| AOC 60-004(f) | 4f-1 | 03-608404 |
| AOC 60-004(f) | 4f-2 | 03-608405 |
| AOC 60-004(f) | 4f-3 | 03-608406 |
| AOC 60-004(f) | 4f-4 | 03-608407 |
| AOC 60-004(f) | 4f-5 | 03-608408 |
| SWMU 60-006(a) | 6a-1 | 03-608409 |
| SWMU 60-006(a) | 6a-2 | 03-608410 |
| SWMU 60-006(a) | 6a-3 | 03-608411 |
| SWMU 60-006(a) | 6a-4 | 03-608412 |
| SWMU 60-006(a) | 7a-1 | 03-608413 |
| SWMU 60-006(a) | 7a-2 | 03-608414 |
| SWMU 60-006(a) | 7a-3 | 03-608415 |
| SWMU 60-006(a) | 7a-4 | 03-608416 |
| SWMU 60-007(b) | 7b-1 | 03-608417 |
| SWMU 60-007(b) | 7b-12 | 03-608428 |
| SWMU 60-007(b) | 7b-2 | 03-608418 |
| SWMU 60-007(b) | 7b-3 | 03-608419 |
| SWMU 60-007(b) | 7b-4 | 03-608420 |
| SWMU 60-007(b) | 7b-5 | 03-608421 |
| SWMU 60-007(b) | 7b-6 | 03-608422 |
| SWMU 60-007(b) | 7b-7 | 03-608423 |
| SWMU 60-007(b) | 7b-8 | 03-608424 |
| SWMU 60-007(b) | 7b-9 | 03-608425 |
| SWMU 60-007(b) | 7b-10 | 03-608426 |
| SWMU 60-007(b) | 7b-11 | 03-608427 |
| **TA-61** | | |
| AOC C-61-002 | c2-1 | 03-608432 |
| AOC C-61-002 | c2-2 | 03-608430 |
| AOC C-61-002 | c2-3 | 03-608431 |
| AOC C-61-002 | c2-4 | 03-608433 |
| AOC C-61-002 | c2-5 | 03-608429 |

**Table 6.2-1**
**Samples Collected and Analyses Requested at SWMU 03-002(c)**

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

**Table 6.2-2**
**Inorganic Chemicals above BVs at SWMU 03-002(c)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Beryllium | Cadmium | Chromium | Lead | Sodium | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **1.83** | **0.4** | **19.3** | **22.3** | **915** | **0.73** |
| **Residential SSL**[b] | | | | **3.13E+01** | **1.56E+02** | **7.79E+01** | **2.19E+02**[c] | **4.00E+02** | **na**[d] | **5.16E+00** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **2.26E+03** | **1.12E+03** | **2.92E+03**[c] | **8.00E+02** | **na** | **7.49E+01** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **1.44E+02** | **3.09E+02** | **4.49E+02**[c] | **8.00E+02** | **na** | **2.04E+01** |
| RE03-09-13306 | 03-608145 | 0.0–1.0 | Soil | —[e] | — | 0.533 (U) | — | — | — | — |
| RE03-09-13307 | 03-608145 | 5.0–5.8 | Soil | 1.18 (U) | — | 0.591 (U) | 20.8 | — | — | — |
| RE03-09-13308 | 03-608146 | 0.0–1.0 | Soil | 1.22 (U) | — | 0.608 (U) | — | — | 2620 | — |
| RE03-09-13309 | 03-608146 | 1.5–2.0 | Soil | 1.3 (U) | — | 0.649 (U) | — | — | 2730 | — |
| RE03-09-13310 | 03-608147 | 0.0–1.0 | Soil | 1.1 (U) | — | 0.549 (U) | 36.2 | — | 970 | — |
| RE03-09-13311 | 03-608147 | 3.5–4.0 | Soil | 1.3 (U) | — | 0.652 (U) | 29.7 | — | 1650 | — |
| RE03-09-13312 | 03-608148 | 0.0–1.0 | Soil | 1.23 (U) | — | 0.613 (U) | — | — | — | — |
| RE03-09-13313 | 03-608148 | 4.5–5.0 | Soil | 1.22 (U) | 1.96 | 0.609 (U) | — | 37.7 | — | 0.931 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] SSL for hexavalent chromium.

[d] na = Not available.

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

**Table 6.2-3**
**Organic Chemicals Detected at SWMU 03-002(c)**

| Sample ID | Location ID | Depth (ft) | Media | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Chlordane[gamma-] | Chrysene | DDT[4,4'-] | Fluoranthene | Phenanthrene | Pyrene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.62E+01** | **6.21E+02** | **1.728E+01** | **2.29E+03** | **1.83E+03** | **1.72E+03** |
| **Industrial SSL**[a] | | | | **2.34E+01** | **2.34E+00** | **2.34E+01** | **7.19E+01** | **2.34E+03** | **7.81E+01** | **2.44E+04** | **2.05E+04** | **1.83E+04** |
| **Construction Worker SSL**[a] | | | | **2.13E+02** | **2.13E+01** | **2.13E+02** | **1.35E+02** | **2.06E+04** | **1.42E+02** | **8.91E+03** | **7.15E+03** | **6.68E+03** |
| RE03-09-13306 | 03-608145 | 0.0–1.0 | Soil | 0.0199 (J) | 0.0153 (J) | 0.0152 (J) | —[b] | 0.0121 (J) | 0.00308 (J) | 0.0266 (J) | 0.0264 (J) | 0.0298 (J) |
| RE03-09-13310 | 03-608147 | 0.0–1.0 | Soil | — | — | — | 0.000983 (J) | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] — = Not detected.

**Table 6.3-1**
**Samples Collected and Analyses Requested at SWMU 03-003(c)**

| Sample ID | Location ID | Depth (ft) | Media | PCBs |
|---|---|---|---|---|
| RC03-01-0012 | 03-14454 | 0.0–0.25 | n/a* | 9441R |
| RC03-01-0013 | 03-14455 | 0.0–0.25 | n/a | 9441R |
| RC03-01-0014 | 03-14456 | 0.0–0.25 | n/a | 9441R |
| RC03-01-0015 | 03-14457 | 0.33–0.5 | Fill | 9441R |
| RC03-01-0016 | 03-14458 | 0.33–0.5 | Fill | 9441R |
| RC03-01-0017 | 03-14459 | 0.33–0.5 | Fill | 9441R |

*n/a = Not applicable.

**Table 6.3-2**
**Organic Chemicals Detected at SWMU 03-003(c)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 |
|---|---|---|---|---|
| **Residential SSL*** | | | | **1.12E+00** |
| **Industrial SSL*** | | | | **8.26E+00** |
| **Construction Worker SSL*** | | | | **4.36E+00** |
| RC03-01-0013 | 03-14455 | 0.0–0.25 | Asphalt | 14 |
| RC03-01-0014 | 03-14456 | 0.0–0.25 | Asphalt | 0.64 |
| RC03-01-0015 | 03-14457 | 0.33–0.5 | Fill | 0.054 |
| RC03-01-0016 | 03-14458 | 0.33–0.5 | Fill | 0.043 |

Note: All concentrations are in mg/kg.
*SSLs from NMED (2009, 108070).

**Table 6.4-1**
**Samples Collected and Analyses Requested at AOC 03-003(d)**

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

**Table 6.4-2**
**Organic Chemicals Detected at AOC 03-003(d)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 |
|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** |
| RE03-09-13314 | 03-608149 | 0.0–0.0 | Concrete | —[b] | 0.0048 |
| RE03-09-13315 | 03-608150 | 0.0–1.0 | Soil | 0.19 | 0.489 |
| RE03-09-13316 | 03-608150 | 1.0–2.0 | Soil | — | 0.0315 |
| RE03-09-13317 | 03-608151 | 0.0–1.0 | Soil | — | 0.0168 (J) |
| RE03-09-13318 | 03-608151 | 1.0–2.0 | Soil | — | 0.0071 |
| RE03-09-13387 | 03-608161 | 0.0–1.0 | Soil | — | 0.408 |
| RE03-09-13388 | 03-608161 | 1.0–2.0 | Soil | — | 0.965 |
| RE03-09-13389 | 03-608162 | 0.0–1.0 | Soil | — | 0.0246 |
| RE03-09-13390 | 03-608162 | 1.0–2.0 | Soil | — | 0.0081 |
| RE03-09-13417 | 03-608172 | 0.0–1.0 | Soil | — | 0.0276 |
| RE03-09-13418 | 03-608172 | 1.0–2.0 | Soil | — | 0.0136 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] — = Not detected.

**Table 6.6-1**
**Samples Collected and Analyses Requested at AOC 03-003(g)**

| Sample ID | Location ID | Depth (ft) | Media | PCBs |
|---|---|---|---|---|
| RE03-10-12113 | 03-611413 | 0.0–0.0 | Swipe | 10-1648 |
| RE03-10-12114 | 03-611413 | 0.0–0.0 | Swipe | 10-1648 |
| RE03-10-12115 | 03-611413 | 0.0–0.0 | Swipe | 10-1648 |

**Table 6.6-2**
**Organic Chemicals Detected at AOC 03-003(g)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1260 |
|---|---|---|---|---|
| **Residential SSL*** | | | | **2.22E+00** |
| **Industrial SSL*** | | | | **8.26E+00** |
| **Construction Worker SSL*** | | | | **7.58E+01** |
| RE03-10-12113 | 03-611413 | 0.0–0.0 | Swipe | 4.44 |
| RE03-10-12114 | 03-611413 | 0.0–0.0 | Swipe | 39.2 |
| RE03-10-12115 | 03-611413 | 0.0–0.0 | Swipe | 6.66 |

Note: Swipe concentrations are in µg/100 $cm^2$, and SSL concentrations are in mg/kg.
*SSLs from NMED (2009, 108070).

**Table 6.8-1**
**Samples Collected and Analyses Requested at SWMU 03-009(a)**

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

*— = Analyses not requested.

**Table 6.8-2**
**Inorganic Chemicals above BVs at SWMU 03-009(a)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Lead | Manganese | Selenium | Sodium |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **0.5** | **1.63** | **2200** | **7.14** | **11.2** | **482** | **0.3** | **2770** |
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **19.3** | **22.3** | **671** | **1.52** | **915** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **4.00E+02** | **1.07E+04** | **3.91E+02** | **na** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03**[d] | **8.00E+02** | **1.45E+05** | **5.68E+03** | **na** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **8.00E+02** | **4.63E+02** | **1.55E+03** | **na** |
| RE03-03-52423 | 03-22538 | 19.5–20.0 | Qbt4 | —[e] | — | — | — | — | — | 0.48 (J+) | — |
| RE03-03-52427 | 03-22539 | 4.0–5.0 | Qbt4 | — | — | — | — | — | — | 0.43 (J+) | — |
| RE03-09-13427 | 03-608178 | 9.0–10.0 | Soil | 1.17 (U) | 0.584 (U) | — | — | — | — | — | — |
| RE03-09-13426 | 03-608178 | 11.5–12.0 | Qbt3 | 1.15 (U) | — | — | 21.5 | 12.4 | — | 1.19 (UJ) | — |
| RE03-09-13428 | 03-608178 | 14.0–15.0 | Qbt3 | 1.19 (U) | — | — | 20.9 | — | — | 1.19 (UJ) | — |
| RE03-09-13429 | 03-608178 | 19.0–20.0 | Qbt3 | 1.11 (U) | — | — | 37.5 | 58.2 | 530 | 1.11 (UJ) | — |
| RE03-09-13430 | 03-608179 | 9.0–10.0 | Soil | 1.01 (U) | 0.503 (U) | — | — | — | — | — | — |
| RE03-09-13431 | 03-608179 | 11.2–12.0 | Qbt3 | 1.16 (U) | — | — | 14.1 | — | — | 1.16 (UJ) | — |
| RE03-09-13432 | 03-608179 | 14.0–15.0 | Qbt3 | 1.08 (U) | — | — | 21.5 | — | — | 1.08 (UJ) | — |
| RE03-09-13433 | 03-608179 | 19.0–20.0 | Qbt3 | 1.06 (U) | — | — | 65.8 | — | — | 1.07 (U) | — |
| RE03-09-13434 | 03-608180 | 9.0–10.0 | Soil | 1.78 (U) | — | 13400 (J) | — | — | — | — | 1160 |
| RE03-09-13436 | 03-608180 | 14.0–15.0 | Qbt3 | 0.742 (U) | — | — | — | — | — | 1.08 (U) | — |
| RE03-09-13437 | 03-608180 | 19.0–20.0 | Qbt3 | 0.887 (U) | — | — | — | — | — | 1.06 (U) | — |
| RE03-09-13438 | 03-608181 | 0.0–1.0 | Soil | 1.05 (U) | 0.523 (U) | — | — | — | — | — | — |
| RE03-09-13439 | 03-608181 | 1.0–2.0 | Soil | 1.08 (U) | 0.541 (U) | — | — | — | — | — | — |
| RE03-09-13440 | 03-608182 | 0.0–1.0 | Soil | 1.04 (U) | 0.519 (U) | — | — | — | — | — | — |
| RE03-09-13441 | 03-608182 | 1.0–2.0 | Soil | 1.06 (U) | 0.532 (U) | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

**Table 6.8-3**
**Organic Chemicals Detected at SWMU 03-009(a)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Bis(2-ethylhexyl)phthalate | Butylbenzene[sec-] | Chrysene | Ethylbenzene | Fluoranthene | Fluorene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **3.47E+02** | **1.10E+02[c]** | **6.21E+02** | **6.97E+01** | **2.29E+03** | **2.29E+03** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **1.37E+03** | **4.50E+02[c]** | **2.34E+03** | **3.85E+02** | **2.44E+04** | **2.44E+04** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **4.76+03** | **1.80E+04[d]** | **2.06E+04** | **6.63E+03** | **8.91E+03** | **8.91E+03** |
| RE03-03-52422 | 03-22538 | 14.5–15.0 | Fill | —[e] | — | NA[f] | NA | — | — | — | — | — | — | — | — | — | — | — |
| RE03-03-52427 | 03-22539 | 4.0–5.0 | Qbt4 | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — |
| RE03-03-52429 | 03-22539 | 19.5–20.0 | Qbt4 | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13427 | 03-608178 | 9.0–10.0 | Soil | 0.108 | 0.293 | 0.0396 | 0.0382 (J) | 0.857 | 0.944 | 1.62 | 0.469 | — | 0.148 (J) | 0.000825 (J) | 0.894 | 0.000756 (J) | 1.83 | — |
| RE03-09-13426 | 03-608178 | 11.5–12.0 | Qbt3 | 0.0133 (J) | 0.0553 | — | — | 0.13 | 0.13 | 0.232 | 0.076 | — | — | — | 0.129 | — | 0.346 | 0.0234 (J) |
| RE03-09-13428 | 03-608178 | 14.0–15.0 | Qbt3 | — | 0.0227 (J) | — | — | 0.0648 | 0.0597 | 0.107 | 0.0332 (J) | — | — | — | 0.0557 | — | 0.159 | — |
| RE03-09-13429 | 03-608178 | 19.0–20.0 | Qbt3 | — | 0.0457 | — | — | 0.0878 | 0.07 | 0.123 | 0.0316 (J) | — | — | — | 0.0782 | — | 0.248 | 0.0187 (J) |
| RE03-09-13430 | 03-608179 | 9.0–10.0 | Soil | — | 0.0104 (J) | — | — | 0.0243 (J) | — | 0.0345 (J) | — | — | — | — | 0.022 (J) | — | 0.045 | — |
| RE03-09-13434 | 03-608180 | 9.0–10.0 | Soil | — | — | — | — | 0.0295 (J) | 0.0309 (J) | 0.0468 | 0.015 (J) | 0.0148 (J) | — | — | 0.0329 (J) | — | 0.045 | — |
| RE03-09-13436 | 03-608180 | 14.0–15.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13438 | 03-608181 | 0.0–1.0 | Soil | 0.0119 (J) | — | — | 0.0069 (J) | — | — | 0.0168 (J) | — | — | — | — | — | — | 0.0195 (J) | — |
| RE03-09-13439 | 03-608181 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0187 (J) | 0.0308 (J) | 0.0168 (J) | — | — | 0.00033 (J) | — | — | 0.0386 | — |
| RE03-09-13440 | 03-608182 | 0.0–1.0 | Soil | — | 0.0219 (J) | — | — | 0.0557 | 0.0511 | 0.0854 | 0.0299 (J) | — | — | — | 0.0505 | — | 0.138 | 0.0117 (J) |
| RE03-09-13441 | 03-608182 | 1.0–2.0 | Soil | 0.0272 (J) | 0.0639 | — | 0.0016 (J) | 0.179 | 0.166 | 0.27 | 0.0996 | — | — | — | 0.16 | — | 0.437 | 0.0329 (J) |

**Table 6.8-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Indeno(1,2,3-cd)pyrene | Isopropylbenzene | Isopropyltoluene[4-] | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Propylbenzene[1-] | Pyrene | Tetrachloroethene | TPH-DRO | Trimethylbenzene[1,2,4-] | Trimethylbenzene[1,3,5-] | Xylene[1,2-] | Xylene[1,3-]+Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E+00** | **3.21E+03** | **3.21E+03[g]** | **1.99E+02** | **3.10E+02[h]** | **4.50E+01** | **1.83E+03** | **3.40E+03[h]** | **1.72E+03** | **6.99E+00** | **520[i]** | **6.20E+01[h]** | **7.80E+02[h]** | **9.55E+03** | **1.09E+03[l]** |
| **Industrial SSL[a]** | | | | **2.34E+01** | **1.49E+04** | **1.49E+04[g]** | **1.09E+03** | **4.10E+03[h]** | **2.52E+02** | **2.05E+04** | **2.10E+04[h]** | **1.83E+04** | **3.64E+01** | **1120[i]** | **2.60E+02[h]** | **1.00E+04[h]** | **3.15E+04** | **3.61E+03[l]** |
| **Construction Worker SSL[a]** | | | | **2.13E+02** | **1.03E+04** | **1.03E+04[g]** | **1.06E+04** | **1.24E+03[j]** | **7.02E+02** | **7.15E+03** | **2.01E+04[j]** | **6.68E+03** | **3.38E+02** | **na[k]** | **6.88E+02[j]** | **3.10E+03[j]** | **2.75E+04** | **3.13E+03[l]** |
| RE03-03-52422 | 03-22538 | 14.5–15.0 | Fill | — | — | — | 0.031 | — | — | — | — | — | 0.00057 (J) | — | — | — | NA | NA |
| RE03-03-52427 | 03-22539 | 4.0–5.0 | Qbt4 | — | — | — | 0.023 | — | — | — | — | — | — | — | — | — | NA | NA |
| RE03-03-52429 | 03-22539 | 19.5–20.0 | Qbt4 | — | — | — | 0.024 | — | — | — | — | — | — | — | — | — | NA | NA |
| RE03-09-13427 | 03-608178 | 9.0–10.0 | Soil | 0.408 | 0.000412 (J) | 0.00183 | — | 0.915 | 0.24 | 0.941 | 0.000744 (J) | 1.86 | — | 226 (J+) | 0.00206 | 0.00111 (J) | 0.00071 (J) | 0.000687 (J) |
| RE03-09-13426 | 03-608178 | 11.5–12.0 | Qbt3 | 0.0688 | — | — | — | 0.0374 (J) | 0.0164 (J) | 0.203 | — | 0.332 | — | 27.5 (J+) | — | — | — | — |
| RE03-09-13428 | 03-608178 | 14.0–15.0 | Qbt3 | 0.0279 (J) | — | — | — | 0.0138 (J) | — | 0.0895 | — | 0.154 | — | 23.6 (J+) | — | — | — | — |
| RE03-09-13429 | 03-608178 | 19.0–20.0 | Qbt3 | 0.0263 (J) | — | — | — | — | — | 0.156 | — | 0.208 | — | — | — | — | — | — |
| RE03-09-13430 | 03-608179 | 9.0–10.0 | Soil | — | — | — | — | — | — | 0.045 | — | 0.0557 | — | — | — | — | — | — |
| RE03-09-13434 | 03-608180 | 9.0–10.0 | Soil | 0.0169 (J) | — | — | 0.00238 (J) | — | — | 0.0242 (J) | — | 0.0669 | — | 6.96 (J) | — | — | — | — |
| RE03-09-13436 | 03-608180 | 14.0–15.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | 3.24 (J) | — | — | — | — |
| RE03-09-13438 | 03-608181 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | 0.0173 (J) | — | 23.7 | — | — | — | — |
| RE03-09-13439 | 03-608181 | 1.0–2.0 | Soil | — | — | 0.000373 (J) | — | — | — | 0.0279 (J) | — | 0.0432 | — | 83.5 (J+) | 0.000741 (J) | 0.000575 (J) | — | — |
| RE03-09-13440 | 03-608182 | 0.0–1.0 | Soil | 0.0249 (J) | — | — | — | — | — | 0.0913 | — | 0.126 | — | 3.91 (J) | — | — | — | — |
| RE03-09-13441 | 03-608182 | 1.0–2.0 | Soil | 0.0928 | — | — | — | — | — | 0.279 | — | 0.373 | — | 7.39 | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as a surrogate based on structural similarity.

[c] SSL from EPA (2007, 099314).

[d] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[e] — = Not detected.

[f] NA = Not analyzed.

[g] Isopropylbenzene used as a surrogate based on structural similarity.

[h] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[i] Screening guidelines for diesel #2 from NMED (2006, 094614).

[j] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[k] na = Not available.

[l] Xylenes used as a surrogate based on structural similarity.

**Table 6.8-4**
**Samples Collected and Analyses Requested at SWMU 03-028**

| Sample ID | Location ID | Depth (ft) | Media | Metals | SVOCs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-03-52348 | 03-22523 | 5.0–5.5 | Soil | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52351 | 03-22523 | 19.0–19.5 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52352 | 03-22524 | 7.5–8.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52354 | 03-22524 | 19.5–20.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |

**Table 6.8-5**
**Inorganic Chemicals above BVs at SWMU 03-028**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Arsenic | Barium | Calcium | Copper | Lead | Magnesium | Nickel | Selenium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **2.79** | **46** | **2200** | **4.66** | **11.2** | **1690** | **6.58** | **0.3** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.90E+00** | **1.56E+04** | **na**[c] | **3.13E+03** | **4.00E+02** | **na** | **1.56E+03** | **3.91E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **1.77E+01** | **2.24E+05** | **na** | **4.54E+04** | **8.00E+02** | **na** | **2.27E+04** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **6.54E+01** | **4.35E+03** | **na** | **1.24E+04** | **8.00E+02** | **na** | **6.19E+03** | **1.55E+03** |
| RE03-03-52351 | 03-22523 | 19.0–19.5 | Qbt4 | —[d] | — | — | — | — | — | — | — | 0.43 (J-) |
| RE03-03-52352 | 03-22524 | 7.5–8.0 | Qbt4 | 10,500 | 3.2 | 148 | 5020 | 5.4 | 13 | 2460 | 7.7 | 0.68 (J-) |
| RE03-03-52354 | 03-22524 | 19.5–20.0 | Qbt4 | — | — | — | — | — | — | — | — | 0.54 (J-) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

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

**Table 6.8-6**
**Organic Chemicals Detected at SWMU 03-028**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Benzoic Acid | Bis(2-ethylhexyl)phthalate | Methylene Chloride |
|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **2.40E+05[b]** | **3.47E+02** | **1.99E+02** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **2.50E+06[b]** | **1.37E+03** | **1.09E+03** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **9.52E+05[c]** | **4.76E+03** | **1.06E+04** |
| RE03-03-52348 | 03-22523 | 5.0–5.5 | Soil | —[d] | 0.28 (J) | 0.079 (J) | — |
| RE03-03-52351 | 03-22523 | 19.0–19.5 | Qbt4 | — | 0.14 (J) | — | — |
| RE03-03-52352 | 03-22524 | 7.5–8.0 | Qbt4 | — | — | — | 0.0036 (J) |
| RE03-03-52354 | 03-22524 | 19.5–20.0 | Qbt4 | 0.0057 (J) | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] — = Not detected.

**Table 6.8-7**
**Samples Collected and Analyses Requested at SWMU 03-029**

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

*— = Analyses not requested.

**Table 6.8-8**
**Inorganic Chemicals above BVs at SWMU 03-029**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Cadmium | Calcium | Chromium | Copper | Iron | Selenium |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **0.5** | **2.79** | **1.63** | **2200** | **7.14** | **4.66** | **14,500** | **0.3** |
| **Soil BV**[a] | | | | **0.83** | **8.17** | **0.4** | **6120** | **19.3** | **14.7** | **21,500** | **1.52** |
| **Residential SSL**[b] | | | | **3.13E+01** | **3.90E+00** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **3.13E+03** | **5.48E+04** | **3.91E+02** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.77E+01** | **1.12E+03** | **na** | **2.92E+03**[d] | **4.54E+04** | **7.95E+05** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **6.54E+01** | **3.09E+02** | **na** | **4.49E+02**[d] | **1.24E+04** | **2.17E+05** | **1.55E+03** |
| RE03-09-13445 | 03-22536 | 1.5–2 | Soil | 1.11 (U) | —[e] | 0.556 (U) | — | — | — | 34,900 | — |
| RE03-09-13446 | 03-22536 | 4–5 | Soil | 1.08 (U) | — | 0.539 (U) | — | — | — | — | — |
| RE03-09-13442 | 03-608183 | 0.6–1 | Soil | 1.07 (U) | — | 0.536 (U) | — | — | — | — | — |
| RE03-09-13443 | 03-608183 | 4–5 | Soil | 1.11 (U) | — | 0.555 (U) | — | — | — | — | — |
| RE03-09-13444 | 03-608183 | 9–10 | Soil | 1.09 (U) | — | 0.544 (U) | — | 19.6 | — | — | — |
| RE03-09-13447 | 03-608184 | 9–10 | Soil | 1.08 (U) | — | 0.54 (U) | — | — | — | — | — |
| RE03-09-13448 | 03-608185 | 0–1 | Soil | 1.08 (U) | 8.7 | 0.54 (U) | 12,200 | — | 18.9 | — | — |
| RE03-09-13449 | 03-608185 | 1–2 | Soil | 1.06 (U) | — | 0.53 (U) | — | — | 40.5 | — | — |
| RE03-09-13450 | 03-608186 | 0–1 | Qbt3 | 1.1 (U) | — | — | — | 11.2 | — | — | 1.12 (U) |
| RE03-09-13451 | 03-608186 | 1–2 | Qbt3 | 1.06 (U) | — | — | — | 22 | — | — | 1.09 (U) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

**Table 6.8-9**
**Organic Chemicals Detected at SWMU 03-029**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Chrysene | Fluoranthene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **6.21E+02** | **2.29E+03** | **1.83E+03** | **1.72E+03** | **520[b]** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **2.34E+03** | **2.44E+04** | **2.05E+04** | **1.83E+04** | **1120[b]** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **2.06E+04** | **8.91E+03** | **7.15E+03** | **6,68E+03** | **na[c]** |
| RE03-09-13445 | 03-22536 | 1.5–2 | Soil | —[d] | 0.0134 | — | — | — | — | — | — | — | 4.8 (J) |
| RE03-09-13446 | 03-22536 | 4–5 | Soil | 0.0023 (J) | — | — | — | — | — | — | — | — | 2.86 (J) |
| RE03-09-13442 | 03-608183 | 0.6–1 | Soil | 0.0246 | 0.0155 | 0.0225 (J) | 0.0184 (J) | 0.0286 (J) | 0.0185 (J) | 0.032 (J) | 0.0126 (J) | 0.0327 (J) | 5 (J) |
| RE03-09-13447 | 03-608184 | 9–10 | Soil | — | — | — | — | — | — | — | — | — | 2.94 (J) |
| RE03-09-13448 | 03-608185 | 0–1 | Soil | 0.0203 | 0.0117 | — | — | — | — | — | — | — | 2.86 (J) |
| RE03-09-13449 | 03-608185 | 1–2 | Soil | 0.0296 | 0.0261 | — | — | — | — | — | — | — | — |
| RE03-09-13450 | 03-608186 | 0–1 | Qbt3 | 0.0065 | 0.0051 | — | — | — | — | — | — | — | — |
| RE03-09-13451 | 03-608186 | 1–2 | Qbt3 | 0.0015 (J) | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Screening guidelines for diesel #2 from NMED (2006, 094614).
[c] na = Not available.
[d] — = Not detected.

**Table 6.8-10**
**Samples Collected and Analyses Requested at SWMU 03-036(a)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | SVOCs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-03-52357 | 03-22525 | 8.0–8.5 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52359 | 03-22525 | 19.5–20.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |

**Table 6.8-11**
**Inorganic Chemicals above BVs at SWMU 03-036(a)**

| Sample ID | Location ID | Depth (ft) | Media | Selenium |
|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.3** |
| **Residential SSL[b]** | | | | **3.91E+02** |
| **Industrial SSL[b]** | | | | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **1.55E+03** |
| RE03-03-52357 | 03-22525 | 8.0–8.5 | Qbt4 | 0.67 (J-) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).

**Table 6.8-12**
**Organic Chemicals Detected at SWMU 03-036(a)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Benzoic Acid | Tetrachloroethene |
|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **2.40E+05[b]** | **6.99E+00** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **2.50E+06[b]** | **3.64E+01** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **9.52E+05[c]** | **3.38E+02** |
| RE03-03-52357 | 03-22525 | 8.0–8.5 | QBT4 | 0.0062 (J) | —[d] | 0.00053 (J) |
| RE03-03-52359 | 03-22525 | 19.5–20.0 | QBT4 | — | 0.25 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] — = Not detected.

**Table 6.8-13**
**Samples Collected and Analyses Requested at SWMU 03-036(c)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | SVOCs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-03-52362 | 03-22526 | 3.0–4.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52365 | 03-22526 | 19.5–20.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |

**Table 6.8-14**
**Inorganic Chemicals above BVs at SWMU 03-036(c)**

| Sample ID | Location ID | Depth (ft) | Media | Arsenic | Selenium |
|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **2.79** | **0.3** |
| **Residential SSL[b]** | | | | **3.90E+00** | **3.91E+02** |
| **Industrial SSL[b]** | | | | **1.77E+01** | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **6.54E+01** | **1.55E+03** |
| RE03-03-52362 | 03-22526 | 3.0–4.0 | Qbt4 | 5.7 | 0.43 (J-) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

**Table 6.8-15**
**Organic Chemicals Detected at SWMU 03-036(c)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone |
|---|---|---|---|---|
| **Residential SSL*** | | | | **6.75E+04** |
| **Industrial SSL*** | | | | **8.51E+05** |
| **Construction Worker SSL*** | | | | **2.63E+05** |
| RE03-03-52365 | 03-22526 | 19.5–20.0 | QBT4 | 0.0051 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED (2009, 108070).

**Table 6.8-16**
**Samples Collected and Analyses Requested at SWMU 03-036(d)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | SVOCs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-03-52368 | 03-22527 | 4.5–5.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |

**Table 6.8-17**
**Inorganic Chemicals above BVs at SWMU 03-036(d)**

| Sample ID | Location ID | Depth (ft) | Media | Lead | Selenium |
|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **11.2** | **0.3** |
| **Residential SSL[b]** | | | | **4.00E+02** | **3.91E+02** |
| **Industrial SSL[b]** | | | | **8.00E+02** | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **8.00E+02** | **1.55E+03** |
| RE03-03-52368 | 03-22527 | 4.5–5.0 | Qbt4 | 13.8 | 0.51 (J-) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).

**Table 6.8-18**
**Organic Chemicals Detected at SWMU 03-036(d)**

| Sample ID | Location ID | Depth (ft) | Media | Tetrachloroethene | TPH-GRO |
|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.99E+00** | **na[b]** |
| **Industrial SSL[a]** | | | | **3.64E+01** | **na** |
| **Construction Worker SSL[a]** | | | | **3.38E+02** | **na** |
| RE03-03-52368 | 03-22527 | 4.5–5.0 | Qbt4 | 0.00025 (J) | 0.86 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] na = Not available.

**Table 6.8-19**
**Samples Collected and Analyses Requested at AOC 03-043(b)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | SVOCs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-03-52372 | 03-22528 | 9.5–10.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |
| RE03-03-52374 | 03-22528 | 19.5–20.0 | Qbt4 | 1885S | 1885S | 1885S | 1885S | 1885S |

**Table 6.8-20**
**Inorganic Chemicals above BVs at AOC 03-043(b)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Arsenic | Barium | Chromium | Iron | Lead | Magnesium | Nickel | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **2.79** | **46** | **7.14** | **14,500** | **11.2** | **1690** | **6.58** | **0.3** | **63.5** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.90E+00** | **1.56E+04** | **2.19E+02[c]** | **5.48E+04** | **4.00E+02** | **na[d]** | **1.56E+03** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **1.77E+01** | **2.24E+05** | **2.92E+03[c]** | **7.95E+05** | **8.00E+02** | **na** | **2.27E+04** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **6.54E+01** | **4.35E+03** | **4.49E+02[c]** | **2.17E+05** | **8.00E+02** | **na** | **6.19E+03** | **1.55E+03** | **9.29E+04** |
| RE03-03-52372 | 03-22528 | 9.5–10.0 | Qbt4 | 7480 | 4.3 | 67.5 | 10 (J-) | 18,400 | 31.7 | 2190 | 6.6 | 0.66 (J-) | 115 |
| RE03-03-52374 | 03-22528 | 19.5–20.0 | Qbt4 | —[e] | — | — | — | — | — | — | — | 0.4 (J-) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] SSL for hexavalent chromium.
[d] na = Not available.
[e] — = Not detected or not detected above BV.

**Table 6.8-21**
**Organic Chemicals Detected at AOC 03-043(b)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone |
|---|---|---|---|---|
| **Residential SSL*** | | | | **6.75E+04** |
| **Industrial SSL*** | | | | **8.51E+05** |
| **Construction Worker SSL*** | | | | **2.63E+05** |
| RE03-03-52374 | 03-22528 | 19.5–20.0 | Qbt4 | 0.003 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED (2009, 108070).

**Table 6.8-22**
**Samples Collected and Analyses Requested at SWMU 03-045(g)**

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

*— = Analyses not requested.

**Table 6.8-23**
**Inorganic Chemicals above BVs at SWMU 03-045(g)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Barium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Nickel | Potassium | Selenium | Sodium | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **0.5** | **2.79** | **46** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **482** | **6.58** | **3500** | **0.3** | **2770** | **1.1** | **17** | **63.5** |
| **Sediment BV**[a] | | | | **0.83** | **3.98** | **127** | **0.4** | **4420** | **10.5** | **4.73** | **11.2** | **13,800** | **19.7** | **2370** | **543** | **9.38** | **2690** | **0.3** | **1470** | **0.73** | **19.7** | **60.2** |
| **Soil BV**[a] | | | | **0.83** | **8.17** | **295** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **671** | **15.4** | **3460** | **1.52** | **915** | **0.73** | **39.6** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **3.90E+00** | **1.56E+04** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **na** | **3.91E+02** | **na** | **5.16E+00** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.77E+01** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **na** | **5.68E+03** | **na** | **7.49E+01** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **6.54E+01** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **na** | **1.55E+03** | **na** | **2.04E+01** | **1.55E+03** | **9.29E+04** |
| RE03-03-52407 | 03-22535 | 0.0–0.5 | Sed | —[g] | 4.2 | 262 | — | 23,400 | 27.5 (J-) | 7.9 | 29.4 | 19,700 | — | 6310 | 582 (J) | 17.5 | 2850 | — | 2190 | — | 32 | 61.1 |
| RE03-03-52408 | 03-22535 | 1.5–2.0 | Sed | — | — | 128 | 0.63 | 13,700 | 14.4 (J-) | — | 24.5 | — | — | 2700 | — | 11 | — | — | — | — | 21.6 | 65.1 |
| RE03-03-52412 | 03-22536 | 0.0–0.5 | Sed | — | — | 241 | 0.93 | 22,100 | 27.7 (J-) | 7.7 | 39.2 | 19,900 | 27.3 | 5200 | — | 19.3 | 2870 | — | 1510 | — | 31.3 | 141 |
| RE03-09-13455 | 03-22536 | 1.0–2.0 | Soil | 1.06 (U) | — | — | — | 16,400 | 58.7 | — | 22.1 | — | — | — | — | — | — | — | — | — | — | 61.9 |
| RE03-03-52413 | 03-22536 | 1.5–2.0 | Sed | — | — | — | — | 66,000 | 10.9 (J-) | — | — | — | — | 3340 | 654 (J) | 11.9 | — | — | — | — | — | — |
| RE03-09-13456 | 03-22536 | 4.0–5.0 | Soil | 1.09 (U) | — | — | 0.547 (U) | — | 20 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13453 | 03-608187 | 1.0–2.0 | Soil | 1.01 (U) | — | — | 0.503 (U) | 13,000 | 38.4 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13454 | 03-608187 | 4.0–5.0 | Soil | 1.04 (U) | — | — | 0.522 (U) | 6530 | 43.3 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13457 | 03-608188 | 0.0–1.0 | Soil | 1.07 (U) | — | — | 0.537 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.04 (U) | — | — |
| RE03-09-13458 | 03-608188 | 1.0–2.0 | Qbt3 | 1.05 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.997 (U) | — | — | — | — |
| RE03-09-13459 | 03-608189 | 0.0–1.0 | Soil | 1.08 (U) | — | — | 0.542 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13460 | 03-608189 | 1.0–2.0 | Qbt3 | 1.03 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.983 (U) | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.8-24**
**Organic Chemicals Detected at SWMU 03-045(g)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Benzoic Acid | Bis(2-ethylhexyl)phthalate | Butylbenzene[n-] | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **2.40E+05[c]** | **3.47E+02** | **1.40E+02[d]** | **6.21E+02** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.50E+06[c]** | **1.37E+03** | **6.10E+02[d]** | **2.34E+03** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **9.52E+05[e]** | **4.76E+03** | **2.01E+04[f]** | **2.06E+04** |
| RE03-03-52407 | 03-22535 | 0.0–0.5 | Sed | NA[g] | NA | 0.16 (J) | 0.22 (J) | 0.19 (J) | 0.2 (J) | 0.2 (J) | —[h] | 0.73 | — | 0.21 (J) |
| RE03-03-52408 | 03-22535 | 1.5–2.0 | Sed | NA | NA | — | — | — | — | — | — | 0.28 (J) | — | — |
| RE03-03-52412 | 03-22536 | 0.0–0.5 | Sed | NA | NA | 0.12 (J) | 0.14 (J) | 0.15 (J) | — | 0.12 (J) | — | 0.77 | — | 0.15 (J) |
| RE03-09-13455 | 03-22536 | 1.0–2.0 | Soil | — | — | 0.0197 (J) | 0.0226 (J) | 0.0317 (J) | — | 0.0115 (J) | — | — | — | 0.0189 (J) |
| RE03-03-52413 | 03-22536 | 1.5–2.0 | Sed | NA | NA | 0.16 (J) | 0.16 (J) | 0.15 (J) | 0.11 (J) | 0.14 (J) | — | 0.32 (J) | 0.0018 (J) | 0.18 (J) |
| RE03-09-13456 | 03-22536 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13453 | 03-608187 | 1.0–2.0 | Soil | — | — | 0.0272 (J) | 0.03 (J) | 0.0404 | 0.0304 (J) | 0.0158 (J) | — | — | — | 0.0238 (J) |
| RE03-09-13454 | 03-608187 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13457 | 03-608188 | 0.0–1.0 | Soil | 0.0052 | 0.0153 | — | 0.0177 (J) | 0.0226 (J) | — | — | — | — | — | 0.0148 (J) |
| RE03-09-13458 | 03-608188 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | 0.174 (J) | — | — | — |
| RE03-09-13459 | 03-608189 | 0.0–1.0 | Soil | 0.002 (J) | 0.0026 (J) | — | — | — | — | — | — | — | — | — |
| RE03-09-13460 | 03-608189 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.8-24 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Fluoranthene | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Methylene Chloride | Phenanthrene | Pyrene | TPH-DRO | TPH-GRO | Trichloroethene | Trimethylbenzene[1,2,4-] | Trimethylbenzene[1,3,5-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **2.29E+03** | **6.21E+00** | **3.21E+03[i]** | **1.99E+02** | **1.83E+03** | **1.72E+03** | **520[j]** | **na[k]** | **4.57E+01** | **6.20E+01[c]** | **7.80E+02[c]** |
| **Industrial SSL[a]** | | | | **2.44E+04** | **2.34E+01** | **1.49E+04[i]** | **1.09E+03** | **2.05E+04** | **1.83E+04** | **1120[j]** | **na** | **2.53E+02** | **2.60E+02[c]** | **1.00E+04[c]** |
| **Construction Worker SSL[a]** | | | | **8.91E+03** | **2.13E+02** | **1.03E+04[i]** | **1.06E+04** | **7.15E+03** | **6.68E+03** | **na** | **na** | **4.60E+03** | **6.88E+02[e]** | **3.10E+03[e]** |
| RE03-03-52407 | 03-22535 | 0.0–0.5 | Sed | 0.37 (J) | 0.18 (J) | — | 0.013 | 0.14 (J) | 0.38 (J) | — | — | — | — | — |
| RE03-03-52408 | 03-22535 | 1.5–2.0 | Sed | 0.12 (J) | — | — | 0.011 | — | 0.11 (J) | — | — | — | — | — |
| RE03-03-52412 | 03-22536 | 0.0–0.5 | Sed | 0.33 (J) | 0.12 (J) | — | 0.018 | 0.12 (J) | 0.28 (J) | — | — | — | — | — |
| RE03-09-13455 | 03-22536 | 1.0–2.0 | Soil | 0.0474 | 0.122 | — | — | 0.0148 (J) | 0.0356 | 6.9 (J) | — | — | — | — |
| RE03-03-52413 | 03-22536 | 1.5–2.0 | Sed | 0.42 | 0.12 (J) | 0.014 | 0.013 | 0.2 (J) | 0.34 (J) | — | 0.95 | 0.0019 (J) | 0.0029 (J) | 0.0011 (J) |
| RE03-09-13456 | 03-22536 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | 0.0165 (J) | — | — | — |
| RE03-09-13453 | 03-608187 | 1.0–2.0 | Soil | 0.0571 | 0.122 | — | — | 0.0183 (J) | 0.0435 | 18.5 (J) | 0.016 (J) | — | — | — |
| RE03-09-13454 | 03-608187 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | 0.0336 (J) | — | — | — |
| RE03-09-13457 | 03-608188 | 0.0–1.0 | Soil | 0.0383 | 0.119 | — | — | 0.0157 (J) | 0.0305 (J) | 48.5 | 0.309 | — | — | — |
| RE03-09-13458 | 03-608188 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | 3.66 (J) | 0.184 | — | — | — |
| RE03-09-13459 | 03-608189 | 0.0–1.0 | Soil | — | — | — | — | — | — | 13.1 | 0.195 | — | — | — |
| RE03-09-13460 | 03-608189 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | 0.377 | — | 0.000329 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as a surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] SSL from EPA (2007, 099314).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[g] NA = Not analyzed.

[h] — = Not detected.

[i] Isopropylbenzene used as a surrogate based on structural similarity.

[j] Screening guidelines for diesel #2 from NMED (2006, 094614).

[k] na = Not available.

**Table 6.9-1**
**Samples Collected and Analyses Requested at SWMU 03-009(i)**

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

**Table 6.9-2**
**Inorganic Chemicals above BVs at SWMU 03-009(i)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Calcium | Chromium | Cobalt | Copper | Cyanide (Total) | Iron | Lead | Manganese | Nickel | Selenium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **0.5** | **2.79** | **46** | **2200** | **7.14** | **3.14** | **4.66** | **0.5** | **14,500** | **11.2** | **482** | **6.58** | **0.3** | **17** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **8.17** | **295** | **6120** | **19.3** | **8.64** | **14.7** | **0.5** | **21,500** | **22.3** | **671** | **15.4** | **1.52** | **39.6** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **na[c]** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **1.56E+03** | **5.48E+04** | **4.00E+02** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **na** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **2.27E+04** | **7.95E+05** | **8.00E+02** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **na** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **6.19E+03** | **2.17E+05** | **8.00E+02** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** |
| RE03-09-13461 | 03-608190 | 0.0–1.0 | Soil | —[g] | 2.44 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13462 | 03-608190 | 1.0–2.0 | Soil | — | 1.33 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13463 | 03-608191 | 0.0–1.0 | Soil | — | 2.07 (U) | — | — | 9350 | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13464 | 03-608191 | 1.0–2.0 | Qbt3 | — | 1.9 (U) | — | 74.4 | 3460 | 14 | 6.06 | 10.2 | 0.631 | 18,500 | — | 565 | 9.55 (J+) | 1 (UJ) | 24.6 |
| RE03-09-13465 | 03-608192 | 4.0–5.0 | Qbt3 | — | 1.04 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.07 (U) | — |
| RE03-09-13466 | 03-608192 | 9.0–10.0 | Qbt3 | — | 1.07 (U) | 4.34 | — | — | — | — | — | — | 19,300 | — | — | — | 1.07 (U) | — |
| RE03-09-13467 | 03-608193 | 4.0–5.0 | Qbt3 | — | 1.01 (U) | — | — | — | — | — | — | — | — | — | — | — | 1 (U) | — |
| RE03-09-13468 | 03-608193 | 9.0–10.0 | Qbt3 | — | 1.1 (U) | — | — | — | — | — | — | — | — | 17 | — | — | 1.09 (U) | — |
| RE03-09-13469 | 03-608194 | 4.0–5.0 | Qbt3 | 8110 (J+) | 1.65 | — | 136 | 2310 | 7.68 | 4.67 | 5.88 | — | — | 12.8 | — | 7.04 | 1.05 (U) | 22.4 |
| RE03-09-13470 | 03-608194 | 9.0–10.0 | Qbt3 | — | 0.794 (J) | — | — | — | — | — | — | — | — | — | — | — | 1.01 (U) | — |
| RE03-09-13471 | 03-608195 | 4.0–5.0 | Qbt3 | — | 0.589 (J) | — | — | — | — | — | — | — | — | — | — | — | 1.03 (U) | — |
| RE03-09-13472 | 03-608195 | 9.0–10.0 | Qbt3 | — | 0.661 (J) | — | — | — | — | — | — | — | — | — | — | — | 1.06 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] na = Not available.
[d] SSL for hexavalent chromium.
[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[g] — = Not detected or not detected above BV.

**Table 6.9-3**
**Organic Chemicals Detected at SWMU 03-009(i)**

| Sample ID | Location ID | Depth (ft) | Media | Anthracene | Aroclor-1254 | Aroclor-1260 | Fluoranthene | Hexanone[2-] | Methylene Chloride | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.72E+04** | **1.12E+00** | **2.22E+00** | **2.29E+03** | **2.10E+02[b]** | **1.99E+02** | **1.72E+03** | **520[c]** |
| **Industrial SSL[a]** | | | | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.44E+04** | **1.40E+03[b]** | **1.09E+03** | **1.83E+04** | **1120[c]** |
| **Construction Worker SSL[a]** | | | | **6.68E+04** | **4.36E+00** | **7.58E+01** | **8.91E+03** | **1.48E+05[d]** | **1.06E+04** | **6.68E+03** | **na[e]** |
| RE03-09-13461 | 03-608190 | 0.0–1.0 | Soil | 0.0364 (J) | 0.0297 | 0.0589 | 0.0526 (J) | —[f] | — | 0.0536 (J) | 28.6 (J) |
| RE03-09-13462 | 03-608190 | 1.0–2.0 | Soil | 0.0367 (J) | — | 0.0434 | 0.0468 (J) | — | — | — | 11.3 |
| RE03-09-13463 | 03-608191 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | 36.4 (J) |
| RE03-09-13464 | 03-608191 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | 11.7 |
| RE03-09-13466 | 03-608192 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | 3.94 (J) |
| RE03-09-13467 | 03-608193 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | 5.44 (J) |
| RE03-09-13468 | 03-608193 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | 4.51 (J) |
| RE03-09-13469 | 03-608194 | 4.0–5.0 | Qbt3 | — | — | — | 0.0161 (J) | — | 0.00234 (J) | 0.0151 (J) | — |
| RE03-09-13470 | 03-608194 | 9.0–10.0 | Qbt3 | — | — | — | — | — | 0.00219 (J) | — | 2.86 (J) |
| RE03-09-13471 | 03-608195 | 4.0–5.0 | Qbt3 | — | — | — | — | 0.00228 (J) | 0.00233 (J) | — | — |
| RE03-09-13472 | 03-608195 | 9.0–10.0 | Qbt3 | — | — | — | — | — | 0.00224 (J) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Screening guidelines for diesel #2 from NMED (2006, 094614).

[d] Butanone[2-] used as a surrogate based on structural similarity.

[e] na = Not available.

[f] — = Not detected.

**Table 6.10-1**
**Samples Collected and Analyses Requested at SWMU 03-012(b)**

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

**Table 6.10-1 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Hexavalent Chromium | Metals | PCBs | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|
| RE03-04-52775 | 03-22576 | 0–0.5 | Soil | 1954S | 1954S | 1953S | — | — | — | — |
| RE03-04-52785 | 03-22576 | 3.5–4 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52776 | 03-22577 | 0–0.5 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52786 | 03-22577 | 3–3.5 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52777 | 03-22578 | 0–0.5 | Soil | 1954S | 1954S | 1953S | — | — | — | — |
| RE03-04-52787 | 03-22578 | 3.5–4 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52778 | 03-22579 | 0–0.5 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52788 | 03-22579 | 3.5–4 | Soil | 1954S | 1954S | — | — | — | — | — |
| RE03-04-52779 | 03-22580 | 0–0.5 | Soil | 1961S | 1961S | 1960S | — | — | — | — |
| RE03-04-52789 | 03-22580 | 3.5–4 | Soil | 1961S | 1961S | — | — | — | — | — |
| RE03-04-52781 | 03-22582 | 0.83–1.33 | Soil | 1959S | 1959S | 1958S | — | — | — | — |
| RE03-04-52791 | 03-22582 | 1.83–2.83 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-04-52782 | 03-22583 | 0–0.5 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-04-52792 | 03-22583 | 3.5–4 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-04-52783 | 03-22584 | 0–0.5 | Soil | 1959S | 1959S | 1958S | — | — | — | — |
| RE03-04-52793 | 03-22584 | 3.5–4 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-04-52784 | 03-22585 | 0–0.5 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-04-52794 | 03-22585 | 3.5–4 | Soil | 1959S | 1959S | — | — | — | — | — |
| RE03-09-13478 | 03-608196 | 0–1 | Soil | — | 10-355 | 10-354 | 10-354 | 10354 | 10-354 | 10-355 |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | — | 10-355 | 10-354 | 10-354 | 10-354 | 10-354 | 10-355 |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | — | 10-355 | 10-354 | 10-354 | 10-354 | 10-354 | 10-355 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | — | 10-355 | 10-354 | 10-354 | 10-354 | 10-354 | 10-355 |

*— = Analyses not requested.

**Table 6.10-2**
**Inorganic Chemicals above BVs at SWMU 03-012(b)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Chromium Hexavalent Ion | Copper | Magnesium | Mercury | Silver | Sodium | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **19.3** | **na**[b] | **14.7** | **4610** | **0.1** | **1** | **915** | **0.73** | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **na** | **2.19E+02**[d] | **2.19E+02** | **3.13E+03** | **na** | **2.30E+01**[e] | **3.91E+02** | **na** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03**[d] | **2.92E+03** | **4.54E+04** | **na** | **3.10E+02**[e] | **5.68E+03** | **na** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **4.49E+02** | **1.24E+04** | **na** | **9.29E+01**[f] | **1.55E+03** | **na** | **2.04E+01** | **9.29E+04** |
| RE03-02-49270 | 03-02-21036 | 0–0.5 | Fill | —[g] | 0.687855 | — | 156.64 | 4.22247 | 26.1067 | — | 0.102157 | 6.44722 | — | — | 97.9569 |
| RE03-02-49272 | 03-02-21038 | 0–0.5 | Fill | — | — | — | 42.8736 | 8.94253 | 20.5747 | — | — | 1.49425 | — | — | 49.8851 |
| RE03-02-49273 | 03-02-21039 | 0–0.5 | Fill | — | — | — | — | 5.23474 | — | — | — | — | — | — | — |
| RE03-02-49287 | 03-02-21039 | 0.5–1 | Fill | 5.57377 (U) | 2.78689 (U) | — | — | 2.06089 | — | — | — | 2.78689 (U) | — | 2.78689 (U) | — |
| RE03-02-49275 | 03-02-21041 | 0–0.5 | Fill | — | — | — | — | 5.61224 | — | — | — | — | — | — | — |
| RE03-02-49289 | 03-02-21041 | 0.5–1 | Fill | — | — | — | — | 3.66213 | — | — | — | — | — | — | — |
| RE03-02-49277 | 03-02-21043 | 0–0.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | 62 |
| RE03-02-49291 | 03-02-21043 | 0.5–1 | Fill | — | — | — | — | 4.00248 | — | — | — | — | — | — | — |
| RE03-02-49278 | 03-02-21044 | 0–0.5 | Fill | — | — | — | 21.34 | 3.25062 | — | — | — | 1.27792 | — | — | 145.161 |
| RE03-02-49292 | 03-02-21044 | 0.5–1 | Fill | — | — | — | — | — | — | — | — | — | — | — | 73.6963 |
| RE03-02-49279 | 03-02-21045 | 0–0.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | 130.17 |
| RE03-02-49293 | 03-02-21045 | 0.5–1 | Fill | — | — | — | 22.1761 | — | — | — | — | — | — | — | 78.7634 |
| RE03-02-49280 | 03-02-21046 | 0–0.5 | Fill | — | — | — | — | 7.57362 | — | — | — | — | — | — | — |
| RE03-02-49294 | 03-02-21046 | 0.5–1 | Fill | — | — | — | — | 5.1573 | — | — | — | — | — | — | — |
| RE03-02-49281 | 03-02-21047 | 0–0.5 | Fill | — | — | — | — | 9.5 | — | — | — | — | — | — | — |
| RE03-02-49296 | 03-02-21048 | 0.5–1 | Fill | — | — | — | 19.3705 | 1.82809 | — | — | — | — | — | — | 57.2639 |
| RE03-02-49283 | 03-02-21049 | 0–0.5 | Fill | — | — | — | 45.8333 | 2.31481 | — | — | — | 1.63194 | — | — | 52.3148 |
| RE03-02-49297 | 03-02-21049 | 0.5–1 | Fill | — | — | — | — | 1.46172 | — | — | — | — | — | — | — |
| RE03-02-49298 | 03-02-21050 | 0.5–1 | Fill | — | — | — | — | 3.70413 | — | — | — | — | — | — | — |
| RE03-02-49300 | 03-02-21052 | 0.5–1 | Fill | — | — | — | — | 2.08034 | — | — | — | — | — | — | — |
| RE03-02-49301 | 03-02-21053 | 0.5–1 | Fill | — | 0.469939 | — | — | 5.0184 | — | — | — | — | — | — | 67.7301 |
| RE03-04-52775 | 03-22576 | 0–0.5 | Soil | NA[h] | 0.524 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52785 | 03-22576 | 3.5–4 | Soil | NA | 0.547 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52776 | 03-22577 | 0–0.5 | Soil | NA | — | — | 31 | 0.241 | — | — | — | 1.18 | — | — | 54.5 |
| RE03-04-52786 | 03-22577 | 3–3.5 | Soil | NA | 0.539 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52777 | 03-22578 | 0–0.5 | Soil | NA | 0.56 (U) | — | 25 | — | — | — | — | 1.88 | — | — | — |
| RE03-04-52778 | 03-22579 | 0–0.5 | Soil | NA | — | — | 28 | — | — | — | — | 1.04 | — | — | 54.6 |
| RE03-04-52788 | 03-22579 | 3.5–4 | Soil | NA | 0.501 (U) | — | — | 0.102 (J) | — | — | — | — | — | — | — |

**Table 6.10-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Chromium Hexavalent Ion | Copper | Magnesium | Mercury | Silver | Sodium | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **19.3** | **na**[b] | **14.7** | **4610** | **0.1** | **1** | **915** | **0.73** | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **na** | **2.19E+02**[d] | **2.19E+02** | **3.13E+03** | **na** | **2.30E+01**[e] | **3.91E+02** | **na** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03**[d] | **2.92E+03** | **4.54E+04** | **na** | **3.10E+02**[e] | **5.68E+03** | **na** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **4.49E+02** | **1.24E+04** | **na** | **9.29E+01**[f] | **1.55E+03** | **na** | **2.04E+01** | **9.29E+04** |
| RE03-04-52779 | 03-22580 | 0–0.5 | Soil | NA | — | — | — | 0.0952 (J) | — | — | — | 1.99 | — | — | — |
| RE03-04-52791 | 03-22582 | 1.83–2.83 | Soil | NA | 0.545 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52782 | 03-22583 | 0–0.5 | Soil | NA | 0.514 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52792 | 03-22583 | 3.5–4 | Soil | NA | 0.532 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52783 | 03-22584 | 0–0.5 | Soil | NA | — | — | — | 0.157 | — | — | — | — | — | — | — |
| RE03-04-52793 | 03-22584 | 3.5–4 | Soil | NA | 0.491 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-04-52784 | 03-22585 | 0–0.5 | Soil | NA | — | — | 32.5 | — | — | — | — | 2.08 | — | — | 54.2 |
| RE03-04-52794 | 03-22585 | 3.5–4 | Soil | NA | — | — | — | 0.21 | — | — | — | — | — | — | — |
| RE03-09-13478 | 03-608196 | 0–1 | Soil | 1.14 (U) | — | 22800 (J+) | — | NA | — | 5240 (J+) | — | — | 1450 | — | — |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | 1.12 (U) | — | 8460 (J+) | — | NA | — | — | — | — | — | — | 50.3 |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | 1.06 (U) | 0.528 (U) | — | — | NA | — | — | 0.159 | 1.17 | — | — | 53.4 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | 1.07 (U) | 0.536 (U) | — | — | NA | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

[h] NA = Not analyzed.

**Table 6.10-3**
**Organic Chemicals Detected at SWMU 03-012(b)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **1.55E+01** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+02** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.54E+01** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+03** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **4.71E+02** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+04** |
| RE03-04-52777 | 03-22578 | 0–0.5 | Soil | NA[c] | NA | 0.0085 (J) | 0.0321 (J) | NA | NA | NA | NA | NA | NA |
| RE03-04-52779 | 03-22580 | 0–0.5 | Soil | NA | NA | 0.0213 (J) | 0.0711 (J) | NA | NA | NA | NA | NA | NA |
| RE03-04-52781 | 03-22582 | 0.83–1.33 | Soil | NA | NA | —[d] | 0.259 | NA | NA | NA | NA | NA | NA |
| RE03-04-52783 | 03-22584 | 0–0.5 | Soil | NA | NA | 0.336 | 0.925 | NA | NA | NA | NA | NA | NA |
| RE03-09-13478 | 03-608196 | 0–1 | Soil | — | — | 0.235 | 0.862 | — | — | — | 0.0451 | — | 0.0233 (J) |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | 0.0542 | 0.139 | 0.812 | 3.19 | — | 0.287 | 0.242 | 0.451 | 0.12 | 0.232 |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | — | 0.00901 (J) | 0.0803 | 0.117 | — | — | 0.0562 | 0.111 | 0.03 (J) | 0.0493 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | — | — | 0.021 | 0.0905 | — | — | — | 0.0492 | 0.015 (J) | — |

**Table 6.10-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02[e]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[f]** |
| **Industrial SSL[a]** | | | | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03[e]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[f]** |
| **Construction Worker SSL[a]** | | | | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03[g]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na[h]** |
| RE03-04-52777 | 03-22578 | 0–0.5 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-04-52779 | 03-22580 | 0–0.5 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-04-52781 | 03-22582 | 0.83–1.33 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-04-52783 | 03-22584 | 0–0.5 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13478 | 03-608196 | 0–1 | Soil | 0.0468 | — | — | 0.00256 (J) | — | — | 0.0615 | 0.0475 | 2.98 (J) |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | 0.548 | 0.0624 | 0.111 | 0.00241 (J) | 0.00868 (J) | 0.025 (J) | 0.447 | 0.534 | 53.8 |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | 0.102 | — | 0.0297 (J) | — | — | — | 0.0362 | 0.0845 | 8.88 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | 0.0389 | — | 0.0141 (J) | 0.00225 (J) | — | — | — | 0.0324 (J) | 4.03 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] NA = Not analyzed.

[d] — = Not detected.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[h] na = Not available.

**Table 6.10-4**
**Samples Collected and Analyses Requested at SWMU 03-014(q)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs |
|---|---|---|---|---|---|
| RE03-09-13482 | 03-608198 | 0–1 | Soil | 10-324 | 10-324 |
| RE03-09-13483 | 03-608198 | 1–2 | Qbt3 | 10-324 | 10-324 |
| RE03-09-13484 | 03-608199 | 0–1 | Soil | 10-324 | 10-324 |
| RE03-09-13485 | 03-608199 | 1–2 | Soil | 10-324 | 10-324 |
| RE03-09-13486 | 03-608200 | 0–1 | Soil | 10-324 | 10-324 |
| RE03-09-13487 | 03-608200 | 1–2 | Qbt3 | 10-324 | 10-324 |

**Table 6.10-5**
**Inorganic Chemicals above BVs at SWMU 03-014(q)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Lead | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **0.5** | **1.63** | **7.14** | **11.2** | **0.3** | **63.5** |
| **Soil BV**[a] | | | | **0.83** | **0.4** | **19.3** | **22.3** | **1.52** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **2.19E+02**[c] | **4.00E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **2.92E+03**[c] | **8.00E+02** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **4.49E+02**[c] | **8.00E+02** | **1.55E+03** | **9.29E+04** |
| RE03-09-13482 | 03-608198 | 0–1 | Soil | —[d] | 0.527 (U) | — | 69.4 | — | 70 |
| RE03-09-13483 | 03-608198 | 1–2 | Qbt3 | 0.567 (U) | — | 11.7 | — | 1.06 (U) | — |
| RE03-09-13484 | 03-608199 | 0–1 | Soil | — | 0.525 (U) | — | 60.6 | — | 50 |
| RE03-09-13485 | 03-608199 | 1–2 | Soil | — | 0.501 (U) | — | 33 | — | 50.8 |
| RE03-09-13486 | 03-608200 | 0–1 | Soil | 1.02 (U) | 0.509 (U) | — | 65.5 | — | 52 |
| RE03-09-13487 | 03-608200 | 1–2 | Qbt3 | — | — | — | — | 0.959 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] SSL for hexavalent chromium.
[d] — = Not detected or not detected above BV.

**Table 6.10-6**
**Organic Chemicals Detected at SWMU 03-014(q)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 |
|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** |
| RE03-09-13482 | 03-608198 | 0–1 | Soil | 0.0256 | 0.123 |
| RE03-09-13483 | 03-608198 | 1–2 | Qbt3 | —[b] | 0.0057 |
| RE03-09-13484 | 03-608199 | 0–1 | Soil | 0.0034 (J) | 0.0098 |
| RE03-09-13485 | 03-608199 | 1–2 | Soil | 0.0014 (J) | 0.0052 |
| RE03-09-13486 | 03-608200 | 0–1 | Soil | 0.0039 | 0.0092 |
| RE03-09-13487 | 03-608200 | 1–2 | Qbt3 | — | 0.0024 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] — = Not detected.

**Table 6.10-7**
**Samples Collected and Analyses Requested at SWMU 03-045(b)**

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

**Table 6.10-8**
**Inorganic Chemicals above BVs at SWMU 03-045(b)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Mercury | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|
| **Soil BV[a]** | | | | **0.83** | **0.4** | **0.1** | **1** | **48.8** |
| **Residential SSL[b]** | | | | **3.13E+01** | **7.79E+01** | **2.30E+01[c]** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **4.54E+02** | **1.12E+03** | **3.10E+02[c]** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **1.24E+02** | **3.09E+02** | **9.29E+01[d]** | **1.55E+03** | **9.29E+04** |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | 1.06 (U) | 0.528 (U) | 0.159 | 1.17 | 53.4 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | 1.07 (U) | 0.536 (U) | —[e] | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[e] — = Not detected or not detected above BV.

**Table 6.10-9**
**Organic Chemicals Detected at SWMU 03-045(b)**

| Sample ID | Location ID | Depth (ft) | Media | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Fluoranthene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03**[b] | **6.21E+02** | **2.29E+03** | **4.81E+00** | **1.99E+02** | **1.83E+03** | **1.72E+03** | **520**[c] |
| **Industrial SSL**[a] | | | | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+00** | **2.34E+01** | **1.83E+04**[b] | **2.34E+03** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **2.05E+04** | **1.83E+04** | **1120**[c] |
| **Construction Worker SSL**[a] | | | | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+01** | **2.13E+02** | **6.68E+03**[b] | **2.06E+04** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **7.15E+03** | **6.68E+03** | **na**[d] |
| RE03-09-13480 | 03-608197 | 0–1 | Soil | 0.00901 (J) | 0.0803 | 0.117 | 0.0562 | 0.111 | 0.03 (J) | 0.0493 | 0.102 | 0.0297 (J) | —[e] | 0.0362 | 0.0845 | 8.88 |
| RE03-09-13481 | 03-608197 | 1–2 | Soil | — | 0.021 | 0.0905 | — | 0.0492 | 0.015 (J) | — | 0.0389 | 0.0141 (J) | 0.00225 (J) | — | 0.0324 (J) | 4.03 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Pyrene used as surrogate based on structural similarity.
[c] Screening guidelines for diesel #2 from NMED (2006, 094614).
[d] na = Not available.
[e] — = Not detected.

**Table 6.10-10**
**Samples Collected and Analyses Requested at SWMU 03-045(c)**

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

**Table 6.10-11**
**Inorganic Chemicals above BVs at SWMU 03-045(c)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Calcium | Magnesium | Sodium | Zinc |
|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **6120** | **4610** | **915** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **na**[c] | **na** | **na** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **na** | **na** | **na** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **na** | **na** | **na** | **9.29E+04** |
| RE03-09-13478 | 03-608196 | 0-1 | Soil | 1.14 (U) | 22,800 (J+) | 5240 (J+) | 1450 | —[d] |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | 1.12 (U) | 8460 (J+) | — | — | 50.3 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] na = Not available.
[d] — = Not detected or not detected above BV.

**Table 6.10-12**
**Organic Chemicals Detected at SWMU 03-045(c)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+02** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02[c]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[d]** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+03** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03[c]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[d]** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+04** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03[e]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na[f]** |
| RE03-09-13479 | 03-608196 | 1–2 | Soil | 0.0542 | 0.139 | 0.812 | 3.19 | 0.287 | 0.242 | 0.451 | 0.12 | 0.232 | 0.0468 | —[g] | — | 0.00256 (J) | — | — | 0.0615 | 0.0475 | 2.98 (J) |
| RE03-09-13478 | 03-608196 | 0–1 | Soil | — | — | 0.235 | 0.862 | — | — | 0.0451 | — | 0.0233 (J) | 0.548 | 0.0624 | 0.111 | 0.00241 (J) | 0.00868 (J) | 0.025 (J) | 0.447 | 0.534 | 53.8 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] na = Not available.

[g] — = Not detected.

**Table 6.11-1**
**Samples Collected and Analyses Requested at SWMU 03-052(f)**

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

**Table 6.11-2**
**Inorganic Chemicals above BVs at SWMU 03-052(f)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Chromium | Copper | Cyanide (Total) | Lead | Perchlorate | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **0.5** | **46** | **1.63** | **7.14** | **4.66** | **0.5** | **11.2** | **na**[b] | **0.3** | **63.5** |
| **Soil BV**[a] | | | | **0.83** | **295** | **0.4** | **19.3** | **14.7** | **0.5** | **22.3** | **na** | **1.52** | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **2.19E+02**[d] | **3.13E+03** | **1.56E+03** | **4.00E+02** | **5.48E+01** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **2.92E+03**[d] | **4.54E+04** | **2.27E+04** | **8.00E+02** | **7.95E+02** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **4.49E+02**[d] | **1.24E+04** | **6.19E+03** | **8.00E+02** | **2.17E+02** | **1.55E+03** | **9.29E+04** |
| RE03-09-13552 | 03-608214 | 0.0–1.0 | Soil | 1.11 (U) | —[e] | — | — | — | — | 26.8 | — | — | — |
| RE03-09-13553 | 03-608214 | 1.0–2.0 | Soil | 1.11 (U) | — | 0.554 (U) | — | — | — | — | — | — | — |
| RE03-09-13554 | 03-608215 | 0.0–1.0 | Soil | 1.15 (U) | — | — | — | 19.3 (J) | — | 42.7 | 0.000821 (J) | — | 122 |
| RE03-09-13555 | 03-608215 | 1.0–2.0 | Qbt3 | 1.13 (U) | 48.8 (J) | — | 20.1 | 7.87 (J) | — | 14.5 | 0.00085 (J) | 1.14 (U) | 66.2 |
| RE03-09-13556 | 03-608216 | 0.0–1.0 | Soil | 1.12 (U) | — | — | — | 15.7 (J) | — | 31.8 | — | — | 140 |
| RE03-09-13557 | 03-608216 | 1.0–2.0 | Qbt3 | 1.09 (U) | 92.6 (J) | — | 22 | 6.86 (J) | — | 16.3 | 0.000769 (J) | 1.08 (U) | 90 |
| RE03-09-13558 | 03-608217 | 0.0–1.0 | Soil | 1.33 (U) | — | — | — | 20.2 (J) | 12.8 | 34.4 | — | — | 200 |
| RE03-09-13559 | 03-608217 | 1.0–2.0 | Soil | 1.44 (U) | — | 0.72 (U) | 67.3 | 27.2 (J) | 1.88 | 56.7 | — | — | 165 |
| RE03-09-13560 | 03-608218 | 0.0–1.0 | Soil | — | — | 0.409 (J) | — | 20.9 (J) | — | 54.1 | — | — | 198 |
| RE03-09-13561 | 03-608218 | 1.0–2.0 | Soil | 1.29 (U) | — | — | — | — | — | 36.4 | — | — | 135 |
| RE03-09-13562 | 03-608219 | 0.0–1.0 | Soil | 1.28 (U) | — | — | — | 18.6 (J) | 0.567 | 40 | — | — | 189 |
| RE03-09-13563 | 03-608219 | 1.0–2.0 | Qbt3 | 1.3 (U) | — | — | 16.6 | 9.72 (J) | — | 25.4 | — | 1.24 (U) | 89.3 |
| RE03-09-13564 | 03-608220 | 0.0–1.0 | Soil | 1.13 (U) | — | 0.566 (U) | — | — | — | — | — | — | — |
| RE03-09-13565 | 03-608220 | 1.0–2.0 | Qbt3 | 1.04 (U) | — | — | 13 | — | — | — | 0.000828 (J) | 1.05 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs 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 6.11-3**
**Organic Chemicals Detected at SWMU 03-052(f)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acenaphthylene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Bis(2-ethylhexyl)phthalate | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+03[b]** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **2.47E+02** | **6.21E+02** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+04[b]** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **1.37E+03** | **2.34E+03** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+03[b]** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **4.76E+03** | **2.06E+04** |
| RE03-09-13552 | 03-608214 | 0.0–1.0 | Soil | —[c] | — | — | 0.0102 (J) | — | — | 0.0327 (J) | 0.0305 (J) | 0.05 | 0.0287 (J) | 0.0172 (J) | 0.0916 (J) | 0.0327 (J) |
| RE03-09-13553 | 03-608214 | 1.0–2.0 | Soil | — | — | — | 0.00779 (J) | — | — | 0.0274 (J) | 0.0236 (J) | 0.0418 | 0.0199 (J) | — | — | 0.024 (J) |
| RE03-09-13554 | 03-608215 | 0.0–1.0 | Soil | 0.372 | — | — | 0.491 | 0.118 | 0.122 | 2.14 | 2.08 | 3.02 | 0.964 | 1.02 | 0.133 (J) | 2.37 |
| RE03-09-13555 | 03-608215 | 1.0–2.0 | Qbt3 | — | — | — | 0.0208 (J) | 0.0277 (J) | 0.0315 (J) | 0.0789 | 0.0827 | 0.128 | 0.0441 | 0.0428 | — | 0.0989 |
| RE03-09-13556 | 03-608216 | 0.0–1.0 | Soil | 0.0602 | — | — | 0.11 | 0.104 | 0.14 | 0.435 | 0.557 | 0.818 | 0.371 | 0.316 | 0.0911 (J) | 0.615 |
| RE03-09-13557 | 03-608216 | 1.0–2.0 | Qbt3 | — | — | — | 0.00849 (J) | 0.0182 (J) | 0.0221 | 0.0424 | 0.0465 | 0.0689 | 0.0193 (J) | 0.0285 (J) | — | 0.0512 |
| RE03-09-13558 | 03-608217 | 0.0–1.0 | Soil | 1.18 | — | 0.0226 (J) | 1.48 | 0.0971 | 0.118 | 2.15 | 1.93 | 2.65 | 0.618 | 1.1 | 0.29 (J) | 2.32 |
| RE03-09-13559 | 03-608217 | 1.0–2.0 | Soil | 0.219 | — | 0.0109 (J) | 0.372 | 0.0893 (J) | 0.129 | 1.02 | 0.979 | 1.36 | 0.469 | 0.505 | 0.204 (J) | 1.15 |
| RE03-09-13560 | 03-608218 | 0.0–1.0 | Soil | 3.35 | 0.0448 | — | 3.86 | 0.093 | 0.117 | 19.9 | 18.7 | 24.2 | 3.49 | 4.86 | 0.144 (J) | 22.9 |
| RE03-09-13561 | 03-608218 | 1.0–2.0 | Soil | 0.0447 (J) | — | — | 0.082 | 0.0395 (J) | 0.0406 (J) | 0.271 | 0.268 | 0.368 | 0.131 | 0.139 | 0.298 (J) | 0.316 |
| RE03-09-13562 | 03-608219 | 0.0–1.0 | Soil | 0.484 | — | — | 0.664 | 0.128 | 0.105 | 1.93 | 1.98 | 2.6 | 0.955 | 1.08 | — | 2.21 |
| RE03-09-13563 | 03-608219 | 1.0–2.0 | Qbt3 | 0.55 | — | — | 1.36 | 0.0278 (J) | 0.0286 (J) | 2.55 | 2.5 | 3.19 | 1.28 | 1.39 | — | 3.08 |
| RE03-09-13564 | 03-608220 | 0.0–1.0 | Soil | — | — | 0.0113 (J) | — | — | 0.008 | — | — | 0.0118 (J) | — | — | — | — |
| RE03-09-13565 | 03-608220 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.11-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dibenz(a,h)anthracene | Dibenzofuran | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylnaphthalene[2-] | Naphthalene | Nitroaniline[4-] | Phenanthrene | Pyrene | Toluene | TPH-DRO | Trimethylbenzene[1,2,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **6.21E-01** | **7.80E+01**[d] | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.10E+02**[d] | **4.50E+01** | **2.40E+02**[d] | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520**[e] | **6.20E+01**[d] |
| **Industrial SSL**[a] | | | | **2.34E+00** | **1.00E+03**[d] | **2.44E+04** | **2.44E+04** | **2.34E+01** | **4.10E+03**[d] | **2.52E+02** | **8.60E+02**[d] | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120**[e] | **2.60E+02**[d] |
| **Construction Worker SSL**[a] | | | | **2.13E+01** | **2.82E+02**[f] | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.24E+03**[f] | **7.02E+02** | **8.52E+03**[f] | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na**[g] | **6.88E+02**[f] |
| RE03-09-13552 | 03-608214 | 0.0–1.0 | Soil | — | — | 0.0541 | — | 0.0194 (J) | — | — | — | 0.0363 (J) | 0.0727 (J) | — | 14.5 | — |
| RE03-09-13553 | 03-608214 | 1.0–2.0 | Soil | — | — | 0.0565 | — | 0.0158 (J) | — | — | — | 0.0351 (J) | 0.0492 | — | 8.2 | — |
| RE03-09-13554 | 03-608215 | 0.0–1.0 | Soil | 0.281 | 0.153 (J) | 5.1 | 0.281 | 0.904 | 0.0683 | 0.127 | — | 3.19 | 8.2 | — | 610 | — |
| RE03-09-13555 | 03-608215 | 1.0–2.0 | Qbt3 | — | — | 0.191 | — | 0.0449 | — | — | — | 0.131 | 0.221 (J) | — | 13.9 | — |
| RE03-09-13556 | 03-608216 | 0.0–1.0 | Soil | — | — | 0.789 | 0.0402 | 0.336 | — | — | — | 0.57 | 1.53 | — | 57.6 | — |
| RE03-09-13557 | 03-608216 | 1.0–2.0 | Qbt3 | — | — | 0.0825 | — | 0.0197 (J) | — | — | — | 0.0579 | 0.114 | — | 9.78 | — |
| RE03-09-13558 | 03-608217 | 0.0–1.0 | Soil | 0.221 | 0.638 | 7.68 | 1.02 | 0.67 | 0.256 | 0.607 | — | 9.35 | 8.06 (J) | — | 111 | — |
| RE03-09-13559 | 03-608217 | 1.0–2.0 | Soil | — | 0.104 (J) | 2.49 | 0.192 | 0.441 | 0.0616 | 0.136 | — | 1.86 | 3.5 | 0.000507 (J) | 87.4 | — |
| RE03-09-13560 | 03-608218 | 0.0–1.0 | Soil | 1.17 | 1.23 | 49.6 | 2.24 | 3.62 | 0.299 | 0.475 | 0.46 (J) | 50.8 | 64.3 (J) | — | 693 | — |
| RE03-09-13561 | 03-608218 | 1.0–2.0 | Soil | — | — | 0.489 | 0.034 (J) | 0.12 | — | — | — | 0.407 | 0.857 | — | 49.3 | — |
| RE03-09-13562 | 03-608219 | 0.0–1.0 | Soil | — | 0.218 (J) | 4.02 | 0.361 | 0.905 | 0.0858 (J) | 0.259 | — | 3.59 | 6.66 | — | 143 (J) | — |
| RE03-09-13563 | 03-608219 | 1.0–2.0 | Qbt3 | — | 0.235 (J) | 5.9 | 0.411 | 1.22 | 0.0872 | 0.246 | — | 5.97 | 9.89 | — | 145 | 0.000435 (J) |
| RE03-09-13564 | 03-608220 | 0.0–1.0 | Soil | — | — | 0.0134 (J) | — | — | — | — | — | — | 0.0211 (J) | — | 23.2 | — |
| RE03-09-13565 | 03-608220 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 5.81 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Screening guidelines for diesel #2 from NMED (2006, 094614).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[g] na = Not available.

**Table 6.13-1**
**Samples Collected and Analyses Requested at SWMU 03-013(i)**

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

**Table 6.13-1 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | SVOCs | TPH-DRO | TPH-GRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13576 | 03-608226 | 0.0–1.0 | Soil | 10-435 | 10-435 | 10-435 | 10-435 | — | 10-435 | 10-435 |
| RE03-09-13577 | 03-608226 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13578 | 03-608227 | 0.0–1.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13579 | 03-608227 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13580 | 03-608228 | 0.0–1.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13581 | 03-608228 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13582 | 03-608229 | 0.0–1.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13583 | 03-608229 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13584 | 03-608230 | 0.0–1.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13586 | 03-608230 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13585 | 03-608231 | 0.0–1.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13587 | 03-608231 | 4.0–5.0 | Soil | 10-436 | 10-436 | 10-436 | 10-436 | — | 10-436 | 10-436 |
| RE03-09-13588 | 03-608232 | 0.0–1.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13589 | 03-608232 | 4.0–5.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13590 | 03-608233 | 0.0–1.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13592 | 03-608233 | 4.0–5.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13593 | 03-608234 | 0.0–1.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13595 | 03-608234 | 4.0–5.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13594 | 03-608235 | 0.0–1.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13597 | 03-608235 | 4.0–5.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13591 | 03-608236 | 0.0–1.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |
| RE03-09-13596 | 03-608236 | 4.0–5.0 | Soil | 10-461 | 10-460 | 10-460 | 10-460 | — | 10-460 | 10-461 |

*— = Analyses not requested.

**Table 6.13-2**
**Inorganic Chemicals above BVs at SWMU 03-013(i)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Calcium | Chromium | Copper | Lead | Magnesium | Nickel | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **295** | **0.4** | **6120** | **19.3** | **14.7** | **22.3** | **4610** | **15.4** | **1.52** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **3.13E+03** | **4.00E+02** | **na** | **1.56E+03** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03**[d] | **4.54E+04** | **8.00E+02** | **na** | **2.27E+04** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02**[d] | **1.24E+04** | **8.00E+02** | **na** | **6.19E+03** | **1.55E+03** | **9.29E+04** |
| RE03-05-59527 | 03-24444 | 0.0–0.5 | Fill | —[e] | — | 0.505 (J) | — | — | — | 38.1 | — | — | 1.7 (U) | 52.8 |
| RE03-05-59528 | 03-24444 | 1.5–1.5 | Fill | — | — | — | — | — | — | — | — | — | 1.75 (U) | — |
| RE03-05-59529 | 03-24445 | 0.0–0.5 | Fill | — | — | 0.797 | — | — | — | — | — | — | 1.68 (U) | — |
| RE03-05-59530 | 03-24445 | 1.5–1.5 | Fill | — | — | 3.53 | — | — | — | — | — | — | 1.81 (U) | 55.9 |
| RE03-05-59531 | 03-24446 | 0.0–0.5 | Fill | NA | — | — | — | — | — | — | — | — | 1.76 (U) | — |
| RE03-05-59532 | 03-24446 | 1.5–1.5 | Fill | NA | — | 0.57 (U) | — | — | — | — | — | — | 1.71 (U) | — |
| RE03-05-59533 | 03-24447 | 0.0–0.5 | Fill | 1.71 (J-) | — | 5.58 | — | — | 21.8 (J) | 238 | — | 16.3 | 1.76 (U) | 482 |
| RE03-05-59534 | 03-24447 | 1.5–1.5 | Fill | 1.55 (J-) | — | 2.79 | — | — | — | 140 | — | — | 1.68 (U) | 196 |
| RE03-05-59535 | 03-24448 | 0.0–0.5 | Fill | 0.961 (J-) | — | 1.18 | — | — | — | 137 | — | — | 1.66 (U) | 113 |
| RE03-05-59536 | 03-24448 | 1.5–1.5 | Fill | — | — | — | — | — | — | 37.6 | — | — | 1.72 (U) | 56.5 |
| RE03-05-59537 | 03-24449 | 0.0–0.5 | Fill | — | — | 0.406 (J) | — | — | — | 45.8 | — | — | 1.79 (U) | 61.7 |
| RE03-05-59538 | 03-24449 | 1.5–1.5 | Fill | — | — | 0.656 (U) | — | — | — | — | — | — | 1.97 (U) | — |
| RE03-05-59539 | 03-24450 | 0.0–0.5 | Fill | — | 302 (J+) | 0.623 | — | — | — | 37.1 | — | — | — | 59.1 |
| RE03-05-59540 | 03-24450 | 1.5–1.5 | Fill | — | — | — | — | — | — | — | — | — | 1.89 (U) | — |
| RE03-05-59541 | 03-24451 | 0.0–0.5 | Fill | NA | — | 0.568 (U) | — | — | — | — | — | — | 1.7 (U) | — |
| RE03-05-59542 | 03-24451 | 1.5–1.5 | Fill | NA | — | — | — | — | — | — | — | — | 1.7 (U) | — |
| RE03-09-13566 | 03-608221 | 0.0–1.0 | Soil | 1.41 | — | 1.36 | — | — | — | 46.5 (J) | — | NA | — | 59.2 |
| RE03-09-13567 | 03-608221 | 4.0–5.0 | Soil | 1.11 (U) | — | 0.555 (U) | — | — | — | — | — | NA | — | — |
| RE03-09-13568 | 03-608222 | 0.0–1.0 | Soil | 1.28 | — | — | 7810 (J+) | — | — | — | — | NA | — | 50.8 |
| RE03-09-13569 | 03-608222 | 4.0–5.0 | Soil | 1.08 (U) | — | 0.54 (U) | — | — | — | — | — | NA | — | — |
| RE03-09-13570 | 03-608223 | 0.0–1.0 | Soil | 1.56 | — | 0.73 | — | — | — | 53.5 (J) | — | NA | — | 73.6 |
| RE03-09-13571 | 03-608223 | 4.0–5.0 | Soil | 1.13 (U) | — | 0.565 (U) | — | — | — | — | — | NA | — | — |
| RE03-09-13572 | 03-608224 | 0.0–1.0 | Soil | 4.6 | — | 0.405 (J) | — | — | — | 115 (J) | — | NA | — | 89 |
| RE03-09-13573 | 03-608224 | 4.0–5.0 | Soil | 1.13 (U) | 373 | 0.567 (U) | — | — | — | — | — | NA | — | — |
| RE03-09-13574 | 03-608225 | 0.0–1.0 | Soil | 2.67 | — | — | — | — | — | 37.3 (J) | — | NA | — | 53.2 |
| RE03-09-13575 | 03-608225 | 4.0–5.0 | Soil | 1.12 (U) | — | 0.56 (U) | — | 21.6 | — | — | — | NA | — | — |
| RE03-09-13576 | 03-608226 | 0.0–1.0 | Soil | 5.71 | — | 0.68 | — | — | 18.5 | 213 (J) | — | NA | — | 212 |
| RE03-09-13577 | 03-608226 | 4.0–5.0 | Soil | 1.19 (U) | — | 0.595 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13578 | 03-608227 | 0.0–1.0 | Soil | 0.914 (J) | — | — | 10500 | — | — | 22.9 | — | — | — | 57.4 |
| RE03-09-13579 | 03-608227 | 4.0–5.0 | Soil | 1.18 (U) | — | 0.591 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13580 | 03-608228 | 0.0–1.0 | Soil | 1.14 (U) | — | 0.572 (U) | 14200 | — | 15.1 | — | 4700 | — | — | — |

**Table 6.13-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Calcium | Chromium | Copper | Lead | Magnesium | Nickel | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **295** | **0.4** | **6120** | **19.3** | **14.7** | **22.3** | **4610** | **15.4** | **1.52** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **3.13E+03** | **4.00E+02** | **na** | **1.56E+03** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03**[d] | **4.54E+04** | **8.00E+02** | **na** | **2.27E+04** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02**[d] | **1.24E+04** | **8.00E+02** | **na** | **6.19E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13581 | 03-608228 | 4.0–5.0 | Soil | 1.13 (U) | — | 0.563 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13582 | 03-608229 | 0.0–1.0 | Soil | 1.08 (U) | — | 0.538 (U) | 9420 | — | — | — | — | — | — | — |
| RE03-09-13583 | 03-608229 | 4.0–5.0 | Soil | 1.15 (U) | — | 0.575 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13584 | 03-608230 | 0.0–1.0 | Soil | 1.08 (U) | — | 0.539 (U) | 10700 | — | — | — | — | — | — | — |
| RE03-09-13586 | 03-608230 | 4.0–5.0 | Soil | 1.2 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13585 | 03-608231 | 0.0–1.0 | Soil | — | — | — | 9560 | 20.6 | — | — | — | — | — | 55.4 |
| RE03-09-13587 | 03-608231 | 4.0–5.0 | Soil | 1.25 (U) | — | 0.625 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13588 | 03-608232 | 0.0–1.0 | Soil | 4.31 | — | 2.71 | 6590 | — | — | 191 | — | — | — | 75 |
| RE03-09-13589 | 03-608232 | 4.0–5.0 | Soil | 1.17 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13590 | 03-608233 | 0.0–1.0 | Soil | 2.24 | — | 0.967 | — | — | — | 49.2 | — | — | — | 51.8 |
| RE03-09-13592 | 03-608233 | 4.0–5.0 | Soil | 1.16 (U) | — | 0.581 (U) | — | — | — | 28.3 | — | — | — | — |
| RE03-09-13593 | 03-608234 | 0.0–1.0 | Soil | — | — | 0.503 (J) | — | — | — | 24.1 | — | — | — | — |
| RE03-09-13595 | 03-608234 | 4.0–5.0 | Soil | 1.18 (U) | — | 0.592 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13594 | 03-608235 | 0.0–1.0 | Soil | 1.02 (J) | — | — | — | — | — | 57.5 | — | — | — | 94 |
| RE03-09-13597 | 03-608235 | 4.0–5.0 | Soil | 1.1 (U) | — | 0.551 (U) | — | — | — | — | — | — | — | — |
| RE03-09-13591 | 03-608236 | 0.0–1.0 | Soil | — | — | — | — | — | — | 50.7 | — | — | — | 66.2 |
| RE03-09-13596 | 03-608236 | 4.0–5.0 | Soil | 1.14 (U) | — | 0.57 (U) | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

**Table 6.13-3**
**Organic Chemicals Detected at SWMU 03-013(i)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acenaphthylene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a) anthracene | Benzo(a) pyrene | Benzo(b) fluoranthene | Benzo(g,h,i) perylene | Benzo(k) fluoranthene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+03[b]** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+04[b]** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+03[b]** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** |
| RE03-05-59527 | 03-24444 | 0.0–0.5 | Fill | —[c] | — | NA[d] | — | — | 2.81 | 2.26 | — | — | — | — | — |
| RE03-05-59528 | 03-24444 | 1.5–1.5 | Fill | — | — | 0.0168 | — | — | — | — | — | — | — | — | — |
| RE03-05-59529 | 03-24445 | 0.0–0.5 | Fill | — | — | NA | — | — | — | — | — | — | — | — | — |
| RE03-05-59530 | 03-24445 | 1.5–1.5 | Fill | — | — | 0.376 | — | — | — | — | — | — | — | — | — |
| RE03-05-59531 | 03-24446 | 0.0–0.5 | Fill | — | — | NA | — | — | 0.0184 (J) | — | — | — | — | — | — |
| RE03-05-59532 | 03-24446 | 1.5–1.5 | Fill | — | — | 0.0091 | — | — | — | — | — | — | — | — | — |
| RE03-05-59533 | 03-24447 | 0.0–0.5 | Fill | 0.0923 | 0.0421 | NA | 0.095 | — | 0.193 | 0.0665 | — | — | — | — | — |
| RE03-05-59534 | 03-24447 | 1.5–1.5 | Fill | — | — | 0.0296 | — | — | 0.0274 (J) | 0.0154 (J) | — | — | — | — | — |
| RE03-05-59535 | 03-24448 | 0.0–0.5 | Fill | — | 0.0186 (J) | NA | — | — | 0.0483 (J-) | 0.021 (J-) | — | — | — | — | — |
| RE03-05-59536 | 03-24448 | 1.5–1.5 | Fill | — | — | — | — | — | 0.0054 (J-) | 0.0039 (J-) | — | — | — | — | — |
| RE03-05-59537 | 03-24449 | 0.0–0.5 | Fill | — | — | NA | — | — | 0.0537 (J-) | 0.0193 (J-) | — | — | — | — | — |
| RE03-05-59538 | 03-24449 | 1.5–1.5 | Fill | — | — | — | — | — | 0.0018 (J) | — | — | — | — | — | — |
| RE03-05-59539 | 03-24450 | 0.0–0.5 | Fill | — | — | NA | 0.0266 (J) | — | 0.0261 | 0.0082 | — | — | — | — | — |
| RE03-05-59540 | 03-24450 | 1.5–1.5 | Fill | — | — | — | — | — | 0.0209 (J-) | 0.0071 (J-) | — | — | — | — | — |
| RE03-05-59541 | 03-24451 | 0.0–0.5 | Fill | — | — | NA | — | — | 0.0025 (J) | 0.0013 (J) | — | — | — | — | — |
| RE03-05-59542 | 03-24451 | 1.5–1.5 | Fill | — | — | — | — | — | 0.0024 (J) | 0.0014 (J) | — | — | — | — | — |
| RE03-09-13566 | 03-608221 | 0.0–1.0 | Soil | — | — | — | 0.00797 (J) | — | 0.0096 (J) | 0.008 (J) | 0.0326 (J) | 0.0318 (J) | 0.0436 | — | 0.0178 (J) |
| RE03-09-13567 | 03-608221 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13568 | 03-608222 | 0.0–1.0 | Soil | — | — | — | 0.0119 (J) | — | — | — | 0.0538 | — | — | — | — |
| RE03-09-13570 | 03-608223 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0542 | 0.0258 | 0.0238 (J) | 0.0203 (J) | 0.0336 (J) | 0.0177 (J) | 0.0141 (J) |
| RE03-09-13571 | 03-608223 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13572 | 03-608224 | 0.0–1.0 | Soil | 0.125 | — | — | 0.162 | — | 0.267 | 0.05 | 0.243 | 0.28 | 0.388 | 0.142 | 0.157 |
| RE03-09-13573 | 03-608224 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13574 | 03-608225 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0152 | 0.0099 | 0.0215 (J) | 0.0212 (J) | — | — | — |
| RE03-09-13575 | 03-608225 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13576 | 03-608226 | 0.0–1.0 | Soil | 0.0155 (J) | — | — | 0.0274 (J) | — | 0.0811 | 0.0252 | 0.107 | 0.119 | 0.169 | 0.125 | 0.0619 |
| RE03-09-13578 | 03-608227 | 0.0–1.0 | Soil | — | — | — | — | 0.0297 | 0.0494 | 0.0202 | 0.0211 (J) | 0.0157 (J) | — | 0.0134 (J) | — |
| RE03-09-13580 | 03-608228 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13581 | 03-608228 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13582 | 03-608229 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13584 | 03-608230 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13586 | 03-608230 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.13-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acenaphthylene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a) anthracene | Benzo(a) pyrene | Benzo(b) fluoranthene | Benzo(g,h,i) perylene | Benzo(k) fluoranthene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+03[b]** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+04[b]** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+03[b]** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** |
| RE03-09-13585 | 03-608231 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13588 | 03-608232 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0289 | 0.0177 (J) | — | — | — | — | — |
| RE03-09-13589 | 03-608232 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13590 | 03-608233 | 0.0–1.0 | Soil | 0.0523 | — | — | 0.0782 | — | 0.0566 | 0.0377 | 0.303 | 0.392 | 0.506 | 0.287 | 0.212 |
| RE03-09-13592 | 03-608233 | 4.0–5.0 | Soil | — | — | — | — | — | 0.0063 | 0.0044 | 0.0311 (J) | 0.0362 (J) | 0.0413 | 0.0302 (J) | 0.0165 (J) |
| RE03-09-13593 | 03-608234 | 0.0–1.0 | Soil | 0.0188 (J) | — | — | 0.0262 (J) | — | 0.0129 | 0.0148 | 0.118 | 0.153 | 0.193 | 0.0982 | 0.0765 |
| RE03-09-13595 | 03-608234 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13594 | 03-608235 | 0.0–1.0 | Soil | 0.016 (J) | — | — | 0.0211 (J) | — | 0.0126 (J) | 0.0109 (J) | 0.098 | 0.131 | 0.175 | 0.0915 | — |
| RE03-09-13597 | 03-608235 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13591 | 03-608236 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0347 | 0.018 | 0.0183 (J) | 0.0194 (J) | 0.0254 (J) | 0.0134 (J) | — |
| RE03-09-13596 | 03-608236 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.13-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Benzoic Acid | Bis (2-ethylhexyl) phthalate | Butanone[2-] | Chrysene | Dibenz(a,h)anthracene | Dibenzofuran | Ethylbenzene | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Isopropylbenzene | Isopropyltoluene[4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **2.40E+05**[e] | **3.47E+02** | **3.96E+04** | **6.21E+02** | **6.21E-01** | **7.80E+01**[e] | **6.96E+01** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03** | **3.21E+03**[f] |
| **Industrial SSL**[a] | | | | **2.50E+06**[e] | **1.37E+03** | **3.69E+05** | **2.34E+03** | **2.34E+00** | **1.00E+03**[e] | **3.85E+02** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04** | **1.49E+04**[f] |
| **Construction Worker SSL**[a] | | | | **9.52E+05**[g] | **4.76E+03** | **1.48E+05** | **2.06E+04** | **2.13E+01** | **2.82E+02**[g] | **6.63E+03** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04** | **1.03E+04**[f] |
| RE03-05-59527 | 03-24444 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | — | — | — | NA | NA |
| RE03-05-59528 | 03-24444 | 1.5–1.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-05-59529 | 03-24445 | 0.0–0.5 | Fill | 0.689 (J) | — | NA | — | — | — | NA | — | — | — | NA | NA |
| RE03-05-59530 | 03-24445 | 1.5–1.5 | Fill | — | — | 0.0174 | — | — | — | — | — | — | — | — | — |
| RE03-05-59531 | 03-24446 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | — | — | — | NA | NA |
| RE03-05-59532 | 03-24446 | 1.5–1.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-05-59533 | 03-24447 | 0.0–0.5 | Fill | 0.666 (J) | — | NA | — | — | — | NA | 1.32 | 0.0947 | — | NA | NA |
| RE03-05-59534 | 03-24447 | 1.5–1.5 | Fill | — | 1.13 (J) | — | — | — | — | — | 0.0795 | — | — | — | 0.0017 |
| RE03-05-59535 | 03-24448 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | 0.535 | 0.017 (J) | — | NA | NA |
| RE03-05-59536 | 03-24448 | 1.5–1.5 | Fill | 0.609 (J) | — | — | — | — | — | — | — | — | — | — | 0.0012 (J) |
| RE03-05-59537 | 03-24449 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | — | — | — | NA | NA |
| RE03-05-59538 | 03-24449 | 1.5–1.5 | Fill | — | 1.39 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-05-59539 | 03-24450 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | 0.161 | 0.013 (J) | — | NA | NA |
| RE03-05-59540 | 03-24450 | 1.5–1.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-05-59541 | 03-24451 | 0.0–0.5 | Fill | — | — | NA | — | — | — | NA | — | — | — | NA | NA |
| RE03-05-59542 | 03-24451 | 1.5–1.5 | Fill | — | 1.19 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13566 | 03-608221 | 0.0–1.0 | Soil | — | — | — | 0.0309 (J) | — | — | — | 0.0692 | — | — | — | — |
| RE03-09-13567 | 03-608221 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13568 | 03-608222 | 0.0–1.0 | Soil | — | — | — | 0.0515 | — | — | — | 0.0861 | — | 0.0422 | — | — |
| RE03-09-13570 | 03-608223 | 0.0–1.0 | Soil | — | — | — | 0.0339 (J) | — | — | — | 0.0684 | — | 0.0557 | — | — |
| RE03-09-13571 | 03-608223 | 4.0–5.0 | Soil | 0.214 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13572 | 03-608224 | 0.0–1.0 | Soil | — | 0.146 (J) | — | 0.289 | 0.0525 | 0.0797 (J) | — | 0.634 | 0.121 | 0.139 | — | — |
| RE03-09-13573 | 03-608224 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13574 | 03-608225 | 0.0–1.0 | Soil | — | — | — | 0.0233 (J) | — | — | — | 0.0464 | — | — | — | — |
| RE03-09-13575 | 03-608225 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13576 | 03-608226 | 0.0–1.0 | Soil | — | — | — | 0.123 | — | — | — | 0.216 | 0.014 (J) | 0.133 | — | — |
| RE03-09-13578 | 03-608227 | 0.0–1.0 | Soil | — | — | — | 0.0147 (J) | — | — | — | 0.0285 (J) | — | 0.0125 (J) | — | — |
| RE03-09-13580 | 03-608228 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13581 | 03-608228 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13582 | 03-608229 | 0.0–1.0 | Soil | — | 0.113 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13584 | 03-608230 | 0.0–1.0 | Soil | — | — | — | — | — | — | 0.000366 (J) | — | — | — | — | — |
| RE03-09-13586 | 03-608230 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13585 | 03-608231 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13588 | 03-608232 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | 0.0225 (J) | — | — | — | — |

**Table 6.13-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Benzoic Acid | Bis (2-ethylhexyl) phthalate | Butanone[2-] | Chrysene | Dibenz(a,h)anthracene | Dibenzofuran | Ethylbenzene | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Isopropylbenzene | Isopropyltoluene[4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **2.40E+05**[e] | **3.47E+02** | **3.96E+04** | **6.21E+02** | **6.21E-01** | **7.80E+01**[e] | **6.96E+01** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03** | **3.21E+03**[f] |
| **Industrial SSL**[a] | | | | **2.50E+06**[e] | **1.37E+03** | **3.69E+05** | **2.34E+03** | **2.34E+00** | **1.00E+03**[e] | **3.85E+02** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04** | **1.49E+04**[f] |
| **Construction Worker SSL**[a] | | | | **9.52E+05**[g] | **4.76E+03** | **1.48E+05** | **2.06E+04** | **2.13E+01** | **2.82E+02**[g] | **6.63E+03** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04** | **1.03E+04**[f] |
| RE03-09-13589 | 03-608232 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13590 | 03-608233 | 0.0–1.0 | Soil | — | 0.111 (J) | — | 0.351 | 0.0668 | — | — | 0.543 | — | 0.245 (J) | — | — |
| RE03-09-13592 | 03-608233 | 4.0–5.0 | Soil | — | — | — | 0.0357 (J) | — | — | — | 0.06 | — | 0.0249 (J) | — | — |
| RE03-09-13593 | 03-608234 | 0.0–1.0 | Soil | — | — | — | 0.143 | 0.0279 (J) | — | — | 0.242 | — | 0.0924 (J) | — | — |
| RE03-09-13595 | 03-608234 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13594 | 03-608235 | 0.0–1.0 | Soil | — | — | — | 0.12 | — | — | — | 0.201 | — | 0.0843 (J) | — | — |
| RE03-09-13597 | 03-608235 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13591 | 03-608236 | 0.0–1.0 | Soil | — | — | — | 0.0189 (J) | — | — | — | 0.0288 (J) | — | 0.0117 (J) | — | — |
| RE03-09-13596 | 03-608236 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.13-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | TPH-DRO | TPH-GRO | Trimethylbenzene[1,2,4-] | Xylene[1,2-] | Xylene[1,3-]+ Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.99E+02** | **3.10E+02**[e] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520**[h] | **na**[i] | **6.20E+01**[e] | **9.55E+03** | **1.09E+03**[j] |
| **Industrial SSL**[a] | | | | **1.09E+03** | **4.10E+03**[e] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120**[h] | **na** | **2.60E+02**[e] | **3.15E+04** | **3.61E+03**[j] |
| **Construction Worker SSL**[a] | | | | **1.06E+04** | **1.24E+03**[g] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na** | **na** | **6.88E+02**[g] | **2.75E+04** | **3.13E+03**[j] |
| RE03-05-59527 | 03-24444 | 0.0–0.5 | Fill | NA | — | — | — | — | NA | 231 | 0.0156 (J) | NA | NA | NA |
| RE03-05-59528 | 03-24444 | 1.5–1.5 | Fill | — | — | — | — | — | — | 134 | 0.0127 (J-) | — | — | — |
| RE03-05-59529 | 03-24445 | 0.0–0.5 | Fill | NA | — | — | — | — | NA | 2730 | 0.35 (J-) | NA | NA | NA |
| RE03-05-59530 | 03-24445 | 1.5–1.5 | Fill | — | — | — | — | — | — | 3340 | 0.132 (J-) | — | — | — |
| RE03-05-59531 | 03-24446 | 0.0–0.5 | Fill | NA | — | — | — | — | NA | 398 | 0.0292 (J) | NA | NA | NA |
| RE03-05-59532 | 03-24446 | 1.5–1.5 | Fill | — | — | — | — | — | — | 88 | — | — | — | — |
| RE03-05-59533 | 03-24447 | 0.0–0.5 | Fill | NA | 0.0275 (J) | — | 1.09 | 1.36 | NA | 5370 | — | NA | NA | NA |
| RE03-05-59534 | 03-24447 | 1.5–1.5 | Fill | — | — | — | — | — | — | 595 | 0.308 | — | — | — |
| RE03-05-59535 | 03-24448 | 0.0–0.5 | Fill | NA | 0.0141 (J) | — | 0.468 | 0.477 | NA | 208 | — | NA | NA | NA |
| RE03-05-59536 | 03-24448 | 1.5–1.5 | Fill | — | — | — | — | — | — | 270 | 0.338 | — | — | — |
| RE03-05-59537 | 03-24449 | 0.0–0.5 | Fill | NA | — | — | 0.0393 (J) | — | NA | 604 | 0.0192 (J) | NA | NA | NA |
| RE03-05-59538 | 03-24449 | 1.5–1.5 | Fill | — | — | — | — | — | — | 9.3 (J) | — | — | — | — |
| RE03-05-59539 | 03-24450 | 0.0–0.5 | Fill | NA | — | — | 0.108 | 0.2 | NA | 92 | — | NA | NA | NA |
| RE03-05-59540 | 03-24450 | 1.5–1.5 | Fill | — | — | — | — | — | — | 161 | 0.013 (J-) | — | — | — |
| RE03-05-59541 | 03-24451 | 0.0–0.5 | Fill | NA | — | — | — | — | NA | 99.9 | — | NA | NA | NA |
| RE03-05-59542 | 03-24451 | 1.5–1.5 | Fill | — | — | — | — | — | — | 230 | 0.0292 (J) | — | — | — |
| RE03-09-13566 | 03-608221 | 0.0–1.0 | Soil | — | — | — | 0.0409 | 0.0565 | 0.00075 (J) | 80.7 (J) | NA | — | — | — |
| RE03-09-13567 | 03-608221 | 4.0–5.0 | Soil | — | — | — | — | — | — | 5.28 (J) | NA | — | — | — |
| RE03-09-13568 | 03-608222 | 0.0–1.0 | Soil | — | — | — | 0.0483 | 0.0806 | 0.000693 (J) | 479 | NA | — | — | — |
| RE03-09-13570 | 03-608223 | 0.0–1.0 | Soil | — | — | — | 0.0364 (J) | 0.0548 | — | 37.1 | NA | — | — | — |
| RE03-09-13571 | 03-608223 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | NA | 0.00035 (J) | — | 0.000429 (J) |
| RE03-09-13572 | 03-608224 | 0.0–1.0 | Soil | — | 0.0783 | 0.192 | 0.658 | 0.585 | — | 48.1 | NA | — | — | — |
| RE03-09-13573 | 03-608224 | 4.0–5.0 | Soil | — | — | — | — | — | — | 4.02 (J) | NA | — | — | — |
| RE03-09-13574 | 03-608225 | 0.0–1.0 | Soil | — | — | — | 0.0265 (J) | 0.0447 | 0.00205 | 17.4 | NA | — | — | — |
| RE03-09-13575 | 03-608225 | 4.0–5.0 | Soil | — | — | — | — | — | 0.000706 (J) | 5.62 (J) | NA | — | — | — |
| RE03-09-13576 | 03-608226 | 0.0–1.0 | Soil | — | — | — | 0.129 | 0.191 | 0.00302 | 37.1 | NA | — | — | — |
| RE03-09-13578 | 03-608227 | 0.0–1.0 | Soil | — | — | — | 0.0178 (J) | 0.027 (J) | 0.000611 (J) | 23.4 | NA | — | — | — |
| RE03-09-13580 | 03-608228 | 0.0–1.0 | Soil | — | — | — | — | — | — | 4.33 (J) | NA | — | — | — |
| RE03-09-13581 | 03-608228 | 4.0–5.0 | Soil | 0.00237 (J) | — | — | — | — | — | — | NA | — | — | — |
| RE03-09-13582 | 03-608229 | 0.0–1.0 | Soil | — | — | — | — | — | 0.00125 | 3.53 (J) | NA | — | — | — |
| RE03-09-13584 | 03-608230 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0104 | 4.02 (J) | NA | — | 0.000548 (J) | 0.00111 (J) |
| RE03-09-13586 | 03-608230 | 4.0–5.0 | Soil | — | — | — | — | — | — | 6.41 (J) | NA | — | — | — |
| RE03-09-13585 | 03-608231 | 0.0–1.0 | Soil | — | — | — | — | — | 0.000457 (J) | 28.6 (J) | NA | — | — | — |
| RE03-09-13588 | 03-608232 | 0.0–1.0 | Soil | 0.00254 (J) | — | — | 0.0149 (J) | 0.0267 (J) | 0.000949 (J) | 300 (J) | NA | — | — | — |
| RE03-09-13589 | 03-608232 | 4.0–5.0 | Soil | 0.00291 (J) | — | — | — | — | — | 6.06 (J) | NA | — | — | — |

**Table 6.13-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | TPH-DRO | TPH-GRO | Trimethylbenzene[1,2,4-] | Xylene[1,2-] | Xylene[1,3-]+ Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.99E+02** | **3.10E+02[e]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520[h]** | **na[i]** | **6.20E+01[e]** | **9.55E+03** | **1.09E+03[j]** |
| **Industrial SSL[a]** | | | | **1.09E+03** | **4.10E+03[e]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120[h]** | **na** | **2.60E+02[e]** | **3.15E+04** | **3.61E+03[j]** |
| **Construction Worker SSL[a]** | | | | **1.06E+04** | **1.24E+03[g]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na** | **na** | **6.88E+02[g]** | **2.75E+04** | **3.13E+03[j]** |
| RE03-09-13590 | 03-608233 | 0.0–1.0 | Soil | 0.00272 (J) | 0.0105 (J) | — | 0.403 | 0.664 | — | 48.2 (J) | NA | — | — | — |
| RE03-09-13592 | 03-608233 | 4.0–5.0 | Soil | 0.00236 (J) | — | — | 0.0365 (J) | 0.0567 | — | 2.92 (J) | NA | — | — | — |
| RE03-09-13593 | 03-608234 | 0.0–1.0 | Soil | 0.00264 (J) | — | — | 0.152 | 0.297 | — | 9.25 (J) | NA | — | — | — |
| RE03-09-13595 | 03-608234 | 4.0–5.0 | Soil | 0.00271 (J) | — | — | — | — | — | — | NA | — | — | — |
| RE03-09-13594 | 03-608235 | 0.0–1.0 | Soil | 0.00227 (J) | — | — | 0.126 | 0.203 | — | 105 (J) | NA | — | — | — |
| RE03-09-13597 | 03-608235 | 4.0–5.0 | Soil | 0.00275 (J) | — | — | — | — | — | 190 (J) | NA | — | — | — |
| RE03-09-13591 | 03-608236 | 0.0–1.0 | Soil | 0.00252 (J) | — | — | 0.0168 (J) | 0.0343 (J) | 0.000498 (J) | 65.1 (J) | NA | — | — | — |
| RE03-09-13596 | 03-608236 | 4.0–5.0 | Soil | 0.00278 (J) | — | — | — | — | — | — | NA | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] NA = Not analyzed.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[h] Screening guidelines for diesel #2 from NMED (2006, 094614).

[i] na = Not available.

[j] Xylenes used as a surrogate based on structural similarity.

**Table 6.14-1**
**Samples Collected and Analyses Requested at SWMU 03-014(a,b,e,f)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13598 | 03-608237 | 0.0–1.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13599 | 03-608237 | 1.0–2.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13600 | 03-608237 | 2.0–3.0 | Qbt3 | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13601 | 03-608238 | 0.0–1.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13602 | 03-608238 | 1.0–2.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13604 | 03-608239 | 0.0–1.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13605 | 03-608239 | 1.0–2.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13606 | 03-608239 | 6.9–7.9 | Qbt3 | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13607 | 03-608240 | 0.0–1.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13608 | 03-608240 | 1.0–2.0 | Soil | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13609 | 03-608240 | 2.0–3.0 | Qbt3 | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13610 | 03-608241 | 0.0–1.0 | Qbt3 | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |
| RE03-09-13611 | 03-608241 | 1.0–2.0 | Qbt3 | 10-465 | 10-465 | 10-465 | 10-464 | 10-464 | 10-463 | 10-464 | 10-463 | 10-463 | 10-463 | 10-464 |

**Table 6.14-2**
**Inorganic Chemicals above BVs at SWMU 03-014(a,b,e,f)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Barium | Cadmium | Chromium | Cobalt | Copper | Cyanide (Total) | Lead | Mercury | Nickel | Nitrate | Perchlorate | Selenium | Silver | Sodium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **2.79** | **46** | **1.63** | **7.14** | **3.14** | **4.66** | **0.5** | **11.2** | **0.1** | **6.58** | **na[b]** | **na** | **0.3** | **1** | **2770** | **17** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **8.17** | **295** | **0.4** | **19.3** | **8.64** | **14.7** | **0.5** | **22.3** | **0.1** | **15.4** | **na** | **na** | **1.52** | **1** | **915** | **39.6** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **3.90E+00** | **1.56E+04** | **7.79E+01** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **na** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.77E+01** | **2.24E+05** | **1.12E+03** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **na** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **6.54E+01** | **4.35E+03** | **3.09E+02** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **na** | **1.55E+03** | **9.29E+04** |
| RE03-09-13598 | 03-608237 | 0.0–1.0 | Soil | 1.06 (U) | —[g] | — | 0.862 | 70.8 | — | 81.1 | 20 | 50.3 | 1.68 | — | 1.68 | 0.00104 (J) | — | 41.2 | — | — | 66.7 |
| RE03-09-13599 | 03-608237 | 1.0–2.0 | Soil | 1.17 (U) | — | — | 0.583 (U) | — | — | 15.8 | — | — | — | — | 1.27 | 0.0057 | — | 1.46 | 1190 | — | — |
| RE03-09-13600 | 03-608237 | 2.0–3.0 | Qbt3 | 1.06 (U) | — | — | — | — | — | — | — | — | — | — | 1.17 | 0.000715 (J) | 1.07 (U) | — | — | — | — |
| RE03-09-13601 | 03-608238 | 0.0–1.0 | Soil | 1.05 (U) | — | — | 0.539 | 48.9 | — | 49.8 | 10.4 | 41.1 | 0.263 | — | 1.56 | 0.000978 (J) | — | 23.4 | — | — | 62.5 |
| RE03-09-13602 | 03-608238 | 1.0–2.0 | Soil | 1.07 (U) | — | — | — | — | — | — | 6 | — | — | — | 1.17 | — | — | 6.97 | — | — | — |
| RE03-09-13604 | 03-608239 | 0.0–1.0 | Soil | 1.12 (U) | — | — | 0.773 | 48.4 | — | 66.8 | 15.6 | 71.3 | 1.17 | — | 1.85 | — | — | 32.8 | — | — | 65.5 |
| RE03-09-13605 | 03-608239 | 1.0–2.0 | Soil | 1.16 (U) | — | — | 0.58 (U) | — | — | — | 0.587 | — | — | — | 1.41 | — | — | 1.63 | — | — | — |
| RE03-09-13606 | 03-608239 | 6.9–7.9 | Qbt3 | 1.13 (U) | — | — | — | — | — | — | — | — | — | — | 3.78 | — | 1.17 (U) | 1.17 | — | — | — |
| RE03-09-13607 | 03-608240 | 0.0–1.0 | Soil | 1.06 (U) | — | — | — | — | — | 17.1 | 10.2 | 83.5 | 0.163 | — | 1.62 | — | — | 6.6 | — | — | — |
| RE03-09-13608 | 03-608240 | 1.0–2.0 | Soil | 1.05 (U) | — | — | 0.526 (U) | — | — | — | — | 22.7 | — | — | 1.33 | — | — | 1.46 | — | — | — |
| RE03-09-13609 | 03-608240 | 2.0–3.0 | Qbt3 | 1.06 (U) | 2.84 | 64.4 | — | — | 4.03 | 4.69 | 1.56 | 12 | — | — | 1.33 | — | 1.06 (U) | 1.19 | — | — | — |
| RE03-09-13610 | 03-608241 | 0.0–1.0 | Qbt3 | 1.1 (U) | 3.47 | 198 | 3.8 | 426 | 3.48 | 305 | 11.4 | 136 | 1.43 | 12.4 | 1.39 | — | 1.11 (U) | 294 | — | 22.5 | 191 |
| RE03-09-13611 | 03-608241 | 1.0–2.0 | Qbt3 | 1.09 (U) | — | — | — | 11 | — | 10.5 | 6.81 | — | 0.107 | — | — | — | 1.1 (U) | 5.71 | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] SSLs from http://www.epa.gov/region09/superfund/prg/index.html.

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-3**
**Organic Chemicals Detected at SWMU 03-014(a,b,e,f)**

| Sample ID | Location ID | Depth (ft) | Media | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Bis(2-ethylhexyl)phthalate | Chrysene | Fluoranthene | Indeno(1,2,3-cd)pyrene | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **3.47E+02** | **6.21E+02** | **2.29E+03** | **6.21E+00** | **3.10E+02[c]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[d]** |
| **Industrial SSL[a]** | | | | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **1.37E+03** | **2.34E+03** | **2.44E+04** | **2.34E+01** | **4.10E+03[c]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[d]** |
| **Construction Worker SSL[a]** | | | | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **4.76E+03** | **2.06E+04** | **8.91E+03** | **2.13E+02** | **1.24E+03[e]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na[f]** |
| RE03-09-13598 | 03-608237 | 0.0–1.0 | Soil | 0.00836 (J) | 0.614 | 0.663 | —[g] | — | — | — | — | — | — | 0.022 (J) | — | — | — | — | 0.02 (J) | 39.1 |
| RE03-09-13599 | 03-608237 | 1.0–2.0 | Soil | — | 0.005 | 0.0054 | — | — | — | — | — | — | — | — | — | — | — | — | — | 6 (J) |
| RE03-09-13600 | 03-608237 | 2.0–3.0 | Qbt3 | — | 0.0071 | 0.0082 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13601 | 03-608238 | 0.0–1.0 | Soil | — | 0.133 | 0.165 | — | — | — | — | — | — | — | 0.0117 (J) | — | — | — | — | — | 16.7 |
| RE03-09-13602 | 03-608238 | 1.0–2.0 | Soil | — | 0.0212 | 0.0274 | 0.0954 | 0.105 | 0.158 | 0.0545 | 0.0599 | — | 0.103 | 0.208 | 0.157 | — | — | 0.0517 | 0.173 | 4.13 (J) |
| RE03-09-13604 | 03-608239 | 0.0–1.0 | Soil | — | 0.401 | 0.307 | — | 0.023 (J) | 0.038 | — | — | 0.0996 (J) | 0.0124 (J) | 0.0329 (J) | — | — | — | 0.0119 (J) | 0.0283 (J) | 34.7 |
| RE03-09-13605 | 03-608239 | 1.0–2.0 | Soil | — | 0.0155 | 0.0119 | — | — | — | — | — | — | — | — | — | — | — | — | — | 3.05 (J) |
| RE03-09-13606 | 03-608239 | 6.9–7.9 | Qbt3 | — | 0.0133 | 0.0103 | — | — | — | — | — | — | — | — | — | — | — | — | — | 4.85 (J) |
| RE03-09-13607 | 03-608240 | 0.0–1.0 | Soil | 0.0206 (J) | 1.08 | 0.773 | 0.0502 | 0.0407 | 0.199 | 0.0375 | 0.0729 | 1.07 | 0.126 | 0.223 | 0.138 | 0.0119 (J) | 0.0149 (J) | 0.0566 | 0.174 | 75.9 |
| RE03-09-13608 | 03-608240 | 1.0–2.0 | Soil | 0.0108 (J) | 0.0421 | 0.0286 | — | 0.0124 (J) | 0.0115 (J) | 0.013 (J) | — | — | — | 0.0229 (J) | 0.121 | — | — | — | 0.019 (J) | 4.7 (J) |
| RE03-09-13609 | 03-608240 | 2.0–3.0 | Qbt3 | — | 0.0858 | 0.0553 | — | 0.0123 (J) | 0.0269 (J) | — | — | — | 0.0128 (J) | 0.0201 (J) | — | — | — | — | 0.0162 (J) | 4.45 (J) |
| RE03-09-13610 | 03-608241 | 0.0–1.0 | Qbt3 | — | 0.595 | 0.534 | 0.0829 | 0.115 | 0.195 | 0.0926 | 0.0683 | 0.135 (J) | 0.0984 | 0.166 | 0.181 | — | — | 0.0414 | 0.152 | 64.3 |
| RE03-09-13611 | 03-608241 | 1.0–2.0 | Qbt3 | — | 0.0623 | 0.0638 | — | — | — | — | — | — | — | — | — | — | — | — | — | 13.9 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] na = Not available.

[g] — = Not detected.

**Table 6.14-4**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 03-014(a,b,e,f)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Plutonium-238 | Plutonium-239/240 | Uranium-235/236 | Uranium-238 |
|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **na[b]** | **na** | **na** | **0.09** | **1.93** |
| **Soil BV[a]** | | | | **0.013** | **0.023** | **0.054** | **0.2** | **2.29** |
| **Residential SAL[c]** | | | | **30** | **37** | **33** | **17** | **87** |
| **Industrial SAL[c]** | | | | **180** | **240** | **210** | **87** | **430** |
| **Construction Worker SAL[c]** | | | | **34** | **40** | **36** | **43** | **160** |
| RE03-09-13598 | 03-608237 | 0.0–1.0 | Soil | —[d] | 0.0934 | 0.0577 | — | — |
| RE03-09-13601 | 03-608238 | 0.0–1.0 | Soil | — | 0.0521 | — | — | — |
| RE03-09-13604 | 03-608239 | 0.0–1.0 | Soil | — | 0.123 | — | — | — |
| RE03-09-13610 | 03-608241 | 0.0–1.0 | Qbt3 | 0.0274 | 0.195 | 0.0594 | 3.18 | 0.103 |

Note: All activities are in pCi/g.

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

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

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

**Table 6.14-5**
**Samples Collected and Analyses Requested at AOC 03-014(b2)**

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

**Table 6.14-6**
**Inorganic Chemicals above BVs at AOC 03-014(b2)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Cadmium | Chromium | Cyanide (Total) | Lead | Perchlorate | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **2.79** | **1.63** | **7.14** | **0.5** | **11.2** | **na[b]** | **0.3** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **8.17** | **0.4** | **19.3** | **0.5** | **22.3** | **na** | **1.52** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **3.90E+00** | **7.79E+01** | **2.19E+02[d]** | **1.56E+03** | **4.00E+02** | **5.48E+01** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.77E+01** | **1.12E+03** | **2.92E+03[d]** | **2.27E+04** | **8.00E+02** | **7.95E+02** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **6.54E+01** | **3.09E+02** | **4.49E+02[d]** | **6.19E+03** | **8.00E+02** | **2.17E+02** | **1.55E+03** | **9.29E+04** |
| RE03-09-13618 | 03-608242 | 0.0–1.0 | Soil | 1.15 (U) | —[e] | 0.575 (U) | — | — | — | — | — | — |
| RE03-09-13619 | 03-608242 | 1.0–2.0 | Qbt3 | 1.15 (U) | 3.61 | — | 14.9 (J) | — | — | — | 1.13 (U) | — |
| RE03-09-13620 | 03-608243 | 0.0–1.0 | Soil | 1.06 (U) | — | 0.528 (U) | — | — | 37.3 | — | — | — |
| RE03-09-13621 | 03-608243 | 1.0–2.0 | Qbt3 | 1.04 (U) | — | — | — | — | 15.9 | — | 0.999 (U) | — |
| RE03-09-13622 | 03-608244 | 0.0–1.0 | Soil | 1.06 (U) | — | 0.528 (U) | — | — | — | 0.0009 (J) | — | — |
| RE03-09-13623 | 03-608244 | 1.0–2.0 | Qbt3 | 1.02 (U) | — | — | — | — | — | 0.00173 (J) | 1.03 (U) | — |
| RE03-09-13624 | 03-608245 | 0.0–1.0 | Soil | 1.29 (U) | — | 0.644 (U) | — | 1.54 | — | — | — | 82.4 |
| RE03-09-13625 | 03-608245 | 1.0–2.0 | Qbt3 | 1.16 (U) | — | — | — | — | — | — | 1.19 (U) | — |
| RE03-09-13626 | 03-608246 | 0.0–1.0 | Soil | 1.18 (U) | — | 0.592 (U) | — | 1.17 | — | — | — | 52.7 |
| RE03-09-13627 | 03-608246 | 1.0–2.0 | Soil | 1.08 (U) | — | 0.538 (U) | — | 1.61 | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] BVs 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 6.14-7**
**Organic Chemicals Detected at AOC 03-014(b2)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Aroclor-1254 | Aroclor-1260 | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Bis(2-ethylhexyl) phthalate | Chrysene | Fluoranthene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.12E+00** | **2.22E+00** | **6.21E-01** | **6.21E+00** | **6.21E+01** | **3.47E+02** | **6.21E+01** | **2.29E+03** | **1.83E+03** | **1.72E+03** | **520[b]** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **8.26E+00** | **8.26E+00** | **2.34E+00** | **2.34E+01** | **2.34E+02** | **1.37E+03** | **2.34E+02** | **2.44E+04** | **2.05E+04** | **1.83E+04** | **1120[b]** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **4.36E+00** | **7.58E+01** | **2.13E+01** | **2.13E+02** | **2.06E+03** | **4.76E+03** | **2.06E+03** | **8.91E+03** | **7.15E+03** | **6.68E+03** | **na[c]** |
| RE03-09-13618 | 03-608242 | 0.0–1.0 | Soil | 0.00433 (J) | —[d] | — | — | — | — | — | — | — | — | — | 3.91 (J) |
| RE03-09-13619 | 03-608242 | 1.0–2.0 | Qbt3 | 0.0144 (J) | — | — | — | — | — | — | — | — | — | — | 6.09 (J) |
| RE03-09-13620 | 03-608243 | 0.0–1.0 | Soil | 0.00952 (J) | 0.0149 (J) | 0.0184 | 0.0191 (J) | 0.0224 (J) | 0.0155 (J) | — | 0.0188 (J) | 0.037 | 0.0186 (J) | 0.0329 (J) | 32.1 |
| RE03-09-13621 | 03-608243 | 1.0–2.0 | Qbt3 | — | 0.0026 (J) | 0.0033 (J) | — | — | — | 0.1 (J) | — | — | — | — | 7.52 |
| RE03-09-13622 | 03-608244 | 0.0–1.0 | Soil | — | 0.021 | 0.0177 | — | — | — | — | — | — | — | — | 17.2 |
| RE03-09-13623 | 03-608244 | 1.0–2.0 | Qbt3 | — | 0.0693 | 0.0514 | — | — | — | — | — | — | — | — | 4.69 (J) |
| RE03-09-13624 | 03-608245 | 0.0–1.0 | Soil | — | 0.0195 (J) | 0.0214 (J) | 0.0151 (J) | — | — | — | 0.0159 (J) | 0.02 (J) | 0.014 (J) | 0.0326 (J) | 31.6 (J) |
| RE03-09-13625 | 03-608245 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 3.02 (J) |
| RE03-09-13626 | 03-608246 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 5.55 (J) |
| RE03-09-13627 | 03-608246 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 2.94 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na = Not available.

[d] — = Not detected.

**Table 6.14-8**
**Samples Collected and Analyses Requested at SWMUs 03-014(c) and 03-014(g)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13628 | 03-608247 | 0.0–1.0 | Soil | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 |
| RE03-09-13629 | 03-608247 | 5.5–6.5 | Soil | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 |
| RE03-09-13630 | 03-608247 | 8.5–9.5 | Soil | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 | 10-405 |

**Table 6.14-9**
**Inorganic Chemicals above BVs at SWMUs 03-014(c) and 03-014(g)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Copper | Cyanide (Total) | Mercury | Nitrate | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **14.7** | **0.5** | **0.1** | **na**[b] | **1** | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **3.13E+03** | **1.56E+03** | **2.30E+01**[d] | **1.25E+05** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **4.54E+04** | **2.27E+04** | **3.10E+02**[d] | **1.82E+06** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **1.24E+04** | **6.19E+03** | **9.29E+01**[e] | **4.96E+05** | **1.55E+03** | **9.29E+04** |
| RE03-09-13628 | 03-608247 | 0.0–1.0 | Soil | 1.08 (U) | —[f] | 16.8 | 19.7 | 0.859 | — | 8.16 | 55.1 |
| RE03-09-13629 | 03-608247 | 5.5–6.5 | Soil | 1.08 (U) | 0.542 (U) | — | — | — | 1.03 (J-) | 2.11 | — |
| RE03-09-13630 | 03-608247 | 8.5–9.5 | Soil | 1.11 (U) | 0.556 (U) | — | 0.872 | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-10**
**Organic Chemicals Detected at SWMUs 03-014(c) and 03-014(g)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1242 | Aroclor-1260 | TPH-DRO |
|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **2.22E+00** | **2.22E+00** | **520**[b] |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** | **1120**[b] |
| **Construction Worker SSL**[a] | | | | **7.58E+01** | **7.58E+01** | **na**[c] |
| RE03-09-13628 | 03-608247 | 0.0–1.0 | Soil | 0.741 | 0.556 | 20.1 |
| RE03-09-13629 | 03-608247 | 5.5–6.5 | Soil | 0.021 | 0.0167 | —[d] |
| RE03-09-13630 | 03-608247 | 8.5–9.5 | Soil | 0.0031 (J) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na = Not available.

[d] — = Not detected.

**Table 6.14-11**
**Samples Collected and Analyses Requested at AOC 03-014(c2)**

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

**Table 6.14-12**
**Inorganic Chemicals above BVs at AOC 03-014(c2)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Copper | Cyanide (Total) | Lead | Mercury | Nickel | Nitrate | Perchlorate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **2200** | **7.14** | **4.66** | **0.5** | **11.2** | **0.1** | **6.58** | **na[b]** | **na** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **6120** | **19.3** | **14.7** | **0.5** | **22.3** | **0.1** | **15.4** | **na** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **na** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13631 | 03-608248 | 0.0–1.0 | Soil | 1.11 (U) | 0.538 (J) | —[g] | — | 21.2 | 4.59 | — | 0.564 | — | — | — | — | 4.99 | — |
| RE03-09-13632 | 03-608248 | 1.0–2.0 | Qbt3 | 1.05 (U) | — | — | 10.8 | 10.6 | 3.87 | — | 0.174 | — | — | — | 1.03 (U) | 1.85 | — |
| RE03-09-13633 | 03-608249 | 0.0–1.0 | Soil | 1.08 (U) | 0.541 (U) | — | — | — | — | — | 0.156 | — | — | — | — | — | — |
| RE03-09-13634 | 03-608249 | 1.0–2.0 | Soil | 1.11 (U) | — | — | — | — | — | 30.5 | 0.364 | — | 1.24 | — | — | 1.82 | 49.8 |
| RE03-09-13635 | 03-608250 | 0.0–1.0 | Soil | 1.08 (U) | — | — | — | 16.3 | 1.55 | — | 0.345 (J+) | — | — | — | — | 5.95 | 60.1 |
| RE03-09-13636 | 03-608250 | 1.0–2.0 | Qbt3 | 1.02 (U) | — | — | — | 5.45 | — | — | — | — | — | 0.000678 (J) | 1.01 (U) | 1.67 | — |
| RE03-09-13637 | 03-608251 | 0.0–1.0 | Soil | 1.1 (U) | 0.87 | 7210 (J+) | 34.4 | 32.3 | 5.56 | — | 0.847 (J+) | — | 2.08 | — | — | 10.9 | 89.4 |
| RE03-09-13638 | 03-608251 | 1.0–2.0 | Soil | 1.07 (U) | 1.09 | — | — | 23.4 | 0.669 | — | 0.534 (J+) | 18.6 | 2.75 | — | — | 7.27 | 88.9 |
| RE03-09-13639 | 03-608252 | 0.0–1.0 | Soil | 1.05 (U) | — | — | — | — | — | — | 0.142 (J+) | — | — | — | — | 2.11 | — |
| RE03-09-13640 | 03-608252 | 1.0–2.0 | Soil | 1.06 (U) | — | — | 20.3 | — | — | — | 0.175 (J+) | — | 1.2 | — | — | 6.94 | — |
| RE03-09-13641 | 03-608253 | 0.0–1.0 | Soil | 1.03 (U) | 0.437 (J) | — | — | — | 0.513 | — | 0.768 (J+) | — | — | — | — | 7.5 | — |
| RE03-09-13642 | 03-608253 | 2.0–3.0 | Qbt3 | 1.04 (U) | — | — | 17.8 | 24.1 | 0.892 | — | 0.722 (J+) | 7.04 | — | 0.000989 (J) | 1.01 (U) | 7.34 | — |
| RE03-09-13643 | 03-608254 | 0.0–1.0 | Soil | 1.04 (U) | — | — | 21.4 | 22.5 | 30.2 | — | 0.116 (J) | — | — | 0.000557 (J) | — | 10.8 | — |
| RE03-09-13644 | 03-608254 | 2.0–3.0 | Qbt3 | 0.999 (U) | — | — | — | — | 0.802 | — | — | — | — | — | 1 (U) | — | — |
| RE03-09-13645 | 03-608255 | 0.0–1.0 | Soil | 1.04 (U) | 0.52 (U) | — | — | — | — | 27.2 | — | — | — | — | — | — | — |
| RE03-09-13646 | 03-608255 | 2.0–3.0 | Soil | 1.05 (U) | 0.526 (U) | 7270 (J+) | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-13**
**Organic Chemicals Detected at AOC 03-014(c2)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Anthracene | Aroclor-1248 | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b) fluoranthene | Benzo(g,h,i) perylene | Benzo(k) fluoranthene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** |
| RE03-09-13631 | 03-608248 | 0.0–1.0 | Soil | —[c] | — | — | 1.65 | 1.22 | — | — | 0.0184 (J) | 0.0137 (J) | — |
| RE03-09-13632 | 03-608248 | 1.0–2.0 | Qbt3 | — | — | — | 0.243 | 0.193 | — | — | — | — | — |
| RE03-09-13633 | 03-608249 | 0.0–1.0 | Soil | — | — | — | 0.998 | 0.953 | — | — | — | — | — |
| RE03-09-13634 | 03-608249 | 1.0–2.0 | Soil | — | — | — | 6.78 | 6.03 | — | — | — | — | — |
| RE03-09-13635 | 03-608250 | 0.0–1.0 | Soil | — | 0.0353 (J) | — | 0.205 | 0.247 | 0.146 | 0.173 | 0.227 | 0.112 | 0.0889 |
| RE03-09-13636 | 03-608250 | 1.0–2.0 | Qbt3 | — | — | — | 0.0309 | 0.0358 | — | — | — | — | — |
| RE03-09-13637 | 03-608251 | 0.0–1.0 | Soil | — | — | — | 0.0817 | 0.0648 | 0.0318 (J) | 0.0365 (J) | 0.0624 | 0.0126 (J) | 0.0257 (J) |
| RE03-09-13638 | 03-608251 | 1.0–2.0 | Soil | — | — | — | 0.171 | 0.121 | — | — | — | — | — |
| RE03-09-13639 | 03-608252 | 0.0–1.0 | Soil | — | — | — | 0.172 | 0.151 | — | — | — | — | — |
| RE03-09-13640 | 03-608252 | 1.0–2.0 | Soil | 0.00248 (J) | — | — | 0.205 | 0.204 | — | — | — | — | — |
| RE03-09-13641 | 03-608253 | 0.0–1.0 | Soil | 0.00196 (J) | — | — | 0.362 | 0.336 | 0.0305 (J) | 0.0398 | 0.0554 | 0.0235 (J) | 0.0203 (J) |
| RE03-09-13642 | 03-608253 | 2.0–3.0 | Qbt3 | 0.0511 (J) | — | — | 0.184 | 0.173 | — | — | — | — | — |
| RE03-09-13643 | 03-608254 | 0.0–1.0 | Soil | — | — | — | 0.0857 | 0.0643 | — | — | 0.0109 (J) | — | — |
| RE03-09-13644 | 03-608254 | 2.0–3.0 | Qbt3 | — | — | 0.0141 | 0.0127 | 0.0063 | — | — | — | — | — |
| RE03-09-13645 | 03-608255 | 0.0–1.0 | Soil | — | 0.0101 (J) | — | — | — | — | 0.0337 (J) | 0.0334 (J) | 0.0177 (J) | — |
| RE03-09-13646 | 03-608255 | 2.0–3.0 | Soil | — | — | — | — | — | 0.0118 (J) | — | — | — | — |

**Table 6.14-13 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Butylbenzene[tert-] | Chrysene | Fluoranthene | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Phenanthrene | Pyrene | Toluene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.30E+02[d]** | **6.21E+02** | **2.29E+03** | **6.21E+00** | **3.21E+03[e]** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520[f]** |
| **Industrial SSL[a]** | | | | **5.50E+02[d]** | **2.34E+03** | **2.44E+04** | **2.34E+01** | **1.49E+04[e]** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120[f]** |
| **Construction Worker SSL[a]** | | | | **1.94E+04[g]** | **2.06E+04** | **8.91E+03** | **2.13E+02** | **1.03E+04[e]** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na[h]** |
| RE03-09-13631 | 03-608248 | 0.0–1.0 | Soil | — | 0.0159 (J) | 0.0292 (J) | 0.123 | — | — | 0.0238 (J) | — | 20.4 |
| RE03-09-13632 | 03-608248 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | 8.73 |
| RE03-09-13633 | 03-608249 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | 20.2 (J) |
| RE03-09-13634 | 03-608249 | 1.0–2.0 | Soil | — | — | 0.0174 (J) | — | — | — | 0.0144 (J) | — | 57.6 |
| RE03-09-13635 | 03-608250 | 0.0–1.0 | Soil | — | 0.167 | 0.316 | 0.0944 | — | 0.17 | 0.373 | — | 44.9 (J) |
| RE03-09-13636 | 03-608250 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | 0.0117 (J) | — | 8.26 |
| RE03-09-13637 | 03-608251 | 0.0–1.0 | Soil | — | 0.0421 | 0.0545 | 0.0231 (J) | — | 0.0161 (J) | 0.0696 | — | 69.1 (J) |
| RE03-09-13638 | 03-608251 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | 11.1 |
| RE03-09-13639 | 03-608252 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | 11.9 (J) |
| RE03-09-13640 | 03-608252 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | 6.38 (J) |
| RE03-09-13641 | 03-608253 | 0.0–1.0 | Soil | — | 0.0398 | 0.0522 | 0.0203 (J) | — | 0.0243 (J) | 0.0787 | — | 12.8 |
| RE03-09-13642 | 03-608253 | 2.0–3.0 | Qbt3 | 0.000685 (J) | — | — | — | 0.0333 | — | — | 0.00156 | 38.3 |
| RE03-09-13643 | 03-608254 | 0.0–1.0 | Soil | — | 0.0132 (J) | 0.0331 (J) | — | — | 0.015 (J) | 0.0272 (J) | — | 25.7 (J) |
| RE03-09-13644 | 03-608254 | 2.0–3.0 | Qbt3 | — | — | — | — | — | — | — | — | 3.27 (J) |
| RE03-09-13645 | 03-608255 | 0.0–1.0 | Soil | — | 0.0311 (J) | 0.0723 | 0.121 | — | 0.0455 | 0.0653 | — | 33.6 (J) |
| RE03-09-13646 | 03-608255 | 2.0–3.0 | Soil | — | — | 0.0113 (J) | — | — | — | 0.0117 (J) | — | 6.42 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] SSL from EPA (2007, 099314).

[e] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] Screening guidelines for diesel #2 from NMED (2006, 094614).

[h] na = Not available.

**Table 6.14-14**
**Radionuclides Detected or Detected above BVs/FVs at AOC 03-014(c2)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 |
|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **na**[b] |
| **Soil BV**[a] | | | | **0.013** |
| **Residential SAL**[c] | | | | **30** |
| **Industrial SAL**[c] | | | | **180** |
| **Construction Worker SAL**[c] | | | | **34** |
| RE03-09-13644 | 03-608254 | 2.0–3.0 | Qbt3 | 0.0498 |
| RE03-09-13646 | 03-608255 | 2.0–3.0 | Soil | 0.0349 |

Note: All activities are in pCi/g.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SALs for radionuclides from LANL (2009, 107655).

**Table 6.14-15**
**Samples Collected and Analyses Requested at SWMUs 03-014(d) and 03-014(h)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13647 | 03-608256 | 0.0–1.0 | Qbt3 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 |
| RE03-09-13648 | 03-608256 | 6.0–7.0 | Qbt3 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 |
| RE03-09-13649 | 03-608256 | 14.0–15.0 | Qbt3 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 | 10-444 |
| RE03-09-13650 | 03-608257 | 2.0–3.0 | Qbt3 | 10-468 | 10-468 | 10-468 | 10-467 | 10-467 | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |
| RE03-09-13651 | 03-608257 | 7.0–8.0 | Qbt3 | 10-468 | 10-468 | 10-468 | 10-467 | —* | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |
| RE03-09-13652 | 03-608257 | 10.0–11.0 | Qbt3 | 10-468 | 10-468 | 10-468 | 10-467 | 10-467 | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |
| RE03-09-13653 | 03-608258 | 0.5–1.5 | Soil | 10-468 | 10-468 | 10-468 | 10-467 | — | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |
| RE03-09-13654 | 03-608258 | 5.5–6.5 | Qbt3 | 10-468 | 10-468 | 10-468 | 10-467 | 10-467 | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |
| RE03-09-13655 | 03-608258 | 10.0–11.0 | Qbt3 | 10-468 | 10-468 | 10-468 | 10-467 | — | 10-466 | 10-467 | 10-466 | 10-466 | 10-466 | 10-467 |

*— = Analyses not requested.

**Table 6.14-16**
**Inorganic Chemicals above BVs at SWMUs 03-014(d) and 03-014(h)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Barium | Cadmium | Chromium | Copper | Cyanide (Total) | Lead | Mercury | Nitrate | Perchlorate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **2.79** | **46** | **1.63** | **7.14** | **4.66** | **0.5** | **11.2** | **0.1** | **na[b]** | **na** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **8.17** | **295** | **0.4** | **19.3** | **14.7** | **0.5** | **22.3** | **0.1** | **na** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **3.90E+00** | **1.56E+04** | **7.79E+01** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **2.30E+01[e]** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.77E+01** | **2.24E+05** | **1.12E+03** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **3.10E+02[e]** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **6.54E+01** | **4.35E+03** | **3.09E+02** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **9.29E+01[f]** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13647 | 03-608256 | 0.0–1.0 | Qbt3 | 1.2 (U) | 3.07 | —[g] | — | — | — | — | 11.7 | — | — | — | 1.16 (U) | — | — |
| RE03-09-13648 | 03-608256 | 6.0–7.0 | Qbt3 | 1.19 (U) | — | — | — | — | — | — | — | — | — | — | 1.14 (U) | — | — |
| RE03-09-13649 | 03-608256 | 14.0–15.0 | Qbt3 | 0.954 (U) | — | — | — | — | — | — | — | — | 1.39 | — | 1.06 (U) | — | — |
| RE03-09-13650 | 03-608257 | 2.0–3.0 | Qbt3 | 1.13 (U) | — | 55.8 | — | 12.1 | 16.5 | — | 22.1 | 0.154 (J+) | 1.37 (J-) | — | 1.14 (U) | 3.89 | — |
| RE03-09-13651 | 03-608257 | 7.0–8.0 | Qbt3 | 1.18 (U) | — | 58.8 | — | — | — | — | 13.9 | — | NA[h] | — | 1.17 (U) | — | — |
| RE03-09-13652 | 03-608257 | 10.0–11.0 | Qbt3 | 1.11 (U) | — | — | — | — | — | — | — | — | — | — | 1.12 (U) | 1.26 | — |
| RE03-09-13653 | 03-608258 | 0.5–1.5 | Soil | 1.03 (U) | — | — | 0.478 (J) | 31.6 | 44 | 1.57 | 36.4 | 0.237 (J+) | NA | 0.000725 (J) | — | 16 | 73.8 |
| RE03-09-13654 | 03-608258 | 5.5–6.5 | Qbt3 | 1.04 (U) | — | — | — | — | — | — | 13.2 | — | — | — | 0.996 (U) | 1.1 | — |
| RE03-09-13655 | 03-608258 | 10.0–11.0 | Qbt3 | 1.05 (U) | — | — | — | — | — | — | — | — | NA | — | 1.06 (U) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070).

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

[h] NA = Not analyzed.

**Table 6.14-17**
**Organic Chemicals Detected at SWMUs 03-014(d) and 03-014(h)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Aroclor-1254 | Aroclor-1260 | Benzo(b) fluoranthene | Fluoranthene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.44E+03** | **6.75E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **2.29E+03** | **1.83E+03** | **1.72E+03** | **520**[b] |
| **Industrial SSL**[a] | | | | **3.67E+04** | **8.51E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.44E+04** | **2.05E+04** | **1.83E+04** | **1120**[b] |
| **Construction Worker SSL**[a] | | | | **1.86E+04** | **2.63E+05** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **8.91E+03** | **7.15E+03** | **6.68E+03** | **na**[c] |
| RE03-09-13647 | 03-608256 | 0.0–1.0 | Qbt3 | —[d] | — | — | 0.003 (J) | — | — | — | — | — |
| RE03-09-13649 | 03-608256 | 14.0–15.0 | Qbt3 | 0.0268 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13650 | 03-608257 | 2.0–3.0 | Qbt3 | — | 0.0069 (J) | 0.0147 | 0.0153 | — | — | — | — | 3.07 (J) |
| RE03-09-13651 | 03-608257 | 7.0–8.0 | Qbt3 | — | 0.00503 (J) | 0.211 | 0.15 | — | — | — | — | 6.81 (J) |
| RE03-09-13652 | 03-608257 | 10.0–11.0 | Qbt3 | — | 0.0047 (J) | 0.0175 | 0.0193 | — | — | — | — | 6.9 (J) |
| RE03-09-13653 | 03-608258 | 0.5–1.5 | Soil | — | — | 0.229 | 0.256 | — | — | — | — | 33.4 |
| RE03-09-13654 | 03-608258 | 5.5–6.5 | Qbt3 | — | — | 0.0124 | 0.0146 | — | — | — | — | 8.02 |
| RE03-09-13655 | 03-608258 | 10.0–11.0 | Qbt3 | — | — | 0.0246 | 0.0224 | 0.0155 (J) | 0.0215 (J) | 0.014 (J) | 0.0269 (J) | 3.95 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na = Not available.

[d] — = Not detected.

**Table 6.14-18**
**Samples Collected and Analyses Requested at SWMU 03-014(i)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13656 | 03-608259 | 0.0–1.0 | Soil | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13657 | 03-608259 | 3.0–4.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13658 | 03-608259 | 8.0–9.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13660 | 03-608260 | 0.0–1.0 | Soil | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13661 | 03-608260 | 3.0–4.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13662 | 03-608260 | 8.0–9.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13664 | 03-608261 | 0.0–1.0 | Soil | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13665 | 03-608261 | 2.0–3.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |
| RE03-09-13666 | 03-608261 | 7.0–8.0 | Qbt3 | 10-386 | 10-386 | 10-386 | 10-386 | 10-386 | 10-385 | 10-386 | 10-385 | 10-385 | 10-385 | 10-386 |

**Table 6.14-19**
**Inorganic Chemicals above BVs at SWMU 03-014(i)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Barium | Calcium | Cobalt | Lead | Mercury | Nitrate | Perchlorate | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **2.79** | **46** | **2200** | **3.14** | **11.2** | **0.1** | **na[b]** | **na** | **0.3** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **8.17** | **295** | **6120** | **8.64** | **22.3** | **0.1** | **na** | **na** | **1.52** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **3.90E+00** | **1.56E+04** | **na** | **2.30E+01[d]** | **4.00E+02** | **2.30E+01[d]** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.77E+01** | **2.24E+05** | **na** | **3.00E+02[d]** | **8.00E+02** | **3.10E+02[d]** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **6.54E+01** | **4.35E+03** | **na** | **3.46E+01[e]** | **8.00E+02** | **9.29E+01[e]** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **9.29E+04** |
| RE03-09-13656 | 03-608259 | 0.0–1.0 | Soil | —[f] | — | — | — | 9.42 | — | 0.353 | 1.18 | — | — | — |
| RE03-09-13657 | 03-608259 | 3.0–4.0 | Qbt3 | 0.689 (U) | — | — | — | — | — | — | — | — | 1.07 (U) | — |
| RE03-09-13658 | 03-608259 | 8.0–9.0 | Qbt3 | — | — | — | — | — | — | — | — | — | 1.09 (U) | — |
| RE03-09-13660 | 03-608260 | 0.0–1.0 | Soil | 0.831 (U) | — | — | — | — | — | — | 4.27 | 0.000877 (J) | — | 62.1 |
| RE03-09-13661 | 03-608260 | 3.0–4.0 | Qbt3 | 1.06 (U) | 4.29 | 53.3 | 2550 | — | 12.3 | — | 1.86 | 0.00147 (J) | 1.05 (U) | — |
| RE03-09-13662 | 03-608260 | 8.0–9.0 | Qbt3 | 1.36 (U) | — | — | — | — | — | — | — | — | 1.04 (U) | — |
| RE03-09-13664 | 03-608261 | 0.0–1.0 | Soil | 1.57 (U) | — | — | — | — | — | — | — | — | — | 54.5 |
| RE03-09-13665 | 03-608261 | 2.0–3.0 | Qbt3 | 1.1 (U) | — | — | — | — | — | — | — | — | 1.06 (U) | — |
| RE03-09-13666 | 03-608261 | 7.0–8.0 | Qbt3 | 0.745 (U) | — | — | — | — | — | — | — | — | 1.09 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-20**
**Organic Chemicals Detected at SWMU 03-014(i)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Benzoic Acid | Chrysene | Fluoranthene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **2.40E+05[c]** | **6.21E+02** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **1.83E+03** | **1.72E+03** | **520[d]** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.50E+06[c]** | **2.34E+03** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **2.05E+04** | **1.83E+04** | **1120[d]** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **9.52E+05[e]** | **2.06E+04** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **7.15E+03** | **6.68E+03** | **na[f]** |
| RE03-09-13656 | 03-608259 | 0.0–1.0 | Soil | 0.221 | 0.182 | 0.0266 (J) | 0.0196 (J) | 0.0316 (J) | 0.0364 (J) | 0.0347 (J) | —[g] | 0.0353 (J) | 0.0796 | 0.125 | — | 0.0325 (J) | 0.0647 | 131 (J) |
| RE03-09-13657 | 03-608259 | 3.0–4.0 | Qbt3 | — | — | — | — | — | — | — | 1.16 (J) | — | — | — | — | — | — | — |
| RE03-09-13660 | 03-608260 | 0.0–1.0 | Soil | 0.0413 | 0.0457 | — | — | 0.0127 (J) | — | — | — | 0.0127 (J) | 0.0153 (J) | — | — | — | 0.0136 (J) | 36.2 (J) |
| RE03-09-13661 | 03-608260 | 3.0–4.0 | Qbt3 | 0.0124 | 0.0187 | — | — | — | — | — | — | — | — | — | 0.00358 (J) | — | — | 8.72 (J) |
| RE03-09-13664 | 03-608261 | 0.0–1.0 | Soil | 0.132 | 0.117 | — | — | 0.0126 (J) | — | — | — | — | 0.021 (J) | 0.127 | — | — | 0.0163 (J) | 9.86 (J) |
| RE03-09-13665 | 03-608261 | 2.0–3.0 | Qbt3 | 0.0023 (J) | 0.0026 (J) | — | — | — | — | — | — | — | — | — | — | — | — | 5.83 (J) |
| RE03-09-13666 | 03-608261 | 7.0–8.0 | Qbt3 | 0.0033 (J) | 0.0027 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[f] na = Not available.

[g] — = Not detected.

**Table 6.14-21**
**Samples Collected and Analyses Requested at SWMU 03-014(j)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13718 | 03-608262 | 0.5–1.5 | Soil | 10-408 | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13719 | 03-608262 | 4–5 | Soil | 10-408 | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13720 | 03-608262 | 9–10 | Qbt3 | 10-408 | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13721 | 03-608263 | 2–3 | Qbt3 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 |
| RE03-09-13723 | 03-608263 | 8–9 | Qbt3 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 | 10-445 |
| RE03-09-13724 | 03-608264 | 0–1 | Soil | 10-489 | 10-489 | 10-489 | 10-488 | —* | 10-487 | 10-488 | 10-487 | 10-487 | 10-487 | 10-488 |
| RE03-09-13725 | 03-608264 | 2–3 | Soil | 10-489 | 10-489 | 10-489 | 10-488 | — | 10-487 | 10-488 | 10-487 | 10-487 | 10-487 | 10-488 |

*— = Analyses not requested.

**Table 6.14-22**
**Inorganic Chemicals above BVs at SWMU 03-014(j)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Cyanide (Total) | Lead | Mercury | Perchlorate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **0.5** | **11.2** | **0.1** | **na[b]** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **0.5** | **22.3** | **0.1** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **1.56E+03** | **4.00E+02** | **2.30E+01[d]** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **2.35e+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **2.27E+04** | **8.00E+02** | **3.10E+02[d]** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.19E+02** | **6.19E+02** | **8.00E+02** | **9.29E+01[e]** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13718 | 03-608262 | 0.5–1.5 | Soil | 1.04 (U) | —[f] | — | — | — | 0.00136 (J) | — | — | 58.3 |
| RE03-09-13719 | 03-608262 | 4–5 | Soil | 1.02 (U) | 0.51 (U) | 0.587 | — | — | 0.00204 (J) | — | — | — |
| RE03-09-13720 | 03-608262 | 9–10 | Qbt3 | 1.03 (U) | — | — | 11.4 | — | — | 1.01 (U) | — | — |
| RE03-09-13721 | 03-608263 | 2–3 | Qbt3 | 1.11 (U) | — | — | — | — | — | 1.07 (U) | — | — |
| RE03-09-13723 | 03-608263 | 8–9 | Qbt3 | 1.08 (U) | — | — | — | — | — | 1.04 (U) | — | — |
| RE03-09-13724 | 03-608264 | 0–1 | Soil | 1.03 (U) | — | — | — | 0.144 | — | — | 2.41 | — |
| RE03-09-13725 | 03-608264 | 2–3 | Soil | 1.08 (U) | — | — | — | — | — | — | 2.22 | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-23**
**Organic Chemicals Detected at SWMU 03-014(j)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(g,h,i) perylene | Bis(2-ethylhexyl) phthalate | Indeno(1,2,3-cd) pyrene | Methylene Chloride | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **1.12E+00** | **2.22E+00** | **1.72E+03[b]** | **3.47E+02** | **6.21E+00** | **1.99E+02** | **520[c]** |
| **Industrial SSL[a]** | | | | **8.26E+00** | **8.26E+00** | **1.83E+04[b]** | **1.37E+03** | **2.34E+01** | **1.09E+03** | **1120[c]** |
| **Construction Worker SSL[a]** | | | | **4.36E+00** | **7.58E+01** | **6.68E+03[b]** | **4.76E+03** | **2.13E+02** | **1.06E+04** | **na[d]** |
| RE03-09-13718 | 03-608262 | 0.5-1.5 | Soil | —[e] | 0.0129 | — | 0.0935 (J) | — | — | 18.2 (J) |
| RE03-09-13719 | 03-608262 | 4-5 | Soil | — | 0.0136 | 0.0283 (J) | — | 0.0334 (J) | — | 29.6 (J) |
| RE03-09-13720 | 03-608262 | 9-10 | Qbt3 | — | 0.0234 | — | — | — | — | 22.4 (J) |
| RE03-09-13721 | 03-608263 | 2-3 | Qbt3 | — | — | — | — | — | 0.00247 (J) | 5.88 (J) |
| RE03-09-13723 | 03-608263 | 8-9 | Qbt3 | — | — | 0.0279 (J) | — | 0.022 (J) | — | — |
| RE03-09-13724 | 03-608264 | 0-1 | Soil | 0.123 | 0.0813 | — | — | — | — | 9.99 (J) |
| RE03-09-13725 | 03-608264 | 2-3 | Soil | 0.172 | 0.2 | — | — | — | — | 4.77 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] Screening guidelines for diesel #2 from NMED (2006, 094614).

[d] na = Not available.

[e] — = Not detected.

**Table 6.14-24**
**Samples Collected and Analyses Requested at SWMUs 03-014 (k,l,m,n)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Tritium | Herbicides | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | Pesticides | Strontium 90 | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13747 | 03-03201 | 4.0–5.0 | Qbt3 | 10-459 | 10-459 | —[a] | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13739 | 03-03201 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13746 | 03-03202 | 4.0–5.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13743 | 03-03202 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| 0103-97-0011 | 03-03264 | 0.0–1.0 | Fill | — | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | — | — |
| 0103-97-0012 | 03-03264 | 1.33–2.33 | Qbt4 | — | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | — | — |
| 0103-97-0013 | 03-03264 | 2.33–3.33 | Qbt4 | — | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | 3375R | — |
| 0103-97-0017 | 03-03266 | 0.0–0.17 | Fill | —[a] | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | — | — |
| 0103-97-0018 | 03-03266 | 0.75–1.75 | Qbt4 | — | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | — | — |
| 0103-97-0019 | 03-03266 | 1.75–2.75 | Qbt4 | — | 3377R | 3375R | 3377R | 3377R | 3376R | — | 3375R | — | 3375R | 3377R | 3375R | — | 3375R | — |
| 0103-97-0020 | 03-03201 | 0.0–1.58 | Fill | —[a] | 3435R | 3433R | 3435R | 3435R | 3434R | — | — | — | 3433R | 3435R | 3433R | 3433R | 3433R | — |
| 0103-97-0021 | 03-03201 | 1.58–2.58 | Qbt4 | — | 3435R | 3433R | 3435R | 3435R | 3434R | — | — | — | 3433R | 3435R | 3433R | 3433R | 3433R | — |
| 0103-97-0022 | 03-03201 | 2.58–3.58 | Qbt4 | — | 3435R | 3433R | 3435R | 3435R | 3434R | — | — | — | 3433R | 3435R | 3433R | 3433R | 3433R | — |
| 0103-97-0023 | 03-03202 | 0.0–0.33 | Fill | — | — | 3433R | — | — | 3434R | — | — | — | 3433R | — | 3433R | 3433R | 3433R | — |
| 0103-97-0343 | 03-603357 | 0.0–0.5 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 3721R | — | — |
| 0103-97-0345 | 03-603357 | 0.0–0.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | — | 3721R | — | — |
| 0103-97-0347 | 03-603357 | 0.0–0.5 | Fill | — | — | — | — | — | — | — | — | — | — | — | — | 3721R | — | — |
| RE03-09-13740 | 03-03264 | 4.0–5.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13741 | 03-03264 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-10-4972 | 03-03265 | 0.0–0.0 | n/a[b] | — | — | — | — | — | 10-458 | — | — | 10-458 | — | — | — | — | — | 10-458 |
| RE03-10-5391 | 03-03265 | 0.0–0.0 | n/a | — | — | — | — | — | 10-458 | — | — | 10-458 | — | — | — | — | — | 10-458 |
| RE03-09-13744 | 03-03265 | 4.0–5.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13745 | 03-03265 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13748 | 03-03266 | 4.0–5.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13749 | 03-03266 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| 0103-97-0363 | 03-03386 | 0.0–0.5 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| 0103-97-0362 | 03-03386 | 0.5–1.0 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| 0103-97-0361 | 03-03386 | 0.67–1.0 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| 0103-97-0367 | 03-03387 | 0.0–0.5 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |

**Table 6.14-24 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Tritium | Herbicides | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | Pesticides | Strontium 90 | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0103-97-0366 | 03-03387 | 0.5–1.0 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| 0103-97-0365 | 03-03387 | 1.0–1.5 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| 0103-97-0364 | 03-03387 | 1.5–2.0 | Fill | — | — | — | — | — | — | — | 4002R | — | — | — | 4002R | — | — | — |
| RE03-09-13726 | 03-608270 | 0.0–1.0 | Qbt3 | — | 10-390 | — | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | — | — | 10-390 | 10-390 | 10-390 | 10-390 |
| RE03-09-13727 | 03-608270 | 3.0–4.0 | Qbt3 | — | 10-390 | — | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | — | — | 10-390 | 10-390 | 10-390 | 10-390 |
| RE03-09-13728 | 03-608270 | 8.0–9.0 | Qbt3 | — | 10-390 | — | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | — | — | 10-390 | 10-390 | 10-390 | 10-390 |
| RE03-09-13736 | 03-608271 | 0.0–1.0 | Soil | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13737 | 03-608271 | 6.0–7.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13738 | 03-608271 | 11.0–12.0 | Qbt3 | 10-459 | 10-459 | — | 10-459 | 10-459 | 10-458 | 10-458 | 10-457 | 10-458 | — | — | 10-457 | 10-457 | 10-457 | 10-458 |
| RE03-09-13732 | 03-608272 | 0.0–1.0 | Soil | 10-408 | 10-408 | — | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | — | — | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13733 | 03-608272 | 3.0–4.0 | Qbt3 | 10-408 | 10-408 | — | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | — | — | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13734 | 03-608272 | 8.0–9.0 | Qbt3 | 10-408 | 10-408 | — | 10-408 | 10-408 | 10-408 | 10-408 | 10-407 | 10-408 | — | — | 10-407 | 10-407 | 10-407 | 10-408 |
| RE03-09-13729 | 03-608273 | 0.0–1.0 | Soil | — | 10-390 | — | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | — | — | 10-390 | 10-390 | 10-390 | 10-390 |
| RE03-09-13730 | 03-608273 | 3.0–4.0 | Qbt3 | — | 10-390 | — | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | 10-390 | — | — | 10-390 | 10-390 | 10-390 | 10-390 |

[a] — = Analyses not requested.
[b] n/a = Not applicable.

**Table 6.14-25**
**Inorganic Chemicals above BVs at SWMUs 03-014 (k,l,m,n)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Calcium | Chromium | Copper | Cyanide (Total) | Iron | Lead | Mercury | Nickel | Nitrate | Perchlorate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **46** | **1.63** | **2200** | **7.14** | **4.66** | **0.5** | **14,500** | **11.2** | **0.1** | **6.58** | **na[b]** | **na** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **295** | **0.4** | **6120** | **19.3** | **14.7** | **0.5** | **21,500** | **22.3** | **0.1** | **15.4** | **na** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **5.48E+04** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **7.95E+05** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **2.17E+05** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13747 | 03-03201 | 4.0–5.0 | Qbt3 | 1.09 (U) | —[g] | — | — | — | — | — | — | — | — | — | 1.7 (J-) | — | 1.12 (U) | — | — |
| RE03-09-13739 | 03-03201 | 6.0–7.0 | Qbt3 | 1.1 (U) | — | — | — | — | — | — | — | — | — | — | 1.54 (J-) | — | 1.12 (U) | — | — |
| RE03-09-13746 | 03-03202 | 4.0–5.0 | Qbt3 | 1.07 (U) | — | — | — | — | — | — | — | — | — | — | 1.29 (J-) | — | 1.07 (U) | — | — |
| RE03-09-13743 | 03-03202 | 6.0–7.0 | Qbt3 | 1.14 (U) | — | — | — | — | — | — | — | — | — | — | 1.23 (J-) | — | 1.1 (U) | — | — |
| 0103-97-0011 | 03-03264 | 0.0–1.0 | Fill | 4.7 (U) | — | 0.47 (U) | — | — | — | NA[h] | — | — | 0.16 | — | NA | NA | — | 2.7 | — |
| 0103-97-0012 | 03-03264 | 1.33–2.33 | Qbt4 | 5.4 (U) | — | — | — | 19.3 | — | NA | — | — | — | 8.6 | NA | NA | — | — | 154 |
| 0103-97-0013 | 03-03264 | 2.33–3.33 | Qbt4 | 5 (U) | — | — | — | 24 | 6.9 | NA | — | — | — | 11.9 | NA | NA | — | — | 164 |
| 0103-97-0014 | 03-03265 | 0.0–1.17 | Fill | 5 (U) | — | 0.5 (U) | — | — | 30 | NA | — | — | 5 (U) | — | — | — | 0.5 (U) | — | — |
| 0103-97-0015 | 03-03265 | 1.67–2.67 | Qbt4 | 5.2 (U) | — | — | — | 9.7 | 4.7 | NA | — | — | 5.2 (U) | — | — | — | — | — | 9.7 |
| 0103-97-0016 | 03-03265 | 2.67–3.67 | Qbt4 | 5 (U) | — | — | — | 11.4 | — | NA | — | — | 5 (U) | — | — | — | — | — | 11.4 |
| 0103-97-0017 | 03-03266 | 0.0–0.17 | Fill | 4.6 (U) | — | 0.49 | — | 38.9 | 44.8 | NA | — | 29.1 | 0.92 | — | NA | NA | — | 18.3 | 76.9 |
| 0103-97-0018 | 03-03266 | 0.75–1.75 | Qbt4 | 5.3 (U) | — | — | — | 13.1 | 8.4 | NA | — | — | — | 8.4 | NA | NA | — | — | — |
| 0103-97-0019 | 03-03266 | 1.75–2.75 | Qbt4 | 5.8 (U) | — | — | — | 17.6 | — | NA | — | — | — | 11.1 | NA | NA | — | — | — |
| 0103-97-0020 | 03-03201 | 0.0–1.58 | Fill | — | — | — | — | — | 25.1 | NA | — | — | 0.55 (J-) | — | NA | NA | — | 3.1 | 71.3 |
| 0103-97-0021 | 03-03201 | 1.58–2.58 | Qbt4 | 0.75 (UJ) | — | — | — | — | 11.6 | NA | — | — | 0.14 (J-) | — | NA | NA | 0.6 (U) | 1.1 (J) | — |
| 0103-97-0022 | 03-03201 | 2.58–3.58 | Qbt4 | 0.76 (UJ) | — | — | — | 8.8 | 5.6 (J) | NA | — | — | — | 8.7 (J) | NA | NA | 0.61 (U) | — | — |
| 0103-97-0023 | 03-03202 | 0.0–0.33 | Fill | 8.3 (J-) | 345 | 15.5 | 6430 | 51.9 | 231 | NA | — | 217 | 0.46 (J-) | 30.7 | NA | NA | — | 1.4 (J) | 638 |
| RE03-09-13740 | 03-03264 | 4.0–5.0 | Qbt3 | 1.13 (U) | — | — | — | 16.8 | 13.2 | — | — | — | — | — | 1.3 (J-) | 0.000595 (J) | 1.15 (U) | 5.55 | — |
| RE03-09-13741 | 03-03264 | 6.0–7.0 | Qbt3 | 1.18 (U) | — | — | — | — | 4.85 | — | — | — | — | — | — | — | 1.12 (U) | — | 122 |
| RE03-09-13744 | 03-03265 | 4.0–5.0 | Qbt3 | 1.06 (U) | — | — | — | — | 5.46 | 1.9 | — | — | — | — | — | — | 1.08 (U) | 1.37 | — |
| RE03-09-13745 | 03-03265 | 6.0–7.0 | Qbt3 | 1.05 (U) | — | — | — | 9.45 | 6.95 | 2.13 | — | — | — | — | 1.22 (J-) | — | 1.1 (U) | 2.53 | — |
| RE03-09-13748 | 03-03266 | 4.0–5.0 | Qbt3 | 1.23 (U) | — | — | — | — | — | 0.578 | — | — | — | — | — | — | 1.18 (U) | — | — |
| RE03-09-13749 | 03-03266 | 6.0–7.0 | Qbt3 | 1.17 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.23 (U) | — | — |
| RE03-09-13726 | 03-608270 | 0.0–1.0 | Qbt3 | — | — | — | — | — | — | — | — | 125 | — | — | — | — | 1.07 (U) | — | 65.5 |
| RE03-09-13727 | 03-608270 | 3.0–4.0 | Qbt3 | 1.14 (U) | — | — | 4570 (J+) | — | — | — | — | 27.1 | — | — | — | — | 1.09 (U) | — | — |
| RE03-09-13728 | 03-608270 | 8.0–9.0 | Qbt3 | 1.15 (U) | — | — | — | — | — | — | 15,200 | — | — | — | — | — | 1.16 (U) | — | — |
| RE03-09-13736 | 03-608271 | 0.0–1.0 | Soil | 1.12 (U) | — | 0.562 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13737 | 03-608271 | 6.0–7.0 | Qbt3 | 1.13 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.15 (U) | — | — |
| RE03-09-13738 | 03-608271 | 11.0–12.0 | Qbt3 | 1.09 (U) | — | — | — | 7.83 | 10.1 | — | — | 16.3 | — | — | — | — | 1.11 (U) | — | — |

**Table 6.14-25 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Calcium | Chromium | Copper | Cyanide (Total) | Iron | Lead | Mercury | Nickel | Nitrate | Perchlorate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **46** | **1.63** | **2200** | **7.14** | **4.66** | **0.5** | **14,500** | **11.2** | **0.1** | **6.58** | **na[b]** | **na** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **295** | **0.4** | **6120** | **19.3** | **14.7** | **0.5** | **21,500** | **22.3** | **0.1** | **15.4** | **na** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **5.48E+04** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **7.95E+05** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **2.17E+05** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13732 | 03-608272 | 0.0–1.0 | Soil | 1.1 (U) | — | — | — | — | — | 4.67 | — | — | 0.176 | — | — | — | — | — | 66.7 |
| RE03-09-13733 | 03-608272 | 3.0–4.0 | Qbt3 | 1.01 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.04 (U) | — | — |
| RE03-09-13734 | 03-608272 | 8.0–9.0 | Qbt3 | 1.03 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.05 (U) | — | — |
| RE03-09-13729 | 03-608273 | 0.0–1.0 | Soil | — | — | 1.02 | — | — | — | 9.48 | — | — | 0.913 | — | — | — | — | 6.19 | 80 |
| RE03-09-13730 | 03-608273 | 3.0–4.0 | Qbt3 | 1.05 (U) | 52.4 | — | — | — | — | — | — | 12.9 | — | — | — | 0.000748 (J) | 1.06 (U) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

[h] NA = Not analyzed.

**Table 6.14-26**
**Organic Chemicals Detected at SWMUs 03-014 (k,l,m,n)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Bis(2-ethylhexyl) phthalate | Butylbenzylphthalate | Carbazole | Carbon Disulfide | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **3.47E+02** | **2.60E+03[c]** | **2.40E+02[d]** | **1.94E+03** | **6.21E+02** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **1.37E+03** | **9.10E+03[c]** | **9.60E+02[d]** | **7.54E+03** | **2.34E+03** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **4.76E+03** | **4.76E+04[e]** | **1.08E+04[f]** | **5.89E+03** | **2.06E+04** |
| 0103-97-0020 | 03-03201 | 0.0–1.58 | Fill | —[g] | NA[h] | — | — | — | — | — | — | — | 3.1 | — | NA | — | — |
| 0103-97-0021 | 03-03201 | 1.58–2.58 | Qbt4 | — | 0.042(J+) | — | — | — | — | — | — | — | 0.5 | — | NA | — | — |
| 0103-97-0022 | 03-03201 | 2.58–3.58 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| RE03-09-13747 | 03-03201 | 4.0–5.0 | Qbt3 | — | — | — | 0.0141 | 0.0133 | — | — | — | — | — | — | NA | — | — |
| RE03-09-13739 | 03-03201 | 6.0–7.0 | Qbt3 | — | — | — | 0.0084 | 0.0072 | — | — | — | — | — | — | NA | — | — |
| 0103-97-0023 | 03-03202 | 0.0–0.33 | Fill | — | 2.2 (J+) | — | — | — | — | — | — | — | 44 | 30 | NA | — | — |
| RE03-09-13746 | 03-03202 | 4.0–5.0 | Qbt3 | — | — | — | 0.0056 | 0.0058 | — | — | — | — | — | — | NA | — | — |
| RE03-09-13743 | 03-03202 | 6.0–7.0 | Qbt3 | — | — | — | 0.0063 | 0.0057 | — | — | — | — | — | — | NA | — | — |
| RE03-09-13740 | 03-03264 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| RE03-09-13741 | 03-03264 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| 0103-97-0014 | 03-03265 | 0.0–1.17 | FILL | — | NA | — | 0.078 | — | — | — | — | — | — | — | NA | NA | — |
| 0103-97-0016 | 03-03265 | 2.67–3.67 | QBT4 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| RE03-09-13744 | 03-03265 | 4.0–5.0 | Qbt3 | — | 0.00613 (J) | — | 0.0098 | 0.0126 | — | — | — | — | — | — | NA | — | — |
| RE03-09-13745 | 03-03265 | 6.0–7.0 | Qbt3 | — | — | — | 0.006 | 0.0116 | — | — | — | — | — | — | NA | — | — |
| 0103-97-0017 | 03-03266 | 0.0–0.17 | Fill | 2.3 (J) | NA | 3.9 | 6.5 | — | 11 | 8.3 | 15 | 5.6 | — | — | 3.2 (J) | NA | 9.3 |
| RE03-09-13748 | 03-03266 | 4.0–5.0 | Qbt3 | — | — | — | 0.01 | 0.0159 | — | — | — | — | — | — | NA | 0.00978 | — |
| RE03-09-13749 | 03-03266 | 6.0–7.0 | Qbt3 | — | 0.00213 (J) | — | 0.0033 (J) | 0.0049 | — | — | — | — | — | — | NA | 0.00637 | — |
| 0103-97-0363 | 03-03386 | 0.0–0.5 | Fill | — | NA | — | — | 0.096 | — | — | — | — | — | — | NA | NA | — |
| 0103-97-0362 | 03-03386 | 0.5–1.0 | Fill | — | NA | — | — | 0.041 | — | — | — | — | — | — | NA | NA | — |
| 0103-97-0367 | 03-03387 | 0.0–0.5 | Fill | — | NA | — | — | 0.089 | — | — | — | — | — | — | NA | NA | — |
| 0103-97-0343 | 03-603357 | 0.0–0.5 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 0103-97-0345 | 03-603357 | 0.0–0.5 | Fill | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| 0103-97-0347 | 03-603357 | 0.0–0.5 | Fill | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13726 | 03-608270 | 0.0–1.0 | Qbt3 | — | — | — | 0.0041 | 0.0044 | — | — | — | — | — | — | NA | — | — |
| RE03-09-13736 | 03-608271 | 0.0–1.0 | Soil | — | — | — | 0.0214 | 0.0505 | — | — | 0.0154 (J) | — | — | — | NA | 0.00281 (J) | — |
| RE03-09-13738 | 03-608271 | 11.0–12.0 | Qbt3 | — | — | — | — | 0.002 (J) | — | — | — | — | — | — | NA | — | — |
| RE03-09-13732 | 03-608272 | 0.0–1.0 | Soil | — | — | — | 0.119 | 0.206 | 0.0152 (J) | 0.013 (J) | 0.0274 (J) | — | — | — | NA | — | 0.0172 (J) |
| RE03-09-13733 | 03-608272 | 3.0–4.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| RE03-09-13734 | 03-608272 | 8.0–9.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | NA | — | — |
| RE03-09-13729 | 03-608273 | 0.0–1.0 | Soil | 0.0176 (J) | — | 0.00827 (J) | 0.0207 | 0.036 | — | 0.012 (J) | 0.0227 (J) | 0.0107 (J) | — | — | NA | — | 0.0122 (J) |
| RE03-09-13730 | 03-608273 | 3.0–4.0 | Qbt3 | — | — | — | — | 0.0037 | — | — | — | — | — | — | NA | — | — |

**Table 6.14-26 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dibenz(a,h)anthracene | Dibenzofuran | Dichlorobenzene[1,4-] | Fluoranthene | Fluorene | Hexanone[2-] | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO | TPH-LRO | Toluene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E-01** | **7.80E+01[c]** | **3.22E+01** | **2.29E+03** | **2.29E+03** | **2.10E+02[c]** | **6.21E+00** | **1.49E+04[i]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[j]** | **na[k]** | **5.57E+03** |
| **Industrial SSL[a]** | | | | **2.34E+00** | **1.00E+03[c]** | **1.80E+02** | **2.44E+04** | **2.44E+04** | **1.40E+03[c]** | **2.34E+01** | **3.21E+03[i]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[j]** | **na** | **5.79E+04** |
| **Construction Worker SSL[a]** | | | | **2.13E+01** | **2.82E+02[e]** | **3.78E+03** | **8.91E+03** | **8.91E+03** | **1.48E+05[l]** | **2.13E+02** | **1.03E+04[i]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na** | **na** | **2.11E+04** |
| 0103-97-0020 | 03-03201 | 0.0–1.58 | Fill | — | — | — | — | — | — | — | — | — | — | — | 3000 | NA | — |
| 0103-97-0021 | 03-03201 | 1.58–2.58 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | 460 | NA | — |
| 0103-97-0022 | 03-03201 | 2.58–3.58 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | 200 | NA | — |
| RE03-09-13747 | 03-03201 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | NA | — |
| RE03-09-13739 | 03-03201 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | NA | — |
| 0103-97-0023 | 03-03202 | 0.0–0.33 | Fill | — | — | — | — | — | — | — | — | — | — | — | 31,000 | NA | — |
| RE03-09-13746 | 03-03202 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 7.67 (J) | NA | — |
| RE03-09-13743 | 03-03202 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 6.57 (J) | NA | — |
| RE03-09-13740 | 03-03264 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 3.22 (J) | NA | — |
| RE03-09-13741 | 03-03264 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 3.02 (J) | NA | — |
| 0103-97-0014 | 03-03265 | 0.0–1.17 | FILL | — | — | — | NA | — | NA | — | — | — | — | NA | NA | NA | NA |
| 0103-97-0016 | 03-03265 | 2.67–3.67 | QBT4 | — | — | — | — | — | — | — | — | — | — | 0.004 (J) | NA | NA | 0.004 (J) |
| RE03-09-13744 | 03-03265 | 4.0–5.0 | Qbt3 | — | — | — | — | — | 0.02 (J) | — | 0.0061 | — | — | — | 7.45 (J) | NA | — |
| RE03-09-13745 | 03-03265 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 786 (J) | NA | — |
| 0103-97-0017 | 03-03266 | 0.0–0.17 | Fill | 1.1 (J) | 1.2 (J) | 1.4 (J) | 24 | 2 (J) | NA | 4.6 | NA | 0.94 (J) | 22 | 32 | NA | NA | NA |
| RE03-09-13748 | 03-03266 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 4.12 (J) | NA | — |
| RE03-09-13749 | 03-03266 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | — | 0.000762 (J) | — | — | — | — | NA | — |
| 0103-97-0363 | 03-03386 | 0.0–0.5 | Fill | — | — | — | — | — | NA | — | NA | — | — | — | NA | NA | NA |
| 0103-97-0362 | 03-03386 | 0.5–1.0 | Fill | — | — | — | — | — | NA | — | NA | — | — | — | NA | NA | NA |
| 0103-97-0367 | 03-03387 | 0.0–0.5 | Fill | — | — | — | — | — | NA | — | NA | — | — | — | NA | NA | NA |
| 0103-97-0343 | 03-603357 | 0.0–0.5 | Soil | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | — | 450 | — |
| 0103-97-0345 | 03-603357 | 0.0–0.5 | Fill | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | — | 290 | — |
| 0103-97-0347 | 03-603357 | 0.0–0.5 | Fill | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | 130 | 490 | — |
| RE03-09-13726 | 03-608270 | 0.0–1.0 | Qbt3 | — | — | — | — | — | — | — | 0.00157 | — | — | — | — | NA | — |
| RE03-09-13736 | 03-608271 | 0.0–1.0 | Soil | — | — | — | 0.0151 (J) | — | — | — | — | — | — | 0.0144 (J) | 3.58 (J) | NA | — |
| RE03-09-13738 | 03-608271 | 11.0–12.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | NA | — |
| RE03-09-13732 | 03-608272 | 0.0–1.0 | Soil | — | — | — | 0.028 (J) | — | — | — | — | — | 0.0116 (J) | 0.03 (J) | 79.8 (J) | NA | — |
| RE03-09-13733 | 03-608272 | 3.0–4.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 3.04 (J) | NA | — |
| RE03-09-13734 | 03-608272 | 8.0–9.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 4.79 (J) | NA | — |

**Table 6.14-26 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dibenz(a,h)anthracene | Dibenzofuran | Dichlorobenzene[1,4-] | Fluoranthene | Fluorene | Hexanone[2-] | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO | TPH-LRO | Toluene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E-01** | **7.80E+01[c]** | **3.22E+01** | **2.29E+03** | **2.29E+03** | **2.10E+02[c]** | **6.21E+00** | **1.49E+04[i]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[j]** | **na[k]** | **5.57E+03** |
| **Industrial SSL[a]** | | | | **2.34E+00** | **1.00E+03[c]** | **1.80E+02** | **2.44E+04** | **2.44E+04** | **1.40E+03[c]** | **2.34E+01** | **3.21E+03[i]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[j]** | **na** | **5.79E+04** |
| **Construction Worker SSL[a]** | | | | **2.13E+01** | **2.82E+02[e]** | **3.78E+03** | **8.91E+03** | **8.91E+03** | **1.48E+05[l]** | **2.13E+02** | **1.03E+04[i]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na** | **na** | **2.11E+04** |
| RE03-09-13729 | 03-608273 | 0.0–1.0 | Soil | — | — | — | 0.024 (J) | — | — | — | — | — | — | 0.026 (J) | 12.2 (J) | NA | — |
| RE03-09-13730 | 03-608273 | 3.0–4.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | NA | — |

Note: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 08070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] SSL from EPA (2007, 099314).

[f] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[g] — = Not detected.

[h] NA = Not analyzed.

[i] Isopropylbenzene used as a surrogate based on structural similarity.

[j] Screening guidelines for diesel #2 from NMED (2006, 094614).

[k] na = Not available.

[l] Butanone[2-] used as a surrogate based on structural similarity.

**Table 6.14-27**
**Radionuclides Detected or Detected above BVs/FVs at SWMUs 03-014(k,l,m,n)**

| Sample ID | Location ID | Depth (ft) | Media | Tritium | Uranium-234 | Uranium-235/236 | Uranium-238 |
|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **na**[b] | **1.98** | **0.09** | **1.93** |
| **Soil BV**[a] | | | | **na** | **2.59** | **0.2** | **2.29** |
| **Residential SAL**[c] | | | | **750** | **170** | **17** | **87** |
| **Industrial SAL**[c] | | | | **440000** | **1500** | **87** | **430** |
| **Construction Worker SAL**[c] | | | | **320000** | **220** | **43** | **160** |
| 0103-97-0016 | 03-03265 | 2.67-3.67 | QBT4 | 0.04 | —[d] | — | — |
| RE03-09-13727 | 03-608270 | 3.0–4.0 | Qbt3 | 0.100773 | — | — | — |
| RE03-09-13728 | 03-608270 | 8.0–9.0 | Qbt3 | 0.213256 | — | — | — |
| RE03-09-13733 | 03-608272 | 3.0–4.0 | Qbt3 | 0.0129915 | — | — | — |
| RE03-09-13734 | 03-608272 | 8.0–9.0 | Qbt3 | 0.0163383 | — | — | — |
| RE03-09-13729 | 03-608273 | 0.0–1.0 | Soil | 0.0567635 | 4.72 | 0.237 | 2.94 |
| RE03-09-13730 | 03-608273 | 3.0–4.0 | Qbt3 | 0.0343154 | — | — | — |

Note: All activities are in pCi/g.

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

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or detected above BV/FV.

**Table 6.14-28**
**Samples Collected and Analyses Requested at SWMU 03-014(o)**

| Sample ID | Locati ID | Depth (ft) | Media | Americium-241 | Tritium | Isotopic Plutonium | Isotopic Uranium | Metals | Nitrate | PCBs | Perchlorate | Pesticides | Strontium 90 | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0103-97-0024 | 03-03203 | 0.0–0.5 | Fill | —* | — | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0025 | 03-03203 | 1.5–2.5 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0026 | 03-03203 | 2.5–3.5 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | 3444R | — |
| 0103-97-0027 | 03-03204 | 0.0–0.83 | Fill | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0028 | 03-03204 | 1.75–2.75 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0029 | 03-03204 | 2.75–3.75 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | 3444R | — |
| RE03-09-13754 | 03-03204 | 3.0–4.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-09-13755 | 03-03204 | 5.0–6.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| 0103-97-0030 | 03-03205 | 0.0–0.75 | Fill | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0031 | 03-03205 | 1.25–2.25 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | — | — |
| 0103-97-0032 | 03-03205 | 2.25–3.25 | Qbt4 | — | 3446R | 3446R | 3446R | 3445R | — | 3444R | — | 3444R | 3446R | 3444R | — | 3444R | — |
| RE03-09-13752 | 03-608275 | 3.0–4.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-10-5525 | 03-608275 | 3.0–4.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-09-13753 | 03-608275 | 5.0–6.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-09-13756 | 03-608276 | 3.0–4.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-09-13757 | 03-608276 | 5.0–6.0 | Qbt3 | — | — | — | — | 10-887 | — | 10-887 | — | — | — | — | — | — | 10-887 |
| RE03-09-13758 | 03-608277 | 0.0–1.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13759 | 03-608277 | 1.0–2.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13760 | 03-608277 | 4.0–5.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13761 | 03-608277 | 6.0–7.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13762 | 03-608278 | 0.0–1.0 | Soil | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13763 | 03-608278 | 1.0–2.0 | Soil | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13764 | 03-608278 | 4.0–5.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13765 | 03-608278 | 6.0–7.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13768 | 03-608279 | 0.0–1.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13769 | 03-608279 | 1.0–2.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13772 | 03-608279 | 4.0–5.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-10-5897 | 03-608279 | 6.0–7.0 | Qbt3 | 10-546 | 10-546 | 10-546 | — | 10-546 | 10-546 | 10-546 | 10-546 | — | 10-546 | 10-546 | 10-546 | 10-546 | 10-546 |
| RE03-09-13766 | 03-608280 | 0.0–1.0 | Soil | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13767 | 03-608280 | 1.0–2.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13771 | 03-608280 | 4.0–5.0 | Qbt3 | 10-518 | 10-518 | 10-518 | — | 10-517 | 10-517 | 10-516 | 10-517 | — | 10-518 | 10-516 | 10-516 | 10-516 | 10-517 |
| RE03-09-13770 | 03-608280 | 6.0–7.0 | Qbt3 | 10-546 | 10-546 | 10-546 | — | 10-546 | 10-546 | 10-546 | 10-546 | — | 10-546 | 10-546 | 10-546 | 10-546 | 10-546 |

*— = Analyses not requested.

**Table 6.14-29**
**Inorganic Chemicals above BVs at SWMU 03-014(o)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Copper | Cyanide (Total) | Lead | Mercury | Nickel | Nitrate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **7.14** | **4.66** | **0.5** | **11.2** | **0.1** | **6.58** | **na[b]** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **19.3** | **14.7** | **0.5** | **22.3** | **0.1** | **9.38** | **na** | **0.3** | **1** | **60.2** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.09E+02** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| 0103-97-0024 | 03-03203 | 0.0–0.5 | Fill | 4.31 (U) | 0.627 | 40.6 (J+) | 46.8 | NA[g] | —[h] | 1.5 | — | NA | — | 19.7 | 53.7 |
| 0103-97-0025 | 03-03203 | 1.5–2.5 | Qbt4 | 3.82 (U) | — | 12.8 (J+) | 5.04 | NA | — | — | 6.7 | NA | — | 1.34 | — |
| 0103-97-0026 | 03-03203 | 2.5–3.5 | Qbt4 | 4.79 (U) | — | 9.88 (J+) | — | NA | — | — | — | NA | — | — | — |
| 0103-97-0027 | 03-03204 | 0.0–0.83 | Fill | 5.38 (U) | 0.538 (U) | — | 18.5 | NA[d] | — | 0.22 | — | NA | — | 6.48 | — |
| 0103-97-0028 | 03-03204 | 1.75–2.75 | Qbt4 | 4.86 (U) | — | — | — | NA | — | — | — | NA | — | — | — |
| 0103-97-0029 | 03-03204 | 2.75–3.75 | Qbt4 | 5.09 (U) | — | 12 (J+) | — | NA | — | — | — | NA | — | — | — |
| RE03-09-13754 | 03-03204 | 3.0–4.0 | Qbt3 | 1.1 (U) | — | — | — | — | — | — | — | NA | 1.08 (U) | — | — |
| RE03-09-13755 | 03-03204 | 5.0–6.0 | Qbt3 | 1.1 (U) | — | — | — | — | — | — | — | NA | 1.08 (U) | — | — |
| 0103-97-0030 | 03-03205 | 0.0–0.75 | Fill | 4.96 (U) | 2.5 | 136 (J+) | 122 | NA | 45.1 | 3.8 | — | NA | — | 71.3 | 131 |
| 0103-97-0031 | 03-03205 | 1.25–2.25 | Qbt4 | 4.94 (U) | — | 25 (J+) | — | NA | — | — | 11.4 | NA | — | 1.13 | — |
| 0103-97-0032 | 03-03205 | 2.25–3.25 | Qbt4 | 4.62 (U) | — | 19.2 (J+) | — | NA | — | — | 10.1 | NA | — | — | — |
| RE03-09-13752 | 03-608275 | 3.0–4.0 | Qbt3 | 1.06 (U) | — | — | — | — | — | — | — | NA | 1.07 (U) | — | — |
| RE03-09-13753 | 03-608275 | 5.0–6.0 | Qbt3 | 1.07 (U) | — | — | — | — | — | — | — | NA | 1.09 (U) | — | — |
| RE03-09-13756 | 03-608276 | 3.0–4.0 | Qbt3 | 1.06 (U) | — | — | 6.47 | — | — | — | — | NA | 1.06 (U) | — | — |
| RE03-09-13757 | 03-608276 | 5.0–6.0 | Qbt3 | 1.08 (U) | — | — | — | — | — | — | — | NA | 1.08 (U) | — | — |
| RE03-09-13758 | 03-608277 | 0.0–1.0 | Qbt3 | — | — | — | 5.72 | — | — | — | — | — | 1.06 (U) | 1.55 | — |
| RE03-09-13759 | 03-608277 | 1.0–2.0 | Qbt3 | 1.05 (U) | — | — | — | — | — | — | — | — | 1.06 (U) | — | — |
| RE03-09-13760 | 03-608277 | 4.0–5.0 | Qbt3 | 1.01 (U) | — | — | — | — | — | — | — | — | 1.01 (U) | — | — |
| RE03-09-13761 | 03-608277 | 6.0–7.0 | Qbt3 | 1.04 (U) | — | 9.94 | — | — | — | — | — | — | 1.03 (U) | — | — |
| RE03-09-13762 | 03-608278 | 0.0–1.0 | Soil | 1.06 (U) | 0.532 (U) | — | — | — | — | — | — | — | — | 1.77 | — |
| RE03-09-13763 | 03-608278 | 1.0–2.0 | Soil | 1.03 (U) | 0.513 (U) | — | — | — | — | — | — | — | — | 1.49 | — |
| RE03-09-13764 | 03-608278 | 4.0–5.0 | Qbt3 | 1 (U) | — | 7.56 | 6.92 | — | — | 0.151 | — | — | 1.01 (U) | 2.6 | — |
| RE03-09-13765 | 03-608278 | 6.0–7.0 | Qbt3 | 1 (U) | — | 7.84 | 5.36 | — | — | — | — | — | 1.02 (U) | 2.05 | — |
| RE03-09-13768 | 03-608279 | 0.0–1.0 | Qbt3 | 1.04 (U) | — | 15.3 | 13.1 | — | — | — | — | — | 1.05 (U) | 1.73 | — |
| RE03-09-13769 | 03-608279 | 1.0–2.0 | Qbt3 | 1.04 (U) | — | — | 5.24 | — | — | — | — | — | 1.02 (U) | — | — |
| RE03-09-13772 | 03-608279 | 4.0–5.0 | Qbt3 | 1.07 (U) | — | — | — | — | 16.9 | — | — | — | 1.06 (U) | — | — |
| RE03-10-5897 | 03-608279 | 6.0–7.0 | Qbt3 | 1.05 (U) | — | 17.6 (J+) | 4.77 (J) | — | 12.1 | — | — | — | 1.06 (U) | — | — |
| RE03-09-13766 | 03-608280 | 0.0–1.0 | Soil | 1.14 (U) | — | — | — | 2.7 | — | 0.13 | — | 3.71 | — | 3.02 | 49 |
| RE03-09-13767 | 03-608280 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | 1.09 (U) | — | — |

**Table 6.14-29 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Copper | Cyanide (Total) | Lead | Mercury | Nickel | Nitrate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **7.14** | **4.66** | **0.5** | **11.2** | **0.1** | **6.58** | **na[b]** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **19.3** | **14.7** | **0.5** | **22.3** | **0.1** | **9.38** | **na** | **0.3** | **1** | **60.2** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **2.30E+01[e]** | **1.56E+03** | **1.25E+05** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **3.10E+02[e]** | **2.27E+04** | **1.82E+06** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.09E+02** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **9.29E+01[f]** | **6.19E+03** | **4.96E+05** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13771 | 03-608280 | 4.0–5.0 | Qbt3 | 1.08 (U) | — | — | — | — | — | — | — | — | 1.09 (U) | — | — |
| RE03-09-13770 | 03-608280 | 6.0–7.0 | Qbt3 | 1.1 (U) | — | 8.78 (J+) | — | — | — | — | — | — | 1.08 (U) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[g] NA = Not analyzed.

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

**Table 6.14-30**
**Organic Chemicals Detected at SWMU 03-014(o)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acenaphthylene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Benzoic Acid | Bis(2-ethylhexyl)phthalate |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+03[b]** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **2.40E+05[c]** | **3.47E+02** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+04[b]** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.50E+06[c]** | **1.37E+03** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+03[b]** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **9.52E+05[d]** | **4.76E+03** |
| 0103-97-0024 | 03-03203 | 0.0–0.5 | Fill | —[e] | — | NA[f] | — | — | — | — | 0.16 (J) | 0.22 (J) | 0.39 | 0.16 (J) | 0.12 (J) | — | — |
| 0103-97-0027 | 03-03204 | 0.0–0.83 | Fill | — | — | NA | — | — | — | — | — | — | — | — | — | — | — |
| 0103-97-0030 | 03-03205 | 0.0–0.75 | Fill | — | 0.036 (J) | NA | 0.057 (J) | — | — | 1.22 | 0.48 | 0.65 | 1.2 | 0.29 (J) | 0.46 | 0.12 (J) | — |
| 0103-97-0032 | 03-03205 | 2.25–3.25 | Qbt4 | — | — | 0.002 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13752 | 03-608275 | 3.0–4.0 | Qbt3 | NA | NA | NA | NA | — | 0.0333 | 0.0395 | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13756 | 03-608276 | 3.0–4.0 | Qbt3 | NA | NA | NA | NA | 0.0188 | 0.0162 | 0.0044 | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13757 | 03-608276 | 5.0–6.0 | Qbt3 | NA | NA | NA | NA | — | 0.0024 (J) | 0.0025 (J) | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13758 | 03-608277 | 0.0–1.0 | Qbt3 | — | — | — | — | — | 0.0119 | 0.0216 | — | — | — | — | — | — | — |
| RE03-09-13759 | 03-608277 | 1.0–2.0 | Qbt3 | — | — | — | — | — | 0.016 | 0.0304 | — | — | — | — | — | — | — |
| RE03-09-13760 | 03-608277 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | 0.002 (J) | — | — | — | — | — | — | — |
| RE03-09-13761 | 03-608277 | 6.0–7.0 | Qbt3 | 0.1 | — | — | — | — | 0.0033 (J) | 0.0041 | — | — | — | — | — | — | — |
| RE03-09-13762 | 03-608278 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0353 | 0.0684 | — | — | — | — | — | — | — |
| RE03-09-13763 | 03-608278 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0356 | 0.0753 | — | — | — | — | — | — | — |
| RE03-09-13764 | 03-608278 | 4.0–5.0 | Qbt3 | — | — | — | — | — | 0.551 | 0.638 | — | — | — | — | — | — | — |
| RE03-09-13765 | 03-608278 | 6.0–7.0 | Qbt3 | — | — | 0.0023 (J) | — | — | 0.048 | 0.0883 | — | — | — | — | — | — | — |
| RE03-09-13768 | 03-608279 | 0.0–1.0 | Qbt3 | — | — | — | — | — | 0.0289 | 0.0536 | — | — | — | — | — | — | — |
| RE03-09-13769 | 03-608279 | 1.0–2.0 | Qbt3 | — | — | — | — | 0.0918 | 0.0465 | 0.0304 | — | — | — | — | — | — | — |
| RE03-09-13772 | 03-608279 | 4.0–5.0 | Qbt3 | — | — | — | — | — | 0.0035 (J) | 0.004 | — | — | — | — | — | — | — |
| RE03-10-5897 | 03-608279 | 6.0–7.0 | Qbt3 | — | — | 0.00257 (J) | — | — | 0.0474 | 0.0535 | — | — | — | — | — | — | 0.0877 (J) |
| RE03-09-13766 | 03-608280 | 0.0–1.0 | Soil | — | — | — | — | — | 0.0229 | 0.0349 | — | — | 0.0152 (J) | — | — | — | — |
| RE03-09-13767 | 03-608280 | 1.0–2.0 | Qbt3 | — | — | — | — | — | 0.0075 | 0.0105 | — | — | — | — | — | — | — |
| RE03-09-13771 | 03-608280 | 4.0–5.0 | Qbt3 | — | — | — | — | — | 0.0053 | 0.0069 | — | — | — | — | — | — | 0.0746 (J) |
| RE03-09-13770 | 03-608280 | 6.0–7.0 | Qbt3 | — | — | — | — | — | — | 0.0016 (J) | — | — | — | — | — | — | — |

**Table 6.14-30 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Carbazole | Chrysene | Dibenz(a,h) anthracene | Fluoranthene | Hexanone[2-] | Indeno(1,2,3-cd) pyrene | Isopropyltoluene [4-] | MCPA | MCPP | Methylene Chloride | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **2.40E+02[g]** | **6.21E+02** | **6.21E-01** | **2.29E+03** | **2.10E+02[c]** | **6.21E+00** | **3.21E+03[h]** | **na[i]** | **na** | **1.99E+02** | **1.83E+03** | **1.72E+03** | **520[j]** |
| **Industrial SSL[a]** | | | | **9.60E+02[g]** | **2.34E+03** | **2.34E+00** | **2.44E+04** | **1.40E+03[c]** | **2.34E+01** | **1.49E+04[h]** | **na** | **na** | **1.09E+03** | **2.05E+04** | **1.83E+04** | **1120[j]** |
| **Construction Worker SSL[a]** | | | | **1.08E+04[k]** | **2.06E+04** | **2.13E+01** | **8.91E+03** | **1.48E+05[l]** | **2.13E+02** | **1.03E+04[h]** | **na** | **na** | **1.06E+04** | **7.15E+03** | **6.68E+03** | **na** |
| 0103-97-0024 | 03-03203 | 0.0–0.5 | Fill | — | 0.25 (J) | — | 0.26 (J) | NA | 0.16 (J) | NA | — | — | NA | 0.036 (J) | 0.23 (J) | NA |
| 0103-97-0027 | 03-03204 | 0.0–0.83 | Fill | — | — | — | — | NA | — | NA | — | 0.993 | NA | — | — | NA |
| 0103-97-0030 | 03-03205 | 0.0–0.75 | Fill | 0.037 (J) | 0.69 | 0.084 (J) | 0.81 | NA | 0.31 (J) | NA | 0.956 | — | NA | 0.29 (J) | 0.74 | NA |
| 0103-97-0032 | 03-03205 | 2.25–3.25 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | NA |
| RE03-09-13752 | 03-608275 | 3.0–4.0 | Qbt3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13756 | 03-608276 | 3.0–4.0 | Qbt3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13757 | 03-608276 | 5.0–6.0 | Qbt3 | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA | NA |
| RE03-09-13758 | 03-608277 | 0.0–1.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.0027 (J) | — | — | — |
| RE03-09-13759 | 03-608277 | 1.0–2.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00339 (J) | — | — | — |
| RE03-09-13760 | 03-608277 | 4.0–5.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.0026 (J) | — | — | — |
| RE03-09-13761 | 03-608277 | 6.0–7.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00315 (J) | — | — | — |
| RE03-09-13762 | 03-608278 | 0.0–1.0 | Soil | NA | — | — | — | — | — | — | NA | NA | 0.00334 (J) | — | — | 3.42 (J) |
| RE03-09-13763 | 03-608278 | 1.0–2.0 | Soil | NA | — | — | — | — | — | — | NA | NA | 0.00251 (J) | — | — | 2.8 (J) |
| RE03-09-13764 | 03-608278 | 4.0–5.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00282 (J) | — | — | 7.79 |
| RE03-09-13765 | 03-608278 | 6.0–7.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | — | — | — | 3.7 (J) |
| RE03-09-13768 | 03-608279 | 0.0–1.0 | Qbt3 | NA | — | — | — | — | — | 0.00037 (J) | NA | NA | 0.00349 (J) | — | — | 3.39 (J) |
| RE03-09-13769 | 03-608279 | 1.0–2.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00311 (J) | — | — | — |
| RE03-09-13772 | 03-608279 | 4.0–5.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00342 (J) | — | — | — |
| RE03-10-5897 | 03-608279 | 6.0–7.0 | Qbt3 | NA | — | — | — | 0.00392 (J) | — | — | NA | NA | — | — | — | 2.98 (J) |
| RE03-09-13766 | 03-608280 | 0.0–1.0 | Soil | NA | — | — | 0.014 (J) | — | — | — | NA | NA | 0.00309 (J) | — | — | 3.4 (J) |
| RE03-09-13767 | 03-608280 | 1.0–2.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00324 (J) | — | — | — |
| RE03-09-13771 | 03-608280 | 4.0–5.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | 0.00323 (J) | — | — | — |
| RE03-09-13770 | 03-608280 | 6.0–7.0 | Qbt3 | NA | — | — | — | — | — | — | NA | NA | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] — = Not detected.

[f] NA = Not analyzed.

[g] SSL from EPA (2007, 099314).

[h] Isopropylbenzene used as a surrogate based on structural similarity.

[i] na = Not available.

[j] Screening guidelines for diesel #2 from NMED (2006, 094614).

[k] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and and equation and parameters from NMED (2009, 108070).

[l] Butanone[2-] used as a surrogate based on structural similarity.

**Table 6.14-31**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 03-014(o)**

| Sample ID | Location ID | Depth (ft) | Media | Plutonium-239/240 | Strontium-90 | Tritium | Uranium-234 |
|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **na** | **na** | **na** | **1.98** |
| **Soil BV[a]** | | | | **0.054** | **1.31** | **na** | **2.59** |
| **Residential SAL[c]** | | | | **33** | **5.7** | **750** | **170** |
| **Industrial SAL[c]** | | | | **210** | **1900** | **440000** | **1500** |
| **Construction Worker SAL[c]** | | | | **36** | **800** | **320000** | **220** |
| 0103-97-0024 | 03-03203 | 0.0–0.5 | Fill | 0.088 | —[d] | NA[e] | — |
| 0103-97-0027 | 03-03204 | 0.0–0.83 | Fill | — | — | 0.286 | — |
| 0103-97-0028 | 03-03204 | 1.75–2.75 | Qbt4 | — | 3.2 | — | — |
| 0103-97-0030 | 03-03205 | 0.0–0.75 | Fill | 0.131 | 8.01 | 2.906 | 2.68 |
| 0103-97-0031 | 03-03205 | 1.25–2.25 | Qbt4 | 0.186 | — | — | — |
| RE03-09-13759 | 03-608277 | 1.0–2.0 | Qbt3 | — | — | 0.0160747 | NA |
| RE03-09-13761 | 03-608277 | 6.0–7.0 | Qbt3 | — | — | 0.0078086 | NA |
| RE03-09-13763 | 03-608278 | 1.0–2.0 | Soil | — | — | 0.00748423 | NA |
| RE03-09-13764 | 03-608278 | 4.0–5.0 | Qbt3 | — | — | 0.00579541 | NA |
| RE03-09-13771 | 03-608280 | 4.0–5.0 | Qbt3 | — | — | 0.0199685 | NA |

Note: All activities are in pCi/g.

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

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

[d] — = Not detected or detected above BV/FV.

[e] Not analyzed.

**Table 6.14-32**
**Samples Collected and Analyses Requested at SWMU 03-014(u)**

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

*— = Analysis not requested

**Table 6.14-33**
**Inorganic Chemicals above BVs at SWMU 03-014(u)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Copper | Cyanide (Total) | Lead | Manganese | Mercury | Nitrate | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **7.14** | **4.66** | **0.5** | **11.2** | **482** | **0.1** | **na[b]** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **19.3** | **14.7** | **0.5** | **22.3** | **671** | **0.1** | **na** | **1.52** | **1** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **2.19E+02[d]** | **3.13E+03** | **1.56E+03** | **4.00E+02** | **1.07E+04** | **2.30E+01[e]** | **1.25E+05** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **2.92E+03[d]** | **4.54E+04** | **2.27E+04** | **8.00E+02** | **1.45E+05** | **3.10E+02[e]** | **1.82E+06** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.09E+02** | **4.49E+02[d]** | **1.24E+04** | **6.19E+03** | **8.00E+02** | **4.63E+02** | **9.29E+01[f]** | **4.96E+05** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-10-5491 | 03-608281 | 0.0–1.0 | Soil | 1.09 (U) | 1.66 | 168 | 224 | —[g] | 116 | — | 1.99 (J) | 4.11 | — | 66.7 | 110 |
| RE03-09-13779 | 03-608281 | 1.0–2.0 | Qbt3 | 1.04 (U) | — | 22.7 | 34.5 | 27.7 | 17.5 | — | 0.272 (J) | — | 1.04 (U) | 9.12 | 73.9 |
| RE03-09-13781 | 03-608282 | 0.0–1.0 | Soil | 1.06 (U) | 0.529 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-10-5490 | 03-608282 | 3.5–4.5 | Qbt3 | 1.03 (U) | — | — | — | — | — | — | — | — | 1.04 (U) | — | — |
| RE03-09-13783 | 03-608283 | 0.0–1.0 | Soil | 1.07 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13799 | 03-608284 | 0.0–1.0 | Soil | 1.08 (U) | — | — | — | — | — | — | 0.145 (J) | — | — | 2.02 | — |
| RE03-09-13800 | 03-608284 | 1.0–2.0 | Qbt3 | 0.994 (U) | — | — | — | 1.1 | 18.7 | — | — | — | 0.992 (U) | — | — |
| RE03-09-13801 | 03-608285 | 0.0–1.0 | Soil | 1.09 (U) | — | — | — | — | — | — | — | — | — | — | 52.9 |
| RE03-09-13802 | 03-608285 | 1.0–2.0 | Soil | 1.12 (U) | 0.561 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13803 | 03-608286 | 0.0–1.0 | Soil | 1.21 (U) | — | — | — | — | — | — | 0.2 | — | — | 2.15 | 91.6 |
| RE03-09-13804 | 03-608286 | 1.0–2.0 | Qbt3 | 1.08 (U) | — | — | — | — | — | 500 | — | — | 1.08 (U) | — | — |
| RE03-09-13805 | 03-608287 | 0.0–1.0 | Soil | 1.12 (U) | 0.561 (U) | — | — | — | — | — | — | — | — | — | 61.7 |
| RE03-09-13806 | 03-608287 | 1.0–2.0 | Qbt3 | 1.13 (U) | — | 7.52 | — | — | 19.2 | — | — | — | 1.14 (U) | — | — |
| RE03-10-5487 | 03-609990 | 0.0–1.0 | Soil | 1.13 (U) | 0.565 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-10-5488 | 03-609990 | 1.0–2.0 | Soil | 1.13 (U) | 0.563 (U) | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.14-34**
**Organic Chemicals Detected at SWMU 03-014(u)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Bis(2-ethylhexyl)phthalate | Chrysene | Dibenz(a,h)anthracene | Diethylphthalate | Fluoranthene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **3.47E+02** | **6.21E+02** | **6.21E-01** | **4.89E+04** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **1.83E+03** | **1.72E+03** | **520[c]** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **1.37E+03** | **2.34E+03** | **2.34E+00** | **5.47E+05** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **2.05E+04** | **1.83E+04** | **1120[c]** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **4.76E+03** | **2.06E+04** | **2.13E+01** | **1.91E+05** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **7.15E+03** | **6.68E+03** | **na[d]** |
| RE03-10-5491 | 03-608281 | 0.0–1.0 | Soil | —[e] | 0.01 (J) | 0.581 | 0.417 | 0.0774 | 0.114 | 0.257 | 0.0968 | 0.341 (J) | 0.121 | 0.0276 (J) | — | 0.159 | 0.0882 | — | 0.0728 | 0.179 | 270 (J) |
| RE03-09-13779 | 03-608281 | 1.0–2.0 | Qbt3 | — | — | 0.0633 | 0.0492 | 0.0225 (J) | 0.0264 (J) | 0.0626 | 0.0266 (J) | 0.0754 (J) | 0.0246 (J) | — | — | 0.0307 (J) | 0.0207 (J) | — | 0.0108 (J) | 0.0297 (J) | 34.4 (J) |
| RE03-09-13781 | 03-608282 | 0.0–1.0 | Soil | — | — | 0.038 | 0.0665 | — | — | — | — | — | — | — | — | — | — | — | — | — | 6.23 (J) |
| RE03-10-5490 | 03-608282 | 3.5–4.5 | Qbt3 | — | — | 0.317 | 0.272 | — | — | — | — | — | — | — | — | — | — | — | — | — | 4.44 (J) |
| RE03-09-13783 | 03-608283 | 0.0–1.0 | Soil | — | — | 0.0106 | 0.0156 | — | 0.016 (J) | 0.0244 (J) | — | — | 0.0141 (J) | — | — | 0.016 (J) | — | 0.00344 (J) | — | 0.0207 (J) | 4.25 (J) |
| RE03-09-13799 | 03-608284 | 0.0–1.0 | Soil | 0.0377 | — | 0.226 | 0.152 | 0.0191 (J) | 0.0183 (J) | 0.0307 (J) | 0.0129 (J) | — | 0.0189 (J) | — | — | 0.0366 | 0.0118 (J) | — | 0.0221 (J) | 0.04 | 125 (J) |
| RE03-09-13800 | 03-608284 | 1.0–2.0 | Qbt3 | — | — | 0.0614 | 0.0464 | 0.0177 (J) | 0.0146 (J) | 0.0247 (J) | — | — | 0.0146 (J) | — | — | 0.0326 (J) | — | — | 0.0237 (J) | 0.03 (J) | 10.6 (J) |
| RE03-09-13801 | 03-608285 | 0.0–1.0 | Soil | — | 0.00842 (J) | 0.17 | 0.134 | 0.0324 (J) | 0.0364 (J) | 0.0657 | 0.0261 (J) | — | 0.0357 (J) | — | — | 0.0739 | 0.0209 (J) | — | 0.0403 | 0.0664 | 14 (J) |
| RE03-09-13802 | 03-608285 | 1.0–2.0 | Soil | — | — | 0.122 | 0.0997 | 0.013 (J) | 0.0114 (J) | 0.0202 (J) | — | — | 0.0123 (J) | — | — | 0.0246 (J) | — | — | 0.0123 (J) | 0.0198 (J) | 9.03 (J) |
| RE03-09-13803 | 03-608286 | 0.0–1.0 | Soil | — | — | 0.279 | 0.262 | — | 0.0361 (J) | 0.0822 | 0.0268 (J) | — | 0.0453 | — | — | 0.0739 | 0.0226 (J) | — | 0.0297 (J) | 0.0746 | 28.7 |
| RE03-09-13804 | 03-608286 | 1.0–2.0 | Qbt3 | — | — | 0.0484 | 0.0438 | — | — | — | — | — | — | — | — | — | — | 0.0035 (J) | — | — | 12.2 |
| RE03-09-13805 | 03-608287 | 0.0–1.0 | Soil | — | — | 0.0733 | 0.0558 | — | 0.0348 (J) | 0.0873 | 0.0388 | — | 0.0639 | — | 0.0916 (J) | 0.0721 | 0.0318 (J) | 0.00241 (J) | 0.0267 (J) | 0.053 | 27 |
| RE03-09-13806 | 03-608287 | 1.0–2.0 | Qbt3 | — | — | 0.0092 | 0.0076 | — | — | 0.0213 (J) | — | — | — | — | — | 0.0169 (J) | — | 0.00331 (J) | — | 0.0118 (J) | 7.27 (J) |
| RE03-10-5487 | 03-609990 | 0.0–1.0 | Soil | — | — | 0.012 | 0.0108 | — | — | — | — | — | — | — | — | — | — | — | — | — | 2.75 (J) |
| RE03-10-5488 | 03-609990 | 1.0–2.0 | Soil | — | — | 0.0019 (J) | 0.0019 (J) | — | — | — | — | — | — | — | — | 0.0132 (J) | — | — | — | 0.013 (J) | 7.27 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] Screening guidelines for diesel #2 from NMED (2006, 094614).

[d] na = Not available.

[e] — = Not detected.

**Table 6.14-35**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 03-014(u)**

| Sample ID | Location ID | Depth (ft) | Media | Plutonium-238 |
|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.023** |
| **Residential SAL**[b] | | | | **37** |
| **Industrial SAL**[b] | | | | **240** |
| **Construction Worker SAL**[b] | | | | **40** |
| RE03-10-5491 | 03-608281 | 0.0–1.0 | Soil | 0.0285 |

Note: All activities are in pCi/g.
[a] BVs from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).

**Table 6.14-36**
**Samples Collected and Analyses Requested at SWMU 03-056(d)**

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

**Table 6.14-37**
**Inorganic Chemicals above BVs at SWMU 03-056(d)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Copper | Cyanide (Total) | Mercury | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **19.3** | **14.7** | **0.5** | **0.1** | **1** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **2.19E+02**[c] | **3.13E+03** | **1.56E+03** | **2.30E+01**[d] | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **2.92E+03**[c] | **4.54E+04** | **2.27E+04** | **3.10E+02**[d] | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **4.49E+02**[c] | **1.24E+04** | **6.19E+03** | **9.29E+01**[e] | **1.55E+03** | **9.29E+04** |
| RE03-09-13811 | 03-608288 | 0.0–1.0 | Soil | 1.07 (U) | 0.533 (U) | —[f] | — | — | — | — | — |
| RE03-09-13812 | 03-608288 | 3.0–4.0 | Soil | 1.07 (U) | — | 22.6 (J+) | 21.8 (J) | 0.554 | 0.161 (J+) | 12 | 52.3 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] SSL for hexavalent chromium.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] — = Not detected or not detected above BV.

**Table 6.14-38**
**Organic Chemicals Detected at SWMU 03-056(d)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | TPH-DRO |
|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.12E+00** | **2.22E+00** | **520**[b] |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** | **1120**[b] |
| **Construction Worker SSL**[a] | | | | **4.36E+00** | **7.58E+01** | **na**[c] |
| RE03-09-13811 | 03-608288 | 0.0–1.0 | Soil | —[d] | 0.0014 (J) | — |
| RE03-09-13812 | 03-608288 | 3.0–4.0 | Soil | 0.0539 | 0.0769 | 3.19 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Screening guidelines for diesel #2 from NMED (2006, 094614).
[c] na = Not available.
[d] — = Not detected.

**Table 6.17-1**
**Samples Collected and Analyses Requested at AOC 03-014(v)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-99-2004 | 03-14227 | 3.0–3.5 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2005 | 03-14227 | 4.0–4.5 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |

**Table 6.17-2**
**Inorganic Chemicals above BVs at AOC 03-014(v)**

| Sample ID | Location ID | Depth (ft) | Media | Cobalt |
|---|---|---|---|---|
| **Soil BV**[a] | | | | **8.64** |
| **Residential SSL**[b] | | | | **2.30E+01** |
| **Industrial SSL**[b] | | | | **3.00E+02** |
| **Construction Worker SSL**[c] | | | | **3.46E+01** |
| RE03-99-2005 | 03-14227 | 4.0–4.5 | Fill | 9 |

Note: All concentrations are in mg/kg.
[a] BVs from LANL (1998, 059730).
[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[c] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table 6.17-3**
**Organic Chemicals Detected at AOC 03-014(v)**

| Sample ID | Location ID | Depth (ft) | Media | TPH-DRO |
|---|---|---|---|---|
| **Residential SSL[a]** | | | | **520[b]** |
| **Industrial SSL[a]** | | | | **1120[b]** |
| **Construction Worker SSL[a]** | | | | **na[c]** |
| RE03-99-2004 | 03-14227 | 3.0–3.5 | Fill | 31 (J-) |
| RE03-99-2005 | 03-14227 | 4.0–4.5 | Fill | 5.7 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Screening guidelines for diesel #2 from NMED (2006, 094614).
[c] na = Not available.

**Table 6.19-1**
**Samples Collected and Analyses Requested at SWMU 03-015 and AOC 03-053**

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

*— = Analyses not requested.

**Table 6.19-2**
**Inorganic Chemicals above BVs at SWMU 03-015 and AOC 03-053**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Chromium | Cobalt | Copper | Lead | Manganese | Mercury | Nickel | Perchlorate | Selenium | Silver | Sodium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Sediment BV[a]** | | | | **0.83** | **127** | **0.4** | **10.5** | **4.73** | **11.2** | **19.7** | **543** | **0.1** | **9.38** | **na[b]** | **0.3** | **1** | **1470** | **19.7** | **60.2** |
| **Soil BV[a]** | | | | **0.83** | **295** | **0.4** | **19.3** | **8.64** | **14.7** | **22.3** | **671** | **0.1** | **15.4** | **na** | **1.52** | **1** | **915** | **39.6** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **4.00E+02** | **1.07E+04** | **2.30E+01[e]** | **1.56E+03** | **5.48E+01** | **3.91E+02** | **3.91E+02** | **na** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **8.00E+02** | **1.45E+05** | **3.10E+02[e]** | **2.27E+04** | **7.95E+02** | **5.68E+03** | **5.68E+03** | **na** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **8.00E+02** | **4.63E+02** | **9.29E+01[f]** | **6.19E+03** | **2.17E+02** | **1.55E+03** | **1.55E+03** | **na** | **1.55E+03** | **9.29E+04** |
| AAB5813 | 03-02004 | 0.0–1.5 | Sed | —[g] | 181 (J-) | — | — | NA[h] | NA | 29.3 (J-) | NA | NA | — | NA | 0.61 (UJ) | — | NA | NA | NA |
| RE03-09-13862 | 03-608289 | 0.0–1.0 | Soil | 1.1 (UJ) | — | 0.551 (U) | — | — | — | — | — | — | 28.7 | — | — | — | — | — | — |
| RE03-09-13863 | 03-608289 | 1.0–2.0 | Soil | 1.08 (UJ) | — | 0.542 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13864 | 03-608290 | 0.0–1.0 | Soil | 1.03 (UJ) | — | — | — | — | — | — | — | — | — | — | — | — | 1350 | — | — |
| RE03-09-13865 | 03-608290 | 1.0–2.0 | Soil | 1.09 (UJ) | — | 0.544 (U) | 19.4 | — | — | — | — | — | — | — | — | — | 3260 | — | — |
| RE03-09-13866 | 03-608291 | 0.0–1.0 | Soil | 1.13 (UJ) | — | — | — | — | — | — | — | — | — | 0.00119 (J) | — | — | — | — | — |
| RE03-09-13867 | 03-608291 | 1.0–2.0 | Soil | 1.09 (UJ) | — | — | — | 26.6 (J) | — | 36 | 1220 | — | — | — | — | — | — | — | — |
| RE03-09-13868 | 03-608292 | 0.0–1.0 | Soil | 1.03 (UJ) | — | — | — | — | — | 23 | — | — | — | — | — | — | — | — | — |
| RE03-09-13869 | 03-608292 | 1.0–2.0 | Soil | 1.19 (UJ) | — | 0.597 (U) | 45.2 | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13870 | 03-608293 | 0.0–1.0 | Soil | 4.32 (J-) | — | 0.57 | — | — | 18.8 | 35.5 | — | 0.211 (J+) | — | 0.000709 (J) | — | 1.36 | — | — | 129 |
| RE03-09-13871 | 03-608293 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | 0.168 (J+) | — | — | — | — | — | — | 57.3 |
| RE03-09-13872 | 03-608294 | 0.0–1.0 | Soil | 1.1 (UJ) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13873 | 03-608294 | 1.0–2.0 | Soil | 1.04 (UJ) | — | — | — | — | — | — | 777 | — | — | — | — | — | — | — | — |
| RE03-09-13874 | 03-608295 | 0.0–1.0 | Soil | 1.03 (UJ) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13875 | 03-608295 | 1.0–2.0 | Soil | 1.09 (UJ) | — | 0.545 (U) | — | 9.62 (J) | — | — | — | — | — | 0.000665 (J) | — | — | — | — | — |
| RE03-09-13876 | 03-608296 | 0.0–1.0 | Soil | 1.03 (UJ) | — | — | — | — | — | 24.3 | 721 | — | — | — | — | — | — | 56.6 | — |
| RE03-09-13877 | 03-608296 | 1.0–2.0 | Soil | 1.11 (UJ) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13878 | 03-608297 | 0.0–1.0 | Soil | 7.39 | — | — | — | — | 17 | 32.8 | — | — | — | — | — | — | — | — | 95.6 |
| RE03-09-13879 | 03-608297 | 1.0–2.0 | Soil | 4.25 | — | 0.619 (U) | 42 | — | — | 197 | — | — | — | — | — | — | — | — | 78.4 |
| RE03-09-13880 | 03-608298 | 2.5–3.5 | Soil | 1.31 (U) | — | 0.654 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 63.1 |
| RE03-09-13881 | 03-608298 | 5.5–6.5 | Soil | 1.19 (U) | — | 0.594 (U) | — | — | — | — | 1320 | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] SSLs from http://www.epa.gov/region09/superfund/prg/index.html.

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

[h] NA = Not analyzed.

**Table 6.19-3**
**Organic Chemicals Detected at SWMU 03-015 and AOC 03-053**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **6.21E+02** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.34E+03** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.31E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **2.06E+04** |
| RE03-09-13862 | 03-608289 | 0.0–1.0 | Soil | —[c] | — | 0.00998 (J) | — | — | 0.0468 | 0.0381 (J) | 0.179 | 0.0293 (J) | — | 0.066 |
| RE03-09-13863 | 03-608289 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | 0.106 | — | — | — |
| RE03-09-13865 | 03-608290 | 1.0–2.0 | Soil | — | — | — | 0.0392 | 0.0255 | — | — | — | — | — | — |
| RE03-09-13866 | 03-608291 | 0.0–1.0 | Soil | 0.0618 | — | 0.108 | — | 0.0174 | 0.193 | 0.169 | 0.352 | 0.114 | — | 0.208 |
| RE03-09-13867 | 03-608291 | 1.0–2.0 | Soil | — | — | 0.0113 (J) | — | 0.0068 | 0.0347 (J) | 0.0215 (J) | 0.141 | 0.0184 (J) | — | 0.0318 (J) |
| RE03-09-13868 | 03-608292 | 0.0–1.0 | Soil | 0.0298 (J) | — | 0.0568 | — | — | 0.156 | 0.143 | 0.335 | 0.107 | — | 0.187 |
| RE03-09-13870 | 03-608293 | 0.0–1.0 | Soil | 0.539 | — | 0.892 | 1.28 | 0.487 | 2.61 | 2.36 | 4.79 | 1.58 | — | 2.85 |
| RE03-09-13871 | 03-608293 | 1.0–2.0 | Soil | 0.0249 (J) | — | 0.0402 | 0.225 | 0.103 | 0.0844 | 0.0789 | 0.229 | 0.0667 | — | 0.0907 |
| RE03-09-13872 | 03-608294 | 0.0–1.0 | Soil | — | — | — | — | — | 0.135 (J) | — | 1.13 | — | — | — |
| RE03-09-13873 | 03-608294 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13874 | 03-608295 | 0.0–1.0 | Soil | — | — | — | — | 0.0018 (J) | — | — | 0.107 | — | — | — |
| RE03-09-13876 | 03-608296 | 0.0–1.0 | Soil | — | — | — | — | 0.0035 (J) | 0.0115 (J) | — | 0.112 | — | — | — |
| RE03-09-13877 | 03-608296 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13878 | 03-608297 | 0.0–1.0 | Soil | 0.0802 | — | 0.178 | — | 0.0513 | 0.441 | 0.382 | 0.698 | — | — | 0.456 |
| RE03-09-13879 | 03-608297 | 1.0–2.0 | Soil | 0.0201 (J) | — | 0.0411 (J) | 0.0187 | 0.0154 | 0.174 | 0.171 | 0.238 | 0.0777 | 0.11 | 0.185 |
| RE03-09-13880 | 03-608298 | 2.5–3.5 | Soil | — | 0.00479 (J) | — | — | — | — | — | — | — | — | — |
| RE03-09-13881 | 03-608298 | 5.5–6.5 | Soil | — | 0.00842 (J) | — | — | — | — | — | — | — | — | — |

**Table 6.19-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03[d]** | **1.99E+02** | **3.10E+02[e]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520[f]** |
| **Industrial SSL[a]** | | | | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04[d]** | **1.09E+03** | **4.10E+03[e]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120[f]** |
| **Construction Worker SSL[a]** | | | | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04[d]** | **1.06E+04** | **1.24E+03[g]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na[h]** |
| RE03-09-13862 | 03-608289 | 0.0–1.0 | Soil | 0.115 | — | — | — | — | — | — | 0.065 | 0.0938 | — | 3.39 (J) |
| RE03-09-13863 | 03-608289 | 1.0–2.0 | Soil | 0.0127 (J) | — | — | — | — | — | — | — | 0.0132 (J) | — | 3.21 (J) |
| RE03-09-13865 | 03-608290 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13866 | 03-608291 | 0.0–1.0 | Soil | 0.513 | 0.0566 | 0.0843 | — | — | 0.0132 (J) | 0.0308 (J) | 0.411 | 0.415 | — | 9.32 |
| RE03-09-13867 | 03-608291 | 1.0–2.0 | Soil | 0.0756 | — | — | — | — | — | — | 0.0493 | 0.0669 | — | 5.06 (J) |
| RE03-09-13868 | 03-608292 | 0.0–1.0 | Soil | 0.408 | 0.0262 (J) | 0.0715 | — | — | — | — | 0.247 | 0.339 | — | 6.05 (J) |
| RE03-09-13870 | 03-608293 | 0.0–1.0 | Soil | 6.75 | 0.508 | 1.22 | — | — | 0.111 (J) | 0.344 (J) | 4.55 | 5.56 | — | 89.8 |
| RE03-09-13871 | 03-608293 | 1.0–2.0 | Soil | 0.23 | 0.0222 (J) | 0.0354 (J) | — | — | — | 0.0174 (J) | 0.187 | 0.2 | — | 8.58 |
| RE03-09-13872 | 03-608294 | 0.0–1.0 | Soil | 0.217 (J) | — | — | 0.00125 | 0.00522 (J) | — | — | 0.124 (J) | 0.204 (J) | — | 271 |
| RE03-09-13873 | 03-608294 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | 24.5 |
| RE03-09-13874 | 03-608295 | 0.0–1.0 | Soil | 0.0165 (J) | — | — | — | — | — | — | — | 0.0134 (J) | — | 3.06 (J) |
| RE03-09-13876 | 03-608296 | 0.0–1.0 | Soil | 0.0187 (J) | — | — | — | — | — | — | — | 0.0164 (J) | — | 11.1 |
| RE03-09-13877 | 03-608296 | 1.0–2.0 | Soil | — | — | — | — | 0.00418 (J) | — | — | — | — | 0.00262 | 13.7 |
| RE03-09-13878 | 03-608297 | 0.0–1.0 | Soil | 0.982 | 0.0779 | 0.196 | — | — | 0.0182 (J) | 0.036 (J) | 0.654 | 0.88 | — | 47 (J) |
| RE03-09-13879 | 03-608297 | 1.0–2.0 | Soil | 0.374 | 0.0175 (J) | 0.113 | — | — | — | 0.0144 (J) | 0.204 | 0.37 | — | 10.3 |
| RE03-09-13880 | 03-608298 | 2.5–3.5 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13881 | 03-608298 | 5.5–6.5 | Soil | — | — | — | — | — | — | — | — | — | — | 3.7 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] Isopropylbenzene used as a surrogate based on structural similarity.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[h] na = Not available.

**Table 6.19-4**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 03-015 and AOC 03-053**

| Sample ID | Location ID | Depth (ft) | Media | Uranium-238 |
|---|---|---|---|---|
| **Soil BV**[a] | | | | **2.29** |
| **Residential SAL**[b] | | | | **87** |
| **Industrial SAL**[b] | | | | **430** |
| **Construction Worker SAL**[b] | | | | **160** |
| RE03-09-13870 | 03-608293 | 0.0–1.0 | Soil | 2.36 |

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

**Table 6.20-1**
**Samples Collected and Analyses Requested at AOC C-03-016**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | SVOCs | TPH-DRO | TPH-GRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|
| RE03-03-52397 | 03-22533 | 1.0–1.5 | Qbt4 | 1885S | —* | 1885S | 1885S | 1885S | 1885S | — |
| RE03-09-13882 | 03-22533 | 4.0–5.0 | Qbt3 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 |
| RE03-09-13883 | 03-22533 | 10.0–11.0 | Qbt3 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 |
| RE03-03-52398 | 03-22533 | 16.0–16.5 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-09-13884 | 03-22533 | 19.0–20.0 | Qbt3 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 | 10-358 |
| RE03-03-52402 | 03-22534 | 4.0–5.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52403 | 03-22534 | 9.5–10.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52405 | 03-22534 | 19.5–20.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |

*— = Analyses not requested.

**Table 6.20-2**
**Inorganic Chemicals above BVs at AOC C-03-016**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Beryllium | Calcium | Chromium | Copper | Iron | Lead | Magnesium | Manganese | Nickel | Selenium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **2.79** | **46** | **1.21** | **2200** | **7.14** | **4.66** | **14,500** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **17** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **1.56E+02** | **na**[c] | **2.19E+02**[d] | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **2.26E+03** | **na** | **2.92E+03**[d] | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **1.44E+02** | **na** | **4.49E+02**[d] | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** |
| RE03-03-52397 | 03-22533 | 1.0–1.5 | Qbt4 | —[e] | — | — | 48 | — | — | — | 9.5 | — | 31.5 | — | 1490 | — | 0.37 (J-) | — |
| RE03-09-13882 | 03-22533 | 4.0–5.0 | Qbt3 | — | 1.15 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.2 (U) | — |
| RE03-09-13883 | 03-22533 | 10.0–11.0 | Qbt3 | — | 1.09 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.13 (U) | — |
| RE03-03-52398 | 03-22533 | 16.0–16.5 | Qbt4 | 24,800 | — | 3.6 | 156 | 4.2 | 9830 (J) | 12 (J-) | 10.8 | 16,400 | 26 | 4980 | — | 10 | 0.69 (J-) | 19.4 |
| RE03-09-13884 | 03-22533 | 19.0–20.0 | Qbt3 | — | 1.16 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.12 (U) | — |
| RE03-03-52402 | 03-22534 | 4.0–5.0 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.39 (J-) | — |
| RE03-03-52403 | 03-22534 | 9.5–10.0 | Qbt4 | — | — | — | — | — | — | — | — | — | 12.6 | — | — | — | 0.48 (J-) | — |
| RE03-03-52405 | 03-22534 | 19.5–20.0 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.38 (J-) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

**Table 6.20-3**
**Organic Chemicals Detected at AOC C-03-016**

| Sample ID | Location ID | Depth (ft) | Media | Bis(2-ethylhexyl) phthalate | TPH-DRO | TPH-GRO |
|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.47E+02** | **520**[b] | **na** |
| **Industrial SSL**[a] | | | | **1.37E+03** | **1120**[b] | **na** |
| **Construction Worker SSL**[a] | | | | **4.76E+03** | **na**[c] | **na** |
| RE03-09-13882 | 03-22533 | 4.0–5.0 | QBT3 | —[d] | — | 0.0196 (J) |
| RE03-09-13883 | 03-22533 | 10.0–11.0 | QBT3 | — | — | 0.0237 (J) |
| RE03-03-52402 | 03-22534 | 4.0–5.0 | QBT4 | 0.15 (J) | 5900 | 390 |
| RE03-03-52403 | 03-22534 | 9.5–10.0 | QBT4 | 0.13 (J) | 7100 | 770 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na = Not available.

[d] — = Not detected.

**Table 6.21-1**
**Samples Collected and Analyses Requested at SWMU 03-021**

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

*— = Analyses not requested.

**Table 6.21-2**
**Inorganic Chemicals above BVs at SWMU 03-021**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Chromium | Cobalt | Copper | Iron | Lead | Manganese | Nickel | Selenium | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **46** | **1.63** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **482** | **6.58** | **0.3** | **1.1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **295** | **0.4** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **671** | **15.4** | **1.52** | **0.73** | **48.8** |
| **Residential SSL[b]** | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **2.19E+02[c]** | **2.30E+01[d]** | **3.13E+03** | **5.48E+04** | **4.00E+02** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **2.92E+03[c]** | **3.00E+02[d]** | **4.54E+04** | **7.95E+05** | **8.00E+02** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **4.49E+02[c]** | **3.46E+01[e]** | **1.24E+04** | **2.17E+05** | **8.00E+02** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **2.04E+01** | **9.29E+04** |
| 0103-97-0241 | 03-03326 | 0.0–1.0 | Soil | —[f] | — | — | — | — | 22.9 | — | 24.7 | — | 24.5 | — | 2.1 (J) | 53 |
| 0103-97-0242 | 03-03327 | 2.0–3.0 | Soil | — | — | — | 28.1 | — | — | — | 84.7 | — | — | — | 2 (J) | — |
| 0103-97-0243 | 03-03327 | 3.0–4.0 | Soil | 0.95 (U) | — | — | 101 | — | — | 33,200 | 33.7 | — | — | — | 1.3 (J) | — |
| 0103-97-0244 | 03-03328 | 3.0–4.0 | Soil | — | — | — | — | — | — | — | 29.7 | — | — | — | — | — |
| 0103-97-0245 | 03-03328 | 4.0–5.0 | Soil | 0.86 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| 0103-97-0246 | 03-03329 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | 31.4 | — | — | — | — | 52.5 |
| 0103-97-0247 | 03-03329 | 3.0–4.0 | Soil | — | — | — | 56.6 | 11.2 | — | — | 358 | — | — | — | — | 193 |
| 0103-97-0248 | 03-03330 | 2.75–3.75 | Soil | — | — | — | — | — | — | — | 103 | — | — | — | — | — |
| 0103-97-0251 | 03-03330 | 3.75–4.25 | Soil | — | — | — | — | — | — | — | 67.1 | — | — | — | — | 49.3 |
| 0103-97-0249 | 03-03331 | 3.0–4.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 49.3 |
| 0103-97-0250 | 03-03331 | 4.0–5.0 | Qbt3 | 0.79 (U) | 63.1 | — | 13.5 | — | — | — | 41.6 | — | 12.5 | 0.63 (U) | — | 74.9 |
| RE03-09-13890 | 03-608299 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13891 | 03-608299 | 1.0–2.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | 1.11 (UJ) | — | — |
| RE03-09-13892 | 03-608300 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13893 | 03-608300 | 1.0–2.0 | Soil | 1.17 (U) | — | 0.587 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13894 | 03-608301 | 0.0–1.0 | Soil | 0.932 (J) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13895 | 03-608301 | 1.0–2.0 | Soil | 1.13 (U) | — | — | — | — | — | — | — | 746 (J-) | — | — | — | 59.9 |
| RE03-09-13896 | 03-608302 | 0.0–1.0 | Soil | 1.15 (U) | — | — | — | — | — | — | — | — | — | — | — | 52.8 |
| RE03-09-13897 | 03-608302 | 1.0–2.0 | Qbt3 | 1.14 (U) | — | — | — | — | — | — | — | — | — | 1.14 (UJ) | — | — |
| RE03-09-13898 | 03-608303 | 0.0–1.0 | Soil | 1.24 | — | — | — | — | — | — | 53.8 | — | — | — | — | 51.9 |
| RE03-09-13899 | 03-608303 | 1.0–2.0 | Soil | 0.991 (J) | — | — | — | — | — | — | 39.3 | — | — | — | — | 51.5 |
| RE03-09-13900 | 03-608304 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13901 | 03-608304 | 1.0–2.0 | Soil | 0.914 (J) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13888 | 03-611943 | 4.0–5.0 | Qbt3 | 1.03 (U) | — | — | 25.7 | — | — | — | — | — | — | 1.07 (U) | — | — |
| RE03-09-13889 | 03-611943 | 5.0–6.0 | Qbt3 | 1.03 (U) | — | — | — | — | — | — | — | — | — | 1.07 (U) | — | — |
| RE03-09-13886 | 03-611944 | 4.0–5.0 | Qbt3 | 1.08 (U) | — | — | — | — | — | — | 36.8 | — | — | 1.14 (U) | — | — |
| RE03-09-13887 | 03-611944 | 5.0–6.0 | Qbt3 | 1.13 (U) | — | — | — | — | — | — | 33.6 | — | — | 1.09 (U) | — | 64 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] SSL for hexavalent chromium.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.21-3**
**Organic Chemicals Detected at SWMU 03-021**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Chrysene | Fluoranthene | Phenanthrene | Pyrene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **6.21E+01** | **6.21E+02** | **2.29E+03** | **1.83E+03** | **1.72E+03** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **2.34E+02** | **2.34E+03** | **2.44E+04** | **2.05E+04** | **1.83E+04** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **2.06E+03** | **2.06E+04** | **8.91E+03** | **7.15E+03** | **6.68E+03** |
| RE03-09-13890 | 03-608299 | 0.0–1.0 | Soil | —[b] | — | 0.0035 (J) | 0.0057 | — | — | — | — | — | 0.0142 (J) | — | 0.0149 (J) |
| RE03-09-13895 | 03-608301 | 1.0–2.0 | Soil | 0.0144 | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13898 | 03-608303 | 0.0–1.0 | Soil | — | 0.0154 (J) | 0.0256 | 0.0178 (J) | 0.044 | 0.0276 (J) | 0.0431 | 0.0183 (J) | 0.0421 | 0.13 | 0.0806 | 0.125 (J) |
| RE03-09-13899 | 03-608303 | 1.0–2.0 | Soil | — | — | 0.0271 | 0.0214 | — | — | — | — | — | — | — | — |
| RE03-09-13900 | 03-608304 | 0.0–1.0 | Soil | — | — | 0.0134 (J) | 0.0144 (J) | — | — | 0.0164 (J) | — | — | 0.0149 (J) | — | 0.0211 (J) |
| RE03-09-13901 | 03-608304 | 1.0–2.0 | Soil | — | — | 0.0492 | 0.0344 | — | — | — | — | — | 0.0176 (J) | 0.0121 (J) | 0.0245 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] — = Not detected.

**Table 6.22-1**
**Samples Collected and Analyses Requested at AOC 03-027**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | TPH-DRO | TPH-GRO | VOCs |
|---|---|---|---|---|---|---|---|---|
| RE03-99-2000 | 03-14225 | 7.0–7.5 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2001 | 03-14225 | 7.5–8.0 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2212 | 03-14225 | 9.0–9.5 | Qbt3 | —* | — | 6108R | — | — |
| RE03-99-2002 | 03-14226 | 7.0–7.5 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2003 | 03-14226 | 7.5–8.0 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2006 | 03-14228 | 7.5–8.0 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2007 | 03-14229 | 7.5–8.0 | Fill | 5825R | 5824R | 5824R | 5824R | 5824R |
| RE03-99-2213 | 03-14230 | 8.5–9.0 | Qbt3 | — | — | 6108R | — | — |
| RE03-99-2214 | 03-14231 | 8.5–9.0 | Qbt3 | — | — | 6108R | — | — |

*— = Analyses not requested.

**Table 6.22-2**
**Inorganic Chemicals above BVs at AOC 03-027**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Beryllium | Iron | Magnesium | Nickel | Sodium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **29,200** | **0.83** | **1.83** | **21,500** | **4610** | **15.4** | **915** | **48.8** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **1.56E+02** | **5.48E+04** | **na**[c] | **1.56E+03** | **na** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **2.26E+03** | **7.95E+05** | **na** | **2.27E+04** | **na** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **1.44E+02** | **2.17E+05** | **na** | **6.19E+03** | **na** | **9.29E+04** |
| RE03-99-2001 | 03-14225 | 7.5–8.0 | Fill | —[d] | 2.8 (U) | — | — | — | — | — | — |
| RE03-99-2003 | 03-14226 | 7.5–8.0 | Fill | — | 3 (U) | — | — | — | — | — | — |
| RE03-99-2006 | 03-14228 | 7.5–8.0 | Fill | — | — | — | — | — | — | — | 49 |
| RE03-99-2007 | 03-14229 | 7.5–8.0 | Fill | 31,000 | 3.1 (U) | 2.5 | 22,000 | 5100 | 22 | 1100 | 54 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] na = Not available.
[d] — = Not detected or not detected above BV.

**Table 6.22-3**
**Organic Chemicals Detected at AOC 03-027**

| Sample ID | Location ID | Depth (ft) | Media | Butanone[2-] | Butylbenzene[n-] | Butylbenzene [sec-] | Isopropylbenzene | Isopropyltoluene [4-] | Propylbenzene[1-] | Tetrachloroethene | TPH-DRO | TPH-GRO | Trimethylbenzene [1,2,4-] | Trimethylbenzene [1,3,5-] | Xylene (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.96E+04** | **1.40E+02**[b] | **1.10E+02**[b] | **3.21E+03** | **3.21E+03**[c] | **3.40E+03**[d] | **6.99E+00** | **520**[e] | **na**[f] | **6.20E+01**[d] | **7.80E+02**[d] | **1.09E+03** |
| **Industrial SSL**[a] | | | | **3.69E+05** | **6.10E+02**[b] | **4.50E+02**[b] | **1.49E+04** | **1.49E+04**[c] | **2.10E+04**[d] | **3.64E+01** | **1120**[e] | **na** | **2.60E+02**[d] | **1.00E+04**[d] | **3.61E+03** |
| **Construction Worker SSL**[a] | | | | **1.48E+05** | **2.01E+04**[g] | **1.80E+04**[g] | **1.03E+04** | **1.03E+04**[c] | **2.01E+04**[h] | **3.38E+02** | **na** | **na** | **6.88E+02**[h] | **3.10E+03**[h] | **3.13E+03** |
| RE03-99-2000 | 03-14225 | 7.0–7.5 | Fill | 0.0027 (J) | 0.00071 (J) | 0.00035 (J) | —[i] | 0.00043 (J) | 0.00064 (J) | — | 160 (J-) | 0.048 (J) | 0.0042 (J) | 0.0036 (J) | 0.001 (J) |
| RE03-99-2001 | 03-14225 | 7.5–8.0 | Fill | — | 0.0011 (J) | 0.00068 (J) | 0.00021 (J) | 0.00076 (J) | 0.00087 (J) | — | 240 (J-) | 0.17 (J-) | 0.0033 (J) | 0.0046 (J) | 0.001 (J) |
| RE03-99-2212 | 03-14225 | 9.0–9.5 | Qbt3 | NA[j] | NA | NA | NA | NA | NA | NA | 1.8 (J) | NA | NA | NA | NA |
| RE03-99-2002 | 03-14226 | 7.0–7.5 | Fill | — | 0.0003 (J) | — | — | — | — | 0.00057 (J) | 14 | — | 0.0018 (J) | 0.0011 (J) | — |
| RE03-99-2003 | 03-14226 | 7.5–8.0 | Fill | — | — | — | — | — | — | — | 27 (J-) | 0.038 (J-) | 0.00044 (J) | — | — |
| RE03-99-2006 | 03-14228 | 7.5–8.0 | Fill | — | — | — | — | — | — | — | 5.5 | — | — | — | — |
| RE03-99-2213 | 03-14230 | 8.5–9.0 | Qbt3 | NA | NA | NA | NA | NA | NA | NA | 3.6 (J) | NA | NA | NA | NA |
| RE03-99-2214 | 03-14231 | 8.5–9.0 | Qbt3 | NA | NA | NA | NA | NA | NA | NA | 3 (J) | NA | NA | NA | NA |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070) unless otherwise noted.
[b] SSL from EPA (2007, 099314).
[c] Isopropylbenzene used as a surrogate based on structural similarity.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] Screening guidelines for diesel #2 from NMED (2006, 094614).
[f] na = Not available.
[g] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).
[h] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[i] — = Not detected.
[j] NA = Not analyzed.

**Table 6.23-1**
**Samples Collected and Analyses Requested at AOC 03-036(b)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | SVOCs | TPH-DRO | TPH-GRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|
| RE03-03-52377 | 03-22529 | 11.0–11.5 | Qbt4 | 1885S | —* | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52378 | 03-22529 | 14.5–15.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52379 | 03-22529 | 19.5–20.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52382 | 03-22530 | 10.0–11.0 | Soil | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52383 | 03-22530 | 14.5–15.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-03-52384 | 03-22530 | 19.5–20.0 | Qbt4 | 1885S | — | 1885S | 1885S | 1885S | 1885S | — |
| RE03-09-13902 | 03-608305 | 14.0–15.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |
| RE03-09-13903 | 03-608305 | 19.0–30.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |
| RE03-09-13904 | 03-608305 | 24.0–25.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |
| RE03-09-13905 | 03-608306 | 14.0–15.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |
| RE03-09-13906 | 03-608306 | 19.0–20.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |
| RE03-09-13907 | 03-608306 | 24.0–25.0 | Qbt3 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 | 10-341 |

*— = Analyses not requested.

**Table 6.23-2**
**Inorganic Chemicals above BVs at AOC 03-036(b)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Beryllium | Calcium | Copper | Lead | Manganese | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **46** | **1.21** | **2200** | **4.66** | **11.2** | **482** | **0.3** | **63.5** |
| **Residential SSL[b]** | | | | **3.13E+01** | **1.56E+04** | **1.56E+02** | **na[c]** | **3.13E+03** | **4.00E+02** | **1.07E+04** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **4.54E+02** | **2.24E+05** | **2.26E+03** | **na** | **4.54E+04** | **8.00E+02** | **1.45E+05** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **1.24E+02** | **4.35E+03** | **1.44E+02** | **na** | **1.24E+04** | **8.00E+02** | **4.63E+02** | **1.55E+03** | **9.29E+04** |
| RE03-03-52377 | 03-22529 | 11.0–11.5 | Qbt4 | —[d] | 66.4 | — | 4500 | 5.9 | 27.3 | — | 0.59 (J-) | — |
| RE03-03-52378 | 03-22529 | 14.5–15.0 | Qbt4 | — | — | — | — | — | — | — | 0.35 (J-) | 64.5 |
| RE03-03-52379 | 03-22529 | 19.5–20.0 | Qbt4 | — | — | — | — | — | — | — | 0.39 (J-) | — |
| RE03-03-52383 | 03-22530 | 14.5–15.0 | Qbt4 | — | — | — | — | — | 21 | — | 1.2 (J-) | — |
| RE03-03-52384 | 03-22530 | 19.5–20.0 | Qbt4 | — | — | 1.3 | — | — | 11.3 | — | 0.54 (J-) | — |
| RE03-09-13902 | 03-608305 | 14.0–15.0 | Qbt3 | 1.12 (U) | — | — | 6250 | 5.34 | — | — | 1.14 (U) | — |
| RE03-09-13903 | 03-608305 | 19.0–30.0 | Qbt3 | 1.2 (U) | 46.7 | — | — | — | 11.7 | 533 | 1.2 (U) | — |
| RE03-09-13904 | 03-608305 | 24.0–25.0 | Qbt3 | 1.13 (U) | — | — | — | — | — | — | 1.1 (U) | — |
| RE03-09-13905 | 03-608306 | 14.0–15.0 | Qbt3 | 0.537 (J) | — | — | — | — | — | — | 1.15 (U) | — |
| RE03-09-13906 | 03-608306 | 19.0–20.0 | Qbt3 | 1.15 (U) | — | — | — | — | — | — | 1.14 (U) | — |
| RE03-09-13907 | 03-608306 | 24.0–25.0 | Qbt3 | 1.08 (U) | — | — | — | — | — | — | 1.04 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

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

**Table 6.23-3**
**Organic Chemicals Detected at AOC 03-036(b)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Isopropyltoluene[4-] | Methylene Chloride | Methylnaphthalene[2-] | Phenanthrene | Tetrachloroethene | TPH-DRO | TPH-GRO | Trimethylbenzene[1,2,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **3.21E+03[b]** | **1.99E+02** | **3.10E+02[c]** | **1.83E+03** | **6.99E+00** | **520[d]** | **na[e]** | **6.20E+01[c]** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **1.49E+04[b]** | **1.09E+03** | **4.10E+03[c]** | **2.05E+04** | **3.64E+01** | **1120[d]** | **na** | **2.60E+02[c]** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **1.03E+04[b]** | **1.06E+04** | **1.24E+03[e]** | **7.15E+03** | **3.38E+02** | **na** | **na** | **6.88E+02[f]** |
| RE03-03-52377 | 03-22529 | 11.0–11.5 | Qbt4 | —[g] | — | — | 0.61 | 0.092 (J) | — | 46 | 0.38 | — |
| RE03-03-52378 | 03-22529 | 14.5–15.0 | Qbt4 | — | — | — | — | — | — | — | 0.23 | — |
| RE03-03-52379 | 03-22529 | 19.5–20.0 | Qbt4 | — | — | — | — | — | — | — | 0.64 | — |
| RE03-03-52382 | 03-22530 | 10.0–11.0 | Soil | — | — | — | — | — | 0.00075 (J) | — | 0.18 | 0.0013 (J) |
| RE03-03-52383 | 03-22530 | 14.5–15.0 | Qbt4 | — | — | — | 0.092 (J) | — | — | 51 | 0.47 | — |
| RE03-03-52384 | 03-22530 | 19.5–20.0 | Qbt4 | 0.0026 (J) | — | — | — | — | — | — | 0.18 | — |
| RE03-09-13902 | 03-608305 | 14.0–15.0 | Qbt3 | — | — | 0.00268 (J) | — | — | — | — | — | — |
| RE03-09-13903 | 03-608305 | 19.0–30.0 | Qbt3 | — | — | 0.00263 (J) | — | — | — | — | 0.0176 (J) | — |
| RE03-09-13905 | 03-608306 | 14.0–15.0 | Qbt3 | 0.00432 (J) | 0.00527 | — | — | — | — | 2.69 (J) | 0.168 | 0.000474 (J) |
| RE03-09-13906 | 03-608306 | 19.0–20.0 | Qbt3 | — | — | — | — | — | — | — | 0.0969 | — |
| RE03-09-13907 | 03-608306 | 24.0–25.0 | Qbt3 | — | — | — | — | — | — | — | 0.0142 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Isopropylbenzene used as a surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] na = Not available.

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[g] — = Not detected.

**Table 6.25-1**
**Samples Collected and Analyses Requested at AOC 03-038(c)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | Cyanide (Total) |
|---|---|---|---|---|---|---|
| RE03-09-13908 | 03-608307 | 0.0–1.0 | Soil | 10-649 | —* | 10-649 |
| RE03-09-13909 | 03-608307 | 1.0–2.0 | Soil | 10-649 | — | 10-649 |
| RE03-09-13910 | 03-608308 | 0.0–1.0 | Soil | 10-649 | 10-649 | 10-649 |
| RE03-09-13911 | 03-608308 | 1.0–2.0 | Soil | 10-649 | 10-649 | 10-649 |
| RE03-09-13912 | 03-608309 | 0.0–1.0 | Soil | 10-649 | — | 10-649 |
| RE03-09-13913 | 03-608309 | 1.0–2.0 | Soil | 10-649 | — | 10-649 |

*— = Analyses not requested.

**Table 6.25-2**
**Inorganic Chemicals above BVs at AOC 03-038(c)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Cobalt | Lead | Manganese | Silver | Sodium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **19.3** | **8.64** | **22.3** | **671** | **1** | **915** | **39.6** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **2.19E+02**[c] | **2.30E+01**[d] | **4.00E+02** | **1.07E+04** | **3.91E+02** | **na**[e] | **3.91E+02** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **2.92E+03**[c] | **3.00E+02**[d] | **8.00E+02** | **1.45E+05** | **5.68E+03** | **na** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **4.49E+02**[c] | **3.46E+01**[f] | **8.00E+02** | **4.63E+02** | **1.55E+03** | **na** | **1.55E+03** |
| RE03-09-13908 | 03-608307 | 0.0–1.0 | Soil | 1.1 (UJ) | 0.551 (U) | —[g] | 37.8 (J-) | 42.6 (J-) | 3280 (J) | 1.17 | — | 47.3 |
| RE03-09-13909 | 03-608307 | 1.0–2.0 | Soil | 1.07 (UJ) | 0.536 (U) | — | — | — | — | — | — | — |
| RE03-09-13910 | 03-608308 | 0.0–1.0 | Soil | 1.08 (UJ) | 0.539 (U) | — | — | 83.7 (J-) | — | — | — | — |
| RE03-09-13911 | 03-608308 | 1.0–2.0 | Soil | 1.13 (UJ) | — | 22.2 | — | 58.6 (J) | — | — | — | — |
| RE03-09-13912 | 03-608309 | 0.0–1.0 | Soil | 1.12 (UJ) | — | — | — | — | — | — | 969 | — |
| RE03-09-13913 | 03-608309 | 1.0–2.0 | Soil | 1.16 (UJ) | 0.58 (U) | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] SSL for hexavalent chromium.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] na =Not available.

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.26-1**
**Samples Collected and Analyses Requested at AOC 03-038(d)**

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

**Table 6.26-2**
**Inorganic Chemicals above BVs at AOC 03-038(d)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Cobalt | Manganese | Nitrate | Thallium |
|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **19.3** | **8.64** | **671** | **na**[b] | **0.73** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **2.19E+02**[d] | **2.30E+01**[e] | **1.07E+04** | **1.25E+05** | **5.16E+00** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **2.92E+03**[d] | **3.00E+02**[e] | **1.45E+05** | **1.82E+06** | **7.49E+01** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **4.49E+02**[d] | **3.46E+01**[f] | **4.63E+02** | **4.96E+05** | **2.04E+01** |
| RE03-09-13914 | 03-608310 | 0.0–1.0 | Soil | 1.04 (J) | —[g] | — | — | — | — | — |
| RE03-09-13915 | 03-608310 | 1.0–2.0 | Soil | 1.51 | — | — | — | — | 2.31 | — |
| RE03-09-13916 | 03-608311 | 0.0–1.0 | Soil | 1.03 | — | 24.7 | — | — | — | — |
| RE03-09-13917 | 03-608311 | 1.0–2.0 | Soil | 1.63 | — | — | 16.4 | 1010 | 2.52 | — |
| RE03-09-13918 | 03-608312 | 0.0–1.0 | Soil | — | 0.572 (U) | — | — | — | — | — |
| RE03-09-13919 | 03-608312 | 1.0–2.0 | Soil | 1.14 (U) | 0.585 (U) | — | — | — | — | — |
| RE03-09-13920 | 03-608313 | 0.0–1.0 | Soil | 1.42 | — | — | — | — | — | — |
| RE03-09-13921 | 03-608313 | 1.0–2.0 | Soil | 1.52 | — | — | — | — | — | — |
| RE03-09-13922 | 03-608314 | 0.0–1.0 | Soil | 1.3 (U) | 0.651 (U) | — | — | — | — | 1.09 |
| RE03-09-13923 | 03-608314 | 1.0–2.0 | Soil | 1.2 (U) | 0.598 (U) | — | — | — | — | — |
| RE03-09-13924 | 03-608315 | 0.0–1.0 | Soil | 1.26 (U) | 0.629 (U) | — | — | — | 1.02 (J+) | — |
| RE03-09-13925 | 03-608315 | 1.0–2.0 | Soil | 1.26 (U) | 0.63 (U) | — | — | — | 1.35 (J+) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070) unless otherwise noted.
[d] SSL for hexavalent chromium.
[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[g] — = Not detected or not detected above BV.

**Table 6.26-3**
**Organic Chemicals Detected at AOC 03-038(d)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **6.21E+02** | **6.21E-01** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.34E+03** | **2.34E+00** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **2.06E+04** | **2.13E+01** |
| RE03-09-13914 | 03-608310 | 0.0–1.0 | Soil | —[c] | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13915 | 03-608310 | 1.0–2.0 | Soil | — | 0.00636 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13916 | 03-608311 | 0.0–1.0 | Soil | — | 0.00329 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13917 | 03-608311 | 1.0–2.0 | Soil | — | 0.00595 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13918 | 03-608312 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13919 | 03-608312 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13920 | 03-608313 | 0.0–1.0 | Soil | 0.0202 (J) | — | 0.0525 | 0.0168 | 0.0052 | 0.0693 | 0.0527 | 0.0687 | 0.025 (J) | 0.0283 (J) | 0.0625 | — |
| RE03-09-13922 | 03-608314 | 0.0–1.0 | Soil | 0.0855 | — | 0.128 | 0.0137 | 0.0171 | 0.217 | 0.215 | 0.262 | 0.131 | 0.115 | 0.241 | 0.0829 |
| RE03-09-13924 | 03-608315 | 0.0–1.0 | Soil | 0.0338 (J) | — | 0.047 | 0.0051 | 0.0069 | 0.0758 | 0.0634 | 0.086 | 0.0395 (J) | — | 0.0724 | 0.0581 |

**Table 6.26-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | Xylene[1,2-] | Xylene[1,3-]+ Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02[d]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **9.55E+03** | **1.09E+03[e]** |
| **Industrial SSL[a]** | | | | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03[f]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **3.15E+04** | **3.61E+03[e]** |
| **Construction Worker SSL[a]** | | | | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03[f]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **2.75E+04** | **3.13E+03[e]** |
| RE03-09-13914 | 03-608310 | 0.0–1.0 | Soil | — | — | — | 0.00498 (J) | — | — | — | — | — | — | — |
| RE03-09-13915 | 03-608310 | 1.0–2.0 | Soil | — | — | — | 0.00598 (J) | — | — | — | — | — | — | — |
| RE03-09-13916 | 03-608311 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | 0.0016 | — | — |
| RE03-09-13917 | 03-608311 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13918 | 03-608312 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | — | 0.000514 (J) | 0.000611 (J) |
| RE03-09-13919 | 03-608312 | 1.0–2.0 | Soil | — | — | — | 0.00622 | — | — | — | — | — | — | — |
| RE03-09-13920 | 03-608313 | 0.0–1.0 | Soil | 0.156 | 0.0228 (J) | 0.0659 | 0.00547 (J) | — | — | 0.151 | 0.127 | — | — | — |
| RE03-09-13922 | 03-608314 | 0.0–1.0 | Soil | 0.609 | 0.074 | 0.156 | — | 0.017 (J) | 0.0391 (J) | 0.523 | 0.644 | — | — | — |
| RE03-09-13924 | 03-608315 | 0.0–1.0 | Soil | 0.215 | 0.0305 (J) | 0.0752 | — | 0.00892 (J) | 0.0233 (J) | 0.196 | 0.206 | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070) unless otherwise noted.
[b] Pyrene used as surrogate based on structural similarity.
[c] — = Not detected.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] Xylenes used as a surrogate based on structural similarity.
[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table 6.26-4**
**Radionuclides Detected or Detected above BVs/FVs at AOC 03-038(d)**

| Sample ID | Location ID | Depth (ft) | Media | Tritium |
|---|---|---|---|---|
| **Soil BV[a]** | | | | **na[b]** |
| **Residential SAL[c]** | | | | **750** |
| **Industrial SAL[c]** | | | | **440000** |
| **Construction Worker SAL[c]** | | | | **320000** |
| RE03-09-13914 | 03-608310 | 0.0–1.0 | Soil | 0.0281121 |
| RE03-09-13915 | 03-608310 | 1.0–2.0 | Soil | 0.0647351 |
| RE03-09-13916 | 03-608311 | 0.0–1.0 | Soil | 0.00909265 |
| RE03-09-13917 | 03-608311 | 1.0–2.0 | Soil | 0.0331976 |

Note: All activities are in pCi/g.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] na = Not available.
[c] SALs for radionuclides from LANL (2009, 107655).

**Table 6.30-1**
**Samples Collected and Analyses Requested at SWMU 03-045(a)**

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

**Table 6.30-2**
**Inorganic Chemicals above BVs at SWMU 03-045(a)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Chromium | Copper | Lead | Mercury | Selenium | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **0.5** | **1.63** | **7.14** | **4.66** | **11.2** | **0.1** | **0.3** | **1** | **63.5** |
| **Soil BV[a]** | | | | **0.83** | **0.4** | **19.3** | **14.7** | **22.3** | **0.1** | **1.52** | **1** | **48.8** |
| **Residential SSL[b]** | | | | **3.13E+01** | **7.79E+01** | **2.19E+02[c]** | **3.13E+03** | **4.00E+02** | **2.30E+01[d]** | **3.91E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **4.54E+02** | **1.12E+03** | **2.92E+03[c]** | **4.54E+04** | **8.00E+02** | **3.10E+02[d]** | **5.68E+03** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **1.24E+02** | **3.09E+02** | **4.49E+02[c]** | **1.24E+04** | **8.00E+02** | **9.29E+01[e]** | **1.55E+03** | **1.55E+03** | **9.29E+04** |
| RE03-09-13932 | 03-608316 | 0–1 | Qbt3 | —[f] | — | — | — | — | — | 1.13 (U) | — | — |
| RE03-09-13933 | 03-608316 | 1–2 | Qbt3 | — | — | 9.71 | — | — | — | 1.12 (U) | — | — |
| RE03-09-13934 | 03-608317 | 0–1 | Soil | 1.22 (U) | — | 88.2 | — | 365 | — | — | — | 161 |
| RE03-09-13935 | 03-608317 | 1–2 | Soil | 1.23 (U) | 0.615 (U) | — | — | 44 | — | — | — | 63.7 |
| RE03-09-13936 | 03-608318 | 0–1 | Qbt3 | 1.22 (U) | — | 26 | — | — | — | 1.23 (U) | — | — |
| RE03-09-13937 | 03-608318 | 1–2 | Qbt3 | 1.29 (U) | — | 27.6 | 5.22 | — | — | 1.32 (U) | — | — |
| RE03-09-13938 | 03-608319 | 0–1 | Soil | — | — | — | 34 | 39.1 | 0.374 | — | 1.76 | 96.8 |
| RE03-09-13939 | 03-608319 | 1–2 | Qbt3 | 1.18 (U) | — | 7.3 | 9.21 | 14.1 | — | 1.17 (U) | — | 65.1 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] SSL for hexavalent chromium.

[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.30-3**
**Organic Chemicals Detected at SWMU 03-045(a)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03**[b] | **6.21E+02** |
| **Industrial SSL**[a] | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04**[b] | **2.34E+03** |
| **Construction Worker SSL**[a] | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03**[b] | **2.06E+04** |
| RE03-09-13932 | 03-608316 | 0–1 | Qbt3 | —[c] | — | — | — | — | — | — | — | — | — |
| RE03-09-13933 | 03-608316 | 1–2 | Qbt3 | — | — | — | — | 0.0018 (J) | — | — | — | — | — |
| RE03-09-13934 | 03-608317 | 0–1 | Soil | 0.954 | — | 1.99 | 0.0444 | 0.0314 (J) | 3.8 | 3.35 | 5.85 | 1.63 | 3.56 |
| RE03-09-13935 | 03-608317 | 1–2 | Soil | — | — | — | 0.0573 | 0.0449 | 0.0869 (J) | 0.0779 (J) | 0.148 (J) | — | — |
| RE03-09-13937 | 03-608318 | 1–2 | Qbt3 | — | — | — | — | 0.0027 (J) | — | — | — | — | — |
| RE03-09-13938 | 03-608319 | 0–1 | Soil | — | 0.00224 (J) | 0.0851 (J) | 0.137 | 0.366 | 0.352 (J) | 0.33 (J) | 0.6 | 0.167 (J) | 0.348 (J) |
| RE03-09-13939 | 03-608319 | 1–2 | Qbt3 | — | — | 0.0324 (J) | 0.0149 (J) | 0.0356 | 0.115 | 0.101 | 0.187 | 0.0501 | 0.104 |

**Table 6.30-3 continued**

| Sample ID | Location ID | Depth (ft) | Media | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Isopropyltoluene[4-] | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO | TPH-GRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03**[d] | **3.10E+02**[e] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520**[f] | **na**[g] |
| **Industrial SSL**[a] | | | | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04**[d] | **4.10E+03**[e] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120**[f] | **na** |
| **Construction Worker SSL**[a] | | | | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04**[d] | **1.24E+03**[h] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na** | **na** |
| RE03-09-13932 | 03-608316 | 0–1 | Qbt3 | — | — | — | — | — | — | — | — | — | 0.0129 (J) |
| RE03-09-13933 | 03-608316 | 1–2 | Qbt3 | — | — | — | — | — | — | — | — | 6.58 (J) | 0.0191 (J) |
| RE03-09-13934 | 03-608317 | 0–1 | Soil | 9.3 | 1.05 | 1.65 | — | 0.173 (J) | 0.72 | 8.26 | 8.32 | 273 | — |
| RE03-09-13935 | 03-608317 | 1–2 | Soil | 0.157 (J) | — | — | — | — | — | 0.102 (J) | 0.163 (J) | 48 (J) | — |
| RE03-09-13937 | 03-608318 | 1–2 | Qbt3 | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13938 | 03-608319 | 0–1 | Soil | 0.671 | — | 0.157 (J) | 0.023 | — | — | 0.394 (J) | 0.721 | 42 | — |
| RE03-09-13939 | 03-608319 | 1–2 | Qbt3 | 0.246 | 0.0178 (J) | 0.0514 | — | — | — | 0.172 | 0.215 | 7.47 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] Isopropylbenzene used as a surrogate based on structural similarity.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] na = Not available.

[h] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table 6.31-1**
**Samples Collected and Analyses Requested at SWMU 03-045(e)**

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

**Table 6.31-2**
**Inorganic Chemicals above BVs at SWMU 03-045(e)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Lead | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **22.3** | **0.73** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **4.00E+02** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **8.00E+02** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **8.00E+02** | **2.04E+01** | **9.29E+04** |
| RE03-09-13940 | 03-608320 | 0.0–1.0 | Soil | 1.09 (U) | 0.543 (U) | 70.7 | —[c] | 54.2 |
| RE03-09-13941 | 03-608320 | 1.0–2.0 | Soil | 1.04 (U) | 0.522 (U) | 99.6 | 1.04 | 54.6 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] — = Not detected or not detected above BV.

**Table 6.31-3**
**Organic Chemicals Detected at SWMU 03-045(e)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(b)fluoranthene | Fluoranthene | Isopropyltoluene[4-] | Phenanthrene | Pyrene | Toluene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.12E+00** | **2.22E+00** | **6.21E+00** | **2.29E+03** | **3.21E+03**[b] | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520**[c] |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.44E+04** | **1.49E+04**[b] | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120**[c] |
| **Construction Worker SSL**[a] | | | | **4.36E+00** | **7.58E+01** | **2.13E+02** | **8.91E+03** | **1.03E+04**[b] | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na**[d] |
| RE03-09-13940 | 03-608320 | 0.0–1.0 | Soil | 0.0024 (J) | 0.0058 | 0.0599 (J) | 0.0814 (J) | —[e] | 0.0589 (J) | 0.0796 (J) | 0.000479 (J) | 300 |
| RE03-09-13941 | 03-608320 | 1.0–2.0 | Soil | — | — | — | 0.239 (J) | 0.00173 | 0.251 (J) | 0.288 (J) | — | 3250 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Isopropylbenzene used as a surrogate based on structural similarity.
[c] Screening guidelines for diesel #2 from NMED (2006, 094614).
[d] na = Not available.
[e] — = Not detected.

**Table 6.32-1**
**Samples Collected and Analyses Requested at SWMU 03-045(f)**

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

**Table 6.32-2**
**Inorganic Chemicals above BVs at SWMU 03-045(f)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony |
|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** |
| **Residential SSL**[b] | | | | **3.13E+01** |
| **Industrial SSL**[b] | | | | **4.54E+02** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** |
| RE03-09-13942 | 03-608321 | 0.0–1.0 | Soil | 0.984 (J) |
| RE03-09-13943 | 03-608321 | 1.0–2.0 | Soil | 1.03 (U) |
| RE03-09-13944 | 03-608322 | 0.0–1.0 | Soil | —[c] |
| RE03-09-13945 | 03-608322 | 1.0–2.0 | Soil | 1.08 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070).
[c] — = Not detected or not detected above BV.

**Table 6.32-3**
**Organic Chemicals Detected at SWMU 03-045(f)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Aroclor-1260 | Fluoranthene | Isopropylbenzene | Isopropyltoluene[4-] | Phenanthrene | Pyrene |
|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **6.75E+04** | **2.22E+00** | **2.29E+03** | **3.21E+03** | **3.21E+03**[b] | **1.83E+03** | **1.72E+03** |
| **Industrial SSL**[a] | | | | **8.51E+05** | **8.26E+00** | **2.44E+04** | **1.49E+04** | **1.49E+04**[b] | **2.05E+04** | **1.83E+04** |
| **Construction Worker SSL**[a] | | | | **2.63E+05** | **7.58E+01** | **8.91+03** | **1.03E+04** | **1.03E+04**[b] | **7.15E+03** | **6.68E+03** |
| RE03-09-13942 | 03-608321 | 0.0–1.0 | Soil | —[c] | 0.0022 (J) | — | — | — | — | — |
| RE03-09-13943 | 03-608321 | 1.0–2.0 | Soil | — | 0.0034 (J) | — | — | — | — | — |
| RE03-09-13944 | 03-608322 | 0.0–1.0 | Soil | 0.00474 (J) | 0.0314 | 0.0257 (J) | — | 0.000364 (J) | 0.0125 (J) | 0.0175 (J) |
| RE03-09-13945 | 03-608322 | 1.0–2.0 | Soil | — | 0.0047 | — | 0.000427 (J) | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Isopropylbenzene used as a surrogate based on structural similarity.
[c] — = Not detected.

**Table 6.33-1**
**Samples Collected and Analyses Requested at SWMU 03-045(h)**

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

*— = Analyses not requested.

**Table 6.33-2**
**Inorganic Chemicals above BVs at SWMU 03-045(h)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Chromium Hexavalent Ion | Cobalt | Copper | Lead | Magnesium | Nickel | Nitrate | Selenium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **29,200** | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **na**[b] | **8.64** | **14.7** | **22.3** | **4610** | **15.4** | **na** | **1.52** | **39.6** |
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **na** | **3.14** | **4.66** | **11.2** | **1690** | **6.58** | **na** | **0.3** | **17** |
| **Residential SSL**[c] | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na** | **2.19E+02**[d] | **2.19E+02** | **2.30E+01**[e] | **3.13E+03** | **4.00E+02** | **na** | **1.56E+03** | **1.25E+05** | **3.91E+02** | **3.91E+02** |
| **Industrial SSL**[c] | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **2.92E+03** | **3.00E+02**[e] | **4.54E+04** | **8.00E+02** | **na** | **2.27E+04** | **1.82E+06** | **5.68E+03** | **5.68E+03** |
| **Construction Worker SSL**[c] | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **4.49E+02** | **3.46E+01**[f] | **1.24E+04** | **8.00E+02** | **na** | **6.19E+03** | **4.96E+05** | **1.55E+03** | **1.55E+03** |
| CAMO-09-6010 | MO-604952 | 0.0–0.5 | Fill | —[g] | 1.13 (UJ) | — | — | 0.567 (U) | — | — | 0.142 (J) | — | — | — | — | — | 1.69 | — | — |
| CAMO-09-6011 | MO-604952 | 6.0–7.0 | Qbt4 | 10,500 | 1.12 (UJ) | 112 | 1.4 | — | 4560 | 15.7 | — | 4.46 | 10.5 | 14 | 2570 | 11.4 | 0.9 (J) | 1.14 (U) | 21.4 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.33-3**
**Organic Chemicals Detected at SWMU 03-045(h)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 | Benzo(b)fluoranthene | Fluoranthene | 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-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.12E+00** | **2.22E+00** | **6.21E+00** | **2.29E+03** | **na**[b] | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.44E+04** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** |
| **Construction Worker SSL**[a] | | | | **4.36E+00** | **7.58E+01** | **2.13E+02** | **8.91E+03** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** |
| CAMO-09-6010 | MO-604952 | 0.0–0.5 | Fill | 0.0193 | 0.0196 | 0.0155 (J) | 0.0236 (J) | 8.45E-05 | 0.000194 | 8.61E-06 | 0.00000103 (J) | 3.32E-05 | 0.000000673 (J) | 0.0000026 (J) | 0.00000139 (J) | 1.91E-05 | 0.00000131 (J) | 0.000000583 (J) |
| CAMO-09-6011 | MO-604952 | 6.0–7.0 | Qbt4 | —[c] | — | — | — | 4.59E-06 | 1.08E-05 | 0.000000152 (J) | — | 4.94E-07 | — | 0.000000298 (J) | — | 1.73E-06 | — | — |

**Table 6.33-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Hexachlorodibenzofuran[1,2,3,7,8,9-] | Hexachlorodibenzofuran[2,3,4,6,7,8-] | 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[1,2,3,7,8-] | Pentachlorodibenzofuran[2,3,4,7,8-] | Pentachlorodibenzofurans (Totals) | Phenanthrene | Pyrene | Tetrachlorodibenzofuran[2,3,7,8-] | Tetrachlorodibenzofurans (Totals) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **1.83E+03** | **1.72E+03** | **na** | **na** |
| **Industrial SSL**[a] | | | | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **2.05E+04** | **1.83E+04** | **na** | **na** |
| **Construction Worker SSL**[a] | | | | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **na** | **7.15E+03** | **6.68E+03** | **na** | **na** |
| CAMO-09-6010 | MO-604952 | 0.0–0.5 | Fill | 0.000000361 (J) | 0.000000784 (J) | 1.68E-05 | 0.00136 (J) | 1.57E-05 | 0.000000407 (J) | 1.92E-06 | 0.000000194 (J) | 0.000000495 (J) | 5.05E-06 | 0.0148 (J) | 0.0187 (J) | 0.000000588 (J) | 4.42E-06 |
| CAMO-09-6011 | MO-604952 | 6.0–7.0 | Qbt4 | — | — | 4.61E-07 | 0.000047 (J) | 0.000000334 (J) | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070).

[b] na = Not available.

[c] — = Not detected.

**Table 6.35-1**
**Samples Collected and Analyses Requested at AOC 03-047(g)**

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

**Table 6.35-2**
**Inorganic Chemicals above BVs at AOC 03-047(g)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Lead | Nitrate | Zinc |
|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **22.3** | **na**[b] | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **4.00E+02** | **1.25E+05** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **8.00E+02** | **1.82E+06** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **8.00E+02** | **4.96E+05** | **9.29E+04** |
| RE03-09-13946 | 03-608324 | 0.0–1.0 | Soil | 1.07 (U) | 0.537 (U) | —[d] | — | — |
| RE03-09-13947 | 03-608324 | 1.0–2.0 | Soil | 1.25 (U) | 0.624 (U) | 24.9 | 1.56 | 52.2 |
| RE03-09-13948 | 03-608325 | 0.0–1.0 | Soil | 1.08 (U) | 0.538 (U) | — | — | — |
| RE03-09-13949 | 03-608325 | 1.0–2.0 | Soil | 1.3 (U) | 0.648 (U) | 37.4 | 1.43 | 62.3 |
| RE03-09-13950 | 03-608326 | 0.0–1.0 | Soil | 1.1 (U) | 0.551 (U) | — | 1.34 | — |
| RE03-09-13951 | 03-608326 | 1.0–2.0 | Soil | 1.25 (U) | 0.625 (U) | 26.2 | 1.88 | 69 |
| RE03-09-13952 | 03-608327 | 0.0–1.0 | Soil | 1.12 (U) | 0.56 (U) | — | 1.44 | 59.1 |
| RE03-09-13953 | 03-608327 | 1.0–2.0 | Soil | 1.27 (U) | 0.635 (U) | 30.8 | 2.04 | 63.8 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009, 108070).
[d] — = Not detected or not detected above BV.

**Table 6.35-3**
**Organic Chemicals Detected at AOC 03-047(g)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Phenanthrene | Pyrene | Tetrachloroethene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+02** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.83E+03** | **1.72E+03** | **6.99E+00** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+03** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **2.05E+04** | **1.83E+04** | **3.64E+01** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+04** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **7.15E+03** | **6.68E+03** | **3.38E+02** |
| RE03-09-13946 | 03-608324 | 0.0–1.0 | Soil | 0.0241 (J) | —[c] | 0.0448 | — | — | — | 0.198 | 0.191 | 0.405 | 0.112 | 0.207 | 0.437 | 0.0185 (J) | 0.0821 | 0.231 | 0.522 | 0.000572 (J) |
| RE03-09-13948 | 03-608325 | 0.0–1.0 | Soil | — | — | — | — | — | — | — | — | 0.103 | — | — | — | — | — | — | — | — |
| RE03-09-13949 | 03-608325 | 1.0–2.0 | Soil | — | 0.0042 (J) | — | 0.364 | 0.313 | 0.132 | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13950 | 03-608326 | 0.0–1.0 | Soil | — | 0.00208 (J) | — | — | — | — | — | — | — | — | — | 0.0148 (J) | — | — | — | 0.0141 (J) | — |
| RE03-09-13951 | 03-608326 | 1.0–2.0 | Soil | — | 0.00486 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13952 | 03-608327 | 0.0–1.0 | Soil | — | — | — | 0.0674 | 0.126 | 0.241 | 0.0142 (J) | — | — | — | 0.0118 (J) | 0.0248 (J) | — | — | 0.0173 (J) | 0.027 (J) | — |
| RE03-09-13953 | 03-608327 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0036 (J) | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] Pyrene used as surrogate based on structural similarity.
[c] — = Not detected.

**Table 6.36-1**
**Samples Collected and Analyses Requested at AOC 03-051(c)**

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

**Table 6.36-2**
**Inorganic Chemicals above BVs at AOC 03-051(c)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Arsenic | Cadmium | Cobalt | Lead | Manganese | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **8.17** | **0.4** | **8.64** | **22.3** | **671** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **3.90E+00** | **7.79E+01** | **2.30E+01**[c] | **4.00E+02** | **1.07E+04** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.77E+01** | **1.12E+03** | **3.00E+02**[c] | **8.00E+02** | **1.45E+05** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **6.54E+01** | **3.09E+02** | **3.46E+01**[d] | **8.00E+02** | **4.63E+02** | **9.29E+04** |
| RE03-09-13954 | 03-608328 | 2.5–3.5 | Soil | 1.26 (U) | —[e] | 0.628 (U) | — | 25.6 | — | 114 |
| RE03-09-13955 | 03-608328 | 4.5–5.5 | Soil | 1.17 (U) | 8.49 | 0.586 (U) | 10.6 | — | 988 | — |
| RE03-09-13956 | 03-608329 | 2.5–3.5 | Soil | 1.15 (U) | — | 0.574 (U) | — | — | — | — |
| RE03-09-13957 | 03-608329 | 4.5–5.5 | Soil | 1.18 (U) | — | — | 11.2 | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.36-3**
**Organic Chemicals Detected at AOC 03-051(c)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.44E+03** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **1.55E+01** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03**[b] | **6.21E+02** |
| **Industrial SSL**[a] | | | | **3.67E+04** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **8.54E+01** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04**[b] | **2.34E+03** |
| **Construction Worker SSL**[a] | | | | **1.86E+04** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **4.71E+02** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03**[b] | **2.06E+04** |
| RE03-09-13955 | 03-608328 | 4.5–5.5 | Soil | —[c] | — | 0.0091 | 0.0115 | 0.0061 | NA[d] | — | — | — | — | — |
| RE03-09-13956 | 03-608329 | 2.5–3.5 | Soil | 0.178 | 0.383 | — | 0.038 | 0.109 | NA | 1.18 | 1.16 | 1.92 | 0.62 | 1.19 |
| RE03-09-13957 | 03-608329 | 4.5–5.5 | Soil | 0.227 | 0.534 | — | — | 0.0028 (J) | NA | 1.36 | 1.21 | 1.92 | 0.63 | 1.3 |

**Table 6.36-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dibenz(a,h)anthracene | Dibenzofuran | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E-01** | **7.80E+01[e]** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.10E+02[e]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520[f]** |
| **Industrial SSL[a]** | | | | **2.34E+00** | **1.00E+03[e]** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **4.10E+03[e]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120[f]** |
| **Construction Worker SSL[a]** | | | | **2.13E+01** | **2.82E+02[g]** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.24E+03[f]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na[h]** |
| RE03-09-13955 | 03-608328 | 4.5–5.5 | Soil | — | — | — | — | — | — | — | — | — | 2.84 (J) |
| RE03-09-13956 | 03-608329 | 2.5–3.5 | Soil | — | 0.0837 (J) | 2.77 | 0.167 | 0.511 | 0.0378 (J) | 0.101 | 1.68 | 2.51 | 62.9 (J) |
| RE03-09-13957 | 03-608329 | 4.5–5.5 | Soil | 0.168 | 0.115 (J) | 3.03 | 0.229 | 0.545 | 0.0625 | 0.133 | 2.12 | 2.56 | 33.7 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] NA = Not analyzed.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[h] na =Not available.

**Table 6.37-1**
**Samples Collected and Analyses Requested at AOC 03-052(b)**

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

**Table 6.37-1 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Isotopic Uranium | Metals | PCBs | SVOCs | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|
| RE03-09-13973 | 03-608337 | 4.0–5.0 | Soil | — | 10-602 | 10-601 | 10-601 | 10-601 | 10-602 |
| RE03-09-13974 | 03-608338 | 1.0–2.0 | Soil | — | 10-602 | 10-601 | 10-601 | 10-601 | 10-602 |
| RE03-09-13975 | 03-608338 | 4.0–5.0 | Soil | — | 10-602 | 10-601 | 10-601 | 10-601 | 10-602 |
| RE03-09-13978 | 03-608340 | 1.0–2.0 | Soil | — | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-13979 | 03-608340 | 4.0–5.0 | Soil | — | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-13981 | 03-608341 | 1.0–2.0 | Soil | — | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-13980 | 03-608341 | 4.0–5.0 | Soil | — | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-13984 | 03-608343 | 1.0–2.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13985 | 03-608343 | 4.0–5.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13986 | 03-608344 | 1.0–2.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13987 | 03-608344 | 4.0–5.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13988 | 03-608345 | 1.0–2.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13989 | 03-608345 | 4.0–5.0 | Soil | — | 10-758 | 10-757 | 10-757 | 10-757 | 10-758 |
| RE03-09-13990 | 03-608346 | 1.0–2.0 | Soil | — | 10-759 | 10-759 | 10-759 | 10-759 | 10-759 |
| RE03-09-13991 | 03-608346 | 4.0–5.0 | Soil | — | 10-759 | 10-759 | 10-759 | 10-759 | 10-759 |

*— = Analyses not requested.

**Table 6.37-2**
**Inorganic Chemicals above BVs at AOC 03-052(b)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Lead | Magnesium | Manganese | Nickel | Selenium | Silver | Sodium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **0.5** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **1** | **2770** | **17** | **63.5** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **22.3** | **4610** | **671** | **15.4** | **1.52** | **1** | **915** | **39.6** | **48.8** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na[c]** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** | **na** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** | **na** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** | **na** | **1.55E+03** | **9.29E+04** |
| 0103-97-0163 | 03-03285 | 0.0–1.0 | Soil | —[g] | 7.7 (UJ) | — | — | 0.64 (U) | — | — | — | — | — | — | — | — | — | 2.2 (U) | — | — | — |
| 0103-97-0164 | 03-03285 | 2.0–3.0 | Fill | — | 7.6 (UJ) | — | — | 0.63 (U) | — | — | — | — | — | — | — | — | — | 2.2 (U) | — | — | — |
| 0103-97-0165 | 03-03286 | 0.0–1.0 | Fill | — | 6.7 (UJ) | — | — | 0.55 (U) | — | — | — | — | — | — | — | — | — | 1.9 (U) | — | — | — |
| 0103-97-0166 | 03-03286 | 1.0–2.0 | Fill | — | 7.2 (UJ) | — | — | 0.6 (U) | — | — | — | — | 64 (J-) | — | — | — | — | 2.1 (U) | — | — | — |
| RE03-09-13982 | 03-03286 | 7.0–8.0 | Soil | — | 1.2 (U) | — | — | 0.602 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13983 | 03-03286 | 10.0–11.0 | Soil | — | 1.22 (U) | — | — | 0.611 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 0103-97-0167 | 03-03287 | 0.0–1.0 | Fill | — | 7.4 (UJ) | — | — | 0.62 (U) | — | — | — | — | — | — | — | — | — | 2.2 (U) | — | — | 49.8 |
| 0103-97-0168 | 03-03287 | 1.0–2.0 | Fill | — | 7.1 (UJ) | — | — | 0.59 (U) | — | — | — | — | 45 (J-) | — | — | — | — | 2.1 (U) | — | — | — |
| 0103-97-0169 | 03-03288 | 0.0–1.0 | Fill | — | 7.3 (UJ) | — | — | 0.6 (U) | — | — | — | — | — | — | — | — | — | 2.1 (U) | — | — | — |
| 0103-97-0170 | 03-03288 | 1.0–2.0 | Fill | — | 7.5 (UJ) | — | — | 0.62 (U) | — | — | — | — | — | — | — | — | — | 2.2 (U) | — | — | — |
| 0103-97-0175 | 03-03291 | 0.0–1.0 | Soil | — | 6.7 (UJ) | — | — | 0.55 (U) | — | — | 21.5 | — | — | — | — | — | — | 1.9 (U) | — | — | — |
| RE03-09-13976 | 03-03291 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| 0103-97-0176 | 03-03291 | 4.0–5.0 | Soil | — | 7.1 (UJ) | — | — | 0.59 (U) | — | — | 13.7 | — | — | — | 1000 (J+) | 20 | — | 2.1 (U) | — | — | — |
| RE03-09-13977 | 03-03291 | 4.0–5.0 | Soil | — | 1.16 (U) | — | — | 0.58 (U) | — | — | 16.7 | — | 27.9 | — | 1420 | — | — | — | — | — | — |
| RE03-10-12247 | 03-03291 | 7.0–8.0 | Soil | — | 1.14 (U) | — | — | 0.569 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-10-12248 | 03-03291 | 10.0–11.0 | Qbt3 | — | 1.1 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.08 (UJ) | — | — | — | — |
| 0103-97-0177 | 03-03292 | 0.0–0.67 | Fill | — | 5.9 (UJ) | — | — | 0.61 (J) | — | — | — | — | — | — | — | — | — | 1.7 (U) | — | — | 152 |
| RE03-09-13958 | 03-608330 | 3.0–4.0 | Soil | — | 1.32 (U) | — | — | 0.662 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13959 | 03-608330 | 5.0–6.0 | Soil | — | 1.2 (U) | — | — | 0.6 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13960 | 03-608331 | 3.0–4.0 | Qbt3 | — | 1.15 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.15 (U) | — | — | — | — |
| RE03-09-13961 | 03-608331 | 5.0–6.0 | Qbt3 | — | 1.2 (U) | — | — | — | — | — | — | — | — | — | — | — | 1.19 (U) | — | — | — | — |
| RE03-09-13962 | 03-608332 | 1.0–2.0 | Soil | — | 1.14 (U) | — | — | 0.568 (U) | — | 20.7 | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13963 | 03-608332 | 4.0–5.0 | Soil | — | 1.2 (U) | — | — | 0.599 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13964 | 03-608333 | 1.0–2.0 | Soil | — | 1.1 (U) | — | — | 0.548 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13965 | 03-608333 | 4.0–5.0 | Soil | — | 1.08 (U) | — | — | 0.538 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13966 | 03-608334 | 1.0–2.0 | Soil | — | 1.05 (U) | — | — | 0.523 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13967 | 03-608334 | 4.0–5.0 | Qbt3 | 17,000 | 1.21 (U) | 430 (J) | 3.17 | — | 4980 | 8.35 | 5.8 | 6.21 | 11.7 | 2690 (J+) | — | 16.5 (U) | 1.16 (U) | — | — | — | — |
| RE03-09-13968 | 03-608335 | 1.0–2.0 | Soil | — | 1.05 (U) | — | — | 0.525 (U) | — | — | — | — | 25.5 | — | 873 | — | — | — | — | — | — |
| RE03-09-13969 | 03-608335 | 4.0–5.0 | Soil | — | 1.13 (U) | 327 (J) | 2.04 | 0.567 (U) | — | — | 9.23 | — | — | — | 1350 | 16.9 (U) | — | — | — | — | — |

**Table 6.37-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Lead | Magnesium | Manganese | Nickel | Selenium | Silver | Sodium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt3 BV**[a] | | | | **7340** | **0.5** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **1** | **2770** | **17** | **63.5** |
| **Fill/Soil BV**[a] | | | | **29,200** | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **22.3** | **4610** | **671** | **15.4** | **1.52** | **1** | **915** | **39.6** | **48.8** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** | **na** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** | **na** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** | **na** | **1.55E+03** | **9.29E+04** |
| RE03-09-13970 | 03-608336 | 1.0–2.0 | Soil | — | 1.12 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13971 | 03-608336 | 4.0–5.0 | Qbt3 | 13,700 | 1.19 (U) | 161 (J) | 2 | — | 3460 | 8.15 | — | 7.6 | — | 2530 (J+) | — | 15.3 (U) | 1.19 (U) | — | — | 18.3 | — |
| RE03-09-13972 | 03-608337 | 1.0–2.0 | Soil | — | 0.983 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13973 | 03-608337 | 4.0–5.0 | Soil | — | 1 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13974 | 03-608338 | 1.0–2.0 | Soil | — | 1.04 (U) | — | — | 0.518 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13975 | 03-608338 | 4.0–5.0 | Soil | — | 1.17 (U) | 811 (J) | — | 0.583 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13978 | 03-608340 | 1.0–2.0 | Soil | — | 1.19 (UJ) | — | — | 0.594 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13979 | 03-608340 | 4.0–5.0 | Soil | — | 1.28 (UJ) | — | — | 0.642 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13981 | 03-608341 | 1.0–2.0 | Soil | — | 1.24 (UJ) | 312 (J+) | — | 0.621 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13980 | 03-608341 | 4.0–5.0 | Soil | — | 1.22 (UJ) | — | — | 0.61 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13984 | 03-608343 | 1.0–2.0 | Soil | — | 1.17 (U) | — | — | 0.583 (U) | — | — | — | — | — | — | — | — | — | — | 1010 | — | — |
| RE03-09-13985 | 03-608343 | 4.0–5.0 | Soil | — | 1.22 (U) | — | — | 0.611 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13986 | 03-608344 | 1.0–2.0 | Soil | — | 1.12 (U) | — | — | 0.56 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13987 | 03-608344 | 4.0–5.0 | Soil | — | 1.18 (U) | — | — | 0.59 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13988 | 03-608345 | 1.0–2.0 | Soil | — | 1.22 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13989 | 03-608345 | 4.0–5.0 | Soil | — | 1.15 (U) | — | — | 0.575 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13990 | 03-608346 | 1.0–2.0 | Soil | — | 1.2 (U) | — | — | 0.601 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13991 | 03-608346 | 4.0–5.0 | Soil | — | 1.15 (U) | — | — | 0.575 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.37-3**
**Organic Chemicals Detected at AOC 03-052(b)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** |
| RE03-09-13982 | 03-03286 | 7.0–8.0 | Soil | —[c] | 0.00695 (J) | — | — | 0.0139 | 0.0075 | — | — | — | — |
| RE03-09-13983 | 03-03286 | 10.0–11.0 | Soil | — | 0.00306 (J) | — | — | 0.0163 | 0.0089 | — | — | — | — |
| RE03-09-13976 | 03-03291 | 1.0–2.0 | Soil | 0.0345 (J) | — | 0.0538 | — | 0.0167 | 0.0161 | 0.0977 | 0.0719 | 0.231 | — |
| RE03-09-13958 | 03-608330 | 3.0–4.0 | Soil | — | 0.0175 (J) | — | — | 0.0018 (J) | — | — | — | — | — |
| RE03-09-13959 | 03-608330 | 5.0–6.0 | Soil | — | 0.0116 (J) | 0.0106 (J) | — | — | — | — | 0.0651 | 0.0903 | 0.0341 (J) |
| RE03-09-13960 | 03-608331 | 3.0–4.0 | Qbt3 | — | 0.00677 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13961 | 03-608331 | 5.0–6.0 | Qbt3 | — | — | — | — | — | — | 0.0178 (J) | 0.0277 (J) | 0.0462 | 0.0211 (J) |
| RE03-09-13962 | 03-608332 | 1.0–2.0 | Soil | — | — | — | — | 0.0052 | 0.0061 | — | — | — | — |
| RE03-09-13963 | 03-608332 | 4.0–5.0 | Soil | — | 0.0023 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13964 | 03-608333 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0022 (J) | — | — | — | — |
| RE03-09-13965 | 03-608333 | 4.0–5.0 | Soil | — | 0.00254 (J) | — | — | — | 0.0028 (J) | — | — | — | — |
| RE03-09-13966 | 03-608334 | 1.0–2.0 | Soil | — | — | — | — | 0.0029 (J) | 0.0039 | — | — | — | — |
| RE03-09-13967 | 03-608334 | 4.0–5.0 | Qbt3 | — | 0.00206 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13969 | 03-608335 | 4.0–5.0 | Soil | — | 0.00943 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13970 | 03-608336 | 1.0–2.0 | Soil | — | 0.004 (J) | — | — | 0.0028 (J) | 0.0018 (J) | — | — | — | — |
| RE03-09-13971 | 03-608336 | 4.0–5.0 | Qbt3 | — | 0.00361 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13973 | 03-608337 | 4.0–5.0 | Soil | — | 0.00391 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13974 | 03-608338 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0026 (J) | — | — | — | — |
| RE03-09-13975 | 03-608338 | 4.0–5.0 | Soil | — | 0.00226 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13978 | 03-608340 | 1.0–2.0 | Soil | — | — | 0.00867 (J) | — | 0.0274 | 0.0221 | — | 0.021 (J) | 0.037 (J) | 0.0166 (J) |
| RE03-09-13979 | 03-608340 | 4.0–5.0 | Soil | — | 0.00809 | — | — | 0.0026 (J) | — | — | — | — | — |
| RE03-09-13980 | 03-608341 | 4.0–5.0 | Soil | — | 0.0417 | — | — | — | — | — | — | — | — |
| RE03-09-13984 | 03-608343 | 1.0–2.0 | Soil | — | — | — | — | — | 0.0188 | — | — | — | — |
| RE03-09-13985 | 03-608343 | 4.0–5.0 | Soil | — | 0.0186 (J) | — | — | — | 0.0059 | — | — | — | — |
| RE03-09-13986 | 03-608344 | 1.0–2.0 | Soil | — | — | 0.0129 (J) | — | 0.581 | 1.13 | 0.0665 | 0.0355 (J) | 0.186 | 0.0143 (J) |
| RE03-09-13987 | 03-608344 | 4.0–5.0 | Soil | — | 0.0106 (J) | — | 0.36 | 0.306 | 0.17 | — | — | 0.114 | — |
| RE03-09-13988 | 03-608345 | 1.0–2.0 | Soil | — | — | 0.00853 (J) | — | 0.114 | 0.0718 | 0.0455 | 0.0358 (J) | 0.189 | 0.0248 (J) |
| RE03-09-13989 | 03-608345 | 4.0–5.0 | Soil | — | — | — | — | 0.006 | 0.0036 (J) | — | — | — | — |
| RE03-09-13990 | 03-608346 | 1.0–2.0 | Soil | — | — | — | — | — | 0.04 (J) | — | — | — | — |
| RE03-09-13991 | 03-608346 | 4.0–5.0 | Soil | — | 0.00606 (J) | — | — | — | 0.0019 (J) | — | — | — | — |

**Table 6.37-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Benzo(k)fluoranthene | Butanone[2-] | Chrysene | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Isopropyltoluene[4-] | Naphthalene | Phenanthrene | Pyrene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E+01** | **3.96E+04** | **6.21E+02** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03[d]** | **4.50E+01** | **1.83E+03** | **1.72E+03** |
| **Industrial SSL[a]** | | | | **2.34E+02** | **3.69E+05** | **2.34E+03** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04[d]** | **2.52E+02** | **2.05E+04** | **1.83E+04** |
| **Construction Worker SSL[a]** | | | | **2.06E+03** | **1.48E+05** | **2.06E+04** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04[d]** | **7.02E+02** | **7.15E+03** | **6.68E+03** |
| RE03-09-13982 | 03-03286 | 7.0–8.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13983 | 03-03286 | 10.0–11.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13976 | 03-03291 | 1.0–2.0 | Soil | — | — | 0.101 | 0.249 | 0.03 (J) | — | — | 0.0171 (J) | 0.207 | 0.242 |
| RE03-09-13958 | 03-608330 | 3.0–4.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13959 | 03-608330 | 5.0–6.0 | Soil | 0.041 | — | 0.069 | 0.184 | — | 0.15 | — | — | 0.0715 | 0.135 |
| RE03-09-13960 | 03-608331 | 3.0–4.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13961 | 03-608331 | 5.0–6.0 | Qbt3 | 0.0133 (J) | — | 0.0328 (J) | 0.0554 | — | 0.14 | — | — | 0.0171 (J) | 0.0393 (J) |
| RE03-09-13962 | 03-608332 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13963 | 03-608332 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13964 | 03-608333 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13965 | 03-608333 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13966 | 03-608334 | 1.0–2.0 | Soil | — | — | 0.013 (J) | 0.0242 (J) | — | — | — | — | — | 0.0174 (J) |
| RE03-09-13967 | 03-608334 | 4.0–5.0 | Qbt3 | — | — | — | 0.0183 (J) | — | — | — | — | — | 0.0136 (J) |
| RE03-09-13969 | 03-608335 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13970 | 03-608336 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13971 | 03-608336 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13973 | 03-608337 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13974 | 03-608338 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13975 | 03-608338 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13978 | 03-608340 | 1.0–2.0 | Soil | — | — | 0.0239 (J) | 0.0622 | — | 0.0155 (J) | — | — | 0.0339 (J) | 0.0489 |
| RE03-09-13979 | 03-608340 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13980 | 03-608341 | 4.0–5.0 | Soil | — | 0.00798 (J) | — | — | — | — | — | — | — | — |
| RE03-09-13984 | 03-608343 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13985 | 03-608343 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13986 | 03-608344 | 1.0–2.0 | Soil | — | — | 0.0692 | 0.0959 | — | — | — | — | 0.0603 | 0.084 |
| RE03-09-13987 | 03-608344 | 4.0–5.0 | Soil | — | — | — | 0.0144 (J) | — | — | — | — | — | — |
| RE03-09-13988 | 03-608345 | 1.0–2.0 | Soil | — | — | 0.0559 | 0.107 | — | — | — | — | 0.0525 | 0.0965 |
| RE03-09-13989 | 03-608345 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13990 | 03-608346 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — |
| RE03-09-13991 | 03-608346 | 4.0–5.0 | Soil | — | — | — | — | — | — | 0.000817 (J) | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] Isopropylbenzene used as a surrogate based on structural similarity.

**Table 6.38-1**
**Samples Collected and Analyses Requested at SWMU 03-054(c)**

| Sample ID | Location ID | Depth (ft) | Media | Hexavalent Chromium | Metals |
|---|---|---|---|---|---|
| RC03-01-0029 | 03-14470 | 6.0–6.5 | Fill | 9516R | 9516R |
| RC03-01-0031 | 03-14472 | 6.0–6.5 | Fill | 9516R | 9516R |
| RC03-01-0032 | 03-14473 | 5.0–5.5 | Fill | 9516R | 9516R |
| RC03-01-0033 | 03-14474 | 8.0–8.5 | Fill | 9516R | 9516R |
| RC03-01-0034 | 03-14475 | 7.0–7.5 | Soil | 9516R | 9516R |
| RC03-01-0036 | 03-14477 | 2.0–2.5 | Soil | 9516R | 9516R |
| RC03-01-0037 | 03-14478 | 2.0–2.5 | Soil | 9516R | 9516R |
| RC03-01-0038 | 03-14479 | 2.0–2.5 | Soil | 9516R | 9516R |
| RE03-04-53103 | 03-22683 | 0.0–0.5 | Fill | —* | 2039S |
| RE03-04-53104 | 03-22683 | 1.5–2.0 | Fill | — | 2039S |
| RE03-04-53108 | 03-22684 | 0.0–0.5 | Fill | — | 2039S |
| RE03-04-53109 | 03-22684 | 1.5–2.0 | Fill | — | 2039S |
| RE03-04-53110 | 03-22685 | 0.0–0.5 | Fill | — | 2039S |
| RE03-04-53111 | 03-22685 | 1.5–2.0 | Fill | — | 2039S |

*— = Analyses not requested.

**Table 6.38-2**
**Inorganic Chemicals above BVs at SWMU 03-054(c)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Calcium | Lead | Zinc |
|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **6120** | **22.3** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **na**[c] | **4.00E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **na** | **8.00E+02** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **na** | **8.00E+02** | **9.29E+04** |
| RC03-01-0029 | 03-14470 | 6.0–6.5 | Fill | 0.92 (UJ) | —[d] | — | — |
| RC03-01-0031 | 03-14472 | 6.0–6.5 | Fill | 0.86 (UJ) | — | — | — |
| RC03-01-0032 | 03-14473 | 5.0–5.5 | Fill | 0.87 (UJ) | — | — | 51.9 (J) |
| RC03-01-0033 | 03-14474 | 8.0–8.5 | Fill | 0.86 (UJ) | — | — | — |
| RC03-01-0034 | 03-14475 | 7.0–7.5 | Soil | 0.87 (UJ) | — | — | — |
| RC03-01-0036 | 03-14477 | 2.0–2.5 | Soil | 0.9 (UJ) | — | — | — |
| RC03-01-0037 | 03-14478 | 2.0–2.5 | Soil | 0.85 (UJ) | 10,200 | — | — |
| RC03-01-0038 | 03-14479 | 2.0–2.5 | Soil | 0.92 (UJ) | — | 147 | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

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

**Table 6.39-1**
**Samples Collected and Analyses Requested at SWMU 03-056(a)**

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

*— = Analyses not requested.

**Table 6.39-2**
**Inorganic Chemicals above BVs at SWMU 03-056(a)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Cobalt | Lead | Silver | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **8.64** | **22.3** | **1** | **48.8** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **na**[c] | **2.30E+01**[d] | **4.00E+02** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **na** | **3.00E+02**[d] | **8.00E+02** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **na** | **3.46E+01**[e] | **8.00E+02** | **1.55E+03** | **9.29E+04** |
| RC03-01-0041 | 03-14481 | 0.5–1 | Fill | —[f] | — | 7850 (J) | — | — | — | — |
| RC03-01-0042 | 03-14482 | 0.5–1 | Fill | — | — | 6750 (J) | — | — | — | — |
| RC03-01-0043 | 03-14483 | 0.5–1 | Fill | — | — | 11,500 (J) | — | — | 1.6 | 89.8 |
| RC03-01-0044 | 03-14484 | 0.5–1 | Fill | — | — | 10,400 (J) | — | — | — | — |
| RE03-09-13992 | 03-608347 | 0–1 | Soil | 1.06 (U) | 0.531 (U) | 8900 (J) | — | — | — | — |
| RE03-09-13993 | 03-608347 | 1–2 | Soil | 0.901 (J) | 0.55 (U) | — | — | 32.2 | — | 58.2 |
| RE03-09-13994 | 03-608348 | 0–1 | Soil | 1.04 (U) | 0.522 (U) | 6300 (J) | — | — | — | — |
| RE03-09-13995 | 03-608348 | 1–2 | Soil | 1.04 (U) | 0.521 (U) | — | — | — | — | — |
| RE03-09-13996 | 03-608349 | 0–1 | Soil | 0.992 (U) | 0.496 (U) | 9990 (J) | 14.7 | — | — | — |
| RE03-09-13997 | 03-608349 | 1–2 | Soil | 1.05 (U) | 0.527 (U) | — | — | — | — | — |
| RE03-09-13998 | 03-608350 | 0–1 | Soil | 1.12 (U) | 0.562 (U) | — | — | — | — | — |
| RE03-09-13999 | 03-608350 | 1–2 | Soil | 1.17 (U) | 0.584 (U) | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] na = Not available.
[d] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[f] — = Not detected or not detected above BV.

**Table 6.39-3**
**Organic Chemicals Detected at SWMU 03-056(a)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Chrysene | Fluoranthene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **6.21E+02** | **2.29E+03** | **1.83E+03** | **1.72E+03** | **520[b]** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **2.34E+03** | **2.44E+04** | **2.05E+04** | **1.83E+04** | **1120[b]** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **2.06E+04** | **8.91E+03** | **7.15E+03** | **6.68E+03** | **na[c]** |
| RE03-09-13992 | 03-608347 | 0–1 | Soil | —[d] | — | — | — | — | — | — | — | — | — | — | 104 (J+) |
| RE03-09-13993 | 03-608347 | 1–2 | Soil | — | — | 0.0366 | 0.0279 | — | — | — | — | — | — | — | 288 |
| RE03-09-13994 | 03-608348 | 0–1 | Soil | — | — | — | 0.0037 | — | — | — | — | 0.0117 (J) | — | 0.0137 (J) | 8.87 |
| RE03-09-13995 | 03-608348 | 1–2 | Soil | — | — | — | 0.0055 | — | — | — | — | — | — | 0.0113 (J) | 10.1 |
| RE03-09-13996 | 03-608349 | 0–1 | Soil | 0.00241 (J) | 0.0111 (J) | — | — | 0.0218 (J) | 0.0138 (J) | 0.0163 (J) | 0.0175 (J) | 0.0378 | 0.0387 | 0.0398 | 3.08 (J) |
| RE03-09-13997 | 03-608349 | 1–2 | Soil | 0.00196 (J) | — | — | 0.0044 | — | — | — | — | — | — | — | — |
| RE03-09-13998 | 03-608350 | 0–1 | Soil | — | — | 0.003 (J) | 0.0046 | — | — | — | — | 0.012 (J) | — | 0.0118 (J) | — |
| RE03-09-13999 | 03-608350 | 1–2 | Soil | — | — | — | 0.0089 | — | — | — | — | — | — | — | 9.35 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na =Not available.

[d] — = Not detected.

**Table 6.42-1**
**Samples Collected and Analyses Requested at AOC 03-056(k)**

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

**Table 6.42-1 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Americium-241 | Gamma Spectroscopy | Gross Alpha Beta | Isotopic Plutonium | Isotopic Uranium | Metals | PCBs | SVOCs | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0103-97-0173 | 03-03290 | 0.0–1.0 | Fill | — | — | — | — | 3411R | 3410R | — | — | — | — |
| 0103-97-0174 | 03-03290 | 1.0–1.5 | Fill | — | — | — | — | 3411R | 3410R | — | — | — | — |
| RE03-09-14009 | 03-03290 | 3.0–4.0 | Fill | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14010 | 03-03290 | 6.0–7.0 | Fill | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14000 | 03-608351 | 0.0–1.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14001 | 03-608351 | 3.0–4.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14002 | 03-608351 | 6.0–7.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14003 | 03-608352 | 0.0–1.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14004 | 03-608352 | 3.0–4.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14005 | 03-608352 | 6.0–7.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14006 | 03-608353 | 0.0–1.0 | Soil | 10-728 | —[b] | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14007 | 03-608353 | 3.0–4.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14008 | 03-608353 | 6.0–7.0 | Soil | 10-728 | — | — | 10-728 | 10-728 | 10-728 | 10-727 | 10-727 | 10-727 | 10-728 |
| RE03-09-14013 | 03-608354 | 1.0–2.0 | Fill | — | — | — | — | — | — | 10-727 | 10-727 | 10-727 | — |
| RE03-09-14014 | 03-608354 | 3.0–4.0 | Fill | — | — | — | — | — | — | 10-727 | 10-727 | 10-727 | — |
| RE03-09-14015 | 03-608355 | 1.0–2.0 | Fill | — | — | — | — | — | — | 10-727 | 10-727 | 10-727 | — |
| RE03-09-14016 | 03-608355 | 3.0–4.0 | Soil | — | — | — | — | — | — | 10-729 | 10-729 | 10-729 | — |
| RE03-09-14017 | 03-608356 | 1.0–2.0 | Soil | — | — | — | — | — | — | 10-729 | 10-729 | 10-729 | — |
| RE03-09-14018 | 03-608356 | 3.0–4.0 | Soil | — | — | — | — | — | — | 10-729 | 10-729 | 10-729 | — |
| RE03-09-14019 | 03-608357 | 1.0–2.0 | Soil | — | — | — | — | — | — | 10-729 | 10-729 | 10-729 | — |
| RE03-09-14020 | 03-608357 | 3.0–4.0 | Soil | — | — | — | — | — | — | 10-729 | 10-729 | 10-729 | — |

[a] n/a = Not applicable.

[b] — = Analyses not requested.

**Table 6.42-2**
**Inorganic Chemicals above BVs at AOC 03-056(k)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Lead | Manganese | Mercury | Silver |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **22.3** | **671** | **0.1** | **1** |
| **Residential SSL**[b] | | | | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **4.00E+02** | **1.07E+04** | **2.30E+01**[e] | **3.91E+02** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **8.00E+02** | **1.45E+05** | **3.10E+02**[e] | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **8.00E+02** | **4.63E+02** | **9.29E+01**[f] | **1.55E+03** |
| 0103-97-0152 | 03-03281 | 0.5–1.0 | Fill | 7.6 (UJ) | —[g] | — | 0.63 (U) | — | — | — | — | — | — | — | 2.2 (U) |
| 0103-97-0153 | 03-03281 | 1.83–2.83 | Fill | 7.2 (UJ) | — | — | 0.6 (U) | — | — | — | — | — | — | — | 2.1 (U) |
| 0103-97-0155 | 03-03282 | 0.5–1.5 | Fill | 6.4 (UJ) | — | — | 0.53 (U) | — | — | — | — | — | — | — | 1.9 (U) |
| 0103-97-0156 | 03-03282 | 1.5–2.17 | Soil | 7.5 (UJ) | — | — | 0.62 (U) | — | — | — | — | — | — | — | 2.2 (U) |
| 0103-97-0158 | 03-03283 | 0.33–1.25 | Fill | 7.4 (UJ) | — | — | 0.61 (U) | — | — | — | — | — | — | — | 2.2 (U) |
| 0103-97-0161 | 03-03284 | 0.5–1.25 | Fill | 7 (UJ) | — | — | 0.58 (U) | — | — | — | — | — | — | — | 2 (U) |
| 0103-97-0171 | 03-03289 | 0.0–1.0 | Fill | 6.6 (UJ) | — | — | 0.55 (U) | — | — | — | 20.1 | 24.9 (J-) | — | — | 1.9 (U) |
| 0103-97-0172 | 03-03289 | 3.5–4.5 | Soil | 7.4 (UJ) | — | — | 0.61 (U) | — | — | — | — | — | — | — | 2.1 (U) |
| 0103-97-0173 | 03-03290 | 0.0–1.0 | Fill | 6.3 (UJ) | — | — | 0.52 (U) | — | — | — | — | — | — | — | 1.8 (U) |
| 0103-97-0174 | 03-03290 | 1.0–1.5 | Fill | 6.9 (UJ) | — | — | 0.57 (U) | — | — | — | 28.2 | — | — | — | 2 (U) |
| RE03-09-14009 | 03-03290 | 3.0–4.0 | Fill | 1.18 (UJ) | — | — | 0.589 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14010 | 03-03290 | 6.0–7.0 | Fill | 1.17 (UJ) | 296 (J+) | — | 0.585 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14000 | 03-608351 | 0.0–1.0 | Soil | 1.19 (UJ) | — | — | 0.593 (U) | — | — | — | — | — | — | 0.113 (J+) | — |
| RE03-09-14001 | 03-608351 | 3.0–4.0 | Soil | 1.1 (UJ) | — | — | 0.55 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14002 | 03-608351 | 6.0–7.0 | Soil | 1.17 (UJ) | — | 1.92 | 0.585 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14003 | 03-608352 | 0.0–1.0 | Soil | 1.07 (U) | — | — | — | — | — | — | — | — | 1000 (J) | — | — |
| RE03-09-14004 | 03-608352 | 3.0–4.0 | Soil | 1.18 (UJ) | — | — | 0.588 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14005 | 03-608352 | 6.0–7.0 | Soil | 1.15 (UJ) | — | — | 0.574 (U) | 6180 (J) | — | — | — | — | — | — | — |
| RE03-09-14006 | 03-608353 | 0.0–1.0 | Soil | 1.18 (UJ) | — | — | 0.591 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14007 | 03-608353 | 3.0–4.0 | Soil | 1.15 (UJ) | — | — | 0.576 (U) | — | 25.1 (J) | — | — | — | — | — | — |
| RE03-09-14008 | 03-608353 | 6.0–7.0 | Soil | 1.15 (UJ) | — | — | 0.574 (U) | — | — | 15 (J) | — | 33.1 (J) | 1200 (J) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.42-3**
**Organic Chemicals Detected at AOC 03-056(k)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Butanone[2-] | Carbon Disulfide | Chrysene | Dibenz(a,h)anthracene |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E_03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **3.96E+04** | **1.94E+03** | **6.21E+02** | **6.21E-01** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **3.69E+05** | **7.54E+03** | **2.34E+03** | **2.34E+00** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **1.48E+05** | **5.89E+03** | **2.06E+04** | **2.13E+01** |
| 0103-97-0153 | 03-03281 | 1.83–2.83 | Fill | NA[c] | —[d] | NA | NA | NA | NA | NA | NA | NA | 0.006 (J) | 0.004 (J) | NA | NA |
| RE03-09-14011 | 03-03281 | 3.0–4.0 | Soil | — | 0.0924 | — | 0.0021 (J) | 0.0022 (J) | 0.0172 (J) | 0.0143 (J) | 0.0218 (J) | — | 0.0171 (J) | — | 0.0147 (J) | — |
| RE03-09-14012 | 03-03281 | 6.0–7.0 | Fill | — | 0.00606 | — | — | — | 0.0243 (J) | 0.0192 (J) | 0.0312 (J) | — | — | — | 0.0192 (J) | — |
| RE03-09-14009 | 03-03290 | 3.0–4.0 | Fill | — | — | — | 0.0041 | 0.003 (J) | — | — | 0.0161 (J) | — | — | — | — | — |
| RE03-09-14010 | 03-03290 | 6.0–7.0 | Fill | — | — | — | 0.0128 | 0.0063 | — | — | — | — | — | — | — | — |
| RE03-09-14000 | 03-608351 | 0.0–1.0 | Soil | 0.017 (J) | — | 0.0315 (J) | 0.0349 | 0.0212 | 0.0834 | 0.0698 | 0.114 | 0.0478 | — | — | 0.0731 | — |
| RE03-09-14001 | 03-608351 | 3.0–4.0 | Soil | — | 0.00243 (J) | — | — | 0.0015 (J) | — | — | — | — | — | — | — | — |
| RE03-09-14002 | 03-608351 | 6.0–7.0 | Soil | — | 0.00351 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14003 | 03-608352 | 0.0–1.0 | Soil | 0.0243 (J) | — | 0.0455 | 0.009 | 0.0073 | 0.0959 | 0.0735 | 0.127 | 0.0535 | — | — | 0.0805 | — |
| RE03-09-14004 | 03-608352 | 3.0–4.0 | Soil | — | 0.104 | — | — | — | — | — | — | — | 0.0213 (J) | — | — | — |
| RE03-09-14006 | 03-608353 | 0.0–1.0 | Soil | 0.975 | — | 1.65 | 0.0249 | 0.0362 | 2.08 | 1.63 | 2.59 | 0.949 | — | — | 1.78 | 0.0912 (J) |
| RE03-09-14007 | 03-608353 | 3.0–4.0 | Soil | 0.026 (J) | — | 0.0403 | — | 0.0074 | 0.0554 | 0.0415 | 0.063 | 0.0333 (J) | — | — | 0.0475 | — |
| RE03-09-14008 | 03-608353 | 6.0–7.0 | Soil | 0.0144 (J) | — | 0.0241 (J) | — | 0.008 | 0.0362 (J) | 0.0231 (J) | 0.0374 (J) | 0.0161 (J) | — | — | 0.0267 (J) | — |
| RE03-09-14013 | 03-608354 | 1.0–2.0 | Fill | 0.0397 (J) | 0.0285 | 0.0963 | — | — | 0.968 | 1.06 | 1.68 | 0.764 | 0.00237 (J) | — | 1.04 | — |
| RE03-09-14014 | 03-608354 | 3.0–4.0 | Fill | 0.018 (J) | 0.0167 | 0.0639 | — | — | 0.797 | 0.795 | 1.27 | 0.594 | — | — | 0.764 | — |
| RE03-09-14015 | 03-608355 | 1.0–2.0 | Fill | 0.0202 (J) | 0.0169 | 0.0521 | — | 0.0084 (J) | 0.229 | 0.233 | 0.359 | 0.121 | 0.00213 (J) | — | 0.207 | — |
| RE03-09-14016 | 03-608355 | 3.0–4.0 | Soil | 0.0205 (J) | 0.0295 (J) | 0.0455 | 0.0403 | 0.0535 | 0.107 | 0.107 | 0.125 | 0.0584 | 0.00577 (J) | — | 0.126 | — |
| RE03-09-14017 | 03-608356 | 1.0–2.0 | Soil | — | 0.0284 (J) | — | 0.0383 | 0.0481 | — | — | — | — | 0.00415 (J) | — | — | — |
| RE03-09-14018 | 03-608356 | 3.0–4.0 | Soil | 0.0171 (J) | 0.313 | 0.0105 (J) | — | 0.0018 (J) | — | — | — | — | 0.00265 (J) | 0.00203 (J) | — | — |
| RE03-09-14019 | 03-608357 | 1.0–2.0 | Soil | 0.114 | 0.0155 (J) | 0.019 (J) | 0.019 | 0.0311 | 0.0261 (J) | 0.0151 (J) | 0.017 (J) | — | 0.00199 (J) | — | 0.0169 (J) | — |
| RE03-09-14020 | 03-608357 | 3.0–4.0 | Soil | — | 0.386 (J) | — | — | — | — | — | — | — | 0.0103 (J) | — | — | — |

**Table 6.42-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dibenzofuran | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Isopropyltoluene[4-] | Methyl-2-pentanone[4-] | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | Trimethylbenzene[1,2,4-] | Xylene[1,3-]+Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **7.80E+01[e]** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03[f]** | **5.95E+03** | **3.10E+02[e]** | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **6.20E+01[e]** | **1.09E+03[g]** |
| **Industrial SSL[a]** | | | | **1.00E+03[e]** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04[f]** | **7.33E+04** | **4.10E+03[e]** | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **2.60E+02[e]** | **3.61E+03[g]** |
| **Construction Worker SSL[a]** | | | | **2.82E+02[h]** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04[f]** | **2.31E+04** | **1.24E+03[h]** | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **6.88E+02[h]** | **3.13E+03[g]** |
| 0103-97-0153 | 03-03281 | 1.83–2.83 | Fill | NA | NA | NA | NA | — | — | NA | — | NA | NA | — | — | NA |
| RE03-09-14011 | 03-03281 | 3.0–4.0 | Soil | — | 0.0408 | — | — | — | — | — | — | 0.021 (J) | 0.0243 (J) | 0.00134 | — | 0.000561 (J) |
| RE03-09-14012 | 03-03281 | 6.0–7.0 | Fill | — | 0.0454 | — | — | — | — | — | — | 0.0269 (J) | 0.0335 (J) | — | — | — |
| RE03-09-14009 | 03-03290 | 3.0–4.0 | Fill | — | 0.027 (J) | — | — | — | — | — | — | 0.0187 (J) | 0.0187 (J) | 0.000871 (J) | — | — |
| RE03-09-14010 | 03-03290 | 6.0–7.0 | Fill | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14000 | 03-608351 | 0.0–1.0 | Soil | — | 0.184 | 0.0143 (J) | 0.0408 | — | — | — | — | 0.118 | 0.154 | — | — | — |
| RE03-09-14001 | 03-608351 | 3.0–4.0 | Soil | — | — | — | — | — | — | — | — | — | — | 0.000569 (J) | — | — |
| RE03-09-14002 | 03-608351 | 6.0–7.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14003 | 03-608352 | 0.0–1.0 | Soil | — | 0.256 | 0.0171 (J) | 0.0514 | — | — | — | — | 0.153 | 0.152 | — | — | — |
| RE03-09-14004 | 03-608352 | 3.0–4.0 | Soil | — | — | — | — | 0.000425 (J) | — | — | — | — | — | 0.00119 (J) | — | 0.000425 (J) |
| RE03-09-14006 | 03-608353 | 0.0–1.0 | Soil | 0.409 (J) | 5.22 | 0.876 | 0.896 | — | — | 0.236 | 0.705 | 5.05 | 4.56 | — | — | — |
| RE03-09-14007 | 03-608353 | 3.0–4.0 | Soil | — | 0.135 | 0.0235 (J) | 0.0292 (J) | — | — | 0.0099 (J) | 0.0307 (J) | 0.125 | 0.101 | — | — | — |
| RE03-09-14008 | 03-608353 | 6.0–7.0 | Soil | — | 0.0789 | 0.0121 (J) | 0.0154 (J) | — | — | — | 0.0138 (J) | 0.0745 | 0.061 | — | — | — |
| RE03-09-14013 | 03-608354 | 1.0–2.0 | Fill | — | 1.86 | 0.022 (J) | 0.701 | — | — | — | — | 0.255 | 1.54 | 0.000609 (J) | — | — |
| RE03-09-14014 | 03-608354 | 3.0–4.0 | Fill | — | 1.4 | — | 0.534 | — | — | — | — | 0.169 | 1.18 | — | — | — |
| RE03-09-14015 | 03-608355 | 1.0–2.0 | Fill | — | 0.474 | — | 0.124 | 0.000402 (J) | — | — | — | 0.168 | 0.39 | — | — | — |
| RE03-09-14016 | 03-608355 | 3.0–4.0 | Soil | — | 0.272 | 0.021 (J) | 0.0918 | — | — | — | — | 0.112 | 0.245 | — | — | — |
| RE03-09-14017 | 03-608356 | 1.0–2.0 | Soil | — | 0.0273 (J) | — | — | — | — | — | — | 0.0265 (J) | 0.0251 (J) | 0.000599 (J) | — | — |
| RE03-09-14018 | 03-608356 | 3.0–4.0 | Soil | — | 0.068 | 0.0181 (J) | — | 0.0419 | 0.00274 (J) | — | — | 0.084 | 0.047 | 0.000952 (J) | — | — |
| RE03-09-14019 | 03-608357 | 1.0–2.0 | Soil | — | 0.0502 | 0.0773 | 0.0531 | — | — | — | — | 0.0977 | 0.0482 | 0.000474 (J) | — | — |
| RE03-09-14020 | 03-608357 | 3.0–4.0 | Soil | — | 0.0176 (J) | — | — | 7.64 | — | — | — | 0.0234 (J) | 0.0126 (J) | 0.00294 | 0.000581 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] NA = Not analyzed.

[d] — = Not detected.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] Xylenes used as a surrogate based on structural similarity.

[h] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table 6.42-4**
**Radionuclides Detected or Detected above BVs/FVs at AOC 03-056(k)**

| Sample ID | Location ID | Depth (ft) | Media | Uranium-235/236 | Uranium-238 |
|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.2** | **2.29** |
| **Residential SAL**[b] | | | | **17** | **87** |
| **Industrial SAL**[b] | | | | **87** | **430** |
| **Construction Worker SAL**[b] | | | | **43** | **160** |
| 0103-97-0171 | 03-03289 | 0.0–1.0 | Fill | —[c] | 4.44 |
| 0103-97-0173 | 03-03290 | 0.0–1.0 | Fill | — | 10.07 |
| 0103-97-0174 | 03-03290 | 1.0–1.5 | Fill | 0.203 | 7.13 |

Note: All activities are in pCi/g.
[a] BVs from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).
[c] — = Not detected, or not detected above BV/FV.

**Table 6.43-1**
**Samples Collected and Analyses Requested at SWMU 03-056(l)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | Cyanide (Total) |
|---|---|---|---|---|---|---|
| RE03-03-51685 | 03-22331 | 0.0–0.4921 | n/a[a] | 1803S | —[b] | — |
| RE03-03-51686 | 03-22331 | 0.4921–2.2966 | Soil | 1803S | — | — |
| RE03-03-51687 | 03-22332 | 0.0–0.4921 | n/a | 1803S | — | — |
| RE03-03-51688 | 03-22332 | 0.4921–2.2966 | Soil | 1803S | — | — |
| RE03-03-51689 | 03-22333 | 0.0–0.6562 | n/a | 1803S | — | — |
| RE03-03-51690 | 03-22333 | 0.6562–1.6404 | Soil | 1803S | — | — |
| RE03-03-51692 | 03-22334 | 0.0–1.6404 | Soil | 1803S | — | — |
| RE03-09-14021 | 03-608358 | 0.0–0.4 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14022 | 03-608358 | 2.0–3.0 | Soil | 10-781 | 10-780 | 10-781 |
| RE03-09-14023 | 03-608360 | 0.0–0.4 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14024 | 03-608360 | 2.0–3.0 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14025 | 03-608362 | 0.0–0.4 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14026 | 03-608362 | 2.0–3.0 | Soil | 10-781 | 10-780 | 10-781 |
| RE03-09-14027 | 03-608364 | 0.0–0.4 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14028 | 03-608364 | 2.0–3.0 | Soil | 10-781 | 10-780 | 10-781 |
| RE03-09-14029 | 03-608366 | 0.0–0.4 | n/a | 10-781 | 10-780 | 10-781 |
| RE03-09-14030 | 03-608366 | 2.0–3.0 | Soil | 10-781 | 10-780 | 10-781 |

[a] n/a = Not applicable.
[b] — = Analyses not requested.

**Table 6.43-2**
**Inorganic Chemicals above BVs at SWMU 03-056(l)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Cyanide (Total) | Iron | Lead |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **29,200** | **0.83** | **8.17** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **0.5** | **21,500** | **22.3** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **1.56E+03** | **5.48E+04** | **4.00E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **2.27E+04** | **7.95E+05** | **8.00E+02** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **6.19E+03** | **2.17E+05** | **8.00E+02** |
| RE03-03-51685 | 03-22331 | 0.0–0.4921 | n/a[g] | 3810 | —[h] | 3.49 | 33.2 | 0.313 | 0.262 | 802 | 2.74 | 1.13 | 6.83 | NA[i] | 4970 (J+) | 8.98 |
| RE03-03-51687 | 03-22332 | 0.0–0.4921 | n/a | 1780 | — | 0.911 | 93.5 | — | 0.05 | 9920 | 2.49 | 0.906 | 6.32 | NA | 2870 (J+) | 2.08 |
| RE03-03-51689 | 03-22333 | 0.0–0.6562 | n/a | 2150 | — | 1.62 | 29.8 | 0.263 | 0.08 | 3780 | 5.61 | 1.85 | 9.32 | NA | 4600 (J+) | 4.43 |
| RE03-03-51690 | 03-22333 | 0.6562–1.6404 | Soil | — | — | — | — | — | — | 9050 | — | — | 29.4 | NA | — | — |
| RE03-03-51692 | 03-22334 | 0.0–1.6404 | Soil | — | — | — | — | — | — | 6800 | — | — | 19.5 | NA | — | — |
| RE03-09-14021 | 03-608358 | 0.0–0.4 | n/a | 1660 | 0.896 (J) | 1.05 | 24.7 (J-) | 0.255 | — | 512 | 2.45 | 1.32 | 4.45 | — | 6040 (J) | 6.42 |
| RE03-09-14022 | 03-608358 | 2.0–3.0 | Soil | — | 1.27 (U) | — | — | — | 0.636 (U) | — | — | — | — | — | — | — |
| RE03-09-14023 | 03-608360 | 0.0–0.4 | n/a | 2640 | — | 1.24 | 48.5 (J-) | 0.278 | — | 5110 | 4.76 | 2.31 | 7.19 | 0.439 | 7530 (J) | 3.62 |
| RE03-09-14024 | 03-608360 | 2.0–3.0 | n/a | 2560 | — | 1.12 (J) | 29.4 (J-) | 0.389 | — | 788 | 3.28 | 0.815 | 1.23 (J) | — | 10,600 (J) | 12.8 |
| RE03-09-14025 | 03-608362 | 0.0–0.4 | n/a | 2930 | 3.49 | 1.05 | 37.3 (J-) | 0.274 | 0.858 | 1150 | 17.5 | 2.64 | 22.4 | — | 9150 (J) | 32.8 |
| RE03-09-14026 | 03-608362 | 2.0–3.0 | Soil | — | 1.22 (U) | — | — | — | 0.612 (U) | — | — | — | — | — | — | — |
| RE03-09-14027 | 03-608364 | 0.0–0.4 | n/a | 1710 | — | 0.736 (J) | 16.9 (J-) | 0.149 | — | 7550 | 7.41 | 1.61 | 7.93 | — | 5170 (J) | 3.01 |
| RE03-09-14028 | 03-608364 | 2.0–3.0 | Soil | — | 1.19 (U) | — | — | — | 0.593 (U) | — | — | — | — | — | — | — |
| RE03-09-14029 | 03-608366 | 0.0–0.4 | n/a | 999 | — | 1.63 | 35.3 (J-) | 0.22 | — | 7410 | 1.97 | 0.827 | 2.78 | — | 2180 (J) | 2.18 |
| RE03-09-14030 | 03-608366 | 2.0–3.0 | Soil | — | 1.24 (U) | — | — | — | 0.619 (U) | — | — | — | — | — | — | 25.8 |

**Table 6.43-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Magnesium | Manganese | Mercury | Nickel | Potassium | Selenium | Silver | Sodium | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **4610** | **671** | **0.1** | **15.4** | **3460** | **1.52** | **1** | **915** | **0.73** | **39.6** | **48.8** |
| **Residential SSL**[b] | | | | **na** | **1.07E+04** | **2.30E+01**[e] | **1.56E+03** | **na** | **3.91E+02** | **3.91E+02** | **na** | **5.16E+00** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL**[b] | | | | **na** | **1.45E+05** | **3.10E+02**[e] | **2.27E+04** | **na** | **5.68E+03** | **5.68E+03** | **na** | **7.49E+01** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL**[b] | | | | **na** | **4.63E+02** | **9.29E+01**[f] | **6.19E+03** | **na** | **1.55E+03** | **1.55E+03** | **na** | **2.04E+01** | **1.55E+03** | **9.29E+04** |
| RE03-03-51685 | 03-22331 | 0.0–0.4921 | n/a | 441 | 154 | — | 4.36 | 470 | 2.92 | — | 911 | 2.82 | 6.26 | 34.4 |
| RE03-03-51687 | 03-22332 | 0.0–0.4921 | n/a | 747 | 135 | — | 5.38 | 340 | 0.116 | — | 876 | — | 8.31 | 10.4 |
| RE03-03-51689 | 03-22333 | 0.0–0.6562 | n/a | 1290 | 150 | — | 6.76 | 452 | 0.478 | — | 746 | — | 9.27 | 16.5 |
| RE03-03-51690 | 03-22333 | 0.6562–1.6404 | Soil | — | 1530 | — | — | — | — | — | — | — | — | — |
| RE03-03-51692 | 03-22334 | 0.0–1.6404 | Soil | — | — | — | — | — | — | — | — | — | — | 60.9 |
| RE03-09-14021 | 03-608358 | 0.0–0.4 | n/a | 230 (J+) | 212 (J+) | — | — | 452 | — | 0.157 (J) | 212 | — | 7.21 (J) | 29.7 |
| RE03-09-14022 | 03-608358 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14023 | 03-608360 | 0.0–0.4 | n/a | 1500 (J+) | 180 (J+) | — | — | 491 | — | 0.129 (J) | — | 0.161 (J) | 12.8 (J) | 19.2 |
| RE03-09-14024 | 03-608360 | 2.0–3.0 | n/a | 739 (J+) | 202 (J+) | 0.0074 (J) | — | 474 | — | 0.157 (J) | — | 0.154 (J) | 8.71 (J) | 41.4 |
| RE03-09-14025 | 03-608362 | 0.0–0.4 | n/a | 393 (J+) | 309 (J+) | 0.013 | — | 597 | — | 0.348 (J) | — | 0.0916 (J) | 12 (J) | 76.4 |
| RE03-09-14026 | 03-608362 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | 51.3 |
| RE03-09-14027 | 03-608364 | 0.0–0.4 | n/a | 1340 (J+) | 110 (J+) | — | — | 364 | — | — | — | — | 8.87 (J) | 13.3 |
| RE03-09-14028 | 03-608364 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14029 | 03-608366 | 0.0–0.4 | n/a | 572 (J+) | 79.2 (J+) | — | — | 233 | — | — | — | — | 4.97 (J) | 8.51 |
| RE03-09-14030 | 03-608366 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] na = Not available.
[d] SSL for hexavalent chromium.
[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).
[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).
[g] n/a = Not applicable.
[h] — = Not detected or not detected above BV.
[i] NA = Not analyzed.

**Table 6.43-3**
**Organic Chemicals Detected at SWMU 03-056(l)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 |
|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.12E+00** | **2.22E+00** |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** |
| **Construction Worker SSL**[a] | | | | **4.36E+00** | **7.58E+01** |
| RE03-09-14026 | 03-608362 | 2.0–3.0 | Soil | 0.0019 (J) | —[b] |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] — = Not detected.

**Table 6.44-1**
**Samples Collected and Analyses Requested at AOC 03-003(n)**

| Sample ID | Location ID | Depth (ft) | Media | PCBs |
|---|---|---|---|---|
| RE03-09-14040 | 03-608368 | 0.0–1.0 | Soil | 10-327 |
| RE03-09-14041 | 03-608368 | 1.0–2.0 | Soil | 10-327 |
| RE03-09-14042 | 03-608369 | 0.0–1.0 | Soil | 10-327 |
| RE03-09-14043 | 03-608369 | 1.0–2.0 | Soil | 10-327 |
| RE03-09-14044 | 03-608370 | 0.0–1.0 | Soil | 10-327 |
| RE03-09-14045 | 03-608370 | 1.0–2.0 | Soil | 10-327 |
| RE03-09-14046 | 03-608371 | 0.0–1.0 | Soil | 10-327 |
| RE03-09-14047 | 03-608371 | 1.0–2.0 | Soil | 10-327 |

**Table 6.44-2**
**Organic Chemicals above BVs at AOC 03-003(n)**

| Sample ID | Location ID | Depth (ft) | Media | Aroclor-1254 | Aroclor-1260 |
|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **1.12E+00** | **2.22E+00** |
| **Industrial SSL**[a] | | | | **8.26E+00** | **8.26E+00** |
| **Construction Worker SSL**[a] | | | | **4.36E+00** | **7.58E+01** |
| RE03-09-14042 | 03-608369 | 0.0–1.0 | Soil | 0.0063 | 0.0095 |
| RE03-09-14046 | 03-608371 | 0.0–1.0 | Soil | —[b] | 0.005 |
| RE03-09-14047 | 03-608371 | 1.0–2.0 | Soil | — | 0.006 |

Note: All concentrations are in mg/kg.
[a] SSLs from NMED (2009, 108070).
[b] — = Not detected.

**Table 6.44-3**
**Samples Collected and Analyses Requested at SWMU 03-059**

| Sample ID | Location ID | Depth (ft) | Media | Tritium | Metals | Nitrate | PCBs | Perchlorate | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| RE03-09-14048 | 03-608372 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2707 | 03-608372 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14050 | 03-608373 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2708 | 03-608373 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14053 | 03-608374 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2710 | 03-608374 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14055 | 03-608375 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2709 | 03-608375 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14056 | 03-608376 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-09-14057 | 03-608376 | 2.0–3.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-09-14058 | 03-608377 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2711 | 03-608377 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14060 | 03-608378 | 0.0–1.0 | Soil | 10-173 | 10-172 | 10-172 | 10-171 | 10-172 | 10-171 | 10-171 | 10-171 | 10-172 |
| RE03-10-2712 | 03-608378 | 2.0–3.0 | Soil | 10-230 | 10-229 | 10-229 | 10-228 | 10-229 | 10-228 | 10-228 | 10-228 | 10-229 |
| RE03-09-14063 | 03-608379 | 0.0–1.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14062 | 03-608379 | 2.0–3.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14065 | 03-608380 | 0.0–1.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14064 | 03-608380 | 2.0–3.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14066 | 03-608381 | 0.0–1.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14067 | 03-608381 | 2.0–3.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14068 | 03-608382 | 0.0–1.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14069 | 03-608382 | 2.0–3.0 | Soil | 10-189 | 10-189 | 10-189 | 10-188 | 10-189 | 10-188 | 10-188 | 10-188 | 10-189 |
| RE03-09-14070 | 03-608383 | 0.0–1.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14071 | 03-608383 | 2.0–3.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14073 | 03-608384 | 0.0–1.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14072 | 03-608384 | 2.0–3.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14074 | 03-608385 | 0.0–1.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14075 | 03-608385 | 2.0–3.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14076 | 03-608386 | 0.0–1.0 | Soil | 10-247 | 10-247 | 10-247 | 10-246 | 10-247 | 10-246 | 10-246 | 10-246 | 10-247 |
| RE03-09-14077 | 03-608386 | 2.0–3.0 | Soil | 10-247 | 10-247 | 10-247 | 10-246 | 10-247 | 10-246 | 10-246 | 10-246 | 10-247 |
| RE03-09-14079 | 03-608387 | 0.0–1.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14078 | 03-608387 | 2.0–3.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14080 | 03-608388 | 0.0–1.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |
| RE03-09-14081 | 03-608388 | 2.0–3.0 | Soil | 10-208 | 10-207 | 10-207 | 10-206 | 10-207 | 10-206 | 10-206 | 10-206 | 10-207 |

**Table 6.44-4**
**Inorganic Chemicals above BVs at SWMU 03-059**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Cobalt | Copper | Lead | Mercury | Nitrate | Perchlorate | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **22.3** | **0.1** | **na**[b] | **na** | **0.73** | **48.8** |
| **Residential SSL**[c] | | | | **3.13E+01** | **7.79E+01** | **na** | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **4.00E+02** | **2.30E+01**[e] | **1.25E+05** | **5.48E+01** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL**[c] | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **8.00E+02** | **3.10E+02**[e] | **1.82E+06** | **7.95E+02** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL**[c] | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **8.00E+02** | **9.29E+01**[f] | **4.96E+05** | **2.17E+02** | **2.04E+01** | **9.29E+04** |
| RE03-09-14048 | 03-608372 | 0–1 | Soil | 2.23 | 1.62 | —[g] | — | — | 16.2 | 48.1 | 0.168 | — | — | — | 133 |
| RE03-10-2707 | 03-608372 | 2–3 | Soil | 1.11 (U) | 0.557 (U) | — | — | — | — | — | — | — | 0.00171 (J) | — | — |
| RE03-09-14050 | 03-608373 | 0–1 | Soil | 0.984 (J) | — | — | — | — | — | 25.6 | — | — | — | — | — |
| RE03-10-2708 | 03-608373 | 2–3 | Soil | 1.07 (U) | 0.536 (U) | — | — | — | — | — | — | — | 0.000602 (J) | — | — |
| RE03-09-14053 | 03-608374 | 0–1 | Soil | 1.17 | 0.847 | — | — | — | 15.2 | — | 0.653 | — | — | — | 58.3 |
| RE03-10-2710 | 03-608374 | 2–3 | Soil | — | — | — | — | — | — | — | 0.295 | — | — | — | — |
| RE03-09-14055 | 03-608375 | 0–1 | Soil | — | 0.578 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-10-2709 | 03-608375 | 2–3 | Soil | 1.22 (U) | 0.61 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14056 | 03-608376 | 0–1 | Soil | 1.21 | 0.527 (U) | 13,100 | — | 21.8 | — | — | — | — | — | — | — |
| RE03-09-14057 | 03-608376 | 2–3 | Soil | 1.2 | 0.569 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14058 | 03-608377 | 0–1 | Soil | 1.13 | — | — | — | — | — | — | — | — | 0.00104 (J) | — | — |
| RE03-10-2711 | 03-608377 | 2–3 | Soil | 1.06 (U) | 0.528 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14060 | 03-608378 | 0–1 | Soil | 1.22 | — | — | — | — | — | — | — | — | — | — | 49.6 |
| RE03-10-2712 | 03-608378 | 2–3 | Soil | 1.14 (U) | 0.568 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14063 | 03-608379 | 0–1 | Soil | 1.2 (U) | 0.598 (U) | — | — | — | — | — | — | 1.26 (J-) | — | — | — |
| RE03-09-14062 | 03-608379 | 2–3 | Soil | 1.21 (U) | 0.607 (U) | — | — | — | — | — | — | 1.07 (J-) | — | — | — |
| RE03-09-14065 | 03-608380 | 0–1 | Soil | 1.23 (U) | 0.617 (U) | 9940 | — | — | — | — | — | — | — | — | — |
| RE03-09-14064 | 03-608380 | 2–3 | Soil | 1.14 (U) | 0.569 (U) | — | — | — | — | — | — | 1.06 (J-) | — | — | — |
| RE03-09-14066 | 03-608381 | 0–1 | Soil | 1.23 (U) | 0.615 (U) | — | — | — | — | — | — | 1.55 (J-) | — | — | — |
| RE03-09-14067 | 03-608381 | 2–3 | Soil | — | 0.596 (U) | 8900 | — | — | — | 23.6 | — | 1.14 (J-) | — | — | — |
| RE03-09-14068 | 03-608382 | 0–1 | Soil | — | 0.607 (U) | — | — | — | — | 27.6 | — | — | — | 1.73 | — |
| RE03-09-14069 | 03-608382 | 2–3 | Soil | 1.14 (U) | 0.569 (U) | — | — | — | — | — | — | 0.975 (J-) | — | — | — |
| RE03-09-14070 | 03-608383 | 0–1 | Soil | 1.15 (U) | 0.575 (U) | 6410 | — | — | — | — | — | 0.816 (J-) | — | — | — |
| RE03-09-14071 | 03-608383 | 2–3 | Soil | 1.18 (U) | 0.59 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14073 | 03-608384 | 0–1 | Soil | 1.18 (U) | 0.591 (U) | — | — | — | — | — | — | 0.862 (J-) | — | — | — |
| RE03-09-14072 | 03-608384 | 2–3 | Soil | 1.1 (U) | 0.551 (U) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14074 | 03-608385 | 0–1 | Soil | 1.03 (U) | 0.516 (U) | — | — | 15.4 | — | — | — | 0.85 (J-) | — | — | — |
| RE03-09-14075 | 03-608385 | 2–3 | Soil | 1.18 (U) | 0.592 (U) | — | — | — | — | 26.6 | — | 1 (J-) | — | — | — |
| RE03-09-14076 | 03-608386 | 0–1 | Soil | 1.02 (U) | 0.508 (U) | — | — | — | — | — | — | 1.1 | — | — | — |
| RE03-09-14077 | 03-608386 | 2–3 | Soil | 1.1 (U) | 0.551 (U) | — | — | — | — | — | — | 1.81 | — | — | — |
| RE03-09-14079 | 03-608387 | 0–1 | Soil | — | 2.64 | — | 26.5 | — | 29.3 | 37.9 | 0.339 | 0.87 (J-) | — | — | 133 |
| RE03-09-14078 | 03-608387 | 2–3 | Soil | 1.16 (U) | 0.579 (U) | — | — | — | — | — | — | 1.98 (J-) | — | — | — |

**Table 6.44-4 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Chromium | Cobalt | Copper | Lead | Mercury | Nitrate | Perchlorate | Thallium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Soil BV[a]** | | | | **0.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **22.3** | **0.1** | **na[b]** | **na** | **0.73** | **48.8** |
| **Residential SSL[c]** | | | | **3.13E+01** | **7.79E+01** | **na** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **4.00E+02** | **2.30E+01[e]** | **1.25E+05** | **5.48E+01** | **5.16E+00** | **2.35E+04** |
| **Industrial SSL[c]** | | | | **4.54E+02** | **1.12E+03** | **na** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **8.00E+02** | **3.10E+02[e]** | **1.82E+06** | **7.95E+02** | **7.49E+01** | **3.41E+05** |
| **Construction Worker SSL[c]** | | | | **1.24E+02** | **3.09E+02** | **na** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **8.00E+02** | **9.29E+01[f]** | **4.96E+05** | **2.17E+02** | **2.04E+01** | **9.29E+04** |
| RE03-09-14080 | 03-608388 | 0–1 | Soil | 1.28 (U) | 0.638 (U) | — | — | — | — | 39.6 | — | 1.21 (J-) | — | — | 71 |
| RE03-09-14081 | 03-608388 | 2–3 | Soil | 1.17 (U) | 0.585 (U) | — | — | — | — | — | — | 1.14 (J-) | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009, 108070) unless otherwise noted.

[d] SSLfor hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 6.44-5**
**Organic Chemicals Detected at SWMU 03-059**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acenaphthylene | Acetone | Anthracene | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Benzoic Acid |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **1.72E+03[b]** | **6.75E+04** | **1.72E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **2.40E+05[c]** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **1.83E+04[b]** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **2.50E+06[c]** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **6.68E+03[b]** | **2.63E+05** | **6.68E+04** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **9.52E+05[d]** |
| RE03-09-14048 | 03-608372 | 0–1 | Soil | —[e] | — | — | 0.0448 | — | 0.146 | 0.136 | 0.23 | 0.239 | 0.309 | 0.0957 | 0.139 | — |
| RE03-10-2707 | 03-608372 | 2–3 | Soil | — | — | — | — | — | 0.0072 | 0.0053 | — | — | — | — | — | — |
| RE03-09-14050 | 03-608373 | 0–1 | Soil | — | — | — | — | — | 0.0129 | 0.0172 | 0.0144 (J) | — | — | — | — | — |
| RE03-10-2708 | 03-608373 | 2–3 | Soil | — | — | — | — | — | 0.0064 | 0.0052 | — | — | — | — | — | — |
| RE03-09-14053 | 03-608374 | 0–1 | Soil | 0.0208 (J) | — | — | — | — | 12.3 | 5.25 | — | — | — | — | — | — |
| RE03-10-2710 | 03-608374 | 2–3 | Soil | — | — | — | — | — | 9.32 | 2.97 | — | — | — | — | — | — |
| RE03-09-14055 | 03-608375 | 0–1 | Soil | — | — | — | — | — | 0.103 | 0.0798 | — | — | — | — | — | — |
| RE03-10-2709 | 03-608375 | 2–3 | Soil | — | — | — | — | — | 0.0311 | 0.0151 | — | — | — | — | — | — |
| RE03-09-14056 | 03-608376 | 0–1 | Soil | — | — | — | — | — | — | 0.0194 | 0.0124 (J) | — | — | — | — | — |
| RE03-09-14057 | 03-608376 | 2–3 | Soil | — | — | — | — | — | — | 0.0017 (J) | — | — | — | — | — | — |
| RE03-09-14058 | 03-608377 | 0–1 | Soil | — | — | — | — | — | — | 0.0129 (J) | 0.0222 (J) | 0.0152 (J) | 0.0268 (J) | 0.0129 (J) | — | — |
| RE03-10-2711 | 03-608377 | 2–3 | Soil | 0.0168 (J) | — | — | 0.0241 (J) | — | — | 0.0073 | 0.0606 | 0.0549 | 0.118 | 0.028 (J) | 0.0431 | — |
| RE03-09-14060 | 03-608378 | 0–1 | Soil | — | 0.0228 (J) | — | 0.041 | — | — | — | 0.109 | 0.082 | 0.216 | 0.0519 | 0.0964 | — |
| RE03-10-2712 | 03-608378 | 2–3 | Soil | — | — | — | — | — | — | — | 0.025 (J) | 0.0144 (J) | 0.0456 | 0.0162 (J) | 0.0127 (J) | — |
| RE03-09-14062 | 03-608379 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 0.496 (J) |
| RE03-09-14066 | 03-608381 | 0–1 | Soil | 0.0411 (J) | — | — | 0.0573 | — | — | — | 0.0592 | 0.0428 | 0.0503 | 0.0303 (J) | 0.0273 (J) | — |
| RE03-09-14068 | 03-608382 | 0–1 | Soil | — | — | 0.004 (J) | — | 0.0182 | 0.0092 | 0.0033 (J) | — | — | — | — | — | — |
| RE03-09-14070 | 03-608383 | 0–1 | Soil | — | — | — | — | — | 0.0024 (J) | 0.0382 | — | — | — | — | — | — |
| RE03-09-14071 | 03-608383 | 2–3 | Soil | — | — | — | — | — | — | 0.0023 (J) | — | — | — | — | — | — |
| RE03-09-14072 | 03-608384 | 2–3 | Soil | — | — | — | — | — | 0.0168 (J) | — | — | — | — | — | — | — |
| RE03-09-14074 | 03-608385 | 0–1 | Soil | — | — | — | — | — | — | 0.0301 | 0.0204 (J) | 0.0149 (J) | 0.0243 (J) | 0.0138 (J) | — | — |
| RE03-09-14075 | 03-608385 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14076 | 03-608386 | 0–1 | Soil | — | — | — | — | — | 0.0063 | 0.0116 | — | — | — | — | — | — |
| RE03-09-14077 | 03-608386 | 2–3 | Soil | 0.04 | — | — | 0.073 | — | 0.0137 | 0.0496 | 0.115 | 0.0929 | 0.16 | 0.0496 | — | — |
| RE03-09-14079 | 03-608387 | 0–1 | Soil | — | — | — | — | — | 0.112 | 0.0912 | 0.0276 (J) | 0.0316 (J) | 0.0529 | 0.0407 (J) | — | — |
| RE03-09-14078 | 03-608387 | 2–3 | Soil | — | — | — | — | — | 0.0021 (J) | 0.0019 (J) | — | — | — | — | — | — |
| RE03-09-14080 | 03-608388 | 0–1 | Soil | — | — | — | 0.00877 (J) | — | 0.0577 | 0.0816 | 0.039 (J) | 0.036 (J) | 0.0841 | 0.0397 (J) | — | — |
| RE03-09-14081 | 03-608388 | 2–3 | Soil | — | — | — | — | — | — | 0.0022 (J) | — | — | — | — | — | — |

**Table 6.44-5 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Bis(2-ethylhexyl)phthalate | Butylbenzylphthalate | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.47E+02** | **2.60E+03**[c] | **6.21E+02** | **6.21E-01** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02**[c] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520**[f] |
| **Industrial SSL**[a] | | | | **1.37E+03** | **9.10E+03**[c] | **2.34E+03** | **2.34E+00** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03**[c] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120**[f] |
| **Construction Worker SSL**[a] | | | | **4.76E+03** | **4.76E+04**[d] | **2.06E+04** | **2.13E+01** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03**[d] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na**[g] |
| RE03-09-14048 | 03-608372 | 0–1 | Soil | 0.078 (J) | — | 0.272 | — | 0.468 | — | 0.0982 | — | — | — | 0.147 | 0.424 | 70.1 (J) |
| RE03-10-2707 | 03-608372 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 3.6 (J) |
| RE03-09-14050 | 03-608373 | 0–1 | Soil | — | — | 0.0138 (J) | — | 0.0271 (J) | — | — | — | — | — | — | 0.0205 (J) | — |
| RE03-10-2708 | 03-608373 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 2.96 (J) |
| RE03-09-14053 | 03-608374 | 0–1 | Soil | 0.0937 (J) | — | — | — | 0.0129 (J) | — | — | — | — | — | — | 0.0127 (J) | — |
| RE03-10-2710 | 03-608374 | 2–3 | Soil | 0.142 (J) | — | — | — | 0.011 (J) | — | — | — | — | — | — | — | 14 (J) |
| RE03-09-14055 | 03-608375 | 0–1 | Soil | — | — | — | — | — | — | — | 0.00246 (J) | — | — | — | — | — |
| RE03-10-2709 | 03-608375 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14056 | 03-608376 | 0–1 | Soil | — | 1.83 | — | — | 0.0185 (J) | — | — | — | — | — | 0.0144 (J) | 0.0167 (J) | 5.87 (J) |
| RE03-09-14057 | 03-608376 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14058 | 03-608377 | 0–1 | Soil | — | — | 0.0159 (J) | — | 0.0347 (J) | — | — | — | — | — | 0.0184 (J) | 0.0307 (J) | 5.33 (J) |
| RE03-10-2711 | 03-608377 | 2–3 | Soil | 0.0832 (J) | — | 0.141 | 0.0109 (J) | 0.098 | — | 0.0291 (J) | — | — | — | 0.0735 | 0.0871 | 9.66 (J) |
| RE03-09-14060 | 03-608378 | 0–1 | Soil | 1.13 | — | 0.181 | — | 0.23 | — | 0.0494 | — | — | — | 0.0434 | 0.256 | — |
| RE03-10-2712 | 03-608378 | 2–3 | Soil | 0.172 (J) | — | 0.0196 (J) | — | 0.0336 (J) | — | 0.0132 (J) | — | — | — | — | 0.0326 (J) | 6.49 (J) |
| RE03-09-14062 | 03-608379 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14066 | 03-608381 | 0–1 | Soil | — | — | 0.0504 | — | 0.17 | 0.0359 (J) | 0.0233 (J) | — | 0.0138 (J) | 0.0291 (J) | 0.209 | 0.163 | — |
| RE03-09-14068 | 03-608382 | 0–1 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14070 | 03-608383 | 0–1 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14071 | 03-608383 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14072 | 03-608384 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14074 | 03-608385 | 0–1 | Soil | — | — | 0.0197 (J) | 0.028 (J) | 0.0495 | — | 0.0104 (J) | — | — | — | 0.0228 (J) | 0.0332 (J) | — |
| RE03-09-14075 | 03-608385 | 2–3 | Soil | 0.0879 (J) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14076 | 03-608386 | 0–1 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 3.52 (J) |
| RE03-09-14077 | 03-608386 | 2–3 | Soil | — | — | 0.115 | — | 0.335 | 0.0484 | 0.0437 | — | 0.00839 (J) | 0.015 (J) | 0.281 | 0.306 | 15.4 |
| RE03-09-14079 | 03-608387 | 0–1 | Soil | 0.109 (J) | — | 0.0319 (J) | — | 0.0638 | — | 0.0245 (J) | — | — | — | 0.0207 (J) | 0.0514 | — |
| RE03-09-14078 | 03-608387 | 2–3 | Soil | 0.0836 (J) | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 6.44-5 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Bis(2-ethylhexyl)phthalate | Butylbenzylphthalate | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.47E+02** | **2.60E+03**[c] | **6.21E+02** | **6.21E-01** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02**[c] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520**[f] |
| **Industrial SSL**[a] | | | | **1.37E+03** | **9.10E+03**[c] | **2.34E+03** | **2.34E+00** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03**[c] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120**[f] |
| **Construction Worker SSL**[a] | | | | **4.76E+03** | **4.76E+04**[d] | **2.06E+04** | **2.13E+01** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03**[d] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na**[g] |
| RE03-09-14080 | 03-608388 | 0–1 | Soil | 0.102 (J) | — | 0.0439 | — | 0.0944 | — | 0.0333 (J) | — | — | — | 0.0346 (J) | 0.0648 | — |
| RE03-09-14081 | 03-608388 | 2–3 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] — = Not detected.

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] na = Not available.

**Table 6.44-6**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 03-059**

| Sample ID | Location ID | Depth (ft) | Media | Tritium |
|---|---|---|---|---|
| **Soil BV**[a] | | | | **na**[b] |
| **Residential SAL**[c] | | | | **750** |
| **Industrial SAL**[c] | | | | **440000** |
| **Construction Worker SAL**[c] | | | | **320000** |
| RE03-09-14048 | 03-608372 | 0.0–1.0 | Soil | 0.148376 |
| RE03-10-2707 | 03-608372 | 2.0–3.0 | Soil | 0.0317062 |
| RE03-09-14068 | 03-608382 | 0.0–1.0 | Soil | 0.118462 |
| RE03-09-14069 | 03-608382 | 2.0–3.0 | Soil | 0.109395 |
| RE03-09-14071 | 03-608383 | 2.0–3.0 | Soil | 0.0349762 |
| RE03-09-14073 | 03-608384 | 0.0–1.0 | Soil | 0.625006 |
| RE03-09-14072 | 03-608384 | 2.0–3.0 | Soil | 0.0855055 |
| RE03-09-14077 | 03-608386 | 2.0–3.0 | Soil | 0.0346744 |
| RE03-09-14079 | 03-608387 | 0.0–1.0 | Soil | 0.236744 |
| RE03-09-14078 | 03-608387 | 2.0–3.0 | Soil | 1.36423 |

Note: All activities are in pCi/g.

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

[b] na = Not available.

[c] SALs for radionuclides from LANL (2009, 107655).

**Table 6.45-1**
**Samples Collected and Analyses Requested at AOC C-03-022**

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

**Table 6.45-2**
**Inorganic Chemicals above BVs at AOC C-03-022**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Cadmium | Calcium | Magnesium |
|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **0.4** | **6120** | **4610** |
| **Residential SSL**[b] | | | | **3.13E+01** | **7.79E+01** | **na**[c] | **na** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **1.12E+03** | **na** | **na** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **3.09E+02** | **na** | **na** |
| RE03-09-14082 | 03-608389 | 1.0–2.0 | Soil | 1.12 (U) | 0.56 (U) | —[d] | — |
| RE03-09-14083 | 03-608389 | 4.0–5.0 | Soil | 1.08 (U) | 0.541 (U) | — | — |
| RE03-09-14084 | 03-608390 | 1.0–2.0 | Soil | 1.08 (U) | 0.539 (U) | — | — |
| RE03-09-14085 | 03-608390 | 4.0–5.0 | Soil | 1.06 (U) | 0.53 (U) | — | — |
| RE03-09-14086 | 03-608391 | 1.0–2.0 | Soil | 1.11 (U) | 0.556 (U) | — | — |
| RE03-09-14087 | 03-608391 | 4.0–5.0 | Soil | 1.06 (U) | 0.532 (U) | — | — |
| RE03-09-14088 | 03-608392 | 1.0–2.0 | Soil | 1.03 (U) | 0.517 (U) | 33,300 | 4900 |
| RE03-09-14089 | 03-608392 | 4.0–5.0 | Soil | 1.04 (U) | 0.521 (U) | 34,100 | 5080 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] — = Not detected.

**Table 6.45-3**
**Organic Chemicals Detected at AOC C-03-022**

| Sample ID | Location ID | Depth (ft) | Media | TPH-DRO |
|---|---|---|---|---|
| **Residential SSL**[a] | | | | **520**[b] |
| **Industrial SSL**[a] | | | | **1120**[b] |
| **Construction Worker SSL**[a] | | | | **na**[c] |
| RE03-09-14082 | 03-608389 | 1.0–2.0 | Soil | 979 |
| RE03-09-14083 | 03-608389 | 4.0–5.0 | Soil | 27900 |
| RE03-09-14086 | 03-608391 | 1.0–2.0 | Soil | 9.54 |

Note: All concentrations are in mg/kg.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Screening guidelines for diesel #2 from NMED (2006, 094614).

[c] na = Not available.

**Table 7.2-1**
**Samples Collected and Analyses Requested at SWMU 60-002 (West)**

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

**Table 7.2-2**
**Samples Collected and Analyses Requested at SWMU 60-002 (Central and East)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | SVOCs | TPH-DRO | TPH-GRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|---|
| RE60-03-52308 | 60-22517 | 4–4.5 | Qbt4 | 1884S | —* | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52307 | 60-22517 | 8.5–9 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52309 | 60-22517 | 14.5–15 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52312 | 60-22518 | 4.5–5 | Soil | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52314 | 60-22518 | 14.5–15 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52317 | 60-22519 | 4.5–5 | Soil | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52320 | 60-22519 | 13.5–14 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52322 | 60-22520 | 3–3.5 | Soil | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52324 | 60-22520 | 14.5–15 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52327 | 60-22521 | 4–4.5 | Soil | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52329 | 60-22521 | 14.5–15 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52332 | 60-22522 | 5.5–6 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-03-52334 | 60-22522 | 16–17 | Qbt4 | 1884S | — | 1884S | 1884S | 1884S | 1884S | — |
| RE60-04-53095 | 60-22680 | 0–1 | Soil | 2042S | 2042S | 2042S | 2042S | 2042S | 2042S | — |
| RE60-04-53096 | 60-22680 | 1.5–2 | Soil | 2042S | 2042S | 2042S | 2042S | 2042S | 2042S | — |
| RE60-04-53098 | 60-22681 | 0–1 | Soil | 2042S | 2042S | 2042S | 2042S | 2042S | 2042S | — |
| RE60-04-53099 | 60-22681 | 1.5–2 | Soil | 2042S | 2042S | 2042S | 2042S | 2042S | 2042S | — |
| RE60-04-53100 | 60-22682 | 0–1 | Soil | 2042S | 2042S | 2042S | 2042S | 2042S | 2042S | — |
| RE60-04-53101 | 60-22682 | 1.5–2 | Soil | — | 2042S | — | — | 2042S | 2042S | — |

*— = Analyses not requested.

**Table 7.2-3**
**Inorganic Chemicals above BVs at SWMU 60-002 (West)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Nickel | Selenium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **0.5** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **17** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **671** | **15.4** | **1.52** | **39.6** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na[c]** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** |
| RE03-09-14094 | 03-608393 | 1–2 | Soil | —[g] | 1.03 (U) | — | — | 0.514 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14095 | 03-608393 | 4–5 | Qbt3 | 10,500 (J) | 1.05 (U) | 65.5 (J+) | — | — | 2680 (J) | 10.8 (J) | 5.33 (J) | 8.74 | 14,900 (J) | 14.7 (J) | 2180 (J+) | — | 9.12 | 1.1 (UJ) | 28.2 (J) |
| RE03-09-14096 | 03-608394 | 1–2 | Qbt3 | 10,500 (J) | 1.05 (U) | 160 (J+) | — | — | — | 14.6 (J) | 7.24 (J) | 7.49 | — | 15.2 (J) | 2030 (J+) | 502 | 8.8 | 1.06 (UJ) | 31.2 (J) |
| RE03-09-14097 | 03-608394 | 4–5 | Qbt3 | 16,000 (J) | 1.16 (U) | 158 (J+) | 1.37 | — | 5310 (J) | 9.17 (J) | — | 7.35 | — | 16.8 (J) | 2820 (J+) | — | 10.3 | 1.13 (UJ) | — |
| RE03-09-14098 | 03-608395 | 1–2 | Soil | — | 1.05 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14099 | 03-608395 | 4–5 | Soil | — | 1.07 (U) | — | — | 0.536 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14100 | 03-608396 | 1–2 | Soil | — | 1.06 (U) | — | — | 0.532 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14101 | 03-608396 | 4–5 | Soil | — | 1.09 (U) | — | — | 0.544 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14102 | 03-608397 | 1–2 | Soil | — | 1.04 (U) | — | — | 0.521 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14103 | 03-608397 | 4–5 | Qbt3 | 8790 (J) | 1.07 (U) | 146 (J+) | — | — | 4070 (J) | 7.94 (J) | — | — | — | 69.3 (J) | 2050 (J+) | — | 6.78 | 1.05 (UJ) | — |
| RE03-09-14104 | 03-608398 | 1–2 | Soil | — | 1.07 (U) | 331 (J+) | — | — | 11,200 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14105 | 03-608398 | 4–5 | Qbt3 | 10,500 (J) | 1.06 (U) | 90.5 (J+) | — | — | 2460 (J) | 9.77 (J) | 4.74 (J) | 6.69 | — | 12.4 (J) | 2390 (J+) | — | 7.11 | 1.05 (UJ) | 23 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 7.2-4**
**Inorganic Chemicals above BVs at SWMU 60-002 (Central and East)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Nickel | Selenium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **0.5** | **2.79** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **63.5** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **8.17** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **671** | **15.4** | **1.52** | **48.8** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na[c]** | **2.19E+02[d]** | **2.30E+01[e]** | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03[d]** | **3.00E+02[e]** | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02[d]** | **3.46E+01[f]** | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **9.29E+04** |
| RE60-03-52308 | 60-22517 | 4–4.5 | Qbt4 | 15,350 | —[g] | 3.52 | 52.5 | — | — | 2440 | 8.2 | 3.83 | — | 17,600 | — | 2540 | — | 7.73 | 0.579 | — |
| RE60-03-52307 | 60-22517 | 8.5–9 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | 539 | — | 0.54 (U) | — |
| RE60-03-52309 | 60-22517 | 14.5–15 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.516 (U) | — |
| RE60-03-52312 | 60-22518 | 4.5–5 | Soil | — | — | — | — | — | — | — | — | — | 14.7 | — | — | — | — | — | — | 74.8 |
| RE60-03-52314 | 60-22518 | 14.5–15 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.48 (U) | — |
| RE60-03-52317 | 60-22519 | 4.5–5 | Soil | — | — | — | 310 | — | 0.539 (U) | 8050 | — | — | — | — | — | — | — | — | — | — |
| RE60-03-52320 | 60-22519 | 13.5–14 | Qbt4 | 23,720 | — | 3.97 | 108 | 1.69 | — | 3470 | 10.1 | — | 7.99 | 15,200 | 15 | 3520 | — | 13.2 | 0.583 (U) | — |
| RE60-03-52322 | 60-22520 | 3–3.5 | Soil | — | — | — | — | — | 0.55 (U) | 8230 | — | 10 | — | — | — | — | — | 16 | — | — |
| RE60-03-52324 | 60-22520 | 14.5–15 | Qbt4 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.489 (U) | — |
| RE60-03-52327 | 60-22521 | 4–4.5 | Soil | — | — | — | — | — | 0.533 (U) | — | — | — | — | — | — | — | — | 17.1 | — | — |
| RE60-03-52332 | 60-22522 | 5.5–6 | Qbt4 | 15,520 | — | 3.45 | 375 | — | — | 2720 | 8.23 | — | — | — | 11.2 | 2390 | — | — | 0.542 (U) | — |
| RE60-03-52334 | 60-22522 | 16–17 | Qbt4 | 9900 | — | — | — | — | — | — | — | — | — | — | 12.4 | — | — | 8.72 | 0.565 (U) | — |
| RE60-04-53096 | 60-22680 | 1.5–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | 726 | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 7.2-5**
**Organic Chemicals Detected at SWMU 60-002 (West)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Fluoranthene | Indeno(1,2,3-cd)pyrene | Phenanthrene | Pyrene | TPH-DRO | TPH-GRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.72E+04** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03[b]** | **6.21E+02** | **2.29E+03** | **6.21E+00** | **1.83E+03** | **1.72E+03** | **520[c]** | **na[d]** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **1.83E+05** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04[b]** | **2.34E+03** | **2.44E+04** | **2.34E+01** | **2.05E+04** | **1.83E+04** | **1120[c]** | **na** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **6.68E+04** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03[b]** | **2.06E+04** | **8.91E+03** | **2.13E+02** | **7.15E+03** | **6.68E+03** | **na** | **na** |
| RE03-09-14094 | 03-608393 | 1–2 | Soil | —[e] | — | — | — | — | — | — | — | — | — | — | — | 0.0671 (J) |
| RE03-09-14095 | 03-608393 | 4–5 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | 0.0699 (J) |
| RE03-09-14096 | 03-608394 | 1–2 | Qbt3 | 0.0189 (J) | — | — | — | — | — | — | — | — | — | — | 13 (J) | 0.0642 (J) |
| RE03-09-14097 | 03-608394 | 4–5 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | 0.0241 (J) |
| RE03-09-14098 | 03-608395 | 1–2 | Soil | — | 0.0541 (J) | 0.154 | 0.119 (J) | 0.139 (J) | 0.0715 (J) | 0.132 (J) | 0.297 | 0.221 | 0.22 | 0.297 | — | 0.0142 (J) |
| RE03-09-14099 | 03-608395 | 4–5 | Soil | — | — | — | — | — | — | — | — | — | — | — | 3.33 (J) | — |
| RE03-09-14100 | 03-608396 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | 2.93 (J) | 0.0212 (J) |
| RE03-09-14101 | 03-608396 | 4–5 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 0.0236 (J) |
| RE03-09-14102 | 03-608397 | 1–2 | Soil | — | — | — | — | — | — | — | 0.0197 (J) | — | 0.0132 (J) | 0.0163 (J) | 90.5 | 3.15 (J) |
| RE03-09-14103 | 03-608397 | 4–5 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 5.86 (J) | 0.0943 (J) |
| RE03-09-14104 | 03-608398 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | 0.0312 (J) |
| RE03-09-14105 | 03-608398 | 4–5 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | 0.0312 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] Screening guidelines for diesel #2 from NMED (2006, 094614).

[d] na = Not available.

[e] — = Not detected.

**Table 7.2-6**
**Organic Chemicals Detected at SWMU 60-002 (Central and East)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Chrysene | Fluoranthene | Fluorene | Hexanone[2-] | Indeno(1,2,3-cd)pyrene | Phenanthrene | Pyrene | TPH-DRO | TPH-GRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E+00** | **6.21E-01** | **6.21E+00** | **1.72E+03**[b] | **6.21E+02** | **2.29E+03** | **2.29E+03** | **2.10E+02**[c] | **6.21E+00** | **1.83E+03** | **1.72E+03** | **520**[d] | **na**[e] |
| **Industrial SSL**[a] | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+01** | **2.34E+00** | **2.34E+01** | **1.83E+04**[b] | **2.34E+03** | **2.44E+04** | **2.44E+04** | **1.40E+03**[c] | **2.34E+01** | **2.05E+04** | **1.83E+04** | **1120**[d] | **na** |
| **Construction Worker SSL**[a] | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **7.58E+01** | **2.13E+02** | **2.13E+01** | **2.13E+02** | **6.68E+03**[b] | **2.06E+04** | **8.91E+03** | **8.91E+03** | **1.48E+05**[f] | **2.13E+02** | **7.15E+03** | **6.68E+03** | **na** | **na** |
| RE60-03-52308 | 60-22517 | 4–4.5 | Qbt4 | —[g] | 0.0062 (J) | — | NA[h] | NA | — | — | — | — | — | — | — | — | — | — | — | 3.9 | — |
| RE60-03-52307 | 60-22517 | 8.5–9 | Qbt4 | — | 0.0044 (J) | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 5.1 | — |
| RE60-03-52309 | 60-22517 | 14.5–15 | Qbt4 | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 1.1 (J) | — |
| RE60-03-52312 | 60-22518 | 4.5–5 | Soil | — | — | — | NA | NA | — | — | — | — | — | 0.0357 (J) | 0.0056 (J) | — | — | — | 0.0443 | 12.9 | — |
| RE60-03-52314 | 60-22518 | 14.5–15 | Qbt4 | — | 0.0042 (J) | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 2.2 | — |
| RE60-03-52317 | 60-22519 | 4.5–5 | Soil | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 1.1 (J) | — |
| RE60-03-52320 | 60-22519 | 13.5–14 | Qbt4 | — | 0.0118 (J) | — | NA | NA | — | — | — | — | — | — | — | 0.0088 | — | — | — | 3 | — |
| RE60-03-52322 | 60-22520 | 3–3.5 | Soil | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 1.8 (J) | — |
| RE60-03-52327 | 60-22521 | 4–4.5 | Soil | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 1.1 (J) | — |
| RE60-03-52329 | 60-22521 | 14.5–15 | Qbt4 | — | 0.0042 (J) | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 11.3 | — |
| RE60-03-52332 | 60-22522 | 5.5–6 | Qbt4 | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 2.6 | — |
| RE60-03-52334 | 60-22522 | 16–17 | Qbt4 | — | — | — | NA | NA | — | — | — | — | — | — | — | — | — | — | — | 2.6 | — |
| RE60-04-53095 | 60-22680 | 0–1 | Soil | 0.0244 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE60-04-53096 | 60-22680 | 1.5–2 | Soil | — | — | — | — | 0.0042 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE60-04-53099 | 60-22681 | 1.5–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.0344 (J) |
| RE60-04-53100 | 60-22682 | 0–1 | Soil | 0.0198 (J) | — | — | 0.0202 | 0.0162 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE60-04-53101 | 60-22682 | 1.5–2 | Soil | NA | — | NA | 0.0025 (J) | — | NA | NA | NA | NA | NA | NA | NA | — | NA | NA | NA | NA | 0.173 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] na = Not available.

[f] Butanone[2-] used as a surrogate based on structural similarity.

[g] — = Not detected.

[h] NA = Not analyzed.

**Table 7.3-1**
**Samples Collected and Analyses Requested at AOCs 60-004(b) and 60-004(d)**

| Sample ID | Location ID | Depth (ft) | Media | Metals | PCBs | SVOCs | TPH-DRO | VOCs | Cyanide (Total) |
|---|---|---|---|---|---|---|---|---|---|
| RE03-09-14106 | 03-608399 | 0.0–1.0 | Soil | 10-643 | 10-644 | 10-644 | 10-644 | 10-644 | 10-643 |
| RE03-09-14107 | 03-608399 | 2.0–3.0 | Soil | 10-643 | 10-644 | 10-644 | 10-644 | 10-644 | 10-643 |
| RE03-09-14108 | 03-608399 | 4.0–5.0 | Soil | 10-643 | 10-644 | 10-644 | 10-644 | 10-644 | 10-643 |
| RE03-09-14109 | 03-608399 | 9.0–10.0 | Qbt3 | 10-643 | 10-644 | 10-644 | 10-644 | 10-644 | 10-643 |
| RE03-09-14110 | 03-608399 | 14.0–15.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14111 | 03-608400 | 0.0–1.0 | Soil | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14112 | 03-608400 | 2.0–3.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14113 | 03-608400 | 4.0–5.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14114 | 03-608400 | 9.0–10.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14115 | 03-608400 | 14.0–15.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14116 | 03-608401 | 0.0–1.0 | Soil | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14117 | 03-608401 | 2.0–3.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14118 | 03-608401 | 4.0–5.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14119 | 03-608401 | 9.0–10.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14120 | 03-608401 | 14.0–15.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14121 | 03-608402 | 0.0–1.0 | Soil | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14122 | 03-608402 | 2.0–3.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14123 | 03-608402 | 4.0–5.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14124 | 03-608402 | 9.0–10.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14125 | 03-608402 | 14.0–15.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14126 | 03-608403 | 0.0–1.0 | Soil | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14127 | 03-608403 | 2.0–3.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14128 | 03-608403 | 4.0–5.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14129 | 03-608403 | 9.0–10.0 | Qbt3 | 10-667 | 10-666 | 10-666 | 10-666 | 10-666 | 10-667 |
| RE03-09-14130 | 03-608403 | 14.0–15.0 | Qbt3 | 10-669 | 10-668 | 10-668 | 10-668 | 10-668 | 10-669 |

**Table 7.3-2**
**Inorganic Chemicals above BVs at AOCs 60-004(b) and 60-004(d)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Manganese | Nickel | Selenium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **482** | **6.58** | **0.3** | **17** |
| **Soil BV**[a] | | | | **29,200** | **0.83** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **671** | **15.4** | **1.52** | **39.6** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **1.07E+04** | **1.56E+03** | **3.91E+02** | **3.91E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **1.45E+05** | **2.27E+04** | **5.68E+03** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **4.63E+02** | **6.19E+03** | **1.55E+03** | **1.55E+03** |
| RE03-09-14106 | 03-608399 | 0.0–1.0 | Soil | —[g] | — | — | — | 0.528 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14107 | 03-608399 | 2.0–3.0 | Soil | — | 1.45 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14108 | 03-608399 | 4.0–5.0 | Soil | — | — | — | — | 0.538 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14109 | 03-608399 | 9.0–10.0 | Qbt3 | — | 1.03 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.02 (UJ) | — |
| RE03-09-14110 | 03-608399 | 14.0–15.0 | Qbt3 | — | 1.04 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.01 (U) | — |
| RE03-09-14111 | 03-608400 | 0.0–1.0 | Soil | — | 1.01 (J) | — | — | 0.567 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14112 | 03-608400 | 2.0–3.0 | Qbt3 | 23,700 (J+) | 1.84 | 212 | 1.44 | — | 2780 | 12.5 | 7.46 | 8.39 (J) | 16,900 | 15.6 | 2400 | — | 10.5 | 1.1 (U) | 29.4 |
| RE03-09-14113 | 03-608400 | 4.0–5.0 | Qbt3 | 9930 (J+) | 0.833 (J) | 71.4 | — | — | 2800 | — | — | 5.16 (J) | — | — | 2110 | — | 8.09 | 1.08 (U) | — |
| RE03-09-14114 | 03-608400 | 9.0–10.0 | Qbt3 | — | — | 58.3 | — | — | — | — | — | — | — | — | — | — | — | 0.976 (U) | — |
| RE03-09-14115 | 03-608400 | 14.0–15.0 | Qbt3 | — | 0.996 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 0.51 (J) | — |
| RE03-09-14116 | 03-608401 | 0.0–1.0 | Soil | — | 1.42 | 431 | — | 0.51 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14117 | 03-608401 | 2.0–3.0 | Qbt3 | 12,200 (J+) | 1.33 | 167 | — | — | 2780 | 9.76 | 5.34 | 7.26 (J) | — | 12.7 | 2180 | — | 6.89 | 1.05 (U) | 24.8 |
| RE03-09-14118 | 03-608401 | 4.0–5.0 | Qbt3 | 23,200 (J+) | 2.73 | 265 | — | — | 17,700 | 13 | 7.49 | 8.94 (J) | 17,000 | 17 | 2390 | 490 | 9.11 | 1.05 (U) | 29.5 |
| RE03-09-14119 | 03-608401 | 9.0–10.0 | Qbt3 | — | 0.952 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 0.613 (J) | — |
| RE03-09-14120 | 03-608401 | 14.0–15.0 | Qbt3 | — | 1.01 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 1.02 (U) | — |
| RE03-09-14121 | 03-608402 | 0.0–1.0 | Soil | — | 1.24 | — | — | 0.531 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14122 | 03-608402 | 2.0–3.0 | Qbt3 | — | 0.667 (J) | 115 | — | — | 2850 | — | — | — | — | 23.9 | — | — | — | 1 (U) | — |
| RE03-09-14123 | 03-608402 | 4.0–5.0 | Qbt3 | — | 1.15 | 141 | — | — | 2950 | — | — | — | — | — | — | — | — | 1.03 (U) | — |
| RE03-09-14124 | 03-608402 | 9.0–10.0 | Qbt3 | — | 0.81 (J) | 54.1 | — | — | — | — | — | — | — | 21.5 | — | 497 | — | 1.06 (U) | — |
| RE03-09-14125 | 03-608402 | 14.0–15.0 | Qbt3 | — | 0.59 (J) | — | — | — | — | — | — | — | — | 15.5 | — | — | — | 1.03 (U) | — |
| RE03-09-14126 | 03-608403 | 0.0–1.0 | Soil | — | — | — | — | 0.529 (U) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14127 | 03-608403 | 2.0–3.0 | Qbt3 | — | 1.18 | 71 | — | — | — | — | — | — | — | — | — | — | — | 1.01 (U) | — |
| RE03-09-14128 | 03-608403 | 4.0–5.0 | Qbt3 | — | 0.819 (J) | 124 | — | — | — | 7.77 | 7.83 | 5.44 (J) | — | — | — | 499 | — | 0.98 (U) | 21.4 |
| RE03-09-14129 | 03-608403 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | 0.567 (J) | — |
| RE03-09-14130 | 03-608403 | 14.0–15.0 | Qbt3 | — | 0.953 (U) | — | — | — | — | — | — | — | — | — | — | — | — | 0.973 (U) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 7.3-3**
**Organic Chemicals Detected at AOCs 60-004(b) and 60-004(d)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Benzo(a) anthracene | Benzo(b) fluoranthene | Benzo(g,h,i) perylene | Butanone[2-] | Chrysene | Fluoranthene | Hexanone[2-] | Naphthalene | Phenanthrene | Pyrene | TPH-DRO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **6.75E+04** | **6.21E+00** | **6.21E+00** | **1.72E+03**[b] | **3.96E+04** | **6.21E+02** | **2.29E+03** | **2.10E+02**[c] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **520**[d] |
| **Industrial SSL**[a] | | | | **8.51E+05** | **2.34E+01** | **2.34E+01** | **1.83E+04**[b] | **3.69E+05** | **2.34E+03** | **2.44E+04** | **1.40E+03**[c] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **1120**[d] |
| **Construction Worker SSL**[a] | | | | **2.63E+05** | **2.13E+02** | **2.13E+02** | **6.68E+03**[b] | **1.48E+05** | **2.06E+04** | **8.91E+03** | **1.48E+05**[e] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **na**[f] |
| RE03-09-14106 | 03-608399 | 0.0-1.0 | Soil | —[g] | 0.0187 (J) | 0.122 | 0.0133 (J) | — | 0.018 (J) | 0.0398 | — | 0.0168 (J) | 0.0464 | 0.0323 (J) | 5.58 (J) |
| RE03-09-14107 | 03-608399 | 2.0-3.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 3.49 (J) |
| RE03-09-14108 | 03-608399 | 4.0-5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 5.77 (J) |
| RE03-09-14109 | 03-608399 | 9.0-10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 3.62 (J) |
| RE03-09-14112 | 03-608400 | 2.0-3.0 | Qbt3 | 0.00451 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14113 | 03-608400 | 4.0-5.0 | Qbt3 | 0.00449 (J) | — | — | — | 0.00288 (J) | — | — | — | — | — | — | — |
| RE03-09-14115 | 03-608400 | 14.0-15.0 | Qbt3 | 0.00179 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14116 | 03-608401 | 0.0-1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 5.54 (J) |
| RE03-09-14119 | 03-608401 | 9.0-10.0 | Qbt3 | — | — | — | — | — | — | — | 0.00202 (J) | — | — | — | — |
| RE03-09-14121 | 03-608402 | 0.0-1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 15.4 |
| RE03-09-14122 | 03-608402 | 2.0-3.0 | Qbt3 | 0.0115 (J) | — | — | — | 0.00325 (J) | — | — | — | — | — | — | — |
| RE03-09-14123 | 03-608402 | 4.0-5.0 | Qbt3 | 0.00218 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14126 | 03-608403 | 0.0-1.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | 24.8 |
| RE03-09-14127 | 03-608403 | 2.0-3.0 | Qbt3 | 0.0147 (J) | — | — | — | 0.00792 (J) | — | — | — | — | — | — | — |
| RE03-09-14128 | 03-608403 | 4.0-5.0 | Qbt3 | 0.00174 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14129 | 03-608403 | 9.0-10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 4.61 (J) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] Butanone[2-] used as a surrogate based on structural similarity.

[f] na =Not available.

[g] — = Not detected.

**Table 7.5-1**
**Samples Collected and Analyses Requested at AOC 60-004(f)**

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

**Table 7.5-2**
**Inorganic Chemicals above BVs at AOC 60-004(f)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **46** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** |
| **Soil BV**[a] | | | | **29,200** | **0.83** | **295** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **5.48E+04** | **4.00E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **7.95E+05** | **8.00E+02** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **2.17E+05** | **8.00E+02** |
| RE03-09-14208 | 03-608404 | 1.0–2.0 | Soil | —[g] | 1.1 (UJ) | — | 0.548 (U) | — | — | — | — | — | — |
| RE03-09-14209 | 03-608404 | 2.0–3.0 | Qbt3 | 13,500 | 1.09 (UJ) | 170 | — | 2250 | 15.4 | 8.87 | 6.86 (J) | 15,100 | 21.2 |
| RE03-09-14210 | 03-608404 | 4.0–5.0 | Qbt3 | 10,200 | — | 94 | — | 3090 | 12 | — | 7.72 (J) | — | 22.5 |
| RE03-09-14211 | 03-608404 | 9.0–10.0 | Qbt3 | — | 1.11 (UJ) | 103 | — | — | — | — | 4.82 (J) | — | 16.2 |
| RE03-09-14212 | 03-608405 | 1.0–2.0 | Soil | — | 1.14 (U) | — | 0.57 (U) | — | — | — | — | — | — |
| RE03-09-14213 | 03-608405 | 2.0–3.0 | Soil | — | 1.11 (U) | — | 0.557 (U) | — | — | — | — | — | — |
| RE03-09-14214 | 03-608405 | 4.0–5.0 | Qbt3 | — | 1.08 (U) | 78.4 (J+) | — | 3590 (J+) | 33.8 | — | — | — | — |
| RE03-09-14215 | 03-608405 | 9.0–10.0 | Qbt3 | — | 1.07 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14216 | 03-608406 | 1.0–2.0 | Soil | — | 1.14 (U) | — | 0.569 (U) | — | — | 9.79 | — | — | — |
| RE03-09-14217 | 03-608406 | 2.0–3.0 | Soil | — | 1.12 (U) | — | 0.559 (U) | — | — | — | — | — | — |
| RE03-09-14218 | 03-608406 | 4.0–5.0 | Soil | — | 1.2 (U) | — | 0.601 (U) | — | — | — | — | — | — |
| RE03-09-14219 | 03-608406 | 9.0–10.0 | Soil | — | 1.18 (U) | — | 0.591 (U) | — | — | — | — | — | — |
| RE03-09-14220 | 03-608407 | 1.0–2.0 | Soil | — | 1.01 (U) | — | 0.693 | — | — | — | 65.3 (J) | — | 61.1 |
| RE03-09-14221 | 03-608407 | 2.0–3.0 | Soil | — | 1.14 (UJ) | — | 0.571 (U) | — | 22.8 | — | 19.8 (J) | — | 24.1 |
| RE03-09-14222 | 03-608407 | 4.0–5.0 | Soil | — | 1.21 (UJ) | — | 0.606 (U) | — | 38.2 | — | — | — | — |
| RE03-09-14223 | 03-608407 | 9.0–10.0 | Qbt3 | — | 1.11 (UJ) | — | — | — | 25.5 | — | — | — | — |
| RE03-09-14224 | 03-608408 | 1.0–2.0 | Soil | — | 1.11 (U) | — | 0.553 (U) | — | — | — | — | — | — |
| RE03-09-14225 | 03-608408 | 2.0–3.0 | Soil | — | 1.07 (U) | — | 0.533 (U) | — | — | — | — | — | — |
| RE03-09-14226 | 03-608408 | 4.0–5.0 | Soil | — | 1.09 (U) | — | 0.546 (U) | — | — | — | — | — | — |
| RE03-09-14227 | 03-608408 | 9.0–10.0 | Soil | — | 1.1 (U) | — | 0.548 (U) | — | — | — | — | — | — |

**Table 7.5-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Magnesium | Manganese | Mercury | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **1690** | **482** | **0.1** | **6.58** | **0.3** | **1** | **1.1** | **17** | **63.5** |
| **Soil BV[a]** | | | | **4610** | **671** | **0.1** | **15.4** | **1.52** | **1** | **0.73** | **39.6** | **48.8** |
| **Residential SSL[b]** | | | | **na** | **1.07E+04** | **2.30E+01[e]** | **1.56E+03** | **3.91E+02** | **3.91E+02** | **5.16E+00** | **3.91E+02** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **na** | **1.45E+05** | **3.10E+02[e]** | **2.27E+04** | **5.68E+03** | **5.68E+03** | **7.49E+01** | **5.68E+03** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **na** | **4.63E+02** | **9.29E+01[f]** | **6.19E+03** | **1.55E+03** | **1.55E+03** | **2.04E+01** | **1.55E+03** | **9.29E+04** |
| RE03-09-14208 | 03-608404 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14209 | 03-608404 | 2.0–3.0 | Qbt3 | 2590 | — | — | 8.1 | 1.12 (UJ) | — | — | 25.6 | — |
| RE03-09-14210 | 03-608404 | 4.0–5.0 | Qbt3 | 2720 | — | — | — | 1.14 (UJ) | — | — | — | 98.2 (J-) |
| RE03-09-14211 | 03-608404 | 9.0–10.0 | Qbt3 | — | — | — | — | 1.13 (UJ) | — | — | — | — |
| RE03-09-14212 | 03-608405 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | 99.9 |
| RE03-09-14213 | 03-608405 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14214 | 03-608405 | 4.0–5.0 | Qbt3 | — | — | — | 6.93 | 1.14 (UJ) | — | — | — | — |
| RE03-09-14215 | 03-608405 | 9.0–10.0 | Qbt3 | — | — | — | — | 1.09 (UJ) | — | — | — | — |
| RE03-09-14216 | 03-608406 | 1.0–2.0 | Soil | — | 839 | — | — | — | — | — | — | — |
| RE03-09-14217 | 03-608406 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14218 | 03-608406 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14219 | 03-608406 | 9.0–10.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14220 | 03-608407 | 1.0–2.0 | Soil | — | — | 0.583 (J+) | — | — | 1.21 | — | — | 183 (J-) |
| RE03-09-14221 | 03-608407 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | 67.8 (J-) |
| RE03-09-14222 | 03-608407 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | 56.9 (J-) |
| RE03-09-14223 | 03-608407 | 9.0–10.0 | Qbt3 | — | — | — | — | 1.11 (UJ) | — | — | — | — |
| RE03-09-14224 | 03-608408 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — |
| RE03-09-14225 | 03-608408 | 2.0–3.0 | Soil | — | — | — | — | — | — | 0.937 | — | — |
| RE03-09-14226 | 03-608408 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | 54.2 |
| RE03-09-14227 | 03-608408 | 9.0–10.0 | Soil | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 7.5-3**
**Organic Chemicals Detected at AOC 60-004(f)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Bis(2-ethylhexyl)phthalate | Chrysene | Di-n-butylphthalate | Dibenz(a,h)anthracene | Dibenzofuran |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **1.55E+01** | **6.21E-01** | **6.21E+00** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **3.47E+02** | **6.21E+02** | **6.11E+03** | **6.21E-01** | **7.80E+01[c]** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **8.54E+01** | **2.34E+00** | **2.34E+01** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **1.37E+03** | **2.34E+03** | **6.84E+04** | **2.34E+00** | **1.00E+03[c]** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **2.58E+01** | **4.71E+02** | **2.13E+01** | **2.13E+02** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **4.76E+03** | **2.06E+04** | **2.38E+04** | **2.13E+01** | **2.82E+02[d]** |
| RE03-09-14212 | 03-608405 | 1.0–2.0 | Soil | —[e] | — | — | 0.0106 | 0.01 | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14213 | 03-608405 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14214 | 03-608405 | 4.0–5.0 | Qbt3 | — | — | — | 0.0021 (J) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14215 | 03-608405 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14216 | 03-608406 | 1.0–2.0 | Soil | — | 0.00703 | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14217 | 03-608406 | 2.0–3.0 | Soil | — | 0.0051 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14218 | 03-608406 | 4.0–5.0 | Soil | — | 0.00482 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14219 | 03-608406 | 9.0–10.0 | Soil | — | 0.00448 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14220 | 03-608407 | 1.0–2.0 | Soil | 0.217 | — | 0.69 | 0.116 | 0.153 | 0.000707 (J+) | 2.33 | 2.18 | 3.06 | 0.973 | 0.975 | 0.091 (J) | 2.29 | 0.118 (J) | 0.401 | 0.15 (J) |
| RE03-09-14221 | 03-608407 | 2.0–3.0 | Soil | — | — | — | — | 0.0028 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14222 | 03-608407 | 4.0–5.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14223 | 03-608407 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | 0.0949 (J) | — | — | — | — |
| RE03-09-14224 | 03-608408 | 1.0–2.0 | Soil | — | — | — | — | 0.0033 (J) | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14227 | 03-608408 | 9.0–10.0 | Soil | — | 0.00438 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 7.5-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Dichloroethene[cis-1,2-] | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Methylene Chloride | Methylnaphthalene[2-] | Naphthalene | Phenanthrene | Pyrene | Toluene | TPH-DRO | Trichloroethene | Trimethylbenzene[1,2,4-] | Trimethylbenzene[1,3,5-] | Xylene[1,3-]+Xylene[1,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **7.82E+02** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **1.99E+02** | **3.10E+02**[c] | **4.50E+01** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520**[f] | **na**[g] | **6.20E+01**[c] | **7.80E+02**[c] | **1.09E+03**[h] |
| **Industrial SSL**[a] | | | | **1.14E+04** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.09E+03** | **4.10E+03**[c] | **2.52E+02** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120**[f] | **na** | **2.60E+02**[c] | **1.00E+04**[c] | **3.61E+03**[h] |
| **Construction Worker SSL**[a] | | | | **3.10E+03** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.06E+04** | **1.24E+03**[d] | **7.02E+02** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na** | **na** | **6.88E+02**[d] | **3.10E+03**[d] | **3.13E+03**[h] |
| RE03-09-14212 | 03-608405 | 1.0–2.0 | Soil | — | — | — | — | 0.00255 (J) | — | — | — | — | — | 6.03 (J) | — | 0.00102 (J) | 0.000621 (J) | — |
| RE03-09-14213 | 03-608405 | 2.0–3.0 | Soil | — | — | — | — | 0.00265 (J) | 0.0104 (J) | — | — | — | — | 11.6 | — | 0.000983 (J) | — | — |
| RE03-09-14214 | 03-608405 | 4.0–5.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | 5.19 (J) | — | — | — | — |
| RE03-09-14215 | 03-608405 | 9.0–10.0 | Qbt3 | — | — | — | — | 0.00234 (J) | — | — | — | — | — | 3.37 (J) | — | — | — | — |
| RE03-09-14216 | 03-608406 | 1.0–2.0 | Soil | — | — | — | — | 0.00284 (J) | — | — | — | — | — | 4.09 (J) | — | — | — | — |
| RE03-09-14217 | 03-608406 | 2.0–3.0 | Soil | — | — | — | — | 0.0026 (J) | — | — | — | — | — | 2.82 (J) | — | — | — | — |
| RE03-09-14218 | 03-608406 | 4.0–5.0 | Soil | — | — | — | — | 0.00291 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14219 | 03-608406 | 9.0–10.0 | Soil | — | — | — | — | 0.00292 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14220 | 03-608407 | 1.0–2.0 | Soil | 0.000926 (J+) | 3.99 | 0.252 | 1.05 | — | 0.0372 (J) | 0.106 | 2.35 | 2.99 | 0.000767 (J+) | 20.1 | 0.000446 (J+) | 0.000662 (J+) | 0.000396 (J+) | 0.000565 (J+) |
| RE03-09-14221 | 03-608407 | 2.0–3.0 | Soil | — | — | — | — | — | — | — | — | — | — | 6.01 (J) | — | — | — | — |
| RE03-09-14222 | 03-608407 | 4.0–5.0 | Soil | — | — | — | — | — | 0.0105 (J) | — | — | — | — | 3.54 (J) | — | — | — | — |
| RE03-09-14223 | 03-608407 | 9.0–10.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | 3.31 (J) | — | — | — | — |
| RE03-09-14224 | 03-608408 | 1.0–2.0 | Soil | — | — | — | — | — | — | — | — | — | — | 5.25 (J) | — | — | — | — |
| RE03-09-14227 | 03-608408 | 9.0–10.0 | Soil | — | — | — | — | — | — | — | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] — = Not detected.

[f] Screening guidelines for diesel #2 from NMED (2006, 094614).

[g] na = Not available.

[h] Xylenes used as a surrogate based on structural similarity.

**Table 7.5-4**
**Radionuclides Detected or Detected above BVs/FVs at AOC 60-004(f)**

| Sample ID | Location ID | Depth (ft) | Media | Tritium |
|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **na**[b] |
| **Soil BV**[a] | | | | **na** |
| **Residential SAL**[c] | | | | **750** |
| **Industrial SAL**[c] | | | | **440000** |
| **Construction Worker SAL**[c] | | | | **320000** |
| RE03-09-14208 | 03-608404 | 1.0–2.0 | Soil | 0.040046 |
| RE03-09-14209 | 03-608404 | 2.0–3.0 | Qbt3 | 0.0327273 |
| RE03-09-14210 | 03-608404 | 4.0–5.0 | Qbt3 | 0.0735814 |
| RE03-09-14211 | 03-608404 | 9.0–10.0 | Qbt3 | 0.149279 |
| RE03-09-14212 | 03-608405 | 1.0–2.0 | Soil | 0.234598 |
| RE03-09-14213 | 03-608405 | 2.0–3.0 | Soil | 0.257011 |
| RE03-09-14214 | 03-608405 | 4.0–5.0 | Qbt3 | 0.301163 |
| RE03-09-14215 | 03-608405 | 9.0–10.0 | Qbt3 | 0.178889 |
| RE03-09-14217 | 03-608406 | 2.0–3.0 | Soil | 0.0448235 |
| RE03-09-14219 | 03-608406 | 9.0–10.0 | Soil | 0.10159 |
| RE03-09-14220 | 03-608407 | 1.0–2.0 | Soil | 0.0902857 |
| RE03-09-14221 | 03-608407 | 2.0–3.0 | Soil | 0.116118 |
| RE03-09-14222 | 03-608407 | 4.0–5.0 | Soil | 0.288519 |
| RE03-09-14223 | 03-608407 | 9.0–10.0 | Qbt3 | 0.131011 |

Note: All activities are in pCi/g.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] SALs for radionuclides from LANL (2009, 107655).

**Table 7.6-1**
**Samples Collected and Analyses Requested at SWMU 60-006(a)**

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

**Table 7.6-2**
**Inorganic Chemicals above BVs at SWMU 60-006(a)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Beryllium | Calcium | Chromium | Copper | Lead | Magnesium | Nickel | Nitrate | Perchlorate | Selenium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **2.79** | **1.21** | **2200** | **7.14** | **4.66** | **11.2** | **1690** | **6.58** | **na**[b] | **na** | **0.3** |
| **Residential SSL**[c] | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+02** | **na** | **2.19E+02**[d] | **3.13E+03** | **4.00E+02** | **na** | **1.56E+03** | **1.25E+05** | **5.48E+01** | **3.91E+02** |
| **Industrial SSL**[c] | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.26E+03** | **na** | **2.92E+03**[d] | **4.54E+04** | **8.00E+02** | **na** | **2.27E+04** | **1.82E+06** | **7.95E+02** | **5.68E+03** |
| **Construction Worker SSL**[c] | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **1.44E+02** | **na** | **4.49E+02**[d] | **1.24E+04** | **8.00E+02** | **na** | **6.19E+03** | **4.96E+05** | **2.17E+02** | **1.55E+03** |
| RE03-09-14228 | 03-608409 | 20.0–21.0 | Qbt3 | —[e] | 1.11 (U) | — | — | — | — | — | — | — | — | 1.26 | — | 1.09 (U) |
| RE03-09-14229 | 03-608409 | 24.0–25.0 | Qbt3 | — | 1.06 (U) | — | — | — | — | — | — | — | — | 1.21 | — | 1.08 (U) |
| RE03-09-14230 | 03-608409 | 29.0–30.0 | Qbt3 | — | 0.987 (U) | — | — | — | — | — | — | — | — | 1.23 | — | 1.05 (U) |
| RE03-09-14231 | 03-608410 | 18.0–19.0 | Qbt3 | — | 1.07 (U) | — | — | — | — | — | — | — | — | 1.33 (J-) | — | 1.07 (U) |
| RE03-09-14232 | 03-608410 | 22.0–23.0 | Qbt3 | — | 1.03 (U) | — | — | — | — | — | — | — | — | — | — | 1.04 (U) |
| RE03-09-14233 | 03-608410 | 27.0–28.0 | Qbt3 | — | 1.06 (U) | — | — | — | — | — | — | — | — | 1.5 (J-) | — | 1.06 (U) |
| RE03-09-14234 | 03-608411 | 18.0–19.0 | Qbt3 | — | 1.06 (U) | — | — | — | — | — | — | — | — | — | 0.000986 (J) | 1.08 (U) |
| RE03-09-14235 | 03-608411 | 22.0–23.0 | Qbt3 | 18,300 (J+) | 1.26 (U) | 3.11 | 2.09 | 2970 | 7.84 | 7.27 | 11.7 | 1810 (J+) | 13.2 | — | 0.00165 (J) | 1.29 (U) |
| RE03-09-14236 | 03-608411 | 27.0–28.0 | Qbt3 | — | 1.19 (U) | — | 1.45 | — | — | 5.54 | — | — | 7.38 (J) | — | 0.000959 (J) | 1.18 (U) |
| RE03-09-14238 | 03-608412 | 10.0–11.0 | Qbt3 | — | 0.981 (U) | — | — | — | — | — | — | — | — | — | — | 1.06 (U) |
| RE03-09-14239 | 03-608412 | 14.0–15.0 | Qbt3 | — | 1.04 (U) | — | — | — | — | — | — | — | — | — | — | 1.05 (U) |
| RE03-09-14240 | 03-608412 | 18.0–19.0 | Qbt3 | — | 1.02 (U) | — | — | — | — | — | — | — | — | — | 0.00128 (J) | 1.02 (U) |
| RE03-09-14241 | 03-608412 | 23.0–24.0 | Qbt3 | — | 1.13 (U) | — | — | — | — | — | — | — | 7.28 (J) | — | 0.00294 | 1.11 (U) |
| RE03-10-9872 | 03-608412 | 35.0–36.0 | Qbt3 | — | 1.2 (U) | — | — | — | 12 | — | — | — | — | 15.6 (J-) | 0.00129 (J) | 1.12 (U) |
| RE03-10-9873 | 03-608412 | 55.0–56.0 | Qbt3 | — | 1.01 (U) | — | — | — | — | — | — | — | — | 50.7 (J-) | — | 1.05 (U) |
| RE03-10-9874 | 03-608412 | 60.0–61.0 | Qbt3 | — | — | — | — | — | — | — | — | — | — | 65 (J-) | — | 1.04 (U) |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs 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 7.6-3**
**Organic Chemicals Detected at SWMU 60-006(a)**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Aroclor-1242 | Aroclor-1254 | Aroclor-1260 | Styrene |
|---|---|---|---|---|---|---|---|---|
| **Residential SSL**[a] | | | | **6.75E+04** | **2.22E+00** | **1.12E+00** | **2.22E+00** | **8.97E+03** |
| **Industrial SSL**[a] | | | | **8.51E+05** | **8.26E+00** | **8.26E+00** | **8.26E+00** | **5.12E+04** |
| **Construction Worker SSL**[a] | | | | **2.63E+05** | **7.58E+01** | **4.36E+00** | **7.58E+01** | **3.03E+04** |
| RE03-09-14231 | 03-608410 | 18.0–19.0 | Qbt3 | 0.0021 (J) | —[b] | — | — | — |
| RE03-09-14233 | 03-608410 | 27.0–28.0 | Qbt3 | — | 0.0356 | 0.0176 | 0.0044 | 0.000764 (J) |
| RE03-09-14234 | 03-608411 | 18.0–19.0 | Qbt3 | 0.00198 (J) | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070).
[b] — = Not detected.

**Table 7.6-4**
**Radionuclides Detected or Detected above BVs/FVs at SWMU 60-006(a)**

| Sample ID | Location ID | Depth (ft) | Media | Tritium | Uranium-235/236 |
|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **na[b]** | **0.09** |
| **Residential SAL[c]** | | | | **750** | **17** |
| **Industrial SAL[c]** | | | | **440000** | **87** |
| **Construction Worker SAL[c]** | | | | **320000** | **43** |
| RE03-09-14233 | 03-608410 | 27.0–28.0 | Qbt3 | 0.0173957 | —[c] |
| RE03-09-14235 | 03-608411 | 22.0–23.0 | Qbt3 | 0.063871 | — |
| RE03-09-14236 | 03-608411 | 27.0–28.0 | Qbt3 | 0.0682411 | — |
| RE03-10-9872 | 03-608412 | 35.0–36.0 | Qbt3 | — | 0.0922 |

Note: All activities are in pCi/g.
[a] BVs from LANL (1998, 059730).
[b] na = Not available.
[c] — = Not detected, or not detected above BV/FV.

**Table 7.7-1**
**Samples Collected and Analyses Requested at SWMU 60-007(a)**

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

*— = Analyses not requested.

**Table 7.7-2**
**Inorganic Chemicals above BVs at SWMU 60-007(a)**

| Sample ID | Location ID | Depth (ft) | Media | Antimony | Barium | Cadmium | Calcium | Thallium |
|---|---|---|---|---|---|---|---|---|
| **Soil BV**[a] | | | | **0.83** | **295** | **0.4** | **6120** | **0.73** |
| **Residential SSL**[b] | | | | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na**[c] | **5.16E+00** |
| **Industrial SSL**[b] | | | | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **7.49E+01** |
| **Construction Worker SSL**[b] | | | | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **2.04E+01** |
| RE03-09-14246 | 03-608413 | 0.0–1.0 | Soil | 0.956 (J) | —[d] | 0.53 (U) | — | — |
| RE03-09-14247 | 03-608413 | 2.0–3.0 | Soil | 1.07 (U) | — | 0.555 (U) | — | — |
| RE03-09-14248 | 03-608413 | 4.0–5.0 | Soil | 1.67 | — | — | — | — |
| RE03-09-14249 | 03-608414 | 0.0–1.0 | Soil | 1.02 (J) | — | 0.553 (U) | — | — |
| RE03-09-14250 | 03-608414 | 2.0–3.0 | Soil | 1.66 | — | 0.536 (U) | — | — |
| RE03-09-14251 | 03-608414 | 4.0–5.0 | Soil | 1.1 | — | 0.548 (U) | — | — |
| RE03-09-14252 | 03-608415 | 0.0–1.0 | Soil | 0.989 (J) | — | — | — | — |
| RE03-09-14253 | 03-608415 | 2.0–3.0 | Soil | 1.44 | — | 0.546 (U) | — | — |
| RE03-09-14254 | 03-608415 | 4.0–5.0 | Soil | 1.51 | — | 0.522 (U) | 6900 | — |
| RE03-09-14255 | 03-608416 | 0.0–1.0 | Soil | 0.971 (J) | — | 0.55 (U) | — | — |
| RE03-09-14256 | 03-608416 | 2.0–3.0 | Soil | 1.9 | — | — | — | — |
| RE03-09-14257 | 03-608416 | 4.0–5.0 | Soil | 0.999 | — | 0.504 (U) | — | — |
| AAB5801 | 60-01025 | 0.0–1.0 | Soil | — | 331 (J-) | — | NA | — |
| RC60-01-0003 | 60-10001 | 0.0–0.5 | Fill | — | — | — | — | 0.75 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs from LANL (1998, 059730).
[b] SSLs from NMED (2009, 108070) unless otherwise noted.
[c] na = Not available.
[d] — = Not detected or not detected above BV.

**Table 7.7-3**
**Organic Chemicals Detected at SWMU 60-007(a)**

| Sample ID | Location ID | Depth (ft) | Media | Toluene | TPH-DRO | TPH-LRO |
|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **5.57E+03** | **520[b]** | **na[c]** |
| **Industrial SSL[a]** | | | | **5.79E+04** | **1120[b]** | **na** |
| **Construction Worker SSL[a]** | | | | **2.11E+04** | **na** | **na** |
| RE03-09-14246 | 03-608413 | 0.0–1.0 | Soil | —[d] | 4.64 (J) | NA[e] |
| RE03-09-14248 | 03-608413 | 4.0–5.0 | Soil | — | 2.99 (J) | NA |
| RE03-09-14249 | 03-608414 | 0.0–1.0 | Soil | — | 4.38 (J) | NA |
| RE03-09-14250 | 03-608414 | 2.0–3.0 | Soil | — | 2.92 (J) | NA |
| RE03-09-14251 | 03-608414 | 4.0–5.0 | Soil | — | 3.09 (J) | NA |
| RE03-09-14252 | 03-608415 | 0.0–1.0 | Soil | — | 6.46 (J) | NA |
| RE03-09-14253 | 03-608415 | 2.0–3.0 | Soil | — | 2.86 (J) | NA |
| RE03-09-14254 | 03-608415 | 4.0–5.0 | Soil | — | 3.5 (J) | NA |
| RE03-09-14255 | 03-608416 | 0.0–1.0 | Soil | — | 3.99 (J) | NA |
| RE03-09-14256 | 03-608416 | 2.0–3.0 | Soil | — | 3.33 (J) | NA |
| RE03-09-14257 | 03-608416 | 4.0–5.0 | Soil | — | 2.58 (J) | NA |
| AAB5799 | 60-01024 | 0.0–1.0 | Soil | 0.001 (J) | NA | NA |
| RC60-01-0003 | 60-10001 | 0.0–0.5 | Fill | NA | — | 130 |
| RC60-01-0006 | 60-10004 | 0.0–0.5 | Fill | NA | 1100 | — |
| RC60-01-0007 | 60-10005 | 0.0–0.25 | Fill | NA | 350 | 160 |
| RC60-01-0008 | 60-10006 | 0.0–0.5 | Fill | NA | — | 41 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009, 108070) unless otherwise noted.
[b] Screening guidelines for diesel #2 from NMED (2006, 094614).
[c] na = Not available.
[d] — = Not detected.
[e] NA = Not analyzed.

**Table 7.8-1**
**Samples Collected and Analyses Requested at SWMU 60-007(b)**

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

**Table 7.8-2**
**Inorganic Chemicals above BVs at SWMU 60-007(b)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Barium | Cadmium | Calcium | Chromium | Copper | Lead | Potassium | Selenium | Sodium | Zinc |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV[a]** | | | | **7340** | **0.5** | **46** | **1.63** | **2200** | **7.14** | **4.66** | **11.2** | **3500** | **0.3** | **2770** | **63.5** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **295** | **0.4** | **6120** | **19.3** | **14.7** | **22.3** | **3460** | **1.52** | **915** | **48.8** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **1.56E+04** | **7.79E+01** | **na[c]** | **2.19E+02[d]** | **3.13E+03** | **4.00E+02** | **na** | **3.91E+02** | **na** | **2.35E+04** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **2.24E+05** | **1.12E+03** | **na** | **2.92E+03[d]** | **4.54E+04** | **8.00E+02** | **na** | **5.68E+03** | **na** | **3.41E+05** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **4.35E+03** | **3.09E+02** | **na** | **4.49E+02[d]** | **1.24E+04** | **8.00E+02** | **na** | **1.55E+03** | **na** | **9.29E+04** |
| RE03-09-14265 | 03-608417 | 0–1 | Soil | —[e] | 1.14 (U) | — | 0.57 (U) | — | — | — | — | — | — | 2240 | — |
| RE03-09-14267 | 03-608418 | 0–0.5 | Soil | — | 1.1 (U) | — | 0.548 (U) | — | — | 38.9 | — | — | — | 4270 | 130 |
| RE03-09-14269 | 03-608419 | 0–0.4 | Soil | — | 1.14 (U) | — | 0.572 (U) | — | — | — | — | — | — | 5710 | — |
| RE03-09-14271 | 03-608420 | 0–0.5 | Soil | — | 1.14 (U) | — | 0.572 (U) | — | — | — | — | 3630 | — | 9420 | 55.8 |
| RE03-09-14273 | 03-608421 | 0–1 | Soil | — | 1.08 (U) | — | 0.539 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14274 | 03-608421 | 1–2 | Soil | — | 1.03 (U) | — | 0.516 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14275 | 03-608422 | 0–1 | Soil | — | 1.18 (U) | — | — | — | — | — | 22.6 (J) | — | — | — | 101 (J) |
| RE03-09-14276 | 03-608422 | 1–2 | Soil | — | 1.1 (U) | — | 0.55 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14277 | 03-608423 | 0–1 | Soil | — | 1.11 (U) | — | 0.42 (J) | 7330 | — | — | — | — | — | — | 89.9 |
| RE03-09-14278 | 03-608423 | 1–2 | Soil | — | 1.04 (U) | — | — | — | — | — | — | — | — | — | 55.3 |
| RE03-09-14279 | 03-608424 | 0–1 | Soil | — | 1.11 (U) | — | — | — | — | — | — | — | — | — | 88.2 (J) |
| RE03-09-14280 | 03-608424 | 1–2 | Qbt3 | 8660 (J) | 1.12 (U) | 93.7 (J+) | — | 2370 (J) | 9.14 (J) | 6.02 | 12.5 (J) | — | 1.12 (UJ) | — | — |
| RE03-09-14281 | 03-608425 | 0–1 | Qbt3 | — | 1.12 (U) | — | — | — | — | — | — | — | 1.15 (U) | — | 64.4 |
| RE03-09-14282 | 03-608425 | 1–2 | Qbt3 | — | 1.12 (U) | — | — | — | 23.5 | — | — | — | 1.14 (U) | — | — |
| RE03-09-14283 | 03-608426 | 0–1 | Qbt3 | — | 1.21 (U) | — | — | — | — | — | — | — | 1.16 (U) | — | — |
| RE03-09-14284 | 03-608426 | 1–2 | Qbt3 | — | 1.1 (U) | — | — | — | — | — | — | — | 1.14 (U) | — | — |
| RE03-09-14285 | 03-608427 | 0–1 | Qbt3 | — | 1.11 (U) | — | — | — | — | — | — | — | 1.14 (U) | — | — |
| RE03-09-14286 | 03-608427 | 1–2 | Qbt3 | — | 1.14 (U) | — | — | — | — | — | — | — | 1.14 (U) | — | — |
| RE03-09-14287 | 03-608428 | 0–1 | Soil | — | 1.09 (U) | — | 0.543 (U) | — | — | — | — | — | — | — | — |
| RE03-09-14288 | 03-608428 | 1–2 | Soil | — | 1.04 (U) | — | 0.518 (U) | — | — | — | — | — | — | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070).

[c] na = Not available.

[d] SSL for hexavalent chromium.

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

**Table 7.8-3**
**Organic Chemicals Detected at SWMU 60-007(b)**

| Sample ID | Location ID | Depth (ft) | Media | Acenaphthene | Acetone | Anthracene | Aroclor-1254 | Aroclor-1260 | Benzo(a) anthracene | Benzo(a) pyrene | Benzo(b) fluoranthene | Benzo(g,h,i) perylene | Benzo(k) fluoranthene | Bis(2-ethylhexyl) phthalate | Chloromethane |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **3.44E+03** | **6.75E+04** | **1.72E+04** | **1.12E+00** | **2.22E+00** | **6.21E-01** | **6.21E+00** | **6.21E+00** | **1.72E+03[b]** | **6.21E+01** | **3.47E+02** | **3.56E+01** |
| **Industrial SSL[a]** | | | | **3.67E+04** | **8.51E+05** | **1.83E+05** | **8.26E+00** | **8.26E+00** | **2.34E+00** | **2.34E+01** | **2.34E+01** | **1.83E+04[b]** | **2.34E+02** | **1.37E+03** | **1.98E+02** |
| **Construction Worker SSL[a]** | | | | **1.86E+04** | **2.63E+05** | **6.68E+04** | **4.36E+00** | **2.58E+01** | **2.13E+01** | **2.13E+02** | **2.13E+02** | **6.68E+03[b]** | **2.06E+03** | **4.76E+03** | **1.13E+03** |
| RE03-09-14265 | 03-608417 | 0–1 | Soil | —[c] | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14267 | 03-608418 | 0–0.5 | Soil | — | 0.00534 (J) | — | — | — | 0.0313 (J) | 0.0334 (J) | 0.0517 | 0.0341 (J) | — | 0.0812 (J) | — |
| RE03-09-14269 | 03-608419 | 0–0.4 | Soil | — | 0.00966 (J) | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14271 | 03-608420 | 0–0.5 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14273 | 03-608421 | 0–1 | Soil | — | — | — | — | 0.0038 | — | — | 0.0214 (J) | — | — | — | 0.0418 |
| RE03-09-14274 | 03-608421 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14275 | 03-608422 | 0–1 | Soil | — | — | 0.0707 (J) | — | — | 0.247 | 0.183 | 0.294 | 0.0925 (J) | 0.131 (J) | 0.389 (J) | — |
| RE03-09-14276 | 03-608422 | 1–2 | Soil | — | — | 0.0192 (J) | — | — | 0.0602 | 0.0462 | 0.0714 | 0.0286 (J) | 0.0298 (J) | 0.12 (J) | — |
| RE03-09-14277 | 03-608423 | 0–1 | Soil | 0.0319 (J) | — | 0.0577 | — | — | 0.218 | 0.216 | 0.352 | 0.096 | 0.13 | 0.1 (J) | — |
| RE03-09-14278 | 03-608423 | 1–2 | Soil | 0.0394 | — | 0.0748 | — | — | 0.162 | 0.156 | 0.218 | 0.072 (J) | 0.0853 | — | — |
| RE03-09-14279 | 03-608424 | 0–1 | Soil | — | — | 0.0162 (J) | — | — | 0.0812 | 0.0862 | 0.155 | 0.0464 | 0.0555 | — | — |
| RE03-09-14280 | 03-608424 | 1–2 | Qbt3 | — | — | — | — | — | 0.0187 (J) | 0.0126 (J) | 0.0198 (J) | — | — | — | — |
| RE03-09-14281 | 03-608425 | 0–1 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14285 | 03-608427 | 0–1 | Qbt3 | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14287 | 03-608428 | 0–1 | Soil | — | — | — | 0.0033 | 0.0029 (J) | 0.021 (J) | 0.0221 (J) | 0.033 (J) | — | 0.0116 (J) | — | — |
| RE03-09-14288 | 03-608428 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | — | — | — |

**Table 7.8-3 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Chrysene | DDT[4,4'-] | Fluoranthene | Fluorene | Indeno(1,2,3-cd) pyrene | Isopropyltoluene[4-] | Phenanthrene | Pyrene | Toluene | TPH-DRO | Trimethylbenzene[1,2,4-] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.21E+02** | **1.72E+01** | **2.29E+03** | **2.29E+03** | **6.21E+00** | **3.21E+03[d]** | **1.83E+03** | **1.72E+03** | **5.57E+03** | **520[e]** | **6.20E+01[f]** |
| **Industrial SSL[a]** | | | | **2.34E+03** | **7.81E+01** | **2.44E+04** | **2.44E+04** | **2.34E+01** | **1.49E+04[d]** | **2.05E+04** | **1.83E+04** | **5.79E+04** | **1120[e]** | **2.60E+02[f]** |
| **Construction Worker SSL[a]** | | | | **2.06E+04** | **1.42E+02** | **8.91E+03** | **8.91E+03** | **2.13E+02** | **1.03E+04[d]** | **7.15E+03** | **6.68E+03** | **2.11E+04** | **na[g]** | **6.88E+02[h]** |
| RE03-09-14265 | 03-608417 | 0–1 | Soil | — | — | — | — | — | — | — | — | — | 79 (J) | — |
| RE03-09-14267 | 03-608418 | 0–0.5 | Soil | 0.0468 | — | 0.0422 | — | 0.0269 (J) | — | — | 0.0576 | — | 136 (J) | — |
| RE03-09-14269 | 03-608419 | 0–0.4 | Soil | — | — | — | — | — | — | — | — | — | 57.2 (J) | — |
| RE03-09-14271 | 03-608420 | 0–0.5 | Soil | — | — | — | — | — | — | — | — | — | 71.5 (J) | — |
| RE03-09-14273 | 03-608421 | 0–1 | Soil | — | — | 0.0188 (J) | — | — | — | 0.0118 (J) | 0.0228 (J) | — | 43.3 | — |
| RE03-09-14274 | 03-608421 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | 3.19 (J) | — |
| RE03-09-14275 | 03-608422 | 0–1 | Soil | 0.246 | — | 0.537 | — | 0.254 | 0.000537 (J) | 0.393 | 0.489 | 0.00103 (J) | 63.5 (J) | — |
| RE03-09-14276 | 03-608422 | 1–2 | Soil | 0.0594 | — | 0.14 | 0.0122 (J) | 0.065 | — | 0.112 | 0.135 | — | 18 | — |
| RE03-09-14277 | 03-608423 | 0–1 | Soil | 0.258 | 0.019 (J) | 0.533 | 0.0315 (J) | 0.103 (J) | — | 0.37 | 0.591 (J) | — | 78.8 | — |
| RE03-09-14278 | 03-608423 | 1–2 | Soil | 0.176 | 0.0217 (J) | 0.402 | 0.0426 | 0.0729 (J) | — | 0.381 | 0.435 | 0.000425 (J) | 31.4 | — |
| RE03-09-14279 | 03-608424 | 0–1 | Soil | 0.12 | — | 0.227 | — | 0.0802 | — | 0.108 | 0.212 | — | 43.6 (J) | — |
| RE03-09-14280 | 03-608424 | 1–2 | Qbt3 | 0.0128 (J) | — | 0.0273 (J) | — | 0.0473 | — | — | 0.0257 (J) | — | 16.3 | — |
| RE03-09-14281 | 03-608425 | 0–1 | Qbt3 | — | — | — | — | — | — | — | — | — | 5.82 (J) | — |
| RE03-09-14285 | 03-608427 | 0–1 | Qbt3 | — | — | — | — | — | — | — | — | — | 3.79 (J) | 0.000413 (J) |
| RE03-09-14287 | 03-608428 | 0–1 | Soil | 0.0287 (J) | — | 0.0517 | — | — | — | 0.0284 (J) | 0.0505 | — | 19.4 | — |
| RE03-09-14288 | 03-608428 | 1–2 | Soil | — | — | — | — | — | — | — | — | — | 5.2 (J) | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Pyrene used as surrogate based on structural similarity.

[c] — = Not detected.

[d] Isopropylbenzene used as a surrogate based on structural similarity.

[e] Screening guidelines for diesel #2 from NMED (2006, 094614).

[f] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[g] na = Not available.

[h] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table 8.5-1**
**Samples Collected and Analyses Requested at AOC C-61-002**

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

**Table 8.5-2**
**Inorganic Chemicals above BVs at AOC C-61-002**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Mercury | Nickel | Selenium | Thallium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt 2,3,4 BV**[a] | | | | **7340** | **0.5** | **2.79** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **0.1** | **6.58** | **0.3** | **1.1** | **17** |
| **Soil BV**[a] | | | | **29,200** | **0.83** | **8.17** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **0.1** | **15.4** | **1.52** | **0.73** | **39.6** |
| **Residential SSL**[b] | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na**[c] | **2.19E+02**[d] | **2.30E+01**[e] | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **2.30E+01** | **1.56E+03** | **3.91E+02** | **5.16E+00** | **3.91E+02** |
| **Industrial SSL**[b] | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03**[d] | **3.00E+02**[e] | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **3.10E+02** | **2.27E+04** | **5.68E+03** | **7.49E+01** | **5.68E+03** |
| **Construction Worker SSL**[b] | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02**[d] | **3.46E+01**[f] | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **9.29E+01** | **6.19E+03** | **1.55E+03** | **2.04E+01** | **1.55E+03** |
| RE03-09-14300 | 03-608429 | 3.0–4.0 | Soil | —[g] | 1.09 (U) | — | — | — | 0.547 (U) | — | — | 11.4 | — | — | — | — | — | — | — | — | — |
| RE03-09-14301 | 03-608429 | 5.0–6.0 | Soil | — | 1.13 (U) | — | — | — | 0.567 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14302 | 03-608429 | 7.0–8.0 | Soil | — | 1.11 (U) | — | — | — | 0.557 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14303 | 03-608429 | 9.0–10.0 | Soil | — | 1.11 (U) | — | — | — | 0.556 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14304 | 03-608429 | 11.0–12.0 | Soil | — | 1.06 (U) | — | — | — | 0.532 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14305 | 03-608429 | 14.0–15.0 | Soil | — | 1.09 (U) | — | — | — | 0.546 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14306 | 03-608430 | 3.0–4.0 | Soil | — | 1.15 (U) | — | 554 | 2.06 | 0.576 (U) | 6630 (J+) | — | 20.9 | — | — | — | — | — | 16 | 2.32 (U) | — | — |
| RE03-09-14307 | 03-608430 | 5.0–6.0 | Soil | — | 1.12 (U) | — | — | — | 0.559 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14308 | 03-608430 | 7.0–8.0 | Soil | — | 1.08 (U) | — | — | — | 0.539 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14309 | 03-608430 | 9.0–10.0 | Soil | — | 1.1 (U) | — | — | — | 0.552 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14310 | 03-608430 | 11.0–12.0 | Soil | — | 1.08 (U) | — | — | — | 0.54 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14311 | 03-608430 | 14.0–15.0 | Soil | — | 1.1 (U) | — | — | — | 0.55 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14312 | 03-608431 | 3.0–4.0 | Soil | — | — | — | — | — | 0.659 (U) | 6960 | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14313 | 03-608431 | 5.0–6.0 | Soil | — | 1.27 (U) | — | — | 1.84 | 0.636 (U) | — | — | — | — | — | — | — | — | — | 2.45 (UJ) | — | — |
| RE03-09-14314 | 03-608431 | 7.0–8.0 | Soil | — | 1.24 (U) | — | 992 | 2.16 | — | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14315 | 03-608431 | 9.0–10.0 | Soil | — | 1.16 (U) | — | — | — | 0.578 (U) | — | — | — | — | — | — | — | — | — | — | — | — |
| RE03-09-14316 | 03-608431 | 11.0–12.0 | Qbt3 | 11,200 | 1.17 (U) | — | 99.2 | 1.26 | — | 2220 | — | — | 5.98 | — | — | — | — | — | 1.13 (UJ) | — | — |
| RE03-09-14317 | 03-608431 | 14.0–15.0 | Qbt3 | 10,300 | 0.861 (J) | — | 66.8 | — | — | 2890 | — | — | 6.05 | — | — | 1860 | — | — | 1.16 (UJ) | — | — |
| RE03-09-14318 | 03-608432 | 3.0–4.0 | Soil | — | 1.14 (J) | — | — | — | — | 7520 | — | — | — | — | 27.6 | — | — | — | 2.56 (UJ) | 1.27 | — |
| RE03-09-14319 | 03-608432 | 5.0–6.0 | Qbt3 | — | 1.11 (U) | — | 83.3 | — | — | — | — | — | — | 25,600 | — | — | — | — | 1.07 (UJ) | — | — |
| RE03-09-14320 | 03-608432 | 7.0–8.0 | Qbt3 | — | 1.14 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.11 (UJ) | — | — |
| RE03-09-14321 | 03-608432 | 9.0–10.0 | Qbt3 | — | 1.14 (U) | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.16 (UJ) | — | — |
| RE03-09-14322 | 03-608432 | 11.0–12.0 | Qbt3 | — | 1.15 | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.13 (UJ) | — | — |
| RE03-09-14323 | 03-608432 | 14.0–15.0 | Qbt3 | — | 0.506 (J) | — | — | — | — | — | — | — | — | — | — | — | — | — | 1.12 (UJ) | — | — |
| RE03-09-14324 | 03-608433 | 3.0–4.0 | Soil | — | 0.92 (J) | — | — | — | — | — | — | — | — | — | 23.1 | — | — | — | — | — | — |
| RE03-09-14325 | 03-608433 | 5.0–6.0 | Soil | — | 1.75 | — | — | 2.22 | — | 13,100 | — | 11.2 | — | — | 22.8 | — | — | 19.8 | — | 1.09 | — |
| RE03-09-14326 | 03-608433 | 7.0–8.0 | Qbt3 | 19,900 | 1.2 (J) | 4.61 (J-) | 288 | 1.83 | — | 6350 | 13.5 | 5.69 | 14 | 19,800 | 19.4 | 4430 | 0.121 | 17.6 | 1.34 (UJ) | — | 26.4 |
| RE03-09-14327 | 03-608433 | 9.0–10.0 | Qbt3 | — | 1.54 | — | 181 | — | — | 10,200 | — | — | — | — | — | — | 0.123 | 7.31 | 1.18 (UJ) | — | — |

**Table 8.5-2 (continued)**

| Sample ID | Location ID | Depth (ft) | Media | Aluminum | Antimony | Arsenic | Barium | Beryllium | Cadmium | Calcium | Chromium | Cobalt | Copper | Iron | Lead | Magnesium | Mercury | Nickel | Selenium | Thallium | Vanadium |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Qbt3 BV[a]** | | | | **7340** | **0.5** | **2.79** | **46** | **1.21** | **1.63** | **2200** | **7.14** | **3.14** | **4.66** | **14,500** | **11.2** | **1690** | **0.1** | **6.58** | **0.3** | **1.1** | **17** |
| **Soil BV[a]** | | | | **29,200** | **0.83** | **8.17** | **295** | **1.83** | **0.4** | **6120** | **19.3** | **8.64** | **14.7** | **21,500** | **22.3** | **4610** | **0.1** | **15.4** | **1.52** | **0.73** | **39.6** |
| **Residential SSL[b]** | | | | **7.81E+04** | **3.13E+01** | **3.90E+00** | **1.56E+04** | **1.56E+02** | **7.79E+01** | **na[c]** | **2.19E+02** | **2.30E+01[d]** | **3.13E+03** | **5.48E+04** | **4.00E+02** | **na** | **2.30E+01** | **1.56E+03** | **3.91E+02** | **5.16E+00** | **3.91E+02** |
| **Industrial SSL[b]** | | | | **1.13E+06** | **4.54E+02** | **1.77E+01** | **2.24E+05** | **2.26E+03** | **1.12E+03** | **na** | **2.92E+03** | **3.00E+02[d]** | **4.54E+04** | **7.95E+05** | **8.00E+02** | **na** | **3.10E+02** | **2.27E+04** | **5.68E+03** | **7.49E+01** | **5.68E+03** |
| **Construction Worker SSL[b]** | | | | **4.07E+04** | **1.24E+02** | **6.54E+01** | **4.35E+03** | **1.44E+02** | **3.09E+02** | **na** | **4.49E+02** | **3.46E+01** | **1.24E+04** | **2.17E+05** | **8.00E+02** | **na** | **9.29E+01** | **6.19E+03** | **1.55E+03** | **2.04E+01** | **1.55E+03** |
| RE03-09-14328 | 03-608433 | 11.0–12.0 | Qbt3 | — | 0.514 (J) | — | 59.9 | — | — | 3220 | — | — | — | 23,900 | — | — | — | — | 1.17 (UJ) | — | — |
| RE03-09-14329 | 03-608433 | 14.0–15.0 | Qbt3 | — | 0.603 (J) | — | 76.7 | 1.25 | — | 3320 | — | — | 4.77 | — | — | — | — | 8.4 | 1.19 (UJ) | — | — |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009, 108070) unless otherwise noted.

[c] na = Not available.

[d] SSL for hexavalent chromium.

[e] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

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

**Table 8.5-3**
**Organic Chemicals Detected at AOC C-61-002**

| Sample ID | Location ID | Depth (ft) | Media | Acetone | Aroclor-1254 | Benzoic Acid | TPH-DRO |
|---|---|---|---|---|---|---|---|
| **Residential SSL[a]** | | | | **6.75E+04** | **1.12E+00** | **2.40E+05[b]** | **520[c]** |
| **Industrial SSL[a]** | | | | **8.51E+05** | **8.26E+00** | **2.50E+06[b]** | **1120[c]** |
| **Construction Worker SSL[a]** | | | | **2.63E+05** | **4.36E+00** | **9.52E+05[d]** | **na[e]** |
| RE03-09-14300 | 03-608429 | 3.0–4.0 | Soil | —[f] | — | — | 3.05 (J) |
| RE03-09-14301 | 03-608429 | 5.0–6.0 | Soil | — | — | 0.445 (J) | 3.61 (J) |
| RE03-09-14303 | 03-608429 | 9.0–10.0 | Soil | — | — | — | 3.23 (J) |
| RE03-09-14304 | 03-608429 | 11.0–12.0 | Soil | — | — | — | 9.38 (J) |
| RE03-09-14305 | 03-608429 | 14.0–15.0 | Soil | — | 0.0021 (J) | — | 2.94 (J) |
| RE03-09-14307 | 03-608430 | 5.0–6.0 | Soil | — | — | — | 4.58 (J) |
| RE03-09-14309 | 03-608430 | 9.0–10.0 | Soil | — | — | — | 2.72 (J) |
| RE03-09-14310 | 03-608430 | 11.0–12.0 | Soil | — | — | — | 2.7 (J) |
| RE03-09-14311 | 03-608430 | 14.0–15.0 | Soil | — | — | — | 2.8 (J) |
| RE03-09-14312 | 03-608431 | 3.0–4.0 | Soil | 0.00229 (J) | — | — | — |
| RE03-09-14313 | 03-608431 | 5.0–6.0 | Soil | — | — | — | 3.98 (J) |
| RE03-09-14315 | 03-608431 | 9.0–10.0 | Soil | — | — | — | 2.74 (J) |
| RE03-09-14317 | 03-608431 | 14.0–15.0 | Qbt3 | 0.002 (J) | — | — | — |
| RE03-09-14321 | 03-608432 | 9.0–10.0 | Qbt3 | — | — | — | 4.88 (J) |
| RE03-09-14322 | 03-608432 | 11.0–12.0 | Qbt3 | 0.00246 (J) | — | — | — |
| RE03-09-14324 | 03-608433 | 3.0–4.0 | Soil | 0.00528 (J) | — | — | 1450 |
| RE03-09-14327 | 03-608433 | 9.0–10.0 | Qbt3 | 0.006 (J) | — | — | — |
| RE03-09-14328 | 03-608433 | 11.0–12.0 | Qbt3 | 0.0034 (J) | — | — | — |
| RE03-09-14329 | 03-608433 | 14.0–15.0 | Qbt3 | 0.00231 (J) | — | — | 11.1 |

Notes: All concentrations are in mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Screening guidelines for diesel #2 from NMED (2006, 094614).

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[e] na = Not available.

[f] — = Not detected.

**Table 10.1-1**
**Summary of Investigation Results and Recommendations**

| Consolidated Unit | SWMU/AOC | Brief Description | Extent Defined? | Potential Unacceptable Risk? | Recommendation |
|---|---|---|---|---|---|
| **TA-03** | | | | | |
| | SWMU 03-002(c) | Former storage area | No | n/a* | Additional extent sampling |
| | SWMU 03-003(c) | Equipment storage area—PCB site | Yes | No | No further action |
| | AOC 03-003(d) | Transformer pad—PCB only site | No | n/a | Additional extent sampling |
| | AOC 03-003(f) | Transformer area—PCB only site | No | n/a | Delayed investigation |
| | AOC 03-003(g) | Transformer area—PCB only site | No | n/a | Delayed investigation |
| | AOC 03-003(o) | Former non-PCB capacitor bank | Yes | No | No further action |
| 03-009(a)-00 | SWMU 03-009(a) | Surface disposal | No | n/a | Additional extent sampling |
| | SWMU 03-028 | Surface impoundment | Yes | No | Corrective action complete |
| | SWMU 03-029 | Landfill | No | n/a | Additional extent sampling |
| | SWMU 03-036(a) | Potential soil contamination | Yes | No | Corrective action complete |
| | SWMU 03-036(c) | Potential soil contamination | Yes | No | Corrective action complete |
| | SWMU 03-036(d) | Potential soil contamination | Yes | No | Corrective action complete |
| | AOC 03-043(b) | Aboveground tank | Yes | No | Corrective action complete |
| | AOC 03-043(d) | Duplicate of SWMU 03-036(a) | Yes | No | Corrective action complete |
| | AOC 03-043(h) | Duplicate of SWMU 03-036(a) | Yes | No | Corrective action complete |
| | SWMU 03-045(g) | Storm drain | No | n/a | Additional extent sampling |
| | SWMU 03-009(i) | Surface disposal site | No | n/a | Additional extent sampling |
| 03-012(b)-00 | SWMU 03-012(b) | Operational release | No | n/a | Additional extent sampling |
| | SWMU 03-014(q) | Holding tank | Yes | No | Corrective action complete |
| | SWMU 03-045(b) | Outfall | No | n/a | Additional extent sampling |
| | SWMU 03-045(c) | Outfall | No | n/a | Additional extent sampling |

**Table 10.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Extent Defined? | Potential Unacceptable Risk? | Recommendation |
|---|---|---|---|---|---|
| 03-013(a)-00 | SWMU 03-013(a) | Storm drain | No | n/a | Delayed investigation |
| | SWMU 03-052(f) | Outfall | No | n/a | Additional extent sampling |
| | AOC 03-013(b) | Floor drains | No | n/a | Delayed investigation |
| | SWMU 03-013(i) | Operational release | No | n/a | Additional extent sampling |
| 03-014(a)-99 | SWMU 03-014(a) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(b) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | AOC 03-014(b2) | Outfall associated with former WWTP | No | n/a | Additional extent investigation |
| | SWMU 03-014(c) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | AOC 03-014(c2) | Outfall associated with former WWTP | No | n/a | Additional extent investigation |
| | SWMU 03-014(d) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(e) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(f) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(g) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(h) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(i) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(j) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(k) | Structure associated with former WWTP | No | n/a | Additional extent sampling |
| | SWMU 03-014(l) | Structure associated with former WWTP | No | n/a | Additional extent sampling |
| | SWMU 03-014(m) | Structure associated with former WWTP | No | n/a | Additional extent sampling |
| | SWMU 03-014(n) | Structure associated with former WWTP | No | n/a | Additional extent sampling |
| | SWMU 03-014(o) | Structure associated with former WWTP | No | n/a | Additional extent sampling |

**Table 10.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Extent Defined? | Potential Unacceptable Risk? | Recommendation |
|---|---|---|---|---|---|
| 03-014(a)-99 (continued) | SWMU 03-014(p) | Structure associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(u) | Structure associated with former WWTP | No | n/a | Additional extent sampling |
| | SWMU 03-056(d) | Drum storage | No | n/a | Additional extent sampling |
| | SWMU 03-014(r) | Lift station associated with former WWTP | No | n/a | Delayed investigation |
| | SWMU 03-014(s) | Lift station associated with former WWTP | No | n/a | Delayed investigation |
| | AOC 03-014(v) | Drain associated with former WWTP | Yes | No | Corrective action complete |
| | AOC 03-014(y) | Drain associated with former WWTP | No | n/a | Delayed investigation |
| 03-015-00 | SWMU 03-015 | Outfall | No | n/a | Additional extent investigation |
| | AOC 03-053 | Operational facility | No | n/a | Additional extent investigation |
| | AOC C-03-016 | Oil metal bin | Yes | No | Corrective action complete |
| | SWMU 03-021 | Outfall | No | n/a | Additional extent investigation |
| | AOC 03-027 | Lift wells | Yes | No | Corrective action complete |
| | AOC 03-036(b) | Former aboveground storage tanks | Yes | No | Corrective action complete |
| | SWMU 03-037 | Underground storage tanks | No | n/a | Delayed investigation |
| | AOC 03-038(c) | Waste lines | Yes | No | Corrective action complete |
| | AOC 03-038(d) | Waste lines | No | n/a | Additional extent investigation |
| | AOC 03-043(a) | Duplicate of SWMUs 03-036(c) and 03-036(d) | Yes | No | Corrective action complete |
| | AOC 03-043(f) | Duplicate of SWMUs 03-036(c) and 03-036(d) | Yes | No | Corrective action complete |
| | AOC 03-043(g) | Duplicate of SWMUs 03-036(c) and 03-036(d) | Yes | No | Corrective action complete |
| | SWMU 03-045(a) | Outfall | No | n/a | Additional extent investigation |
| | SWMU 03-045(e) | Outfall | No | n/a | Delayed investigation |
| | SWMU 03-045(f) | Outfall | No | n/a | Additional extent investigation |

**Table 10.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Extent Defined? | Potential Unacceptable Risk? | Recommendation |
|---|---|---|---|---|---|
| | SWMU 03-045(h) | Outfall | No | n/a | Additional extent investigation |
| | AOC 03-047(d) | Storage area | Yes | No | No further action |
| | AOC 03-047(g) | Drum storage | No | n/a | Additional extent investigation |
| | AOC 03-051(c) | Soil contamination | No | n/a | Additional extent investigation |
| | AOC 03-052(b) | Storm drainage | No | n/a | Additional extent investigation |
| | SWMU 03-054(c) | Outfall | No | n/a | Delayed investigation |
| | SWMU 03-056(a) | Storage area | No | n/a | Additional extent investigation |
| | SWMU 03-056(c) | Transformer storage area—PCB site | Yes | No | No further action |
| | AOC 03-056(h) | Container storage area | No | n/a | Delayed investigation |
| | AOC 03-056(k) | Container storage area | No | n/a | Additional extent investigation |
| | SWMU 03-056(l) | Storage area | Yes | No | Corrective action complete |
| 03-059-00 | AOC 03-003(n) | One-time spill—PCB site | Yes | No | Corrective action complete |
| | SWMU 03-059 | Storage area—PCB site | No | n/a | Additional extent investigation |
| | AOC C-03-022 | Kerosene tanker trailer | No | n/a | Additional extent investigation |
| **TA-60** | | | | | |
| | SWMU 60-002 | Storage areas (west, central, east) | No | n/a | Additional extent investigation |
| | AOC 60-004(b) | Storage area | Yes | No | Corrective action complete |
| | AOC 60-004(d) | Storage area | Yes | No | Corrective action complete |
| | AOC 60-004(f) | Storage area | No | n/a | Additional extent investigation |
| | SWMU 60-006(a) | Septic system | No | n/a | Additional extent investigation |
| | SWMU 60-007(a) | Release | No | n/a | Additional extent investigation |
| | SWMU 60-007(b) | Release | No | n/a | Additional extent investigation |

**Table 10.1-1 (continued)**

| Consolidated Unit | SWMU/AOC | Brief Description | Extent Defined? | Potential Unacceptable Risk? | Recommendation |
|---|---|---|---|---|---|
| **TA-61** | | | | | |
| | SWMU 61-002 | Transformer storage area—PCB site | Yes | No | No further action |
| | SWMU 61-005 | Landfill | n/a | n/a | Closure under RCRA Subtitle D |
| | SWMU 61-006 | Used oil storage tank | n/a | n/a | Regulated under 40 CFR 279 and 20.4.1.1002 NMAC |
| | AOC C-61-002 | Subsurface contamination | No | n/a | Additional extent investigation |

Note: Shading denotes consolidated unit.
*n/a = Not applicable.

# Appendix A

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

## A-1.0 ACRONYMS AND ABBREVIATIONS

| | |
|---|---|
| %D | percent difference |
| %R | percent recovery |
| %RSD | percent relative standard deviation |
| ACA | accelerated corrective action |
| AI | adequate intake |
| AK | acceptable knowledge |
| ALARA | as low as reasonably achievable |
| AOC | area of concern |
| ATSDR | Agency for Toxic Substances and Disease Registry |
| AUF | area use factor |
| bgs | below ground surface |
| BTEX | benzene, toluene, ethylbenzene, and xylene |
| BV | background value |
| CCV | continuing calibration verification |
| CFR | Code of Federal Regulations |
| CMR | Chemistry and Metallurgy Research |
| COC | chain of custody |
| Consent Order | Compliance Order on Consent |
| COPEC | chemical of potential ecological concern |
| COPC | chemical of potential concern |
| CSM | conceptual site model |
| CST | Chemical Science and Technology (a Laboratory division) |
| CVAA | cold vapor atomic absorption |
| D&D | decontamination and decommissioning |
| DAF | dilution attenuation factor |
| DDT | dichlorophenyltrichloroethylene |
| DL | detection limit |
| DOE | Department of Energy (U.S.) |
| DGPS | differential global-positioning system |
| dpm | disintegrations per minute |
| DRO | diesel range organic |
| DU | depleted uranium |
| EDL | estimated detection limit |

| | |
|---|---|
| Eh | oxidation–reduction potential |
| EM | electromagnetic |
| EP | Environmental Programs Directorate |
| EPA | Environmental Protection Agency (U.S.) |
| EPC | exposure point concentration |
| EQL | estimated quantitation limit |
| ER | Environmental Restoration (Project) |
| ESL | ecological screening level |
| eV | electron-volt |
| FIP | field implementation plan |
| FV | fallout value |
| GC/MS | gas chromatography/mass spectrometry |
| GPR | ground-penetrating radar |
| GPS | global-positioning system |
| GRO | gasoline range organic |
| HI | hazard index |
| HIR | historical investigation report |
| HQ | hazard quotient |
| HR | home range |
| HSA | hollow-stem auger |
| ICS | interference check sample |
| ICV | initial calibration verification |
| I.D. | inside diameter |
| ID | identification |
| IDW | investigation-derived waste |
| IFGMP | Interim Facility-Wide Groundwater Monitoring Plan |
| IS | internal standard |
| $K_d$ | soil-water partition coefficient |
| $K_{ow}$ | octanol-water partition coefficient |
| kVA | kilo volt amperes |
| LAL | lower acceptance limit |
| LANL | Los Alamos National Laboratory |
| LCS | laboratory control sample |
| LOAEL | lowest observed adverse effect level |

| | |
|---|---|
| LRO | lubrication range organic |
| MASW | multianalysis of shear waves |
| MCPA | methyl chlorophenoxy acetic acid |
| MCPP | 2-(2-methyl-4- chlorophenoxy) propionic |
| MDL | method detection limit |
| MS | matrix spike |
| MSW | Municipal Solid Waste |
| NFA | no further action |
| NMED | New Mexico Environment Department |
| NOAEL | no observed adverse effect level |
| NPDES | National Pollutant Discharge Elimination System |
| NSSB | National Security Science Building |
| NTS | Nevada Test Site |
| OU | operable unit |
| PAH | polycyclic aromatic hydrocarbon |
| PAUF | population area use factor |
| PCB | polychlorinated biphenyl |
| PCE | tetrachloroethane |
| PID | photoionization detector |
| PPE | personal protective equipment |
| PQL | practical quantitation limit |
| QA | quality assurance |
| QC | quality control |
| Qbt | Tshirege Member of the Bandelier Tuff |
| RAGS | Risk Assessment Guidance for Superfund (EPA) |
| RCRA | Resource Conservation and Recovery Act |
| RCT | radiation control technician |
| RDA | recommended daily allowance |
| RfD | reference dose |
| RFI | RCRA facility investigation |
| RL | reporting limit |
| RLW | radioactive liquid waste |
| RLWTF | radioactive liquid waste treatment facility |
| RPD | relative percent difference |

| | |
|---|---|
| SAL | screening action level |
| SCL | sample collection log |
| SF | slope factor |
| SMO | Sample Management Office |
| SOP | standard operating procedure |
| SOW | statement of work |
| SSL | soil screening level |
| SVOC | semivolatile organic compound |
| SWMU | solid waste management unit |
| SWSC | Sanitary Wastewater Systems Consolidation |
| T&E | threatened and endangered |
| TA | technical area |
| TAL | target analyte list |
| TCE | trichloroethene |
| TD | total depth |
| TPH | total petroleum hydrocarbon |
| TRV | toxicity reference value |
| TSCA | Toxic Substances Control Act |
| TSS | total suspended solids |
| UAL | upper acceptance limit |
| UCL | upper confidence limit |
| UTL | upper tolerance limit |
| VCA | voluntary corrective action |
| VOC | volatile organic compound |
| WCSF | waste characterization strategy form |
| WWTP | wastewater treatment plant |
| 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 2009 investigation at Upper Sandia Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Table B-1.0-1 provides a summary of 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 and 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 2009 investigation. All drilling was conducted for the purpose of collecting investigation samples.

## B-3.0 FIELD-SCREENING METHODS

This section summarizes the field-screening methods used during the investigation activities. Field screening for volatile organic compounds (VOCs) was performed as necessary for health and safety purposes. Field screening for radioactivity was performed on every sample submitted to the Sample Management Office (SMO). Field-screening results for all investigation activities are described in section 3.2-3 and presented in Table 3.2-2 of the investigation report.

### B-3.1 Field Screening for VOCs

Field screening for VOCs was conducted for all samples, except as noted in section B-10.0. Screening was conducted using a MiniRae 2000 photoionization detector (PID) equipped with an 11.7-electron-volt lamp. Screening was performed in accordance with the manufacturer's specifications and SOP-06.33, Headspace Vapor Screening with a Photoionization Dectector. Screening was performed on each sample collected, and screening measurements were recorded on the field 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 radioactivity before they were submitted to the SMO, targeting alpha and beta/gamma emitters. 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 for detection of alpha emissions. The operational range varies from trace emissions to 1 million disintegrations per minute. 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-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 site-safety officer. Calibration of the Eberline E-600 was conducted by the RCT. All calibrations were performed according to the manufacturer's specifications and requirements.

### B-4.1 MiniRAE 2000 Instrument Calibration

The MiniRAE 2000 PID was calibrated both 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 (ID) number
- final span settings
- date and time
- concentration and type of calibration gas used (isobutylene at 100 ppm)
- name of the personnel 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 Eberline E-600 was calibrated daily by the RCT 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-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 2008, 103404; NMED 2008, 102721).

### B-5.1 Surface Sampling Methods

Surface samples were collected within Technical Area 03 (TA-03), TA-60, and TA-61 using either hand-auger or spade-and-scoop methods. Surface 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. A stainless-steel scoop and bowl were used to homogenize the samples, which were transferred to sterile sample collection jars or bags. Samples were preserved using coolers to maintain the required temperature and chemical preservatives such as nitric acid 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 SOP-5058, Sample Control and Field Documentation.

Sample collection tools were decontaminated (see section B-5.8) immediately before each sample was collected in accordance with a subcontractor procedure technically equivalent to SOP-5061, Field Decontamination of Equipment.

### B-5.2 Borehole Logging

Continuous boring logs were completed for all boreholes drilled with a hollow-stem auger (HSA) drill rig. During drilling, all boreholes were continuously cored and logged in 5-ft intervals. Information recorded on field boring logs included footage and percent recovery, lithology and depths of lithologic contacts, depth of samples collected, core descriptions, and other relevant observations. The borehole logs are presented in Appendix C on CD.

### B-5.3 Subsurface Tuff Sampling Methods

Subsurface samples were collected using approved subcontractor procedures technically equivalent to SOP-06.10, Hand Auger and Thin-Wall Tube Sampler, or SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials. Borehole samples were collected in a stainless-steel split-spoon core-barrel sampler that retrieved core in 5.0-ft intervals. The samples collected, listed by borehole and depth, are provided in tables for each site discussed in this investigation report.

Core retrieved from the subsurface was field screened for VOCs and was visually inspected and logged. Following inspection, the 5.0-ft core section to be sampled was removed from the core barrel and placed in a stainless-steel bowl and homogenized. The material was crushed, if necessary, with a decontaminated rock hammer and stainless-steel spoon to allow core material to fit into sample containers.

Samples for VOC analysis were collected immediately to minimize the loss of subsurface VOCs during the sample collection process. After collection of the VOC samples, a stainless-steel scoop and bowl

were used to homogenize the samples for the remaining analytical suites, after which the samples were transferred to sterile sample collection jars or bags for transport to the SMO. The sample collection tools were decontaminated (see section B-5.8) immediately before each sample was collected in accordance with an approved subcontractor procedure technically equivalent to SOP-5061, Field Decontamination of Equipment.

### B-5.4 Test Pit Excavation and Grab Sampling

Four test pits were excavated at an inactive surface disposal site consisting of construction debris, including crushed tuff, pieces of concrete, rock, and piles of fill. Two grab samples were collected within each pit at depths of 5 ft and 10 ft below ground surface (bgs) to characterize the material. Excavation was completed using a backhoe. The excavated soil was staged a minimum of 3 ft from the edge of the excavation, and the excavations were appropriately benched to allow access and egress. After sample collection, the excavations were backfilled with clean fill material. The excavated soil was managed as investigation-derived waste (IDW), as described in Appendix D.

### B-5.5 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. 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., auger buckets, 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, perchlorate, and total cyanide) 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 one per day when samples at the time samples were collected for VOCs. Trip blanks consisted of containers of certified clean sand opened and kept with the other sample containers during the sampling process.

### B-5.6 Sample Documentation and Handling

Field personnel completed an SCL and COC form for each sample. Sample containers were sealed with signed 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 SCLs and COC forms and accepted custody of the samples.

### B-5.7 Borehole Abandonment

All boreholes were abandoned in accordance with an approved subcontractor procedure technically equivalent to SOP-5034, Monitoring Well and Borehole Abandonment, by filling the boreholes with

bentonite chips up to 2–3 ft from the ground surface. The chips were hydrated and clean soil was placed on top. Pavement was patched as necessary depending on existing site conditions. All cuttings were managed as IDW, as described in Appendix D.

### B-5.8 Decontamination of Sampling Equipment

The split-spoon core barrels and all other sampling equipment that came (or could have come) in contact with sample material were decontaminated after each core was retrieved and logged. Decontamination included wiping the equipment with Fantastik and paper towels. Decontamination of the drilling equipment was conducted before mobilization of the drill rig to another borehole to avoid cross-contamination between samples and borehole 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 a RCT before it was released from the site.

### B-5.9 Site Demobilization and Restoration

All drilling equipment was demobilized from the site on December 22, 2009. Before equipment was removed from the site, a Laboratory RCT screened the equipment for radioactivity to ensure all materials were clean of site contamination. All temporary fencing and staging areas were dismantled (except the waste management area) and returned to preinvestigation conditions. All excavated and disturbed areas were regraded and reseeded with native grass mix in the spring of 2010.

## B-6.0 SEPTIC TANK REMOVAL AND EXCAVATION

One septic tank, Solid Waste Management Unit (SWMU) 60-006(a) was removed in accordance with the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721). An excavator was used to remove the 1000-gal. concrete septic tank and associated piping. A 6-in. inlet line to the septic tank was plugged with concrete and the end taped over. Plastic sheeting was placed in the bottom of the excavation to use as a marker before it was backfilled with overburden and clean fill. The excavated soil was managed as investigation-derived waste as described in Appendix D. Following the tank removal, confirmation samples were collected beneath the tank using a HSA drill rig.

The specific sequence of activities associated with the septic tank and waste-removal 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 the stockpiling, characterization, and disposal of waste at the appropriate facility; (4) surveying limits of excavation and establishing subgrade; (5) performing confirmation sampling; (6) backfill, including compacting and revegetating the surface after demobilization.

## B-7.0 GEODETIC SURVEYING

Geodetic surveys of all sample locations were performed 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 GEOPHYSICAL SURVEYS

ARM Geophysics (a division of ARM Group, Inc.) performed a nonintrusive geophysical investigation at SWMU 03-029, a former landfill, using the multianalysis of shear waves (MASW) method as well as ground-penetrating radar (GPR). The survey was conducted to locate a buried waste disposal site within an area approximately 150 ft long by 400 ft wide.

Six MASW traverses and 16 GPR profiles were completed within the survey area. The MASW survey used a 24-channel Geometrics Geode seismograph with 48 Oyo/Geospace 4.5 Hz geophones connected by two 24-takeout spread cables. The GPR survey was conducted using a GSSI Model No. SIR3000 GPR with a 200-MHz antenna. The results of the geophysical surveys are included in Appendix E.

## B-9.0 IDW STORAGE AND DISPOSAL

All 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 (DOE) orders, and Laboratory implementation requirements. 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 2008, 103404; NMED 2008, 102721). Details of IDW management for the Upper Sandia Canyon Aggregate Area investigation are presented in Appendix D.

## B-10.0 DEVIATIONS FROM WORK PLAN

Several proposed sampling locations identified in the approved investigation work plan (LANL 2008, 103404; NMED 2008, 102721) were moved as a result of site conditions encountered during the field activities. These locations were moved because they were sited on top or next to underground utilities, could not be sampled as a result of refusal, or were inaccessible. When locations were moved, the new locations were sited as close as possible to the planned locations. Deviations to specific sampling locations are described in Table B-10.0-1. Additional deviations to the approved work plan scope are discussed below.

- The investigation work plan required specific (e.g., 0.0–1.0 ft bgs) and relative (e.g., soil-tuff interface, base of structure) sampling intervals, but in some cases the sampling intervals overlapped and the samples collected served a dual purpose. For example, at location 03-608260 in SWMU 03-014(i), samples were planned for the soil-tuff interface and the base of a structure. The base of the structure was encountered in the same interval (3.0–4.0 ft bgs) sampled for the soil-tuff interface (sample RE03-09-13661), so the single sample represents both the soil-tuff interface and the base of the structure. The proposed samples not collected for this reason are presented in Table B-10.0-1.
- One sample was not collected at SWMU 03-014(k) (location 03-608266) from 8–9 ft bgs because no recovery of material occurred from that interval during drilling.
- The investigation work plan required 16 samples to be collected from four borehole locations at SWMU 03-014(k). Three of the four boreholes had the “bed tuff interface” corresponding to the

proposed sample of "0-1 ft below base of the bed." Therefore, one sample was collected to represent both sampling criteria.

- The investigation work plan required six samples to be collected from three borehole locations at SWMU 03-014(u). The depths defined in the field implementation plan (FIP) indicate " 0.0–1.0 ft bgs" and either "base of tank" or "soil/tuff interface," whichever is reached first. Only one sample was collected at location 03-608283 because the surface sample met both criteria defined in FIP and, therefore, is representative of both "0.0–1.0 ft bgs" and "soil/tuff interface."
- The investigation work plan required four samples to be collected from one borehole in the seepage pit at SWMU 60-006(a) to define the nature and vertical extent of contamination. After the seepage pit was located and was found to be filled with gravel, a borehole was drilled at the northern edge and downgradient of the pit. The samples were collected as directed in the work plan at the same four depth intervals (taking into account the change in elevation from south to north). Additional samples were also collected from three deeper intervals that corresponded to 35–36, 45–46, and 60–61 ft bgs to define vertical extent.
- The investigation work plan required 12 samples to be collected from three borehole locations to determine the extent of contamination identified in previous sampling efforts at SWMU 03-009(a). During the drilling of borehole 03-608180, the sample collected at depth 9–10 ft bgs overlapped with the soil-tuff interface sample and, therefore, represents both soil-tuff interface and 9–10 ft bgs. A total of 11 total samples were collected from SWMU 03-009(a).
- The investigation work plan required six samples to be collected from three locations (including one historical location) in a sludge-drying bed at SMWU 03-014(o) to define the vertical extent of contamination. Samples were collected using a backhoe instead of the proposed hand auger because the beds contained extensive loose gravel. The work plan proposed sampling at depths of 4.0–5.0 ft and 6.0–7.0 ft bgs; however, field conditions limited the use of the backhoe (mainly because of the loose gravel within and around the bed and the compacted tuff at 5 ft bgs), the following samples were collected instead: 3.0–4.0 ft bgs (under the bed liner) and 5.0–6.0 ft bgs (2 ft below the drainline).
- The investigation work plan required six samples to be collected from two locations to define nature and extent at the pump pit at SWMU 03-014(j). At location 03-608263, only two of the three proposed samples were collected because the soil-tuff interface corresponded to the same interval as the base of the structure; therefore, a total of five samples were collected.
- The investigation work plan required 12 samples to be collected from three borehole locations to characterize the SWMU 03-014(i) site. At all three borehole locations, only three of the four proposed samples were collected because the soil-tuff interface corresponded to the same interval as the base of the structure.
- The investigation work plan required collection of 15 samples from five locations to confirm the Phase I Resource Conservation and Recovery Act facility investigation (RFI) results and to define the extent of contamination. Specifically, at SWMU 03-014(a), locations 03-608238 and 03-608240, only two of the three proposed samples were collected because the soil-tuff interface corresponded to the 1–2-ft-bgs depth interval.
- The investigation work plan required four samples to be collected from two historical locations at SMWU 03-021, locations 03-03329 and 03-03331, to confirm Phase I RFI results and to further characterize the vertical extent of contamination. Based on the confirmed presence of a buried water line, the original location was moved 5 ft to the north for 03-03329 and 5 ft to the south for location 03-03331.

- The approved investigation work plan required the removal of the septic tank at SWMU 60-006(a) and the associated seepage pit. When gravel was discovered at the top of the seepage pit, it was decided that the sampling location associated with the seepage pit would be moved downgradient instead of directly within the pit. Based on the downgradient sampling results, the seepage pit contents were determined to pose no unacceptable risk to human or ecological receptors and the pit was therefore not removed.

## B-11.0 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 New 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 2008. "Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-4798, Los Alamos, New Mexico. (LANL 2008, 103404)

NMED (New Mexico Environment Department), August 12, 2008. "Approval with Modifications Upper Sandia Canyon Aggregate Area Investigation Work Plan," 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 2008, 102721)

**Table B-1.0-1**
**Brief Description 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. The sample is typically placed in a clean stainless-steel bowl for transfer into various sample containers. |
| Hand Auger Sampling | This method is typically used for sampling soil or sediment at depths of less than 10–15 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 [I.D.]), creating a vertical hole that can be advanced to the desired sampling depth. When the desired depth was reached, the auger was decontaminated before the hole was advanced through the sample depth. The sample material was transferred from the auger bucket to a stainless-steel sampling bowl before the various required sample containers were filled. |
| Split-Spoon Core-Barrel Sampling | In this method, a stainless-steel core barrel (typically 4-in. I.D., 2.5 ft long) is advanced using a powered drilling rig. The core barrel extracts a continuous length of soil and/or rock that can be examined as a unit. The split-spoon core barrel is a cylindrical barrel split lengthwise so that the two halves can be separated to expose the core sample. Once extracted, the section of core was screened for radioactivity and organic vapors, and described in a geologic log. A portion of the core was then collected as a discrete sample from the desired depth. |
| 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. |
| Handling, Packaging, and Shipping of Samples | Field team members sealed and labeled samples before packing and ensure the sample containers and the containers used for transport were free of external contamination.<br>Field team members packaged all samples to minimize the possibility of breakage during transportation.<br>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. |
| 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 Quality Control Samples | Field quality control samples were collected as follows:<br>*Field Duplicates*: at a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses<br>*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<br>*Trip Blanks*: required for all field events that include the collection of samples for VOC analysis. Trip blanks containers of certified clean sand were opened and kept with the other sample containers during the sampling process |

**Table B-1.0-1 (continued)**

| Method | Summary |
|---|---|
| Field Decontamination of Drilling 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 quality assurance. Specific requirements for each sample were printed on the SCL provided by the SMO (size and type of container, e.g., glass, amber glass, and polyethylene). All samples were preserved by placing them in insulated containers with ice 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 Standard for A/E/C/ and Facility Management. All coordinates were expressed as State Plain Coordinate System 83, NM Central, U.S. feet. All elevation data were reported relative to the National Geodetic Vertical Datum of 1983. |
| 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. Drummed IDW was stored on pallets to prevent deterioration of containers. A waste storage area was established before waste was generated. Waste storage areas located in controlled areas of the laboratory were controlled as needed to prevent inadvertent addition or management of wastes by unauthorized personnel. 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 D. |

**Table B-1.0-2**
**Standard Operating Procedures Used for the**
**Investigation Activities at Upper Sandia Canyon Aggregate Area**

| |
|---|
| SOP-5018, Integrated Fieldwork Planning and Authorization |
| SOP-5028, Coordinating and Evaluating Geodetic Surveys |
| SOP-5034, Monitoring Well and Borehole Abandonment |
| SOP-5055, General Instructions for Field Investigations |
| SOP-5056, Sample Containers and Preservation |
| SOP-5057, Handling, Packaging, and Transporting Field Samples |
| SOP-5058, Sample Control and Field Documentation |
| SOP-5059, Field Quality Control Samples |
| SOP-5061, Field Decontamination of Equipment |
| SOP-5181, Notebook and Logbook Documentation for Environmental Directorate Technical and Field Activities |
| SOP-5238, Characterization and Management of Environmental Program Waste |
| SOP-5245, Background Value Comparisons – Inorganic Chemicals |
| SOP-5246, Background Value Comparisons – Radionuclides |
| SOP-06.09, Spade and Scoop Method for the Collection of Soil Samples |
| SOP-06.10, Hand Auger and Thin-Wall Tube Sampler |
| SOP-06.26, Core Barrel Sampling for Subsurface Earth Materials |
| SOP-06.33, Headspace Vapor Screening with a Photoionization Detector |
| EP-DIR-QAP-0001, Quality Assurance Plan for the Environmental Programs |

Note: Procedures used were approved subcontractor procedures technically equivalent to the procedures listed.

**Table B-10.0-1**
**Summary of Sampling Deviations from the Approved Work Plan**

| Site ID | Work Plan Location | Sample Location ID | Description of Deviation |
|---|---|---|---|
| **TA-03** | | | |
| SWMU 03-009(a) | 9a-3 | 03-608180 | Soil-tuff interface corresponded to 9–10 ft bgs proposed sample; one sample collected at this depth. |
| SWMU 03-013(i) | 13i-13 | 03-608230 | Moved approximately 6 in east because of concrete |
| SWMU 03-014(a) | 14a-2 | 03-608238 | Soil-tuff interface corresponded to 1–2 ft bgs proposed sample; one sample collected at this depth. |
| | 14a-4 | 03-608240 | Soil-tuff interface corresponded to 1–2 ft bgs proposed sample; one sample collected at this depth. |
| SWMU 03-014(d) | 14d-1 | 03-608256 | Moved 20 ft southwest for drill rig access |
| SWMU 03-014(i) | 14i-1 | 03-608260 | Moved 5 ft east. Additionally, soil-tuff interface corresponded to proposed sample at base of structure; one sample collected at this depth (3.0–4.0 ft bgs). |
| | 14i-2 | 03-608261 | Soil-tuff interface corresponded to proposed sample at base of structure; one sample collected at this depth (2.0–3.0 ft bgs). |
| | 14i-3 | 03-608259 | Moved 10 ft north. Additionally, soil-tuff interface corresponded to proposed sample at base of structure; one sample collected at this depth (3.0–4.0 ft bgs). |
| SWMU 03-014(j) | 14j-1 | 03-608263 | Moved 20 ft west. Additionally, soil-tuff interface corresponded to proposed sample at base of structure; one sample collected at this depth (2.0–3.0 ft bgs). |
| | 14j-2 | 03-608262 | Moved 20 ft west for drill rig access |
| | 14j-3 | 03-608264 | Moved 1.5 ft north to clear power line |
| SWMU 03-014(k) | 14k-6 | 03-608265 | Bed-tuff interface corresponded to proposed sample at 0–1.0 ft below base of bed; one sample collected at this depth (6.0–7.0 ft bgs). |
| | 14k-7 | 03-608271 | Bed-tuff interface corresponded to proposed sample at 0–1.0 ft below base of bed; one sample collected at this depth (6.0–7.0 ft bgs). |
| | 14k-8 | 03-608268 | Bed-tuff interface corresponded to proposed sample at 0–1.0 ft below base of bed; one sample collected at this depth (3.0–4.0 ft bgs). |
| | 14k-9 | 03-608266 | No sample collected from 8–9 ft bgs because of insufficient recovery |
| SMWU 03-014(o) | 14o-1 | 03-03204 | Samples collected using a backhoe instead of hand auger |
| | 14o-2 | 03-608276 | Samples collected using a backhoe instead of hand auger |
| | 14o-3 | 03-608275 | Samples collected using a backhoe instead of hand auger |
| SWMU 03-014(q) | 14q-3 | 03-608198 | Moved 10 ft east |
| SWMU 03-014(u) | 14u-1 | 03-608281 | Bottom of tank is the same as soil-tuff interface |
| | 14u-3 | 03-608283 | Only one sample collected at 0–1.0 ft |
| SWMU 03-021 | 21-1 | 03-611944 | Moved 5 ft south from historical sampling location 03-03329 |
| | 21-2 | 03-611943 | Moved 5 ft south from historical sampling location 03-03331 |
| | 21-3 | 03-608303 | Moved 4 ft south |

**Table B-10.0-1 (continued)**

| Site ID | Location | Sample Location ID | Description of Deviation |
|---|---|---|---|
| AOC C-03-022 | C22-4 | 03-608392 | Moved 2 ft east because of auger refusal at 4 ft bgs |
| SWMU 03-045(a) | 45a-1 | 03-608316 | Moved 3 ft south because of concrete/rebar |
| AOC 03-052(b) | 52b-7 | 03-608332 | Moved 2 ft west |
| SWMU 03-059 | 59-4 | 03-608386 | Hit concrete 5.0–6.0 ft thick; failed to get through with concrete drill. Moved 5 ft north, encountered concrete; moved 5 ft east, encountered concrete; moved 5 ft northeast, encountered concrete. Put new location halfway between 03-608385 and proposed 03-608386 location per the Laboratory subcontractor technical representative; final measurement of 31 ft west of original location. All holes backfilled, plugged, and sealed. |
| **TA-60** | | | |
| SWMU 60-006(a) | Seepage Pit | n/a* | Not removed, considered no risk, additional sampling conducted |
| | 6a-4 | 03-608412 | Borehole moved 4 ft north, downgradient of the seepage pit and extended to 3 ft below bottom elevation of pit for a total of seven samples collected |
| SWMU 60-007(b) | 7b-1 | 03-608417 | Moved 10 ft south. Additionally, only 0–1 ft bgs sediment sample collected because tuff was encountered at 1 ft bgs. |
| | 7b-2 | 03-608418 | Moved 10 ft west. Additionally, only 0–0.5 ft bgs sediment sample collected because tuff was encountered at 0.5 ft bgs. |
| | 7b-3 | 03-608419 | Moved 15 ft east. Additionally, only 0–0.5 ft bgs sediment sample collected because tuff was encountered at 0.4 ft bgs. |
| | 7b-4 | 03-608420 | Moved 3 ft east. Additionally, only 0–0.5 ft bgs sediment sample collected because tuff was encountered at 0.5 ft bgs. |
| **TA-61** | | | |
| AOC C-61-002 | C2-2 | 03-608430 | Moved 5 ft south |

*n/a = Not applicable.

# Appendix C

*Borehole Logs*
*(on CD included with this document)*

# Appendix D

*Investigation-Derived Waste Management*

## D-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 Upper Sandia Canyon Aggregate Area at Technical Area 03 (TA-03), TA-60, and TA-61 of Los Alamos National Laboratory (LANL or the Laboratory).

All IDW generated during the field investigation was managed in accordance with standard operating procedure (SOP) EP-SOP-5238, Characterization and Management of Environmental Program (EP) 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 D-1 (on CD).

The selection of waste containers was based on appropriate U.S. Department of Transportation requirements, waste types, and estimated volumes of IDW to be 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.

Wastes were 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.”

## D-2.0 WASTE STREAMS

The IDW streams generated and managed during the investigation of Upper Sandia Canyon Aggregate Area are described below and are summarized in Table D-2.0-1. The waste numbers correspond with those identified in the WCSF.

- WCSF Waste Stream #1: Municipal Solid Waste (MSW) consisted of noncontact trash and debris and empty sample preservation containers. Approximately 2.5 $yd^3$ of waste was generated, and was determined to be nonhazardous, nonradioactive municipal solid waste. It was stored in plastic-lined trash cans and disposed of at the Los Alamos County landfill.
- WCSF Waste Stream #2: Drill cuttings consisted of sediment, soil, and rock removed during hollow-stem auger drilling. Approximately, 5.5 $yd^3$ of drill cuttings were generated during this investigation and stored in 1 $yd^3$ wrangler bags. All wrangler bags were directly sampled. The cuttings will be land-applied if they meet the criteria of the NMED-approved Notice of Intent Decision Tree, Land Application of IDW Solids from Construction of Wells and Boreholes and the Radiological Decision Tree (SOP ENV-RCRA-QOP-011.1). Cuttings that cannot be land-applied

are expected to be low-level waste or industrial waste that will be disposed of at an authorized off-site disposal facility.

- WCSF Waste Stream #3: Contact waste consisted of spent personal protective equipment, material used in dry decontamination of sampling equipment (e.g., paper towels), and sampling equipment and other materials that contacted, or potentially contacted, contaminated environmental media and could not be decontaminated. This waste included, but was not limited to, plastic sheeting (e.g., tarps and liners), gloves, paper towels, plastic and glass sample bottles, and disposable sampling supplies. These wastes were containerized at the point of generation 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 0.8 $yd^3$ of contact waste was generated and will be disposed of at an authorized off-site disposal facility.
- WCSF Waste Streams #4, #5, and #6: No decontamination fluids were generated, no petroleum-contaminated soils were found, and no American Radiation Services (Rad-Van) samples were returned.
- WCSF Waste Stream #7: Concrete, steel, and septic tank debris waste consisted of concrete with rebar and tuff. Approximately 10 $yd^3$ of septic tank debris were generated from this activity, all from the removal of Solid Waste Management Unit 60-006(a), the septic tank. The debris was determined to be industrial waste and will be disposed of at an authorized off-site disposal facility.
- WCSF Waste Stream #8: No liquid or sludge was found in the septic tank.

**Table D-2.0-1**
**Summary of IDW Generation and Management**

| Waste Stream | Waste Type | Volume | Characterization Method | On-Site Management | Disposition |
|---|---|---|---|---|---|
| Municipal Solid | MSW | 2.5 $yd^3$ | AK | Plastic bags | Off-site municipal landfill |
| Drill Cuttings | Industrial | 5.5 $yd^3$ | Direct sampling | 1-$yd^3$ wrangler bags | Intended path: Land application or authorized off-site disposal facility |
| Contact Waste | Industrial | 0.8 $yd^3$ | AK and analytical results of site characterization. | 5-gal. drums | Intended path: Authorized off-site disposal facility |
| Concrete, Steel, and Septic Tank Debris | Industrial | 10 $yd^3$ | AK and analytical results of site characterization | 20-$yd^3$ rolloff bin | Intended path: Authorized off-site disposal facility |

# Attachment D-1

*Waste Characterization Strategy Form*
*(on CD included with this document)*

# Appendix E

*Geophysical Surveys*

February 1, 2010

Ms. Deborah Steven
4200 W. Jemez Rd
Suite 502 (4th flr)
Los Alamos, New Mexico 87544

Re: Geophysical Survey Results
SWMU 03-029 Landfill Delineation
ARM Project 09303

Dear Ms. Steven:

ARM Geophysics, a division of ARM Group Inc. (ARM), has prepared this report to provide the results of the geophysical survey performed at SWMU 03-029 for Terranear PMC (TPMC) at the Los Alamos National Laboratory, Los Alamos, New Mexico. The objective of the survey was to attempt to locate possible buried trenches reported to contain asphalt at Solid Waste Management Unit (SWMU) 03-029.

SWMU 03-029 was previously surveyed with electromagnetic geophysical techniques to locate anomalies that could potentially represent areas of buried asphalt. One anomalous area was detected that could represent possible buried asphalt. This area was excavated by TPMC personnel and the anomaly did not contain buried asphalt.

The scope of work included the use of multiple geophysical methods to optimize data collection. ARM recommended performing multi-analysis of shear waves (MASW) surveys within SWMU 03-029. The MASW method was recommended because the seismic wave would detect areas of lesser compaction, such as buried debris, and is capable of detecting shallow objects of interest. ARM also collected several ground penetrating radar (GPR) profiles over the SWMU 03-029 area.

ARM collected six MASW traverses and 16 GPR profiles within the survey area. Each profile is provided on figures presented at the end of the text and a detailed discussion of each of the profiles is provided in the following sections.

## MULTI-ANALYSIS OF SHEAR WAVE

Seismic surveys are able to discriminate between and among materials with relatively different physical properties (i.e. density), based on the velocity of the seismic wave as it

travels through each discrete layer. In general, the more rigid the material, the faster the wave will travel through it.

Propagation velocity (also known as phase velocity) of surface waves is frequency (wavelength) dependent. This property is known as dispersion. The dispersiveness of soils is determined mainly by the vertical variation in shear wave velocity (Vs). By recording fundamental-mode Rayleigh waves propagating from the source to receiver, the dispersive properties directly beneath the seismic spread can be measured and represented by a curve (dispersion curve). This curve is used to estimate the vertical variation of Vs (1-D Vs profile) through a process called inversion.

The MASW method utilizes pattern-recognition techniques. It employs multiple receivers (geophones) equally spaced along a linear survey line and measures the travel-times of seismic waves generated by an implosive source (e.g., sledge hammer). This approach allows recognition of the various propagation characteristics of the seismic wavefield. Once the dispersive properties of the fundamental mode Rayleigh waves are identified (via pattern recognition), a corresponding signal curve is extracted and used in the inversion of a 1-D Vs profile. This profile best represents the vertical Vs distribution at the middle of the receiver spread. By moving the same shot-receiver configuration incrementally along a preset survey line, multiple measurements can be made, each producing a 1-D Vs profile that, when all gathered together, is used to construct a 2-D Vs cross-section along the survey line.

MASW has been used to map bedrock topography, identify bedrock fractures, abandoned mine workings, waste pits and trenches, and evaluate sink activity (e.g., voids, pinnacles, zones of enhanced weathering) to depths upwards of approximately 120 feet below ground surface (BGS). Unlike refraction, MASW is not constrained by velocity inversion (high speed layer overlying a lower speed layer), and it can be used in urbanized environments where noise associated with vehicle traffic and buried utilities that typically mask body waves do not significantly impact the robust (larger amplitude) surface waves.

**MASW Data Collection**

Multi-channel Analysis Surface Wave (MASW) Surveys were performed along six traverses. Their locations are shown on Figure 1. The total line length of each MASW traverse is longer than the actual distance imaged so that there is sufficient data collected to produce a profile.

The MASW survey was carried-out using a 24-channel Geometrics Geode seismograph with 48 Oyo/Geospace 4.5 Hz geophones connected by two 24-takeout spread cables. Data were acquired using the following parameters:

- Geophone spacing = 5 feet
- Offset (distance between source and first geophone) = 25 feet
- Source offset = 5 feet
- Record length = 700 msec
- Sampling interval = 62.5 *u*sec
- All acquisition filters out

- Shot gather = 15 traces
- Staked shots/station = 5

***MASW Data Processing***

The MASW data profiles were processed using the software program *SurfSeis*. The first step in processing of the seismic data is to convert the seismic data (SEG-2) into the processing format and combine all shot gathers into a single file for each seismic line. The data file is then assigned field geometry and recompiled into a roll-along mode data set. The geophysicist then identifies the range of surface wave velocities for each shot gather and conducts a dispersion-curve analysis for all shot gathers. An inversion analysis for all dispersion-curves analyzed is performed to determine the 1-dimensional shear wave velocities. A 2-dimensional shear wave velocity profile is then constructed by interpolating the 1-dimensional shear wave velocities profiles using a Kriging algorithm. The number of folds of data towards the ends of the survey line decreases so data quality decreases.

## GROUND PENETRATING RADAR

GPR is an electromagnetic instrument that transmits and records radar (electromagnetic [EM]) pulses). GPR systems produce cross-sectional images of subsurface features by transmitting discrete radar pulses into the subsurface and recording the echoes or reflections from interfaces between materials with differing dielectric properties. To conduct a GPR survey, an antenna containing a transmitter and a receiver is slowly pulled along the ground surface. The transmitter radiates short pulses of high frequency EM energy into the ground. When the wave encounters the interface between two materials having different dielectric constants (dielectric permittivity), a portion of the energy is reflected back. The contrast in dielectric permittivity between the two media can be quantified by a reflection coefficient at the media interface. The magnitude of the reflection coefficient increases as the contrast in dielectric constant increases. The signal is transmitted to a control unit, displayed on a color monitor, and digitally recorded.

Air or air-filled voids have dielectric permittivity of 1. Soils, concrete, and other materials have higher permittivities such as: 5.5 for dry concrete; 6 for sandy soil, and 15 for wet sand. Due to the contrast in dielectric properties between the anticipated subsurface materials and metallic pipes, the locations of the pipes should be discernible in the GPR data.

The effective penetration depth of a radar system is controlled by the dielectric permittivity, the electrical conductivity (usually dictated by moisture content) of the soils and the frequency of the antenna. In highly conductive materials (such as clay), the pulse is dissipated at very shallow depths. Two-way travel time on the GPR records can furnish estimates of depth if the dielectric constant for subsurface materials is known. If it is unknown, then an approximate depth can be obtained by using published average dielectric constants for the site soils. During this survey ARM used 6.25 as the dielectric constant.

Resolution of the GPR system is dependent on the frequency of the antenna used during the survey. Very high frequency antennae (900 megahertz [MHz] or greater) can resolve small features (less than an inch in diameter) but can penetrate to a maximum depth of 2 feet or shallower. Lower frequency antennae (100 to 500 MHz) can resolve objects deeper in the

subsurface (up to 50 feet bgs, depending on soil conditions) but usually miss objects near surface. There is a tradeoff between depth penetration and resolution; in some cases it may be necessary to utilize two or more antennae to collect the necessary depth and resolution information.

***GPR Data Collection***

GPR profiles were collected along four of the ER traverses as well as along Mill and Searle Streets. The GPR survey was conducted using a GSSI Model No. SIR3000 GPR with a 200-MHz antenna manufactured by GSSI of North Salem, New Hampshire.
ARM ran a test line with the 200 MHZ antenna in order to determine the optimum recording parameters for the GPR at this site. These parameters include the range (amount of time the instrument records after transmitting an EM pulse), scan rate (number of recorded traces or scans per second), transmitter pulse rate (frequency at which the EM pulses are transmitted), instrument gains, and filter settings. These settings are automatically stored in a header file with the digital GPR data.

A marker switch on the antenna unit was used to identify control points (fiducial markers) on the GPR records. With the 200 MHZ antenna, as the GPR antenna is moved along each traverse, the marker switch was keyed at 5-foot intervals in order to maintain a distance record on each of the GPR files. The digital GPR data were reviewed in real time on a color monitor and stored on the GPR hard drive. Information such as line location, direction, and fiducial marker locations were recorded in the field notes.

***GPR Data Processing***

The SIR3000 system stores each GPR file digitally in the memory of the radar unit. At the conclusion of the survey, all GPR data files collected during the investigation were downloaded to the network computers at the ARM office. To begin the processing, each GPR file was edited to remove stagnant points (areas where the data collector paused or had to maneuver around obstacles). These areas show up as flat lines and images, and are of no value to the overall survey.

After removal of stagnant areas, the GPR files were converted and saved as bitmap images. The bitmap files were transferred into Surfer, a commercial software package. By using Surfer, distance markers and other annotations can be added to the records.

## GEOPHYSICAL SURVEY RESULTS

### MASW

The locations of each of the MASW traverses were recorded with GPS equipment and are shown on Figure 1. The coordinates are presented in US State Plane NAD83 NM Central Zone, US survey feet. The MASW data profiles were collected to evaluate the subsurface for anomalous areas that could represent buried asphalt. Areas of non-compacted and less dense material have lower shear velocities than dense materials such as bedrock. Each profile was reviewed for areas of low shear velocities in configurations that could represent buried trenches of asphalt.

***MASW Line 00***
Along Line 00 from northeast to southwest, 34 seismic shots were collected along a total inline distance of 270 feet. The processed seismic profile is presented on Figure 2.

Based on the MASW data, the subsurface material (within 20 feet of the ground surface) has a shear velocity of less than 1,800 ft/sec. The MASW profile indicates that the subsurface does not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering. The lower velocity zones at the inline distance of approximately 100 feet (station #1025) correspond to a drainage channel that was present at the ground surface.

***MASW Line 01***
Along Line 01 from southwest to northeast, 24 seismic shots were collected along a total inline distance of 255 feet. The processed seismic profile is presented on Figure 2.

Based on the MASW data, the subsurface material (within 20 feet of the ground surface) has a shear velocity of less than 2,400 ft/sec. The MASW profile indicates that the subsurface does not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering.

***MASW Line 02***
Along Line 02 from northeast to southwest, 33 seismic shots were collected along a total inline distance of 300 feet. The processed seismic profile is presented on Figure 3.

Based on the MASW data, the subsurface material (within 10 feet of the ground surface) has a shear velocity of 1,400 to 1,700 ft/sec. From approximately 10 feet to 25 feet BGS the shear velocity ranges from 950 to 1,250 ft/sec. The MASW profile indicates that the subsurface does not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering.

***MASW Line 03***
Along Line 03 from northeast to southwest, 26 seismic shots were collected along a total inline distance of 265 feet. The processed seismic profile is presented on Figure 3.

Based on the MASW data, the subsurface material (within 10 feet of the ground surface) has a shear velocity of 1,300 to 1,700 ft/sec. From approximately 10 feet to 20 feet BGS the shear velocity ranges from 950 to 1,150 ft/sec. The MASW profile indicates that the subsurface does not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering.

***MASW Line 04***
Along Line 04 from southeast to northwest, 22 seismic shots were collected along a total inline distance of 245 feet. The processed seismic profile is presented on Figure 4.

Based on the MASW data, the subsurface material (within 10 feet of the ground surface) has a shear velocity greater than 1,300 ft/sec. From approximately 10 feet to 22 feet BGS the shear velocity ranges from 950 to 1,150 ft/sec. The MASW profile indicates that the subsurface does

not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering.

***MASW Line 05***

Along Line 05 from northeast to northwest, 14 seismic shots were collected along a total inline distance of 205 feet. The processed seismic profile is presented on Figure 4.

Due to the limited space, MASW Line 05 presents approximately 60 linear feet of data. Based on the limited MASW data, the subsurface material (within 20 feet of the ground surface) has a shear velocity of less than 1,450 ft/sec. The MASW profile indicates that the subsurface does not appear to have anomalous areas that could represent buried asphalt. The profile indicates near homogenous layering.

**Ground Penetrating Radar**

The locations of each of the GPR traverses were recorded with GPS equipment and are shown on Figure 5. The coordinates are presented in US State Plane NAD83 NM Central Zone, US survey feet.

Sixteen GPR profiles were collected in two orientations across the area of interest and are shown on Figure 5. The profiles are provided as Figures 6 through 14. Based on the GPR records, it appears as if the GPR energy was able to record information to a depth of approximately 10 feet.

***GPR Profiles 01 and 02***

GPR Profiles 01 and 02 are oriented northwest to southeast and located on the west side of the survey area. GPR Profile 01 is 70 feet long and GPR Profile 02 is 105 feet. These profiles are presented on Figure 6.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that indicates a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer with different electrical properties. The third layer is located below 7.5 feet BGS. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profiles 03 and 04***

GPR Profiles 03 and 04 are oriented northwest to southeast and located on the west side of the survey area. Both profiles are 115 feet long. These profiles are presented on Figure 7.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer which appears to be less dense. The third layer is located below 7.5 feet BGS. On each profile, there is a parabolic anomaly located at the inline distance of approximately 95 feet and located approximately 9 feet BGS. Its location is coincident with a broad, linear, and discontinuous anomaly located by the previous terrain conductivity survey. This isolated anomaly may represent buried rock, void or possibly an

old pipe segment. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profiles 05 and 06***

GPR Profiles 05 and 06 are oriented northwest to southeast and located in the central area of the survey area. GPR Profile 05 is 100 feet long and GPR Profile 06 is 60 feet long. These profiles are presented on Figure 8.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 7.5 feet BGS. The anomaly present on GPR Profile 05 at the inline distance of 15 feet was caused by the antenna loosing contact with the ground surface. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profiles 07, 08 and 09***

GPR Profiles 07, 08, and 09 are oriented northwest to southeast and located in the central area of the survey area. The profiles are 80 feet, 75 feet, and 70 feet long, respectively. These profiles are presented on Figure 9.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 7.5 feet BGS. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profiles 10 and 11***

GPR Profiles 10 and 11 are oriented northwest to southeast and located in the eastern portion of the survey area. The profiles are 65 feet and 90 feet long, respectively. These profiles are presented on Figure 10.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 7.5 feet. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profiles 12 and 13***

GPR Profiles 12 and 13 are oriented northwest to southeast and located in the eastern portion of the survey area. The profiles are 125 feet and 145 feet long, respectively. These profiles are presented on Figure 11.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 7.5 feet

BGS. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profile 14***

GPR Profile 14 is oriented northeast to southwest and located on the south side of the survey area. The profile is 195 feet long and presented on Figure 12.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 10 feet BGS. Starting at the inline distance of 100 feet, high amplitude reflections are observed. The location of this anomaly is consistent with the hyperbolic anomalies observed in lines 3 and 4, as well as the EM anomaly identified during the previous terrain conductivity survey. This layer shows several breaks, at the inline distance of 115 feet, 130 feet, and 155 feet. These breaks in the subsurface layer may correspond to trenching activity that occurred previously at the site. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profile 15***

GPR Profile 15 is oriented southwest to northeast and located in the central portion of the survey area. The profile is 90 feet long and presented on Figure 13.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 10 feet BGS. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

***GPR Profile 16***

GPR Profile 16 is oriented southwest to northeast and located in the central portion of the survey area. The profile is 150 feet long and presented on Figure 14.

The GPR profiles indicate the presence of three layers in the subsurface. Approximately 2.5 feet BGS is bright reflection that may indicate a change in the subsurface material. From approximately 3 feet to 7.5 BGS there is a second layer. The third layer is located below 10 feet BGS. Overall the GPR profile indicates homogenous layers in the subsurface. The GPR did not detect the presence of anomalies that could represent buried asphalt.

## SURVEY LIMITATIONS

Based on the preceding discussion, geophysical surveys are typically not 100-percent accurate and they cannot always completely define subsurface conditions. ARM will not accept responsibility for inherent technique limitations, survey limitations, potentially foreseen or unforeseen site-specific conditions, or alleged operator error. By receiving this report and/or using or relying upon the data, figures, and information provided with this report, including any

markings placed on the ground surface, the Client, Owner, and all persons in any way using or relying on the information collected from this survey accept all liability for the use, reliance, and actions taken based on the information collected in the survey and contained in the report, and shall hold ARM harmless for any and all damages allegedly resulting from or actually resulting from the information collected from this survey.

The client hereby agrees that, to the fullest extent permitted by law, ARM's total liability to Client and the Owner for any and all injuries, claims, losses, expenses, or damages whatsoever arising out of or in any way relating to the project from any cause or causes including but not limited to ARM's negligence, errors, omissions, strict liability, or breach of contract, shall not exceed the total amount paid by the Client or the Owner for the services of ARM for this survey.

## SUMMARY

ARM collected six MASW profiles, and 16 GPR traverses within the survey area to locate anomalies that may represent possible buried asphalt. The MASW and GPR surveys did not detect the presence of anomalies with characteristics of buried asphalt along the profiles.

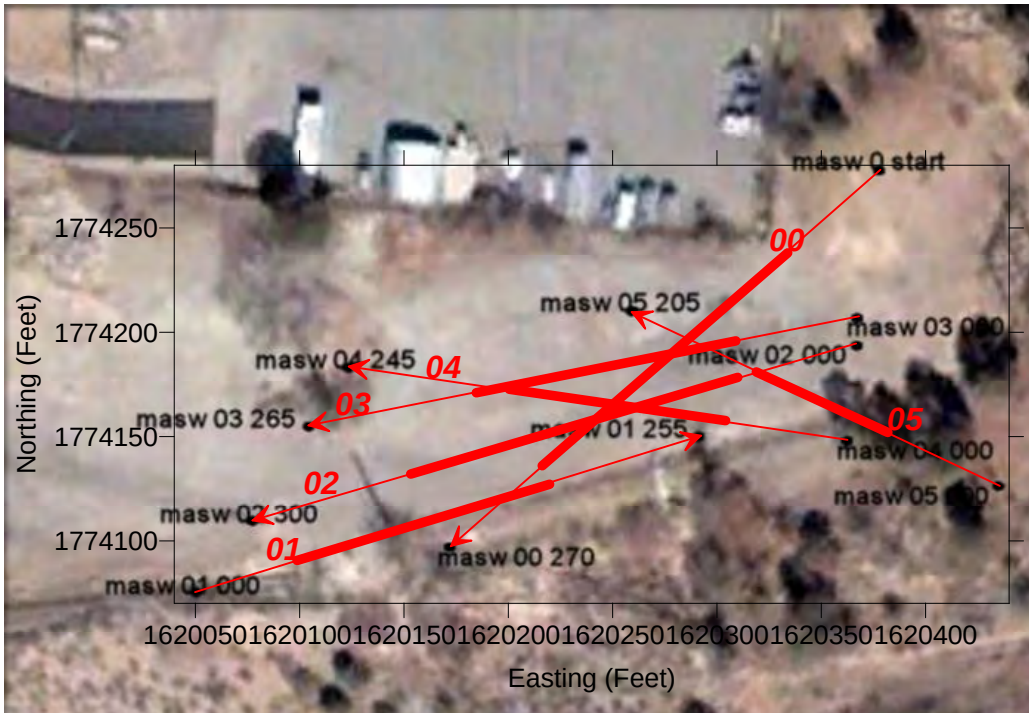
ARM appreciates the opportunity to provide geophysical services to the TerranearPMC on this project. If you have any questions regarding this report, please feel free to call either of the undersigned.

Respectfully submitted,

Beth A. Williams

Beth A. Williams, PG
Senior Geophysicist

M. Scott McQuown, P.G.
Senior Geophysicist




Feet

0 50 100 150 200

05

Location and Orientation of MASW Traverse

Location of Presented MASW Data

Coordinates are in
NAD83 NM Central
US Survey Feet

# Location of MASW Traverses

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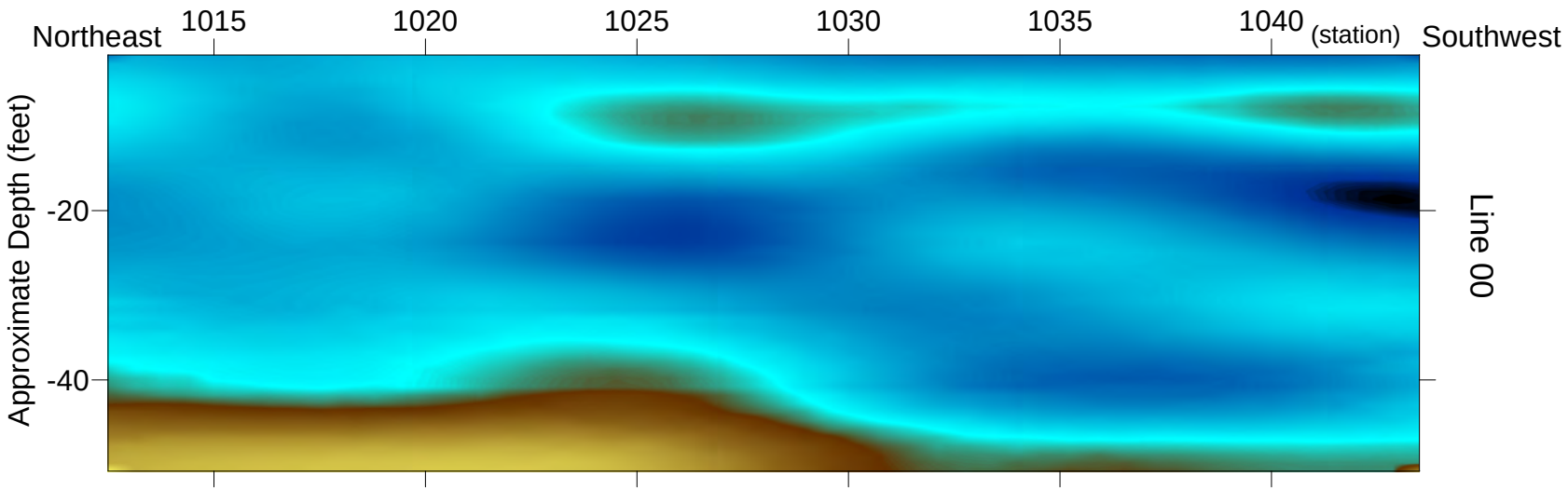
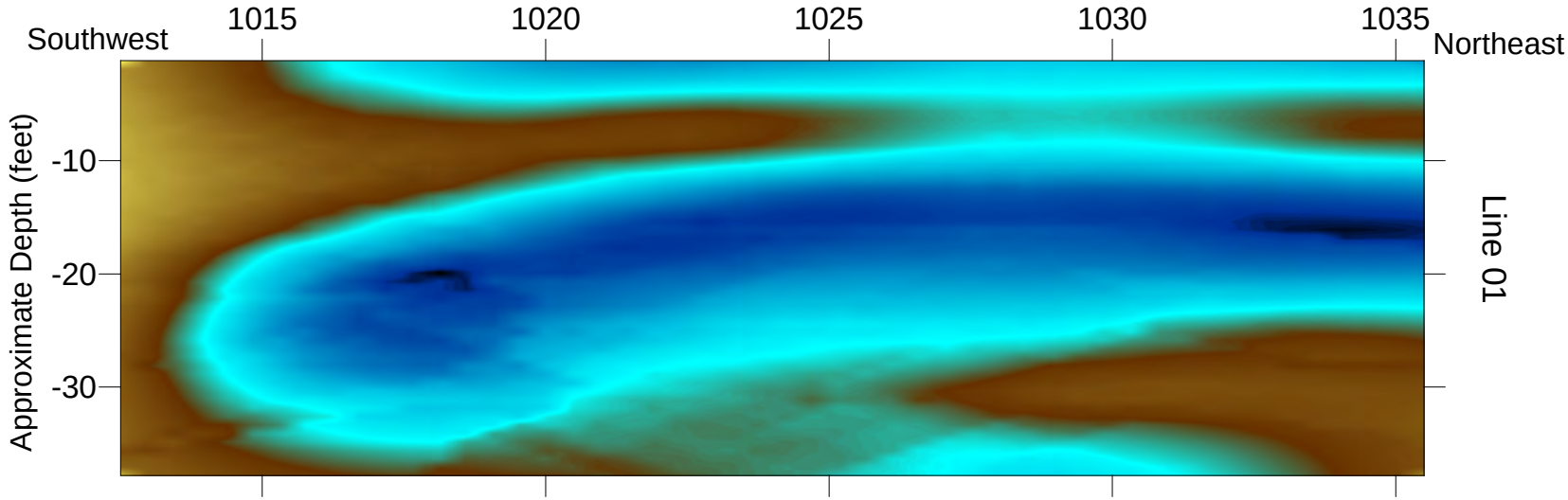
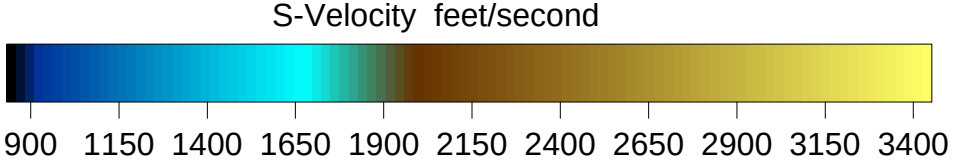
SWMU 03-029
Los Alamos National Laboratory

| February 2010 | 09303 |
|---|---|
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 1 |




Interpretation may change if additional data becomes available.

# MASW Profiles 00 and 01

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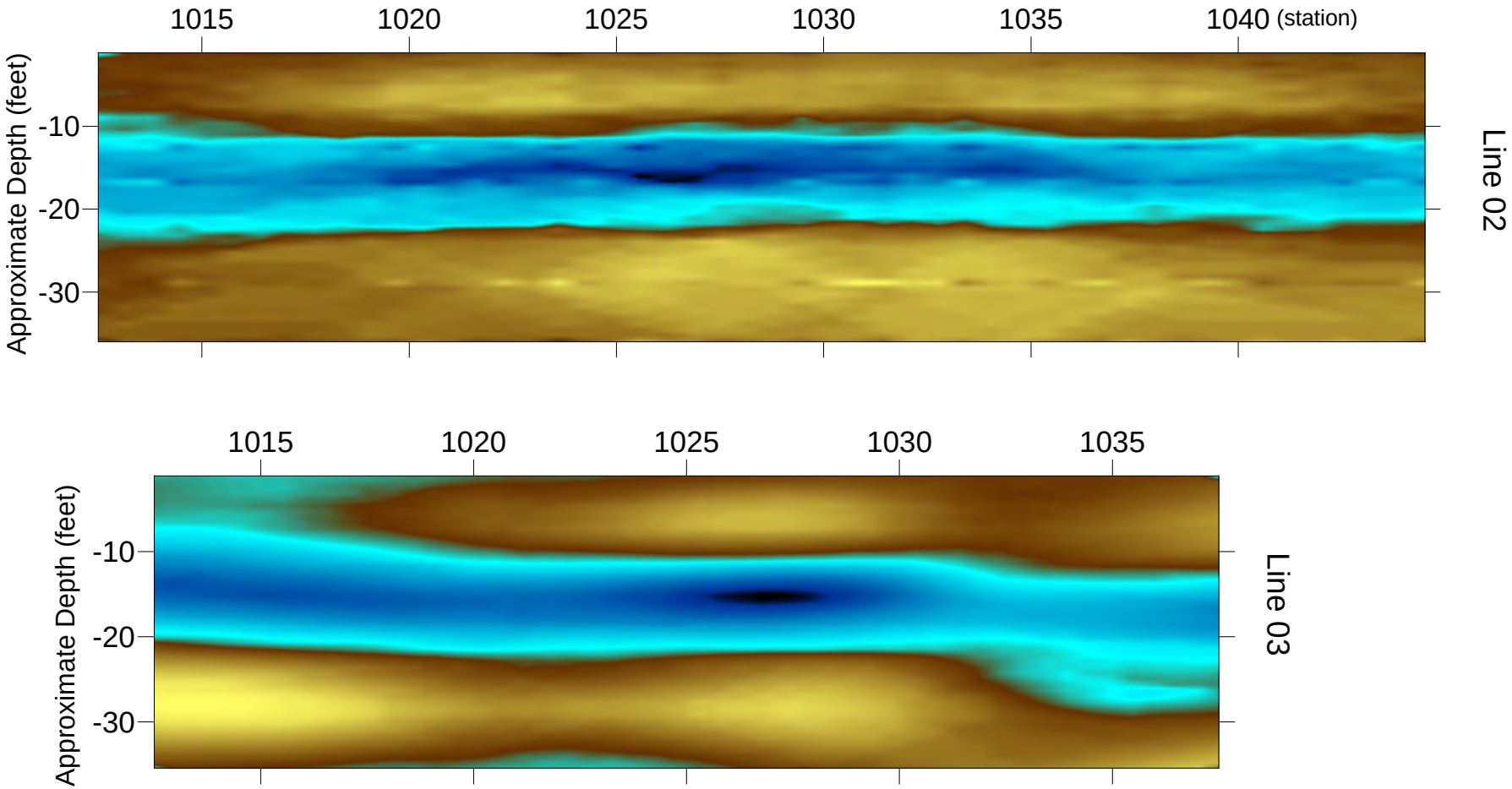
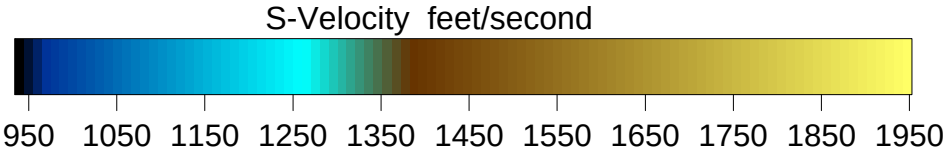
Los Alamos National Laboratory

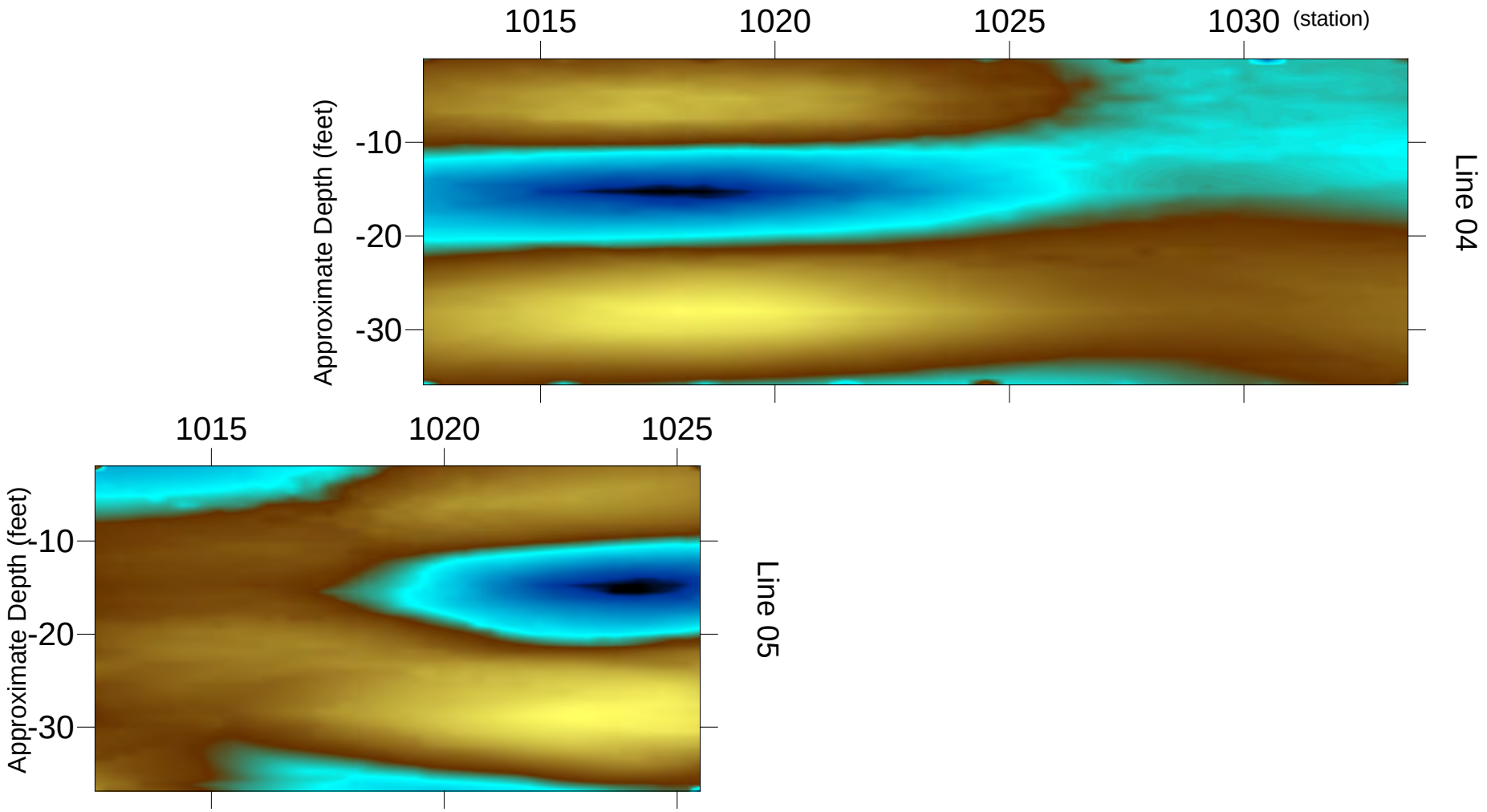
| February 2010 | 09303 |
|---|---|
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 2 |




Interpretation may change if additional data becomes available.

| MASW Profiles 02 and 03 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 3 |




Interpretation may change if additional data becomes available.

| MASW Profiles 04 and 05 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
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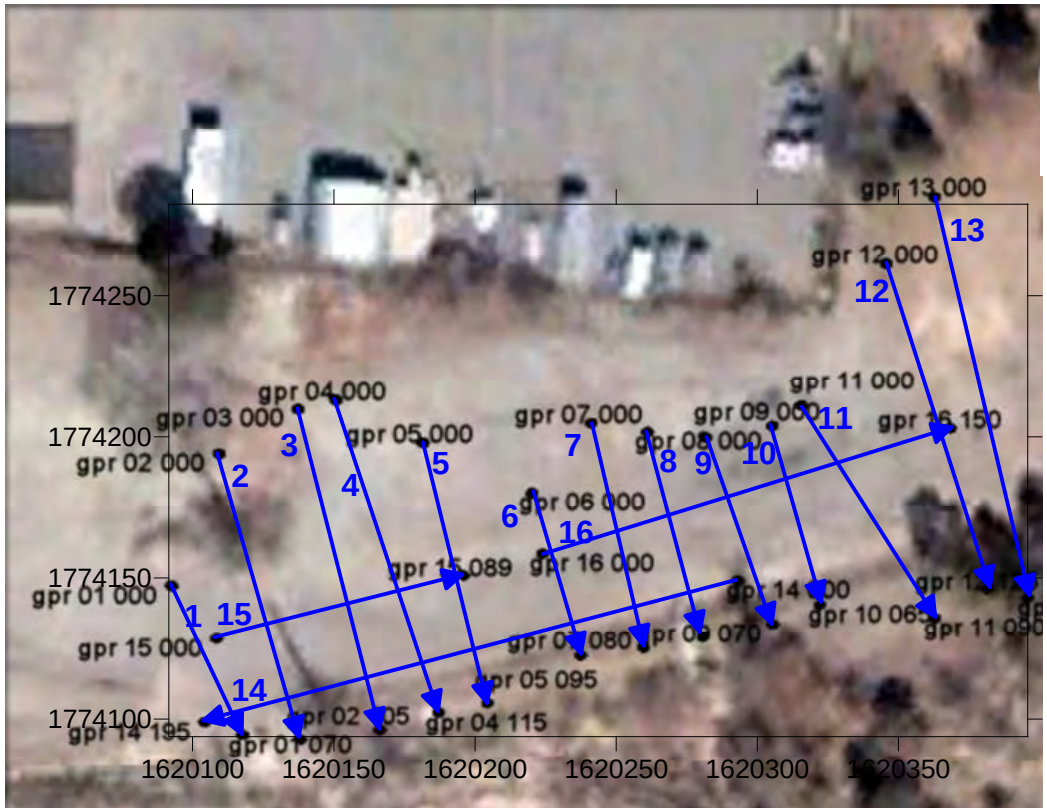
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 4 |




13 → Location and Orientation of GPR Profile

Coordinates are in
NAD83 NM Central
US Survey Feet

# Location of GPR Traverses

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SWMU 03-029
Los Alamos National Laboratory

| February 2010 | 09303 |
|---|---|
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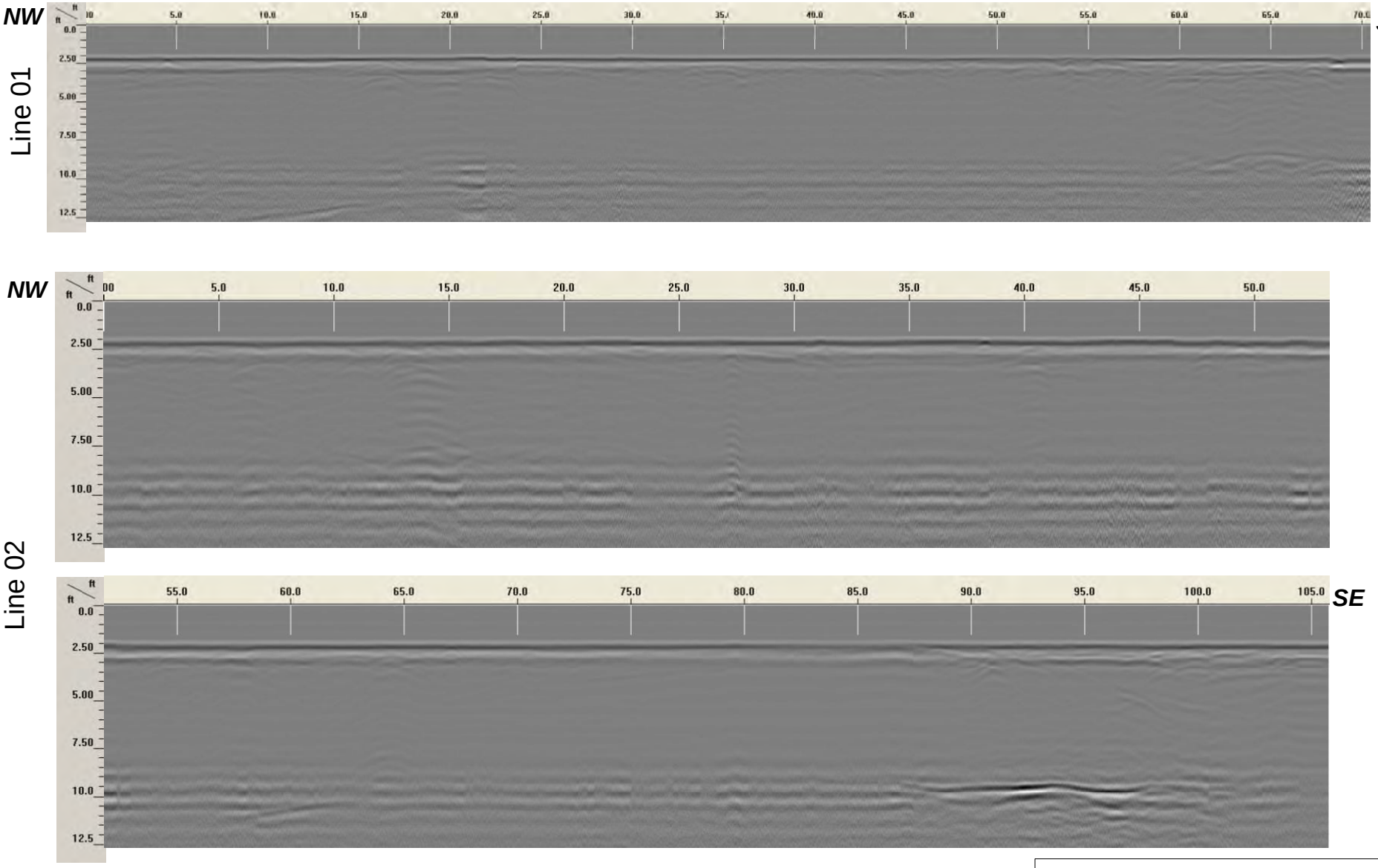


Interpretation may change if additional data becomes available.

| GPR Profiles 01 and 02 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
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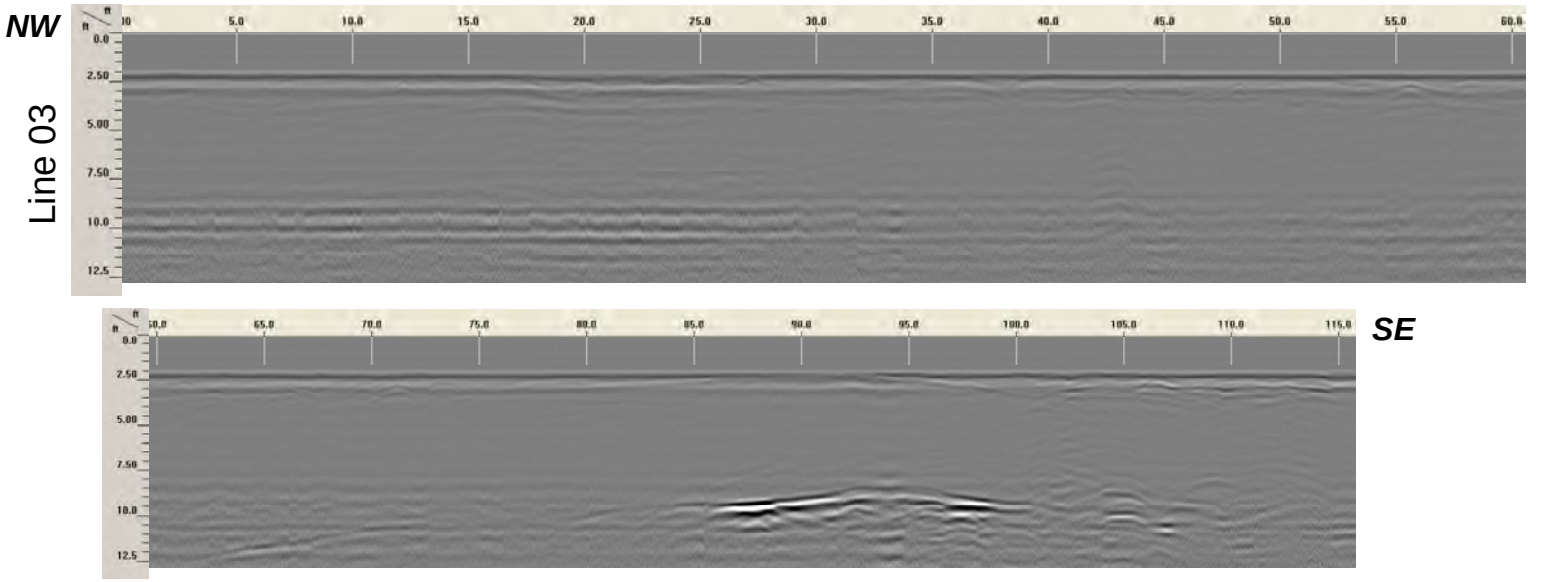
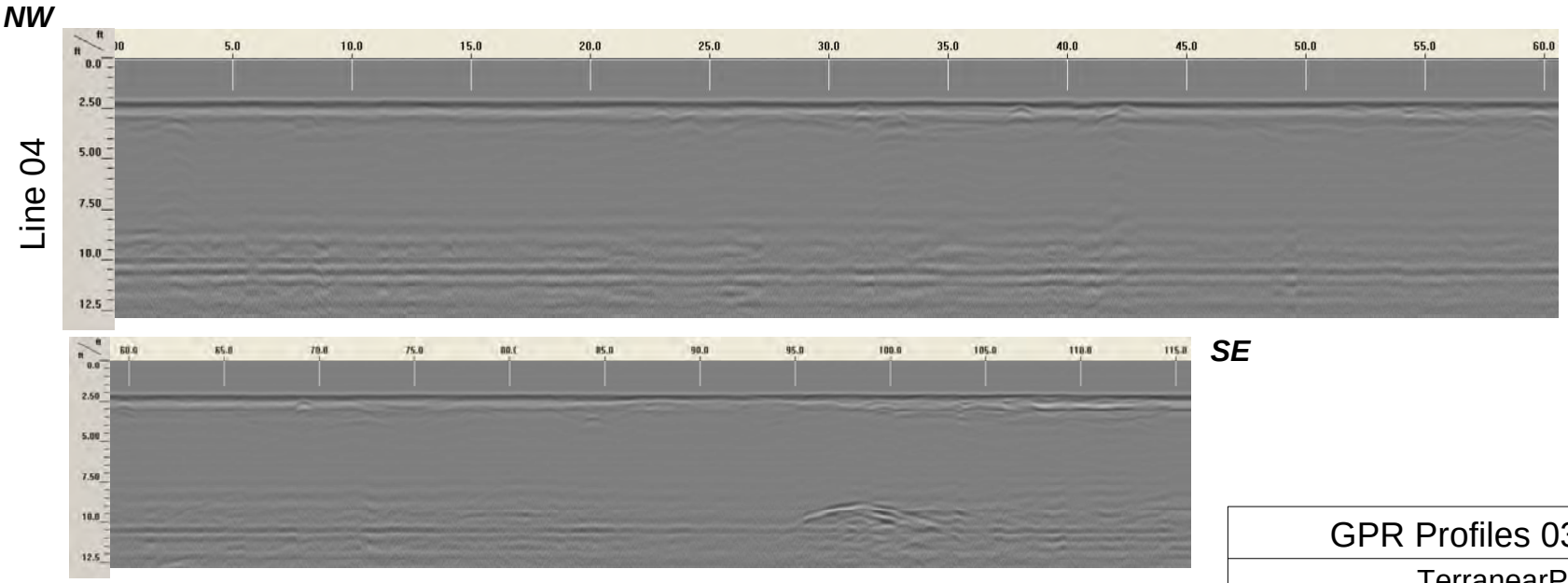
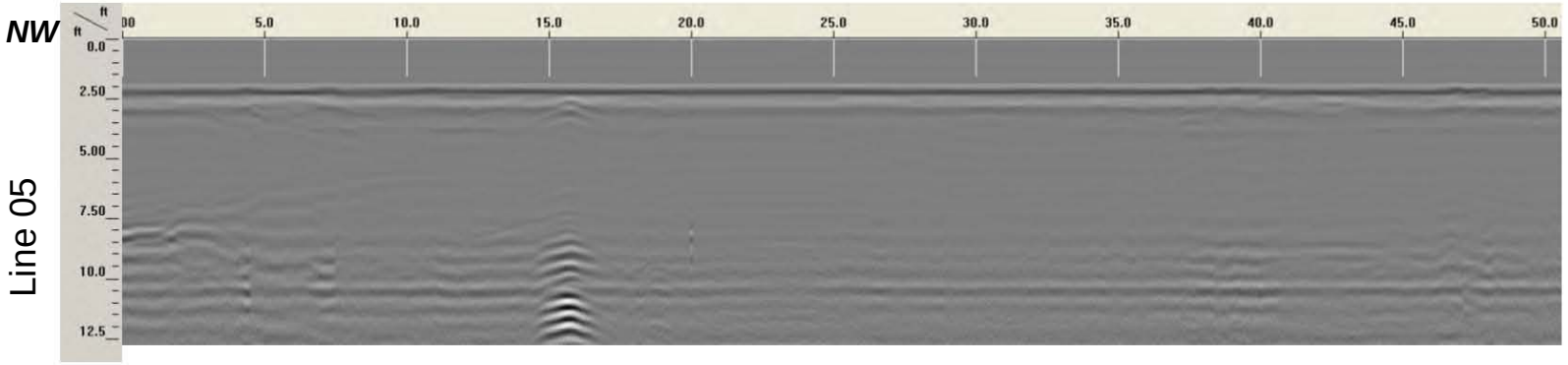
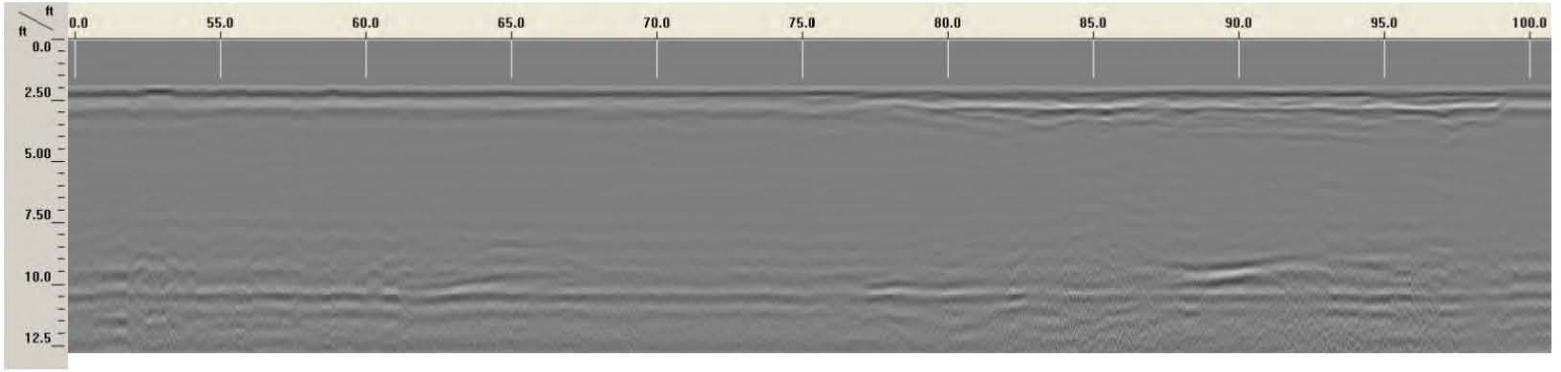


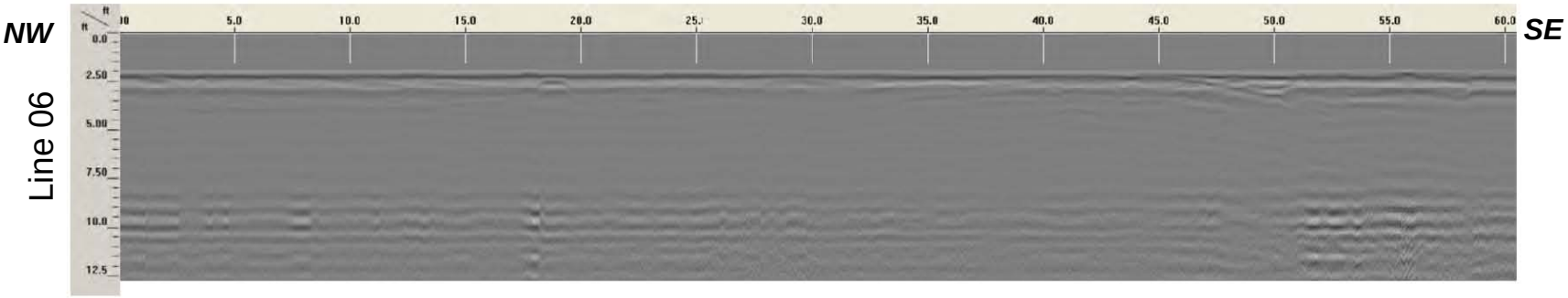




Interpretation may change if additional data becomes available.

| GPR Profiles 03 and 04 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 7 |




Interpretation may change if additional data becomes available.

| GPR Profiles 05 and 06 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
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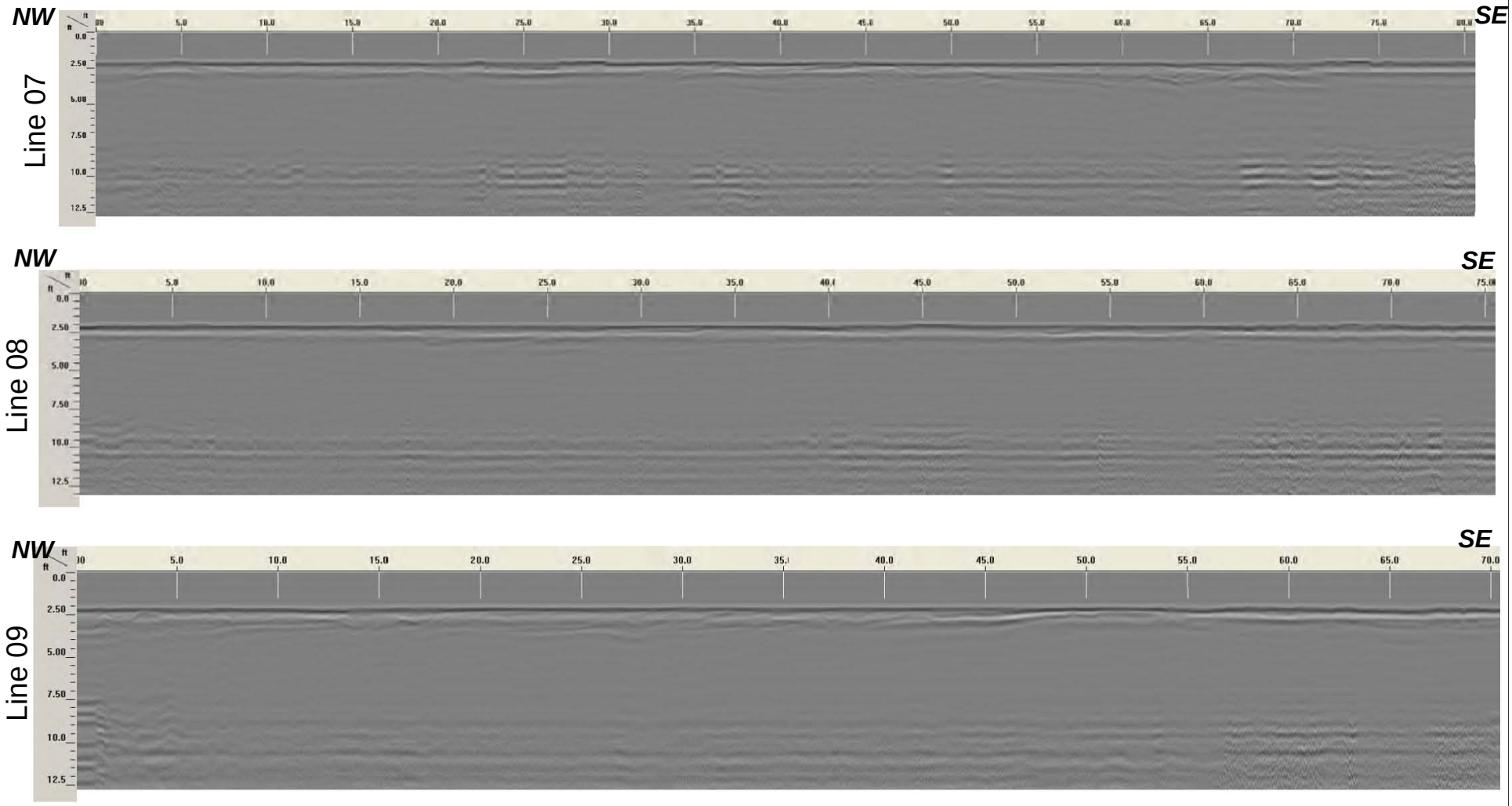
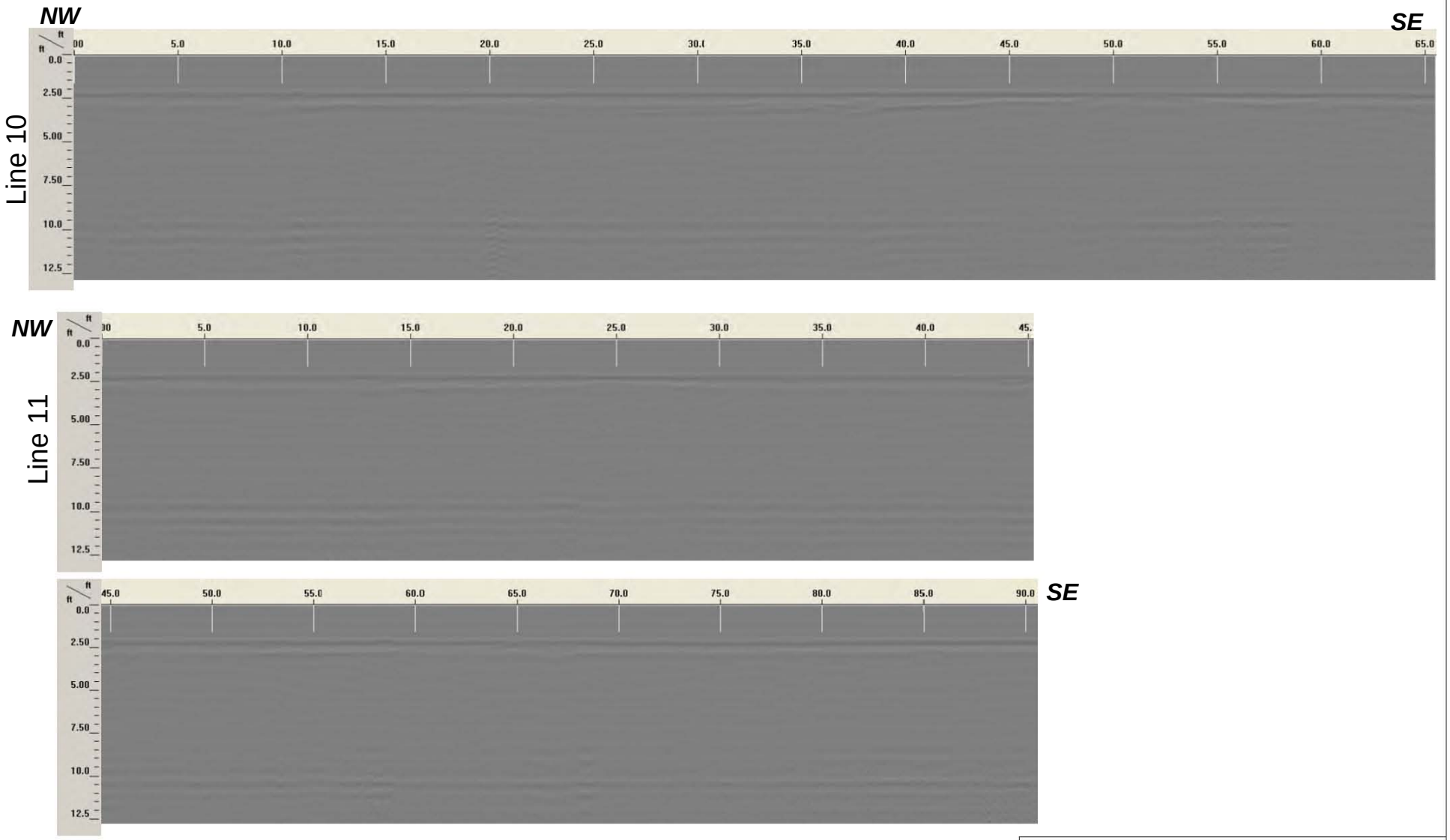
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 8 |



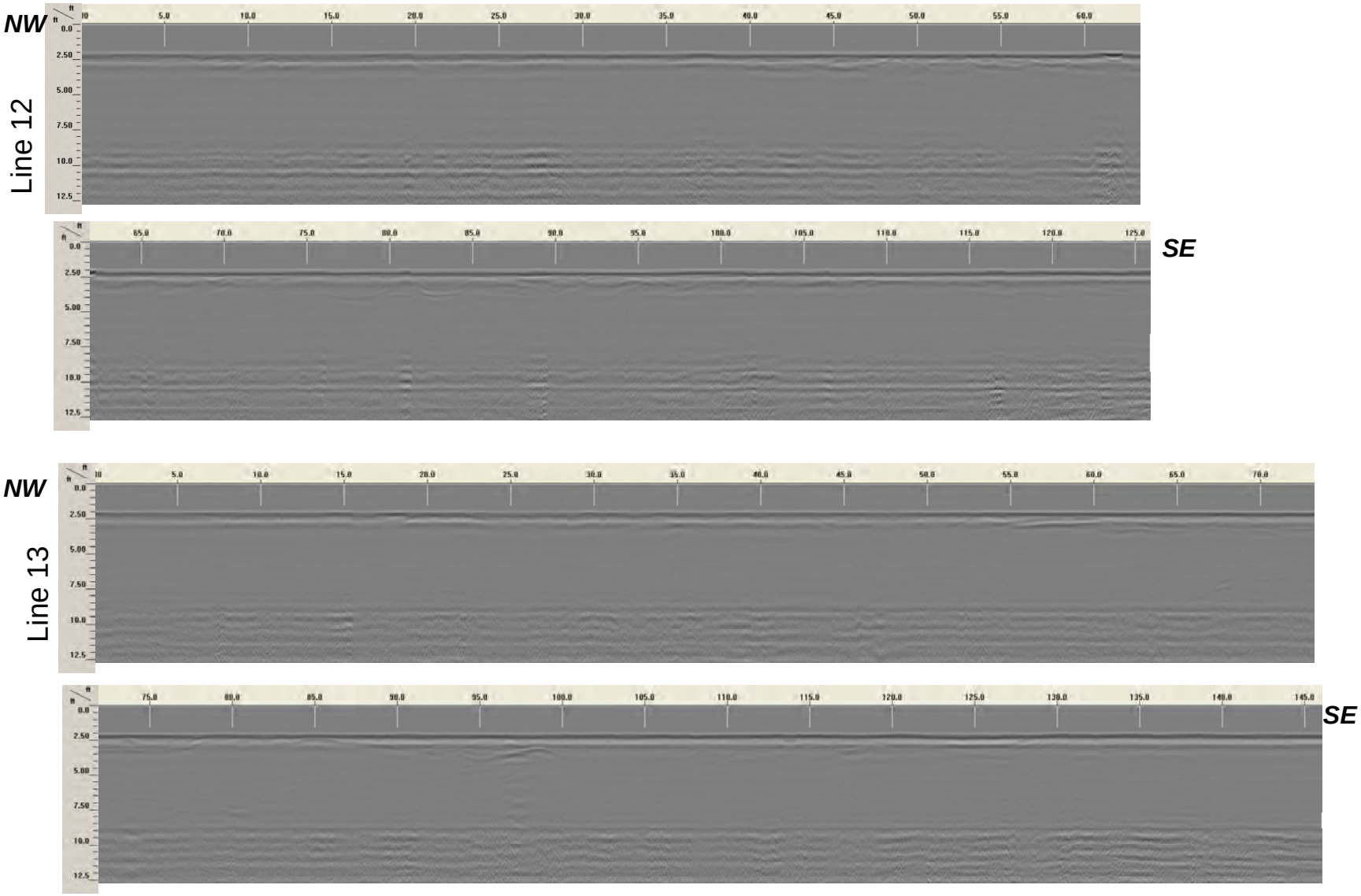

Interpretation may change if additional data becomes available.

| GPR Profiles 07, 08, and 09 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 9 |




Interpretation may change if additional data becomes available.

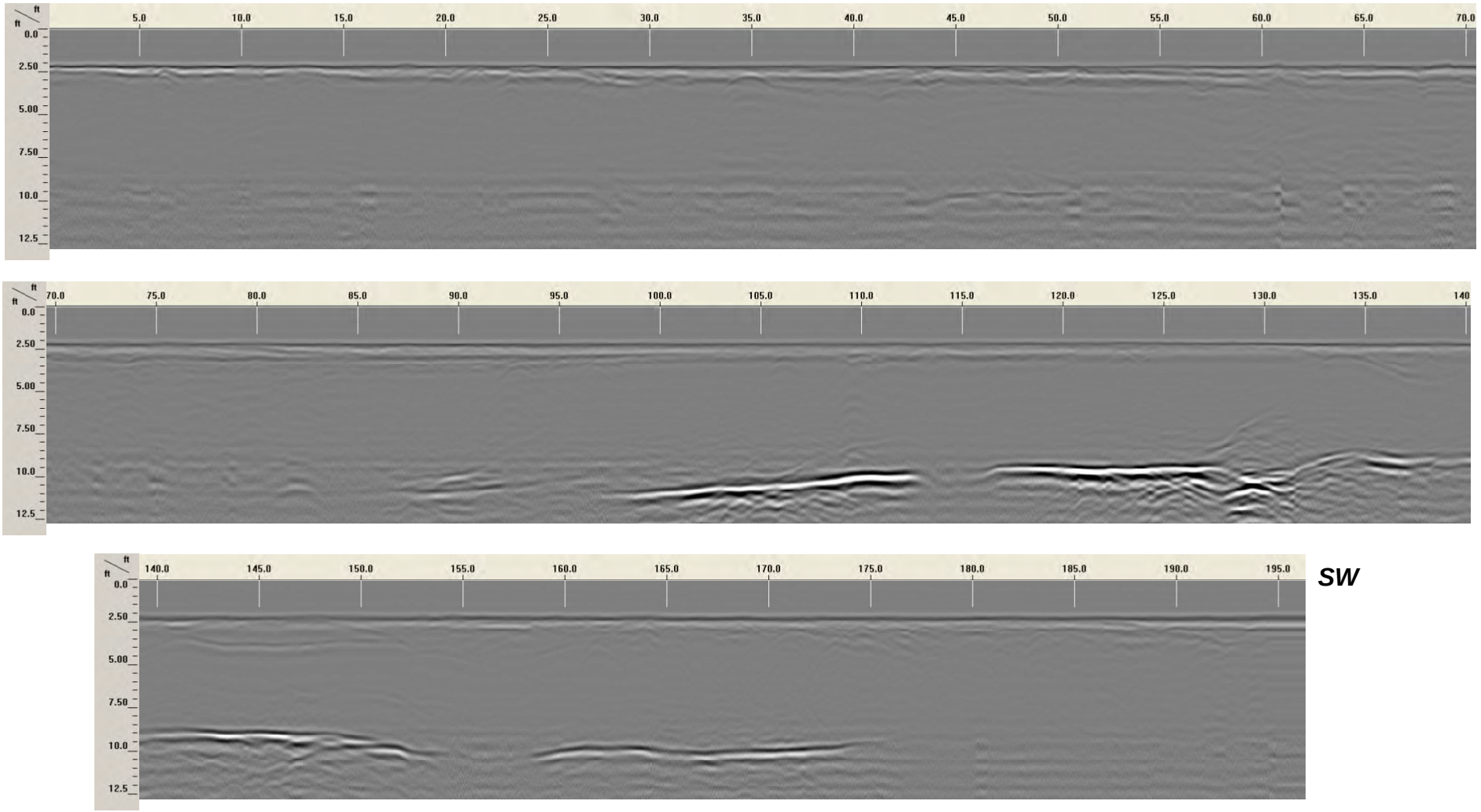
| GPR Profiles 10 and 11 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 10 |




Interpretation may change if additional data becomes available.

| GPR Profiles 12 and 13 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 11 |

***NE***

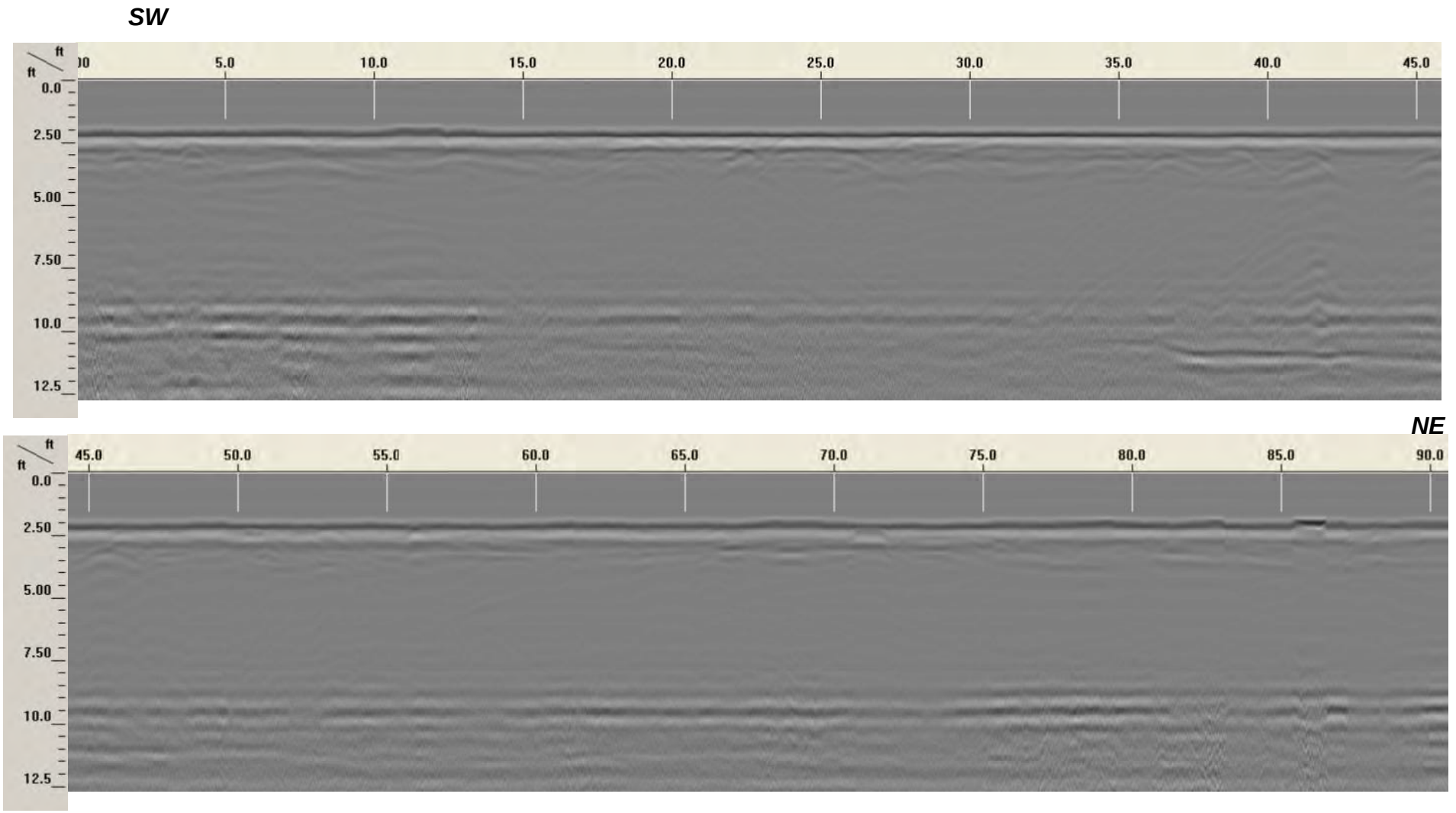



***SW***

Line 14

Interpretation may change if additional data becomes available.

| GPR Profile 14 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 12 |

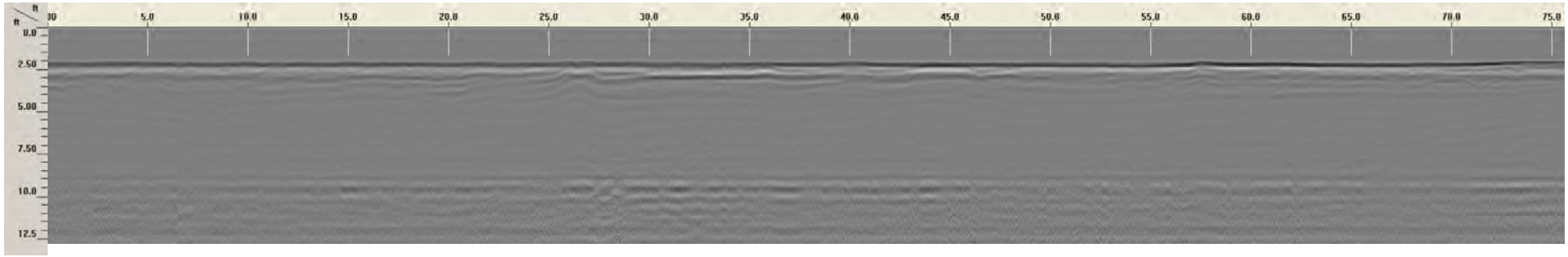



Line 15

Interpretation may change if additional data becomes available.

| GPR Profile 15 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 13 |

***SW***

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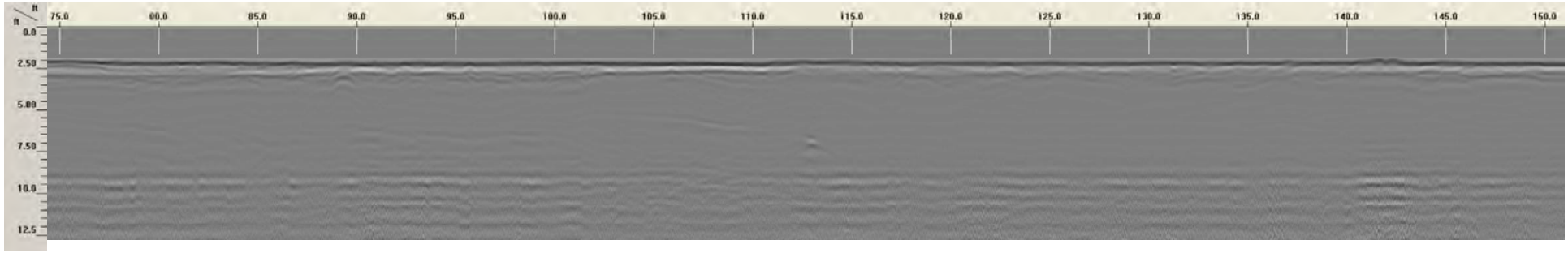



Line 16

Interpretation may change if additional data becomes available.

| GPR Profile 16 | |
|---|---|
| TerranearPMC<br>SWMU 03-029<br>Los Alamos National Laboratory | |
| February 2010 | 09303 |
| ARM GEOPHYSICS *Surface & Borehole Geophysics* | Figure 14 |

# Appendix F

*Analytical Program*

## F-1.0 INTRODUCTION

This appendix discusses the analytical methods and data-quality review for samples collected during investigations (1994 through 2010) at the Upper Sandia Canyon 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 the Laboratory's statements of work (SOWs) for analytical laboratories (LANL 1995, 049738; LANL 2000, 071233). 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 (IS), 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 laboratories (LANL 1995, 049738; LANL 2000, 071233). Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in standard operating procedure (SOP) EP-ERSS-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 Data
- SOP-5162, Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data
- SOP-5163, Routine Validation of Organochlorine Pesticides and PCB Analytical Data
- SOP-5164, Routine Validation of High Explosives 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 (SW-846 EPA Method 8290)
- SOP-5171, Routine Validation of Total Petroleum Hydrocarbons Gasoline Range Organics/Diesel Range Organics Analytical Data (Method 80151B)
- 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 numbers), 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 forms (COCs) 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

Historical data evaluated in this report were collected from 1994 to 2008 during Resource Conservation and Recovery Act facility investigations and several corrective actions. All data records include a vintage code field denoting how and where samples were submitted for analyses. All historical data evaluated in this report were revalidated by current quality control metrics.

### F-2.1 Historical Laboratory Screening Data and Sample Documentation

Samples collected before 1995–1996 were analyzed internally at the Laboratory's Chemical Science and Technology (CST) on-site and off-site laboratories. Historical data analyzed on-site by CST have been determined by the Laboratory to be screening-level quality only and are not used for decision-making purposes. Therefore, CST on-site data are removed from reporting datasets used to assess site contamination and/or risk and presented separately as screening data. Data analyzed off-site by CST are determined to be of sufficient quality for decision-making purposes only if complete data packages can be located and the analytical data are reviewed and revalidated to current QA standards.

## F-3.0 INORGANIC CHEMICAL ANALYSES

A total of 781 samples (plus 80 field duplicates) collected within the Upper Sandia Canyon Aggregate Area were analyzed for inorganic chemicals. All 781 samples (plus 80 field duplicates) were analyzed for target analyte list (TAL) metals; 194 samples (plus 23 field duplicates) were analyzed for nitrate; 229 samples (plus 26 field duplicates) were analyzed for perchlorate; 60 samples (plus 3 field duplicates) were analyzed for hexavalent chromium; and 532 samples (plus 58 field duplicates) were analyzed for total cyanide. The analytical methods used for inorganic chemicals are listed in Table F-1.0-1.

Tables within the investigation report summarize all samples collected and the analyses requested from the Upper Sandia Canyon Aggregate Area. All inorganic chemical results are provided on DVD in Appendix G.

### F-3.1 Inorganic Chemical QA/QC Samples

The use of QA/QC samples is designed to produce quantitative measures of the reliability of specific parts of an analytical procedure. 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) and is described briefly in the sections below. For some of the analyses performed before the 1995 SOW was implemented, slightly different QA/QC procedures may have been followed.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals in soil/tuff, LCS percent recovery (%R) should fall within the control limits of 75%–125% (LANL 1995, 049738; LANL 2000, 071233).

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).

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).

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%.

Details regarding the quality of the inorganic chemical analytical data included in the datasets are summarized in the following subsections.

### F-3.2 Data Quality Results for Inorganic Chemicals

The majority of the analytical results were qualified as not detected (U) because the analytes were not detected by the respective analytical methods. No quality issues were associated with the data presented.

#### F-3.2.1 Chain of Custody

SCL/COC forms were maintained properly 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

A total of 15 TAL metals were qualified as estimated not detected (UJ) because the extraction/analytical holding time were exceeded by less than 2 times the published method for holding times.

A total of 27 TAL metals were qualified as estimated and biased low (J-) because the extraction/analytical holding time were exceeded by less than 2 times the published method for holding times.

Two nitrate results were qualified as estimated and biased low (J-) because the extraction/analytical holding time were exceeded by less than 2 times the published method for holding times.

### F-3.2.6 Initial and Continuing Calibration Verifications

Four nitrate results were qualified as estimated not detected (UJ) because the initial calibration verification (ICV) and/or continuing calibration verification (CCV) were recovered outside the method-specific limits.

Nine TAL metals results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

Seven TAL metals results were qualified as estimated and biased high (J+) because the associated ICV and/or CCV were recovered above the upper warning limit but were less than or equal to the upper acceptance limit (UAL).

### F-3.2.7 Interference Check Sample and/or Serial Dilutions

One TAL metals result was qualified as estimated (J) because the serial dilution sample RPD was greater than 10% and the sample result was greater than 50 times the MDL.

### F-3.2.8 Laboratory Duplicate Samples

A total of 15 metals results were qualified as estimated not detected (UJ) because the sample and the duplicate sampling results were greater than or equal to 5 times the reporting limit (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 analyzed on a non-Laboratory sample.

A total of 838 TAL metals results were qualified as estimated (J) because the sample and the duplicate sampling results were greater than or equal to 5 times the RL, and the duplicate RPD was greater than 35% for soil samples.

### F-3.2.9 Preparation Blanks

A total of 135 TAL metals results, 2 cyanide results, and 5 hexavalent chromium results were qualified as not detected (U) because the sampling results were less than or equal to 5 times the concentration of the related analytes in the method blank.

A total of 227 TAL metals results and 35 total cyanide results were qualified as not detected (U) because the sampling results were less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 288 TAL metals results and 16 nitrate results were qualified as not detected (U) because the sampling results were less than or equal to 5 times the concentration of the related analyte in the equipment or rinsate blank.

A total of 257 TAL metals results were qualified as estimated (J) because the sampling results were greater than 5 times the concentration of the related analytes in the method blank.

### F-3.2.10 Matrix Spike Samples

A total of 19 TAL metals results were qualified as estimated not detected (UJ) because the sample volume was not sufficient for an MS to be analyzed on a Laboratory sample.

A total of 289 TAL metals results and 86 nitrate results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 9 TAL metals results and 13 nitrate 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 908 TAL metals results and 45 nitrate 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 32 TAL metals results were qualified as estimated (J) because the sample volume was not sufficient for an MS to be analyzed on a Laboratory sample.

A total of 72 TAL metals results were qualified as estimated and biased high (J+) because the associated analytes were recovered above 150% in the associated spike sample.

A total of 108 TAL metals results were qualified as estimated and biased high (J+) because the associated analytes were recovered above the 125% but below 150% in the associated spike sample.

A total of 1952 TAL metals results and 2 nitrate 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 Laboratory Control Sample Recoveries

A total of 15 TAL metals results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated laboratory control sample.

A total of 32 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 laboratory control sample.

### F-3.2.12 Detection Limits

A total of 521 TAL metals results and two hexavalent chromium results were qualified as estimated (J) because the sampling result was reported as detected between the estimated detection limit (EDL) and the method detection limit (MDL).

A total of 1692 TAL metals results, 1 nitrate result, 1 hexavalent chromium result, 46 perchlorate results, and 33 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-3.2.13 Rejected Results

A total of 22 antimony results were qualified as rejected (R) because the associated MS recovery was less than 30%, indicating a low bias.

A total of 45 TAL metals results (10 magnesium, 11 nickel, and 24 silicon dioxide) were qualified as rejected (R) because the associated MS recovery was less than 10% indicating an extremely low bias.

A total of 10 inorganic results (6 nitrate and 4 mercury) were qualified as rejected (R) because the extraction/analytical holding time were exceeded by more than 2 times the published method for holding times.

The rejected data were not used to characterize the nature and extent or the potential human and ecological risks. However, sufficient data of good quality are available to characterize the site(s) and conduct the risk assessments. The results of other qualified data were used as reported and did not affect the usability of the sampling results.

## F-4.0 ORGANIC CHEMICAL ANALYSES

A total of 747 samples (plus 80 field duplicates) collected within the Upper Sandia Canyon Aggregate Area were analyzed for organic chemicals. A total of 619 samples (plus 70 field duplicates) were analyzed for volatile organic chemicals (VOCs); 647 samples (plus 72 field duplicates) were analyzed for semivolatile organic chemicals (SVOCs); 664 samples (plus 74 field duplicates) were analyzed for polychlorinated biphenyls (PCBs); 2 samples were analyzed for dioxins/furans; 30 samples (plus 1 field duplicate) were analyzed for pesticides; 22 samples were analyzed for herbicides; 530 samples (plus 56 field duplicates) were analyzed for total petroleum hydrocarbon (TPH) diesel range organics (DRO); and 112 samples (plus 12 field duplicates) were analyzed for TPH gasoline range organics (GRO). All QC procedures were followed as required by the analytical laboratory SOWs (LANL 1995, 049738; LANL 2000, 071233). The analytical methods used for organic chemicals are listed in Table F-1.0-1.

Tables within the investigation report summarize all samples collected from the Upper Sandia Canyon Aggregate Area and the analyses requested. All organic chemical 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 produce quantitative measures of the reliability of specific parts of an analytical procedure. 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 SOW (LANL 2000, 071233) and described briefly in the paragraphs 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.

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.

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 2000, 071233).

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 UAL.

A surrogate compound (a surrogate) is an organic compound used in the analyses of target analytes that is similar in composition and behavior to the target analytes but is 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.

Internal standards 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. Internal standards are used as the basis for quantitation of target analytes. The percent recovery for ISs should be within the range of 50%–200%.

Details regarding the quality of the organic chemical analytical data included in the dataset are summarized in the following sections.

### F-4.2 Data Quality Results for Organic Chemicals

The majority of the analytical results were qualified as not detected (U) because the analytes were not detected by the respective analytical methods. No quality issues were associated with the data presented.

Two SVOC results were qualified as not detected (U) because the mass spectra did not meet specifications.

Seven TPH-DRO results were qualified as estimated not detected (UJ) because the project chemist identified quality deficiencies in the reported data that required further qualification.

A total of 12 dioxin/furan results were qualified as estimated not detected (UJ) because the instrument performance sample did not pass method acceptance criteria.

A total of 12 dioxin/furan results were qualified as estimated (J) because the instrument performance sample did not pass method acceptance criteria.

#### F-4.2.1 Maintenance of Chain of Custody

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

A total of 121 VOC results were qualified as estimated not detected (UJ) because of sample dilutions.

### F-4.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for organic chemicals.

### F-4.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for organic chemicals.

### F-4.2.6 Initial and Continuing Calibration Verifications

A total of 18 PCB results, 43 SVOC results, and 46 VOC results were qualified as estimated not detected (UJ) because the associated percent relative standard deviation (%RSD) or percent difference (%D) exceeded criteria in the initial or continuing calibration standard.

Three PCB results, 79 pesticide results, 3299 SVOC results, and 2674 VOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method-specific limits.

Four PCB results, one TPH-DRO result, and five VOC results were qualified as estimated (J) because the associated %RSD or %D exceeded criteria in the initial or continuing calibration standard.

Two dioxin/furan results, 37 SVOC results, and 102 VOC results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method specific limits.

A total of 118 VOC results were qualified as estimated (J) because the ICV and/or CCV were not analyzed at the appropriate method frequency.

### F-4.2.7 Surrogate Recoveries

Two TPH-DRO results, 277 SVOC results, 3 TPH-GRO results, 34 PCB results, and 244 VOC results were qualified as estimated not detected (UJ) because the associated surrogate was recovered below the LAL but was greater than or equal to 10% R, which indicates the potential for a low bias in the results.

Two TPH-DRO results, four TPH-GRO result, and eight PCB results were qualified as estimated and biased low (J-) because the associated surrogate was recovered below the LAL but was greater than or equal to 10% R.

Two TPH-DRO results and two TPH-GRO result were qualified as estimated and biased low (J-) because the associated surrogate was recovered at less than 10% R.

Two TPH-DRO results and nine VOC results were qualified as estimated and biased high (J+) because the surrogate %R value is greater than the UAL, which indicates a potential for a high bias in the results and a potential for false positive results.

### F-4.2.8 IS Responses

A total of 29 SVOC results and 148 VOC results were qualified as estimated not detected (UJ) because the associated IS area counts were less than 50% but greater than 10% R when compared with the area counts in the previous continuing calibration standard.

Two SVOC results and four VOC results were qualified as estimated (J) because the associated IS area counts were less than 50% but greater than 10% R when compared with the area counts in the applicable continuing calibration standard.

#### F-4.2.9 Method Blanks

A total of 18 TPH-DRO results, two PCB results, 13 SVOC results, and 74 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 analyte in the method blank.

A total of 23 VOC results were qualified as not detected (U) because the sample result is less than or equal to 5 times (10 times for common laboratory contaminants) the concentration of the related analyte in the trip blank, rinsate blank, or equipment blank.

#### F-4.2.10 Matrix Spikes

A total of 48 TPH-DRO results and 1 TPH-GRO result were qualified as estimated not detected (UJ) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

Three TPH-DRO results were qualified as estimated not detected (UJ) because the MS/MS duplicate (MSD) RPD was greater than 30%.

Nine TPH-DRO results were qualified as estimated (J) because the MS/MSD RPD was greater than 30%.

A total of 94 TPH-DRO results and 11 TPH-GRO results were qualified as estimated (J) because a low recovery (%R < 70%) was observed for these analytes in the associated spike sample.

Three TPH-DRO 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 Laboratory Control Sample Recoveries

Five SVOC results and 37 VOC results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated LCS.

#### F-4.2.13 Quantitation and Method Detection Limits

Three dioxin/furan results, 114 PCB results, 2 pesticide results, 890 SVOC results, 153 TPH-DRO results, 15 TPH-GRO results, and 173 VOC results were qualified as estimated (J) because the sampling result was reported as detected between the PQL and the MDL.

#### F-4.2.14 Rejected Data

Six TPH-DRO, six TPH-LRO and five VOC results were qualified as rejected (R) because a low recovery (<10%) was observed for these analytes in the associated LCSs.

A total of six organic results (two acetone, one isopropyltoluene[4-], one tetrachloroethene, and two TPH-GRO) were qualified as rejected (R) because the affected results were not analyzed with a valid 5-point calibration curve and/or a standard at the reporting limit.

The rejected data were not used to characterize the nature and extent or the potential human and ecological risks. However, sufficient data of good quality were available to characterize the site(s) and conduct the risk assessments. The results of other qualified data were used as reported and did not affect the usability of the sampling results.

## F-5.0 RADIONUCLIDE ANALYSES

A total of 295 samples (plus 29 field duplicates) collected within the Upper Sandia Canyon Aggregate Area were analyzed for radionuclides. A total of 187 samples (plus 24 field duplicates) were analyzed for americium-241; 5 samples were analyzed for gamma-emitting radionuclides; 2 samples were analyzed for alpha/beta emitting radionuclides; 141 samples (plus 13 field duplicates) were analyzed for tritium; 213 samples (plus 24 field duplicates) were analyzed for isotopic plutonium; 219 samples (plus 22 field duplicates) were analyzed for isotopic uranium; and 42 samples (plus 3 field duplicates) were analyzed for strontium-90. The analytical methods used for radionuclides are listed in Table F-1.0-1.

Tables in the investigation report summarize all samples collected from the Upper Sandia Canyon Aggregate Area and the analyses requested. All radionuclide 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). Some sampling 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. This data qualification is related to detection status only not to data quality issues.

To assess the accuracy and precision of the 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) 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/tuff, LCS %R should fall between the control limits of 80%–120%.

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.

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%.

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.

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).

Details regarding the quality of the radionuclide analytical data included in the dataset are summarized in the following subsections.

## F-5.2 Data Quality Results for Radionuclides

### F-5.2.1 Chain of Custody

COC forms were maintained properly for all samples (Appendix G).

### F-5.2.2 Sample Documentation

All samples were properly documented on the SCL 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 Matrix Spike Samples

The MS criteria were met for all samples analyzed for radionuclides.

### F-5.2.8 Tracer Recoveries

A total of 6 isotopic plutonium results and 25 isotopic uranium results were qualified as estimated not detected (UJ) because the tracer is less than the LAL but greater than or equal to 10% R.

A total of 50 isotopic uranium results were qualified as estimated and biased low (J-) because the tracer is less than the LAL but greater than or equal to 10% R.

### F-5.2.9 Laboratory Control Sample Recoveries

LCS recovery criteria were met for all samples analyzed for radionuclides.

### F-5.2.10 Laboratory Duplicate Samples Recoveries

Laboratory duplicate sample recovery criteria were met for all samples analyzed for radionuclides.

### F-5.2.11 Rejected Data

A total of two gross alpha results, two gross beta results, and two tritium results were qualified as rejected (R) because the required MS information is missing.

The rejected data were not used to characterize the nature and extent or the potential human and ecological risks. However, sufficient data of good quality were available to characterize the site(s) and conduct the risk assessments. The results of other qualified data were used as reported and did 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 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 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)

LANL (Los Alamos National Laboratory), December 2000. "University of California, Los Alamos National Laboratory (LANL), I8980SOW0-8S, Statement of Work for Analytical Laboratories," Rev. 1, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2000, 071233)

**Table F-1.0-1**
**Inorganic Chemical, Organic Chemical, and Radionuclide**
**Analytical Methods for Samples Collected from the Upper Sandia Canyon Aggregate Area**

| Analytical Method | Analytical Description | Analytical Suite |
|---|---|---|
| EPA 300.0 | Ion chromatography | Anions |
| EPA 905.0 | Beta counting | Strontium-90 |
| EPA 906.0 | Distillation and liquid scintillation | Tritium |
| EPA SW-846: 6010/6010B | 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/off-line distillation | Total cyanide |
| EPA SW-846:6850 | Liquid chromatography–mass spectrometry/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: 8082 | Gas chromatography | PCBs |
| EPA SW-846: 8260 and 8260B | Gas chromatography–mass spectrometry (GC/MS) | VOCs |
| EPA TO-15 | GC/MS | VOCs |
| EPA SW-846: 8270 and 8270C | GC/MS | SVOCs |
| EPA SW-846: 8290 | High resolution gas chromatography/high resolution mass spectrometry | Dioxins/furans |
| EPA SW-846: 8321A | High performance liquid chromatography | Explosive compounds |
| Generic: gamma spectroscopy | 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 DVD included with this document)*

# Appendix H

*Box Plots and Statistical Results*

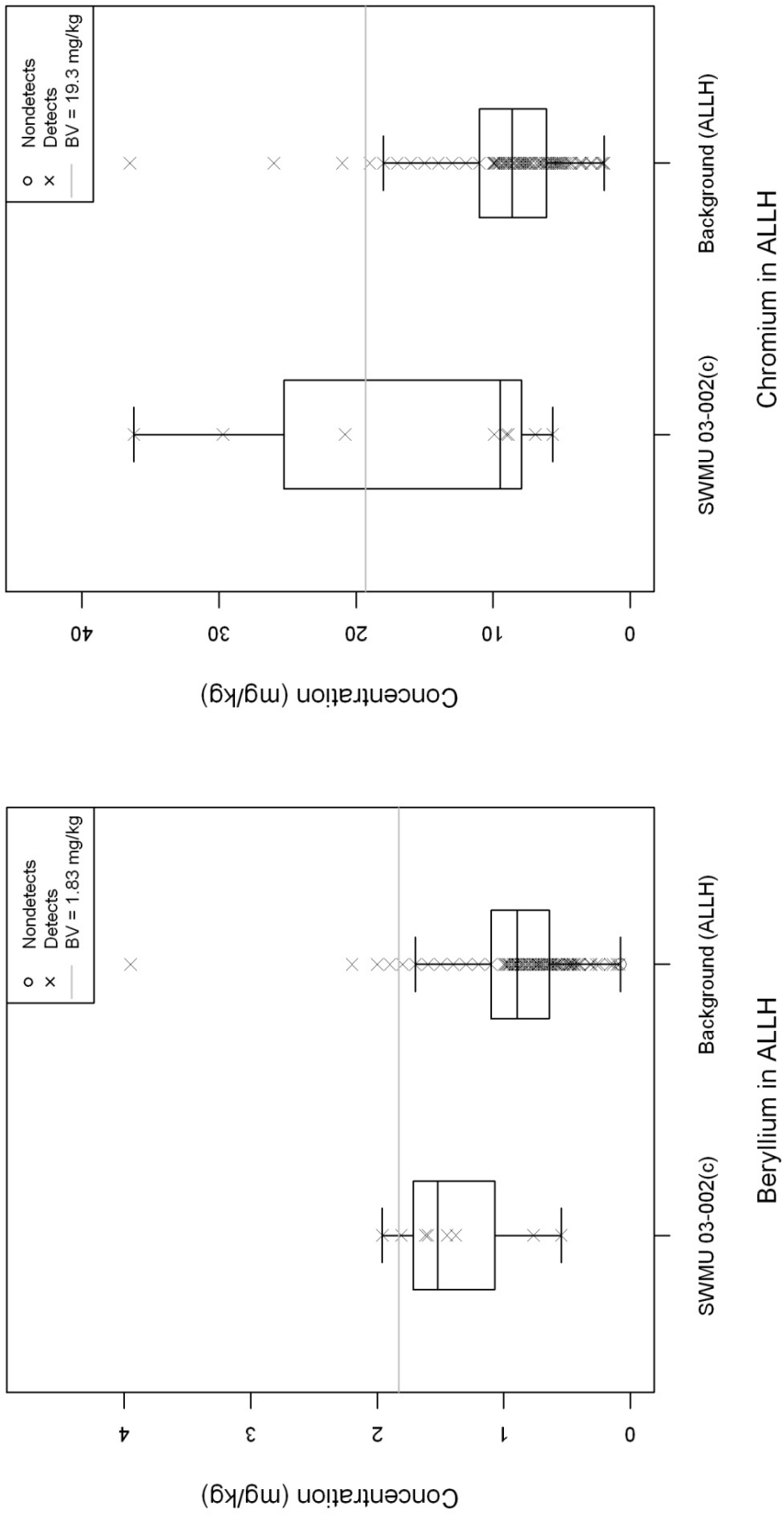



**Figure H-1 Box plots for beryllium and chromium in soil at SWMU 03-002(c)**

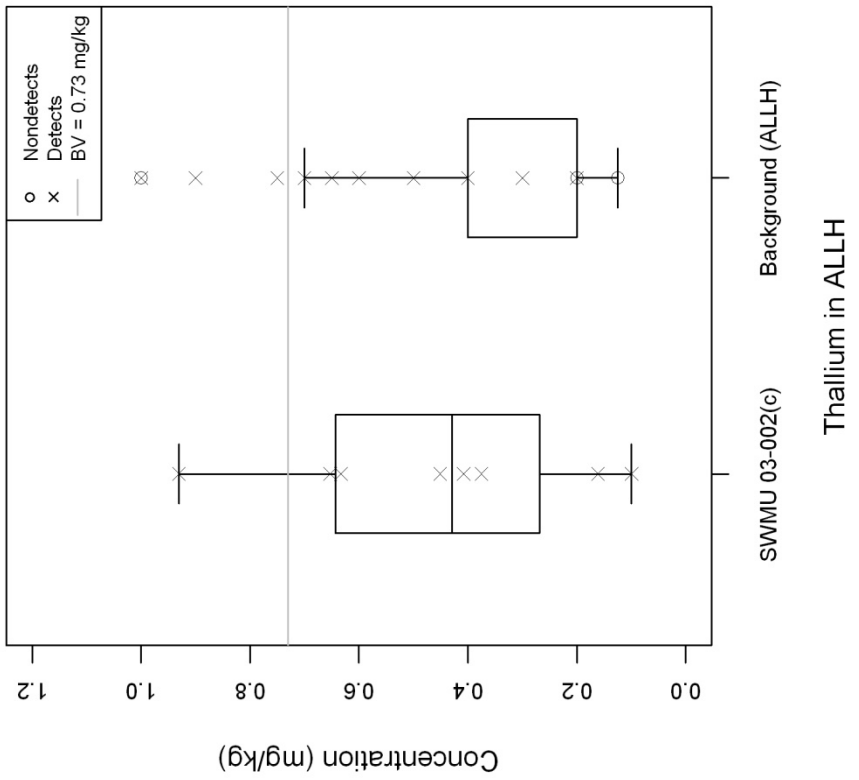



**Figure H-2 Box plot for thallium in soil at SWMU 03-002(c)**

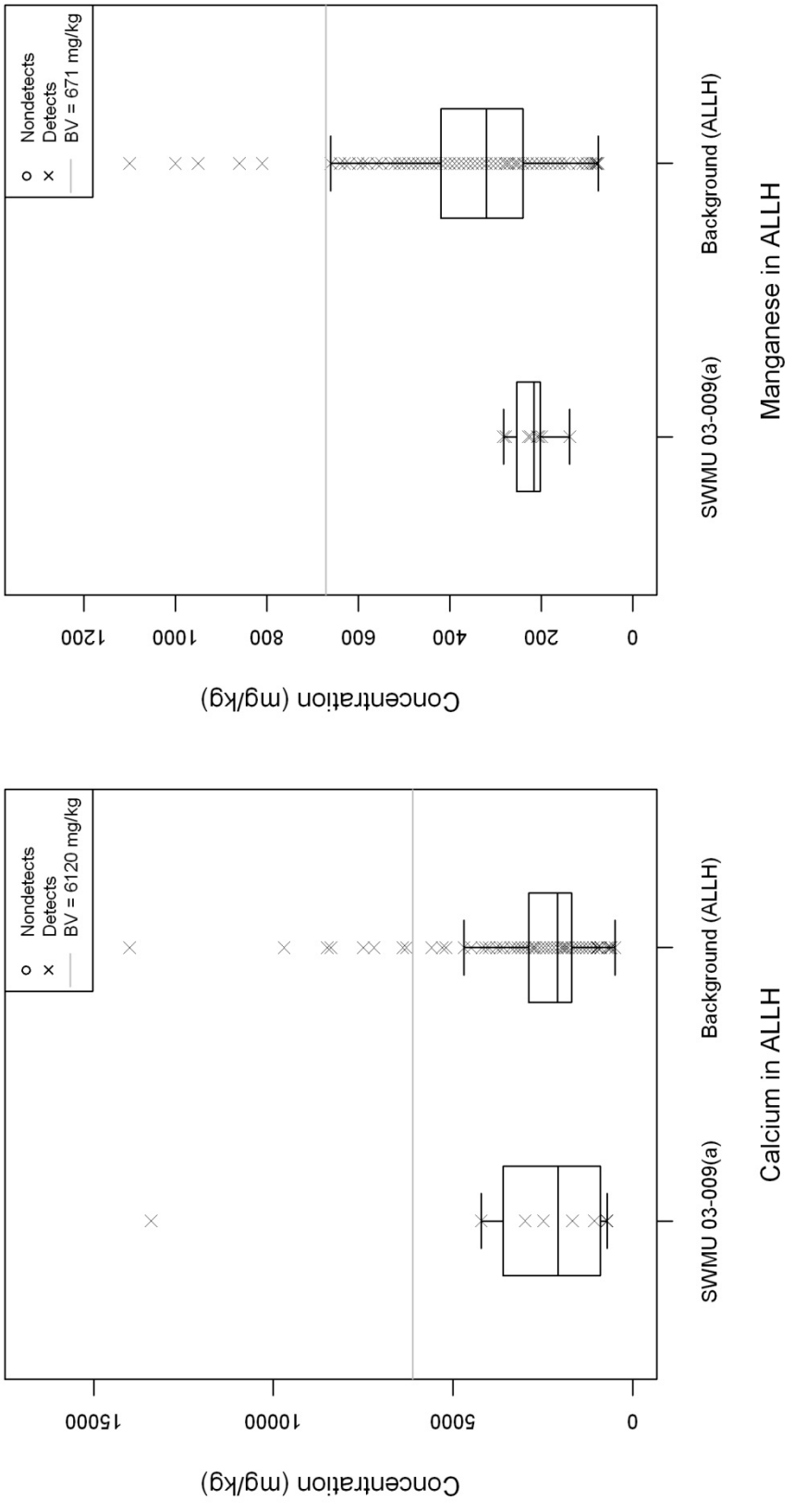



**Figure H-3 Box plots for calcium and manganese in soil at SWMU 03-009(a)**

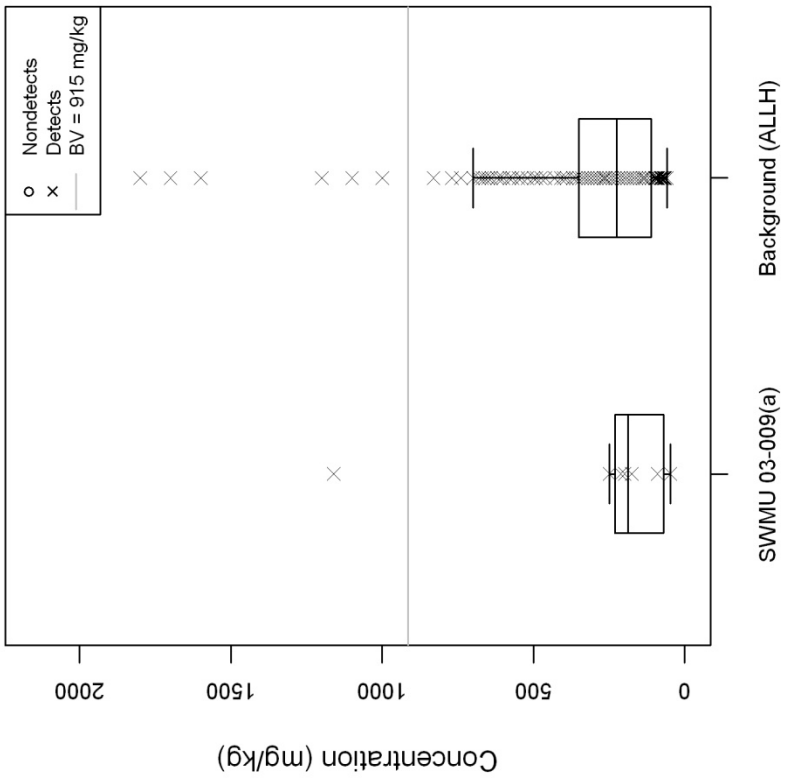
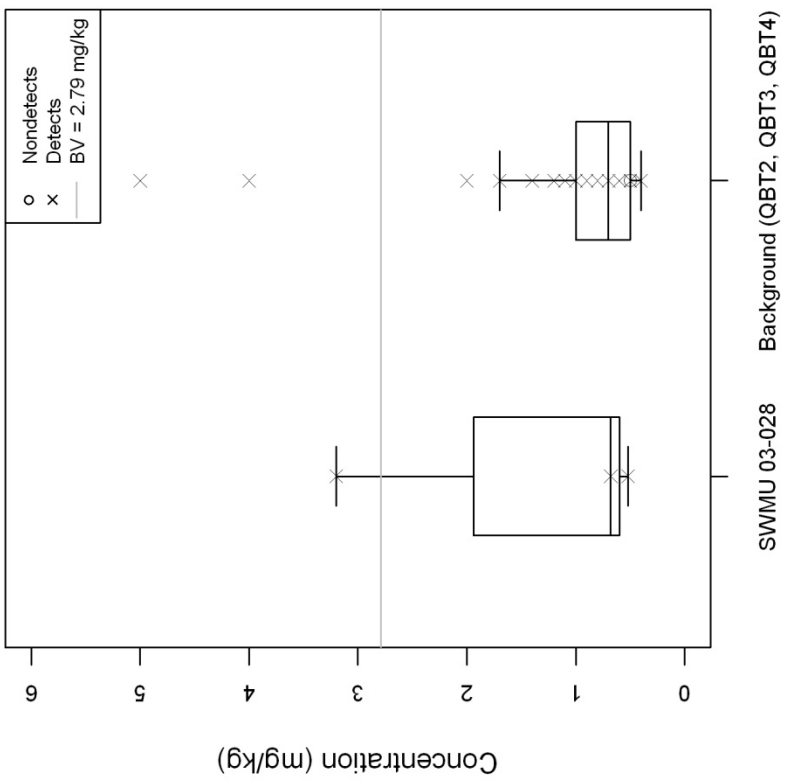



**Figure H-4 Box plot for sodium in soil at SWMU 03-009(a)**



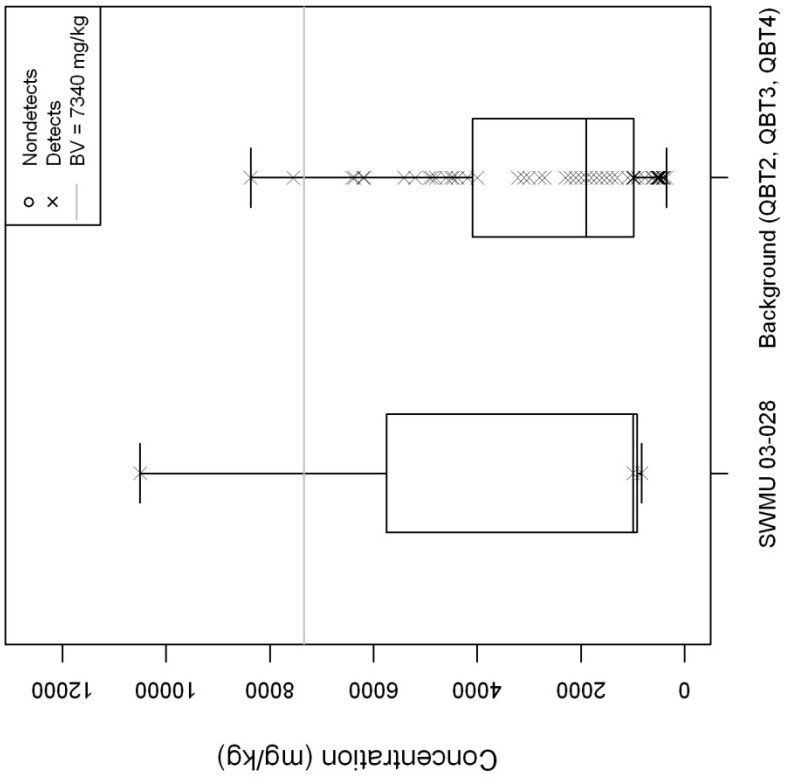
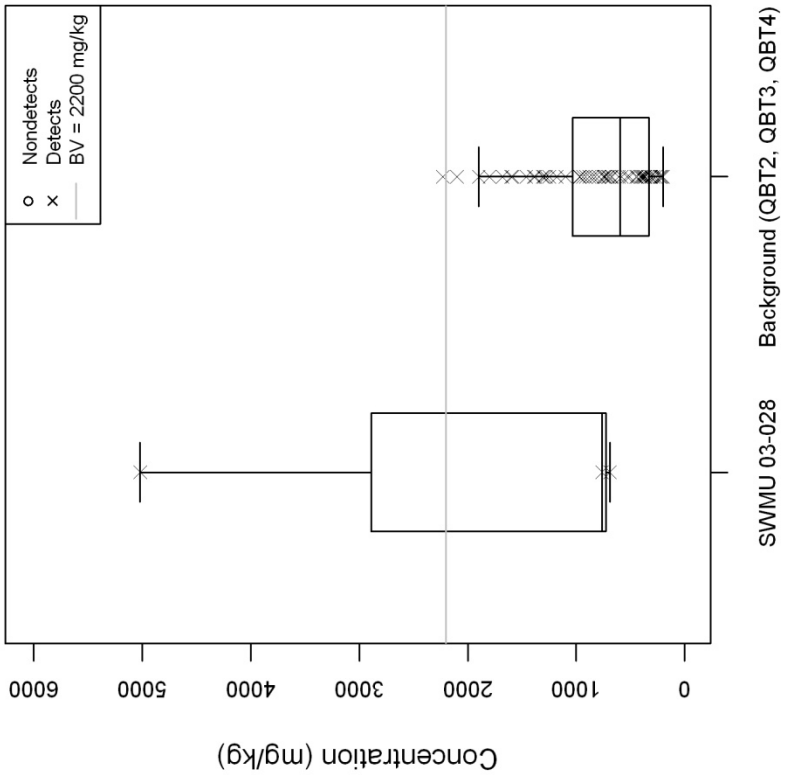




**Figure H-5 Box plots for aluminum and arsenic in tuff at SWMU 03-028**



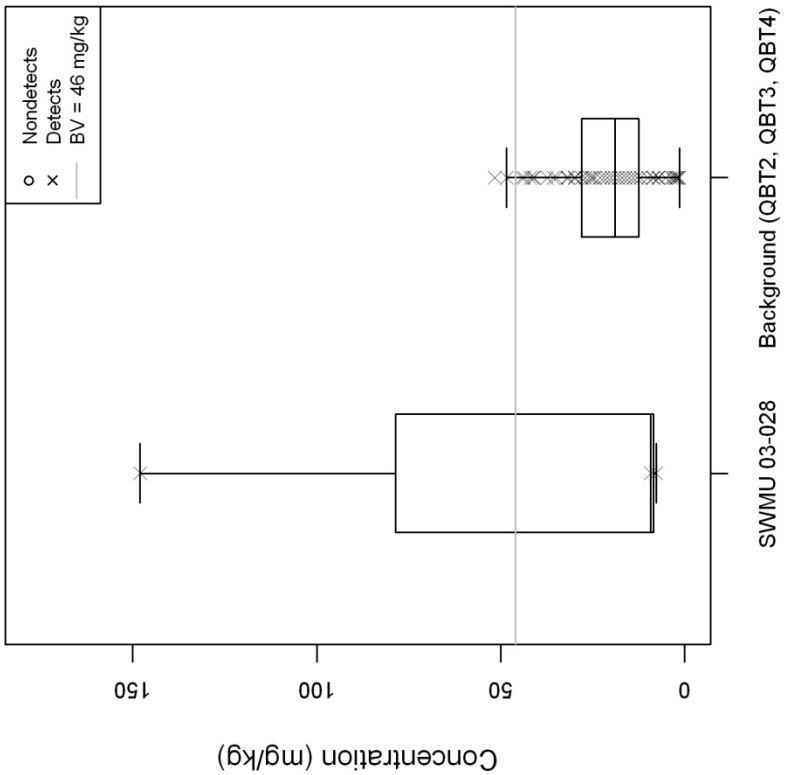
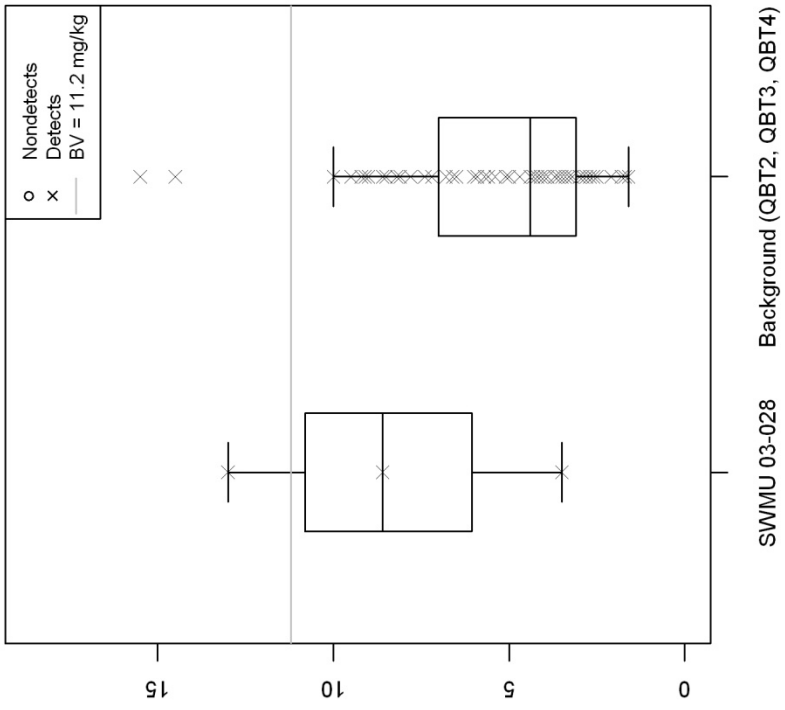




**Figure H-6 Box plots for barium and calcium in tuff at SWMU 03-028**



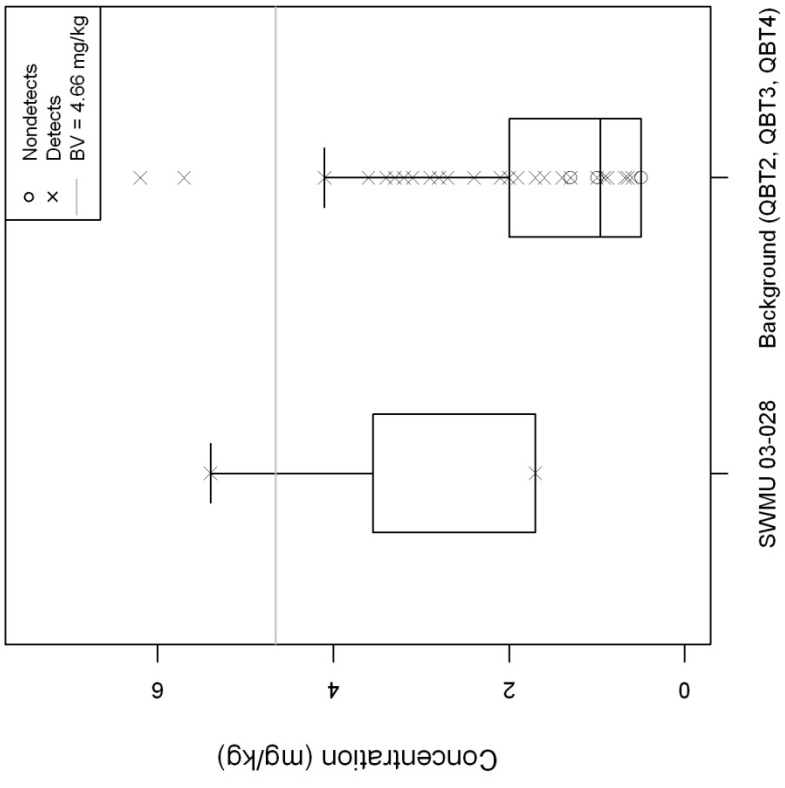




**Figure H-7 Box plots for copper and lead in tuff at SWMU 03-028**

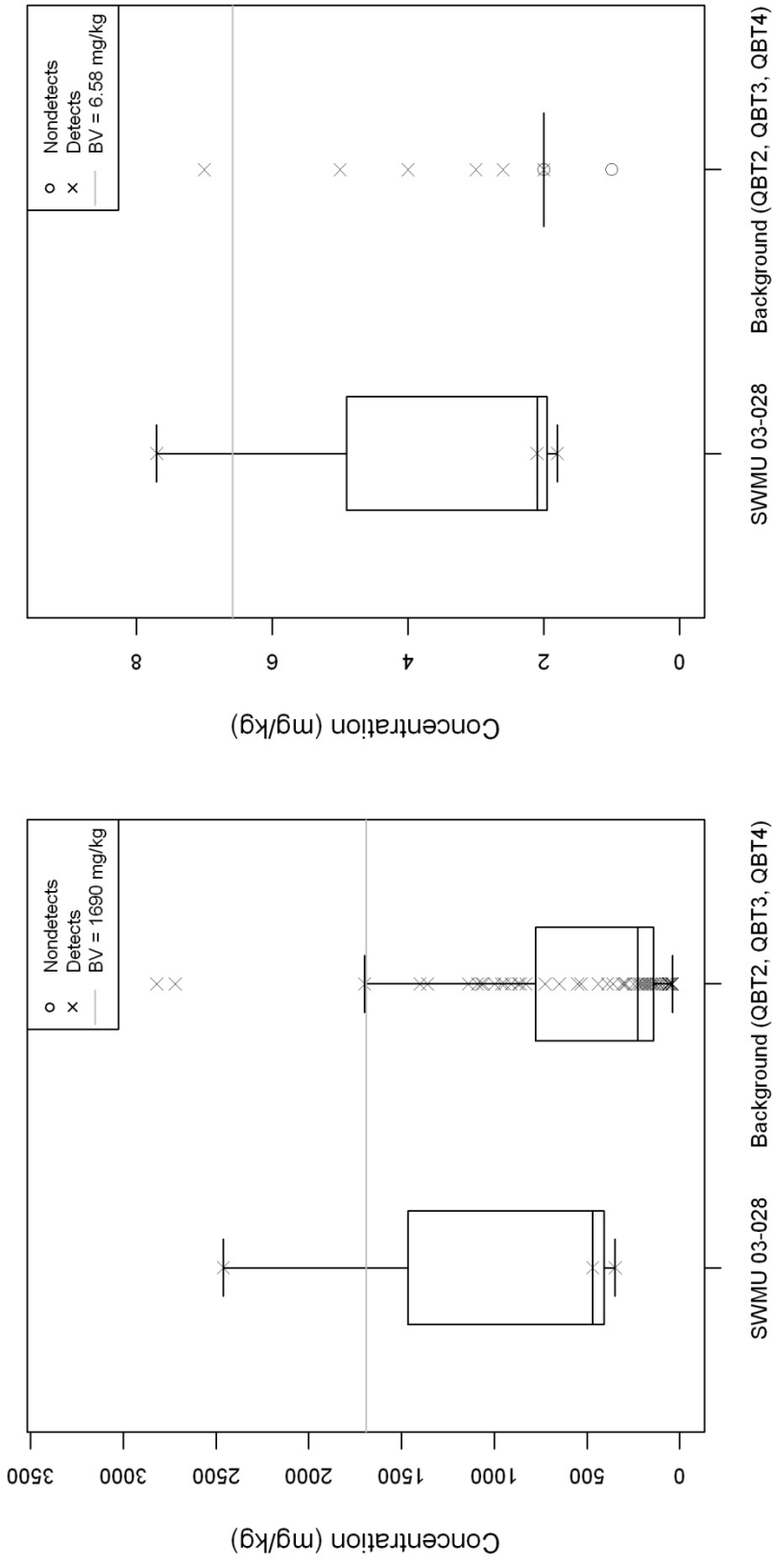



**Figure H-8 Box plots for magnesium and nickel in tuff at SWMU 03-028**

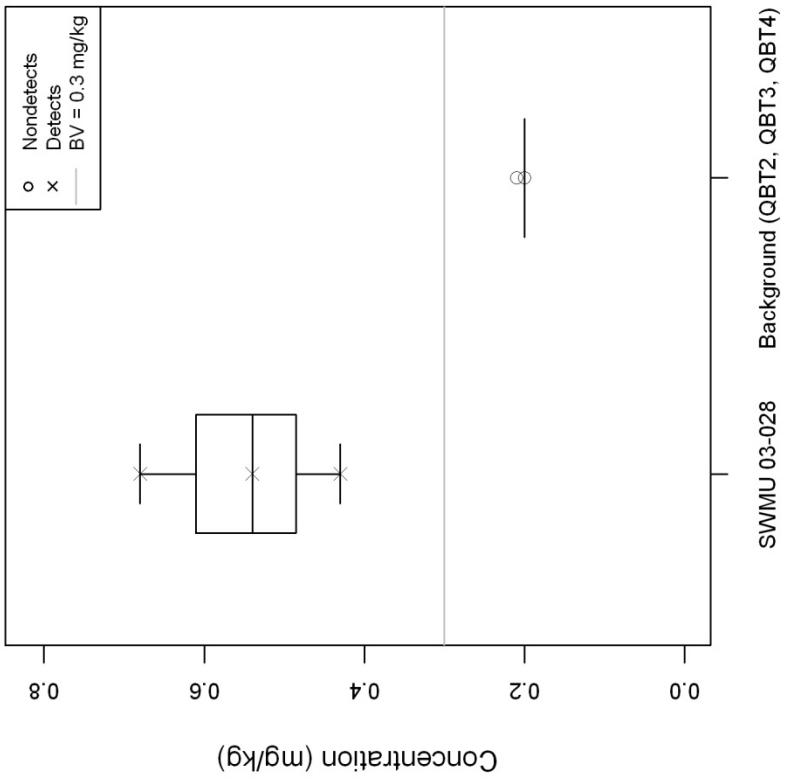



**Figure H-9 Box plot for selenium in tuff at SWMU 03-028**

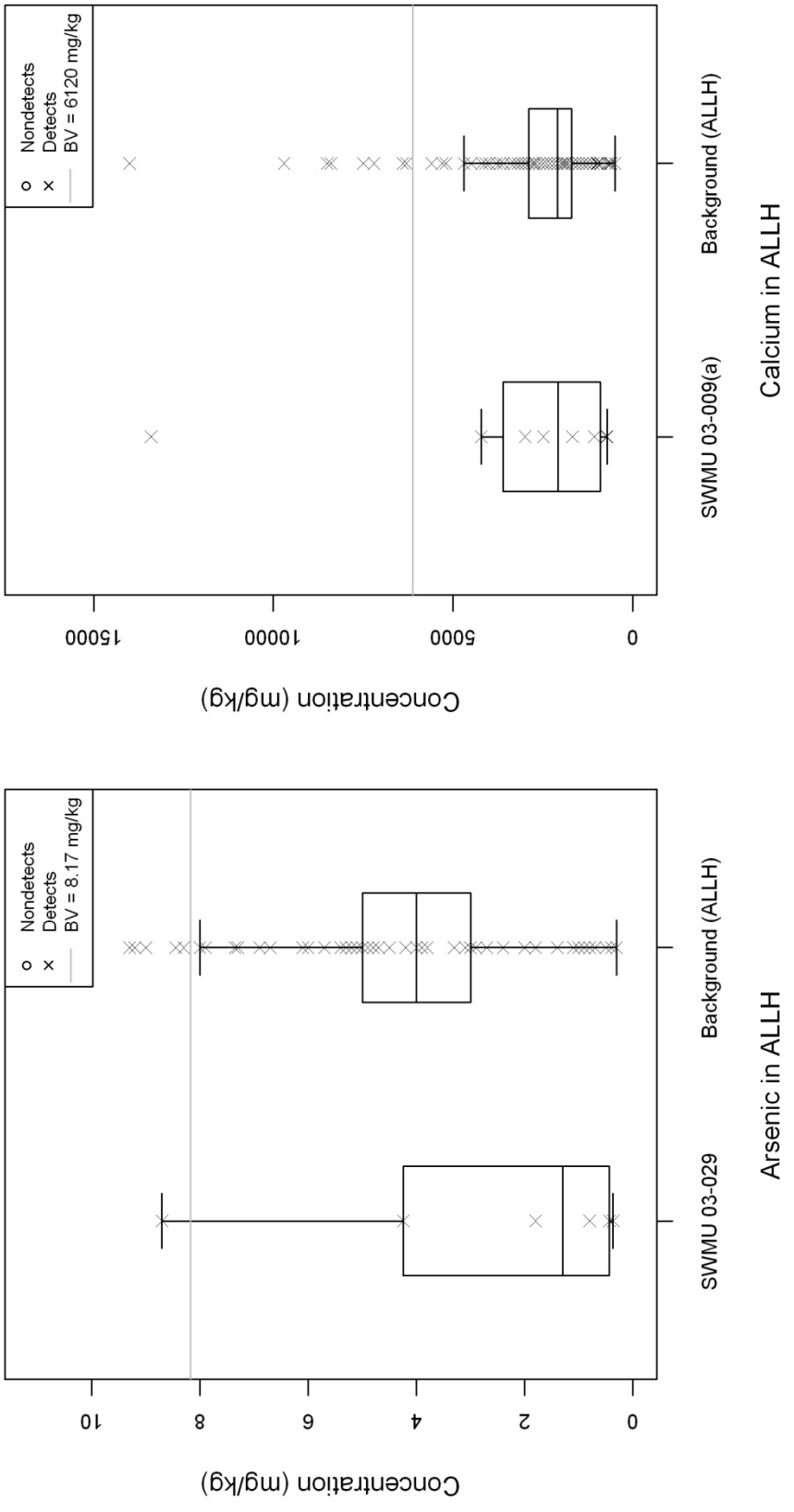



**Figure H-10 Box plots for arsenic and calcium in soil at SWMU 03-029**

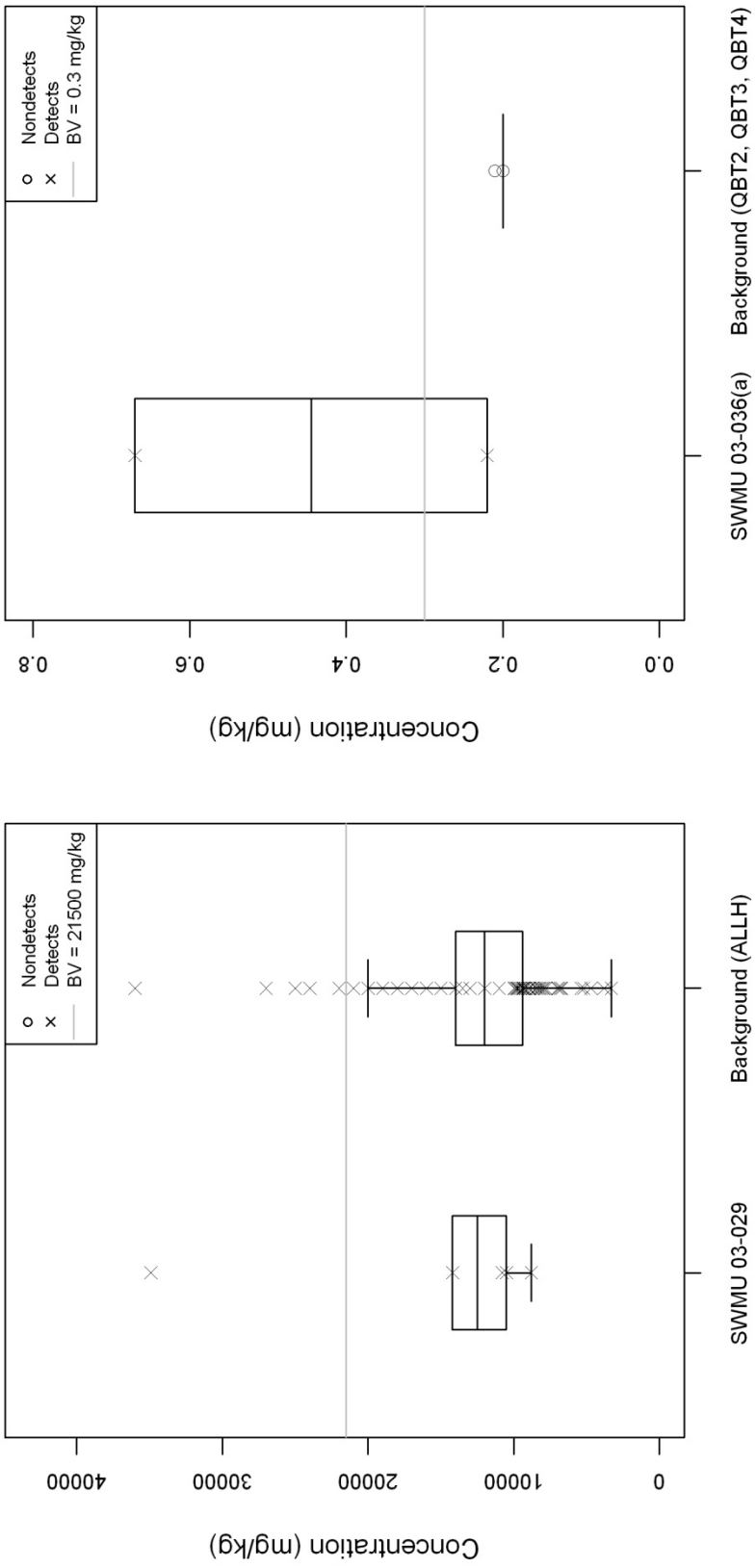



**Figure H-11 Box plots for iron in soil at SWMU 03-029 and selenium in tuff at SWMU 03-036(a)**

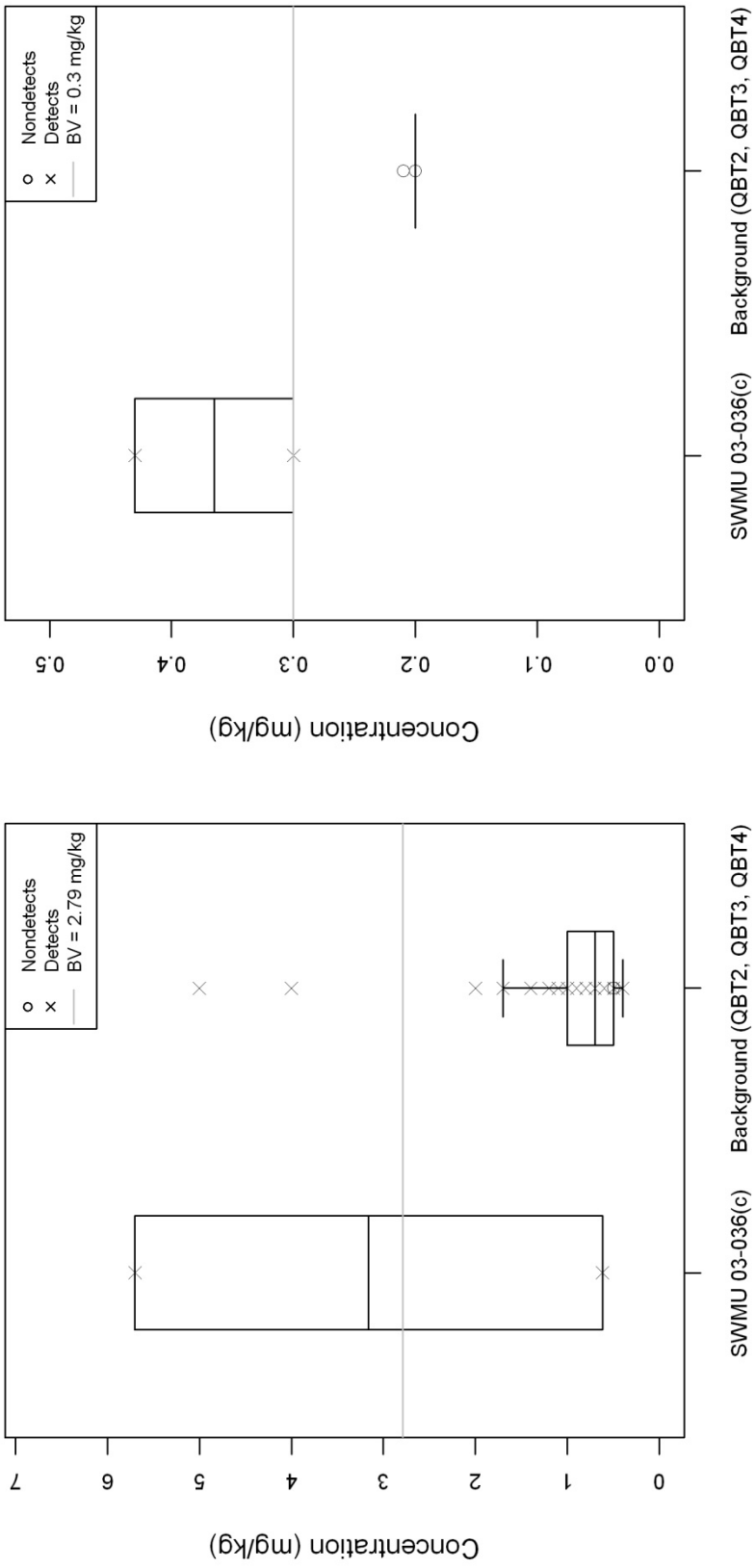



**Figure H-12 Box plots for arsenic and selenium in tuff at SWMU 03-036(c)**

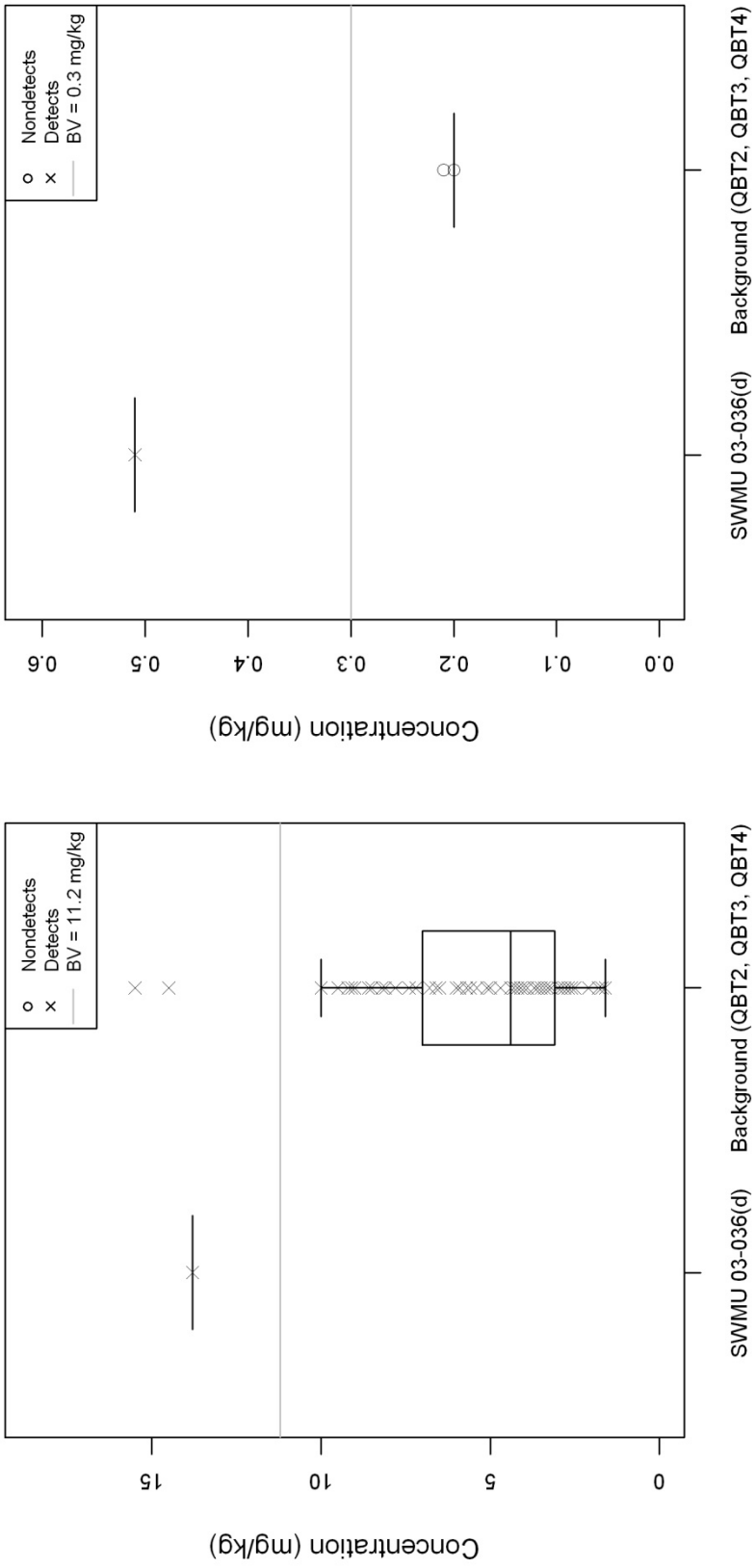
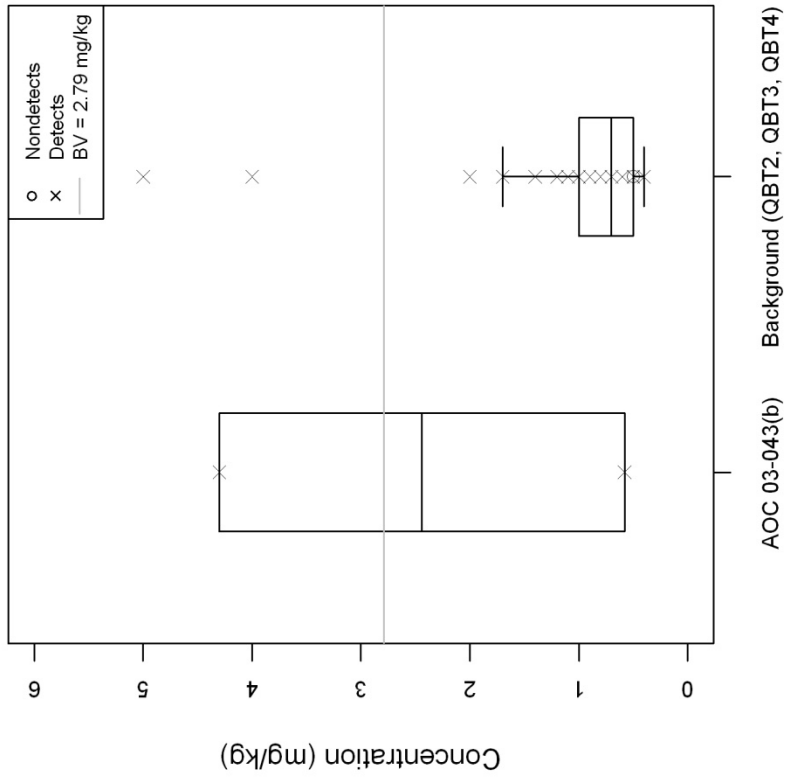



**Figure H-13 Box plots for lead and selenium in tuff at SWMU 03-036(d)**



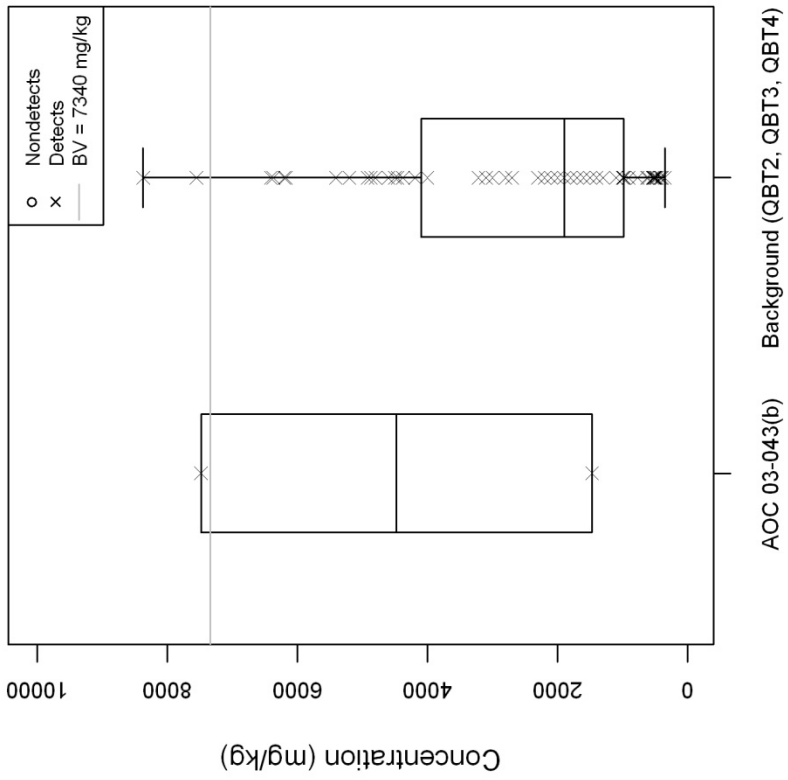
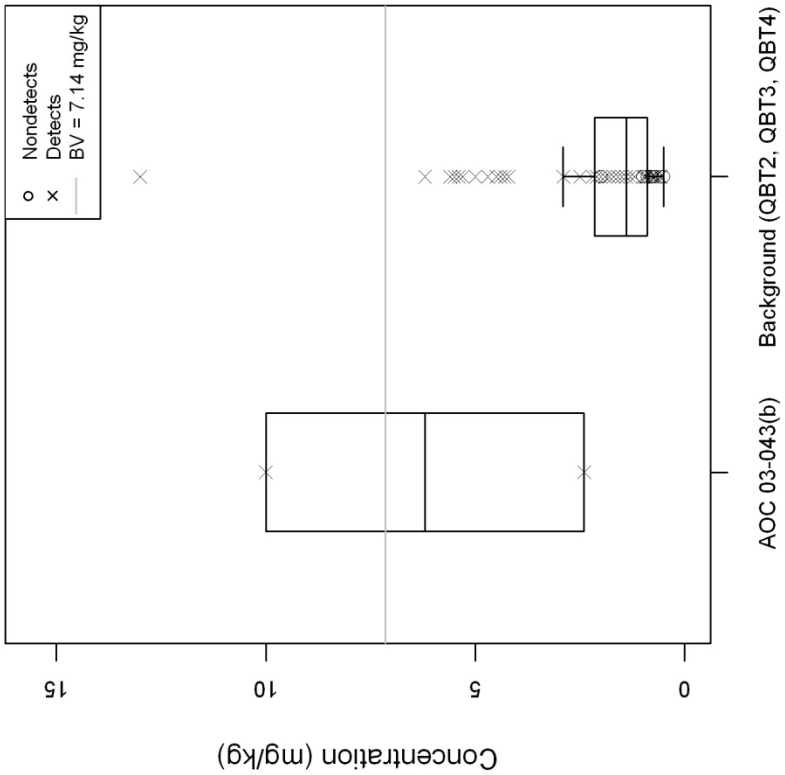




**Figure H-14 Box plots for aluminum and arsenic in tuff at AOC 03-043(b)**



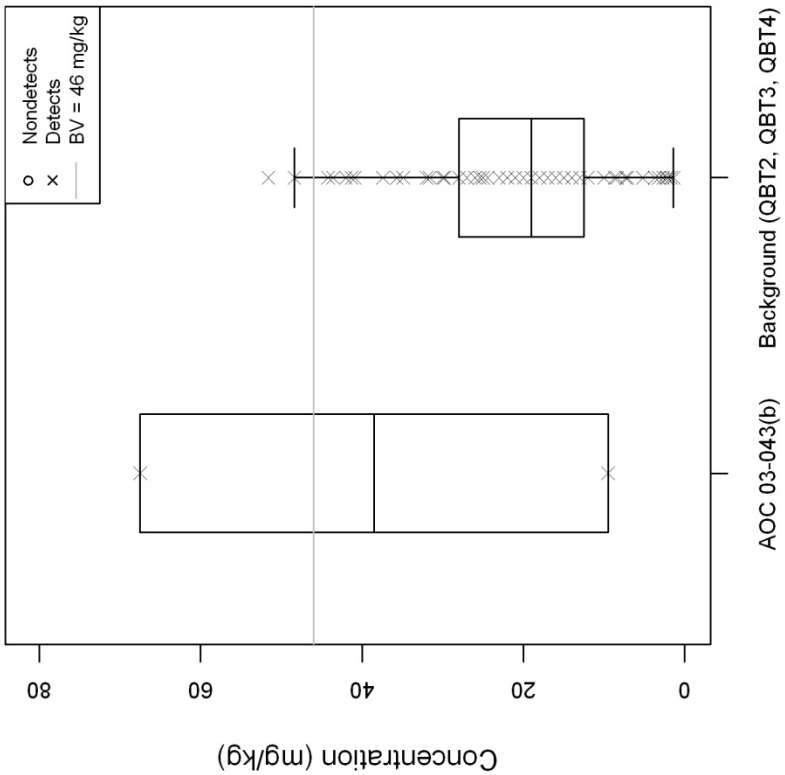
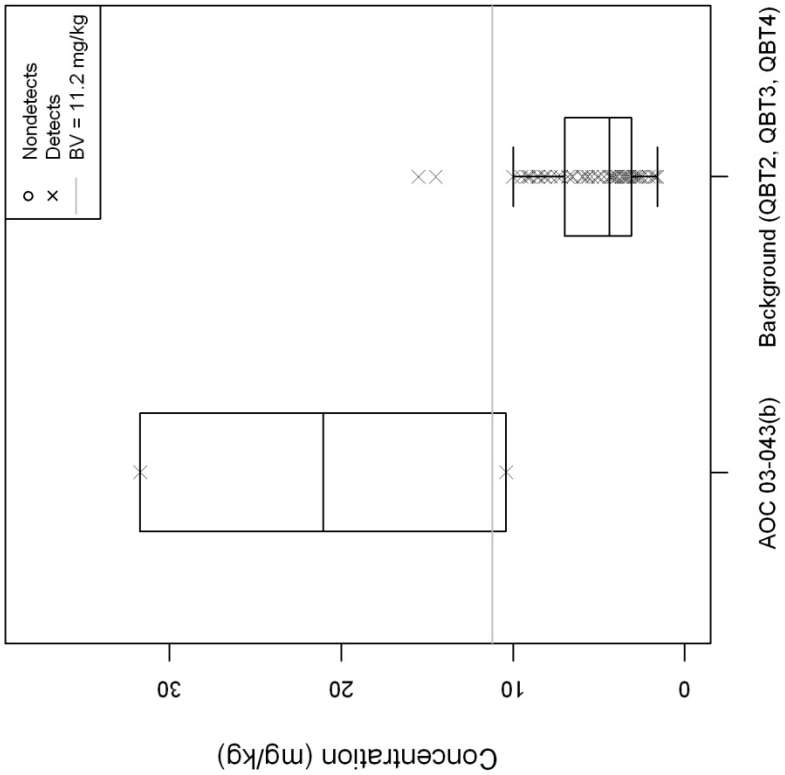




**Figure H-15 Box plots for barium and chromium in tuff at AOC 03-043(b)**



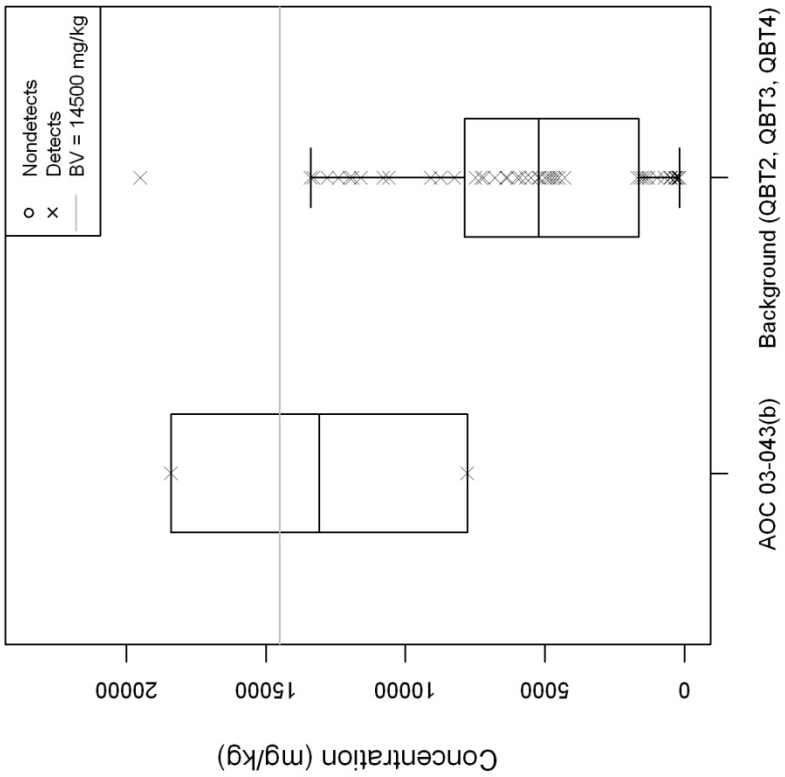
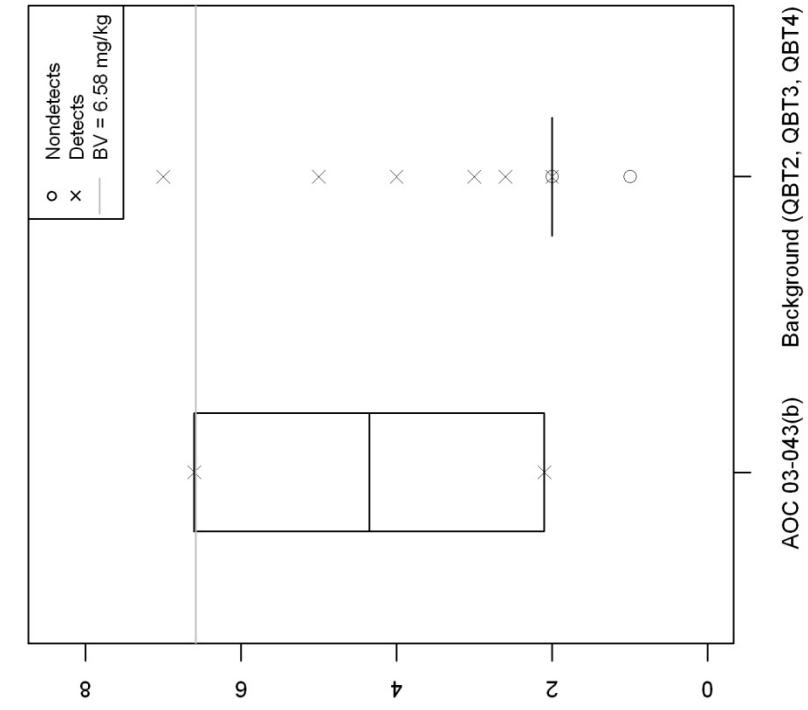




**Figure H-16 Box plots for iron and lead in tuff at AOC 03-043(b)**



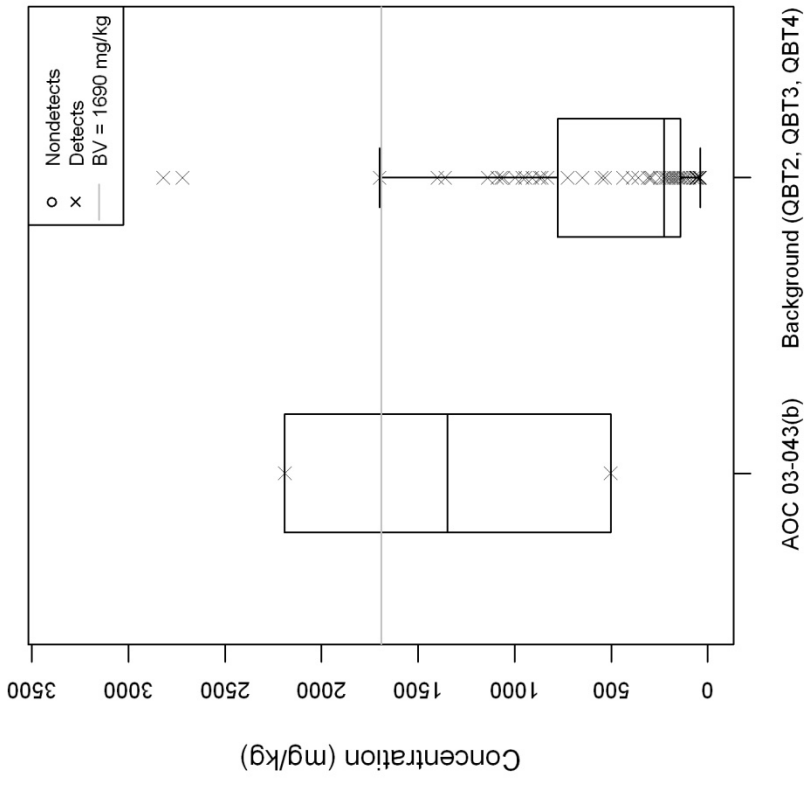
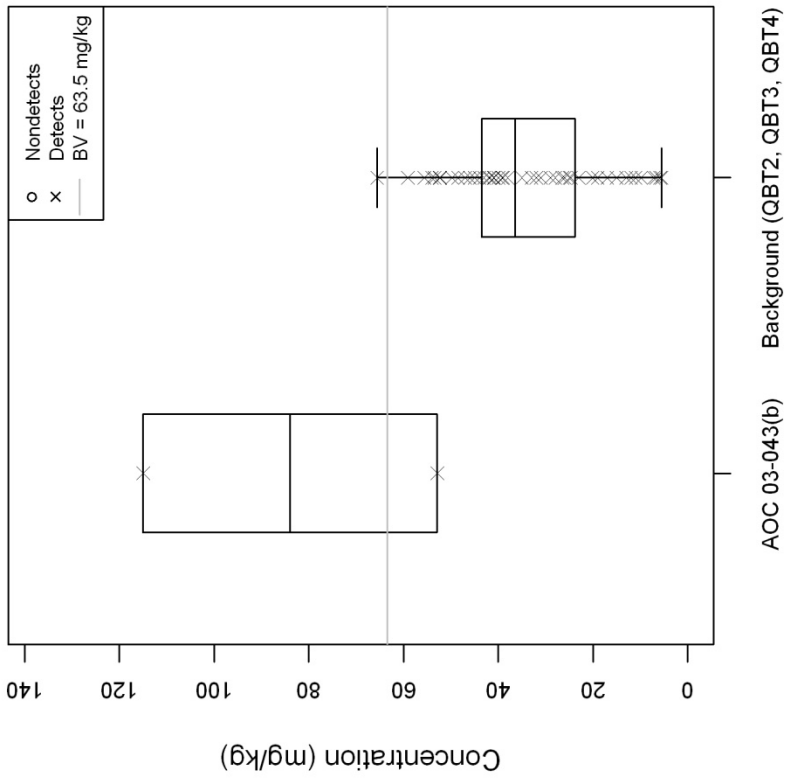




**Figure H-17 Box plots for magnesium and nickel in tuff at AOC 03-043(b)**



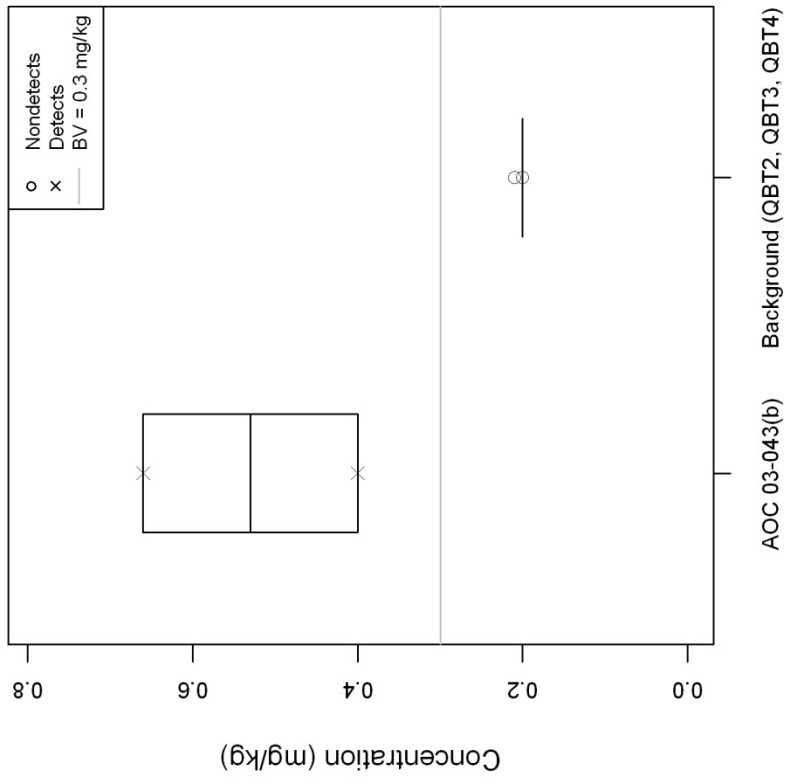
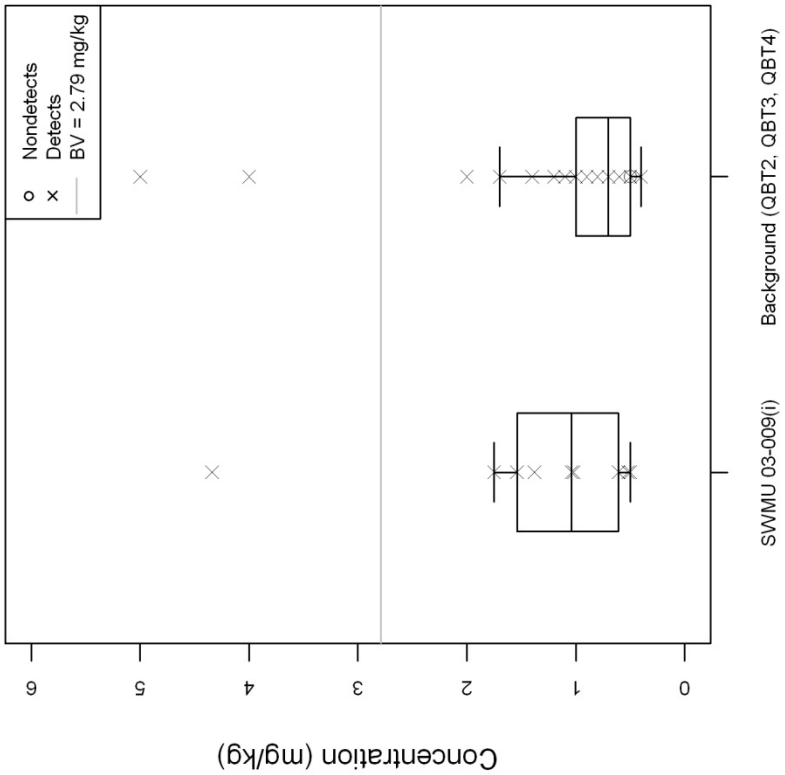




**Figure H-18 Box plots for selenium and zinc in tuff at AOC03-043(b)**



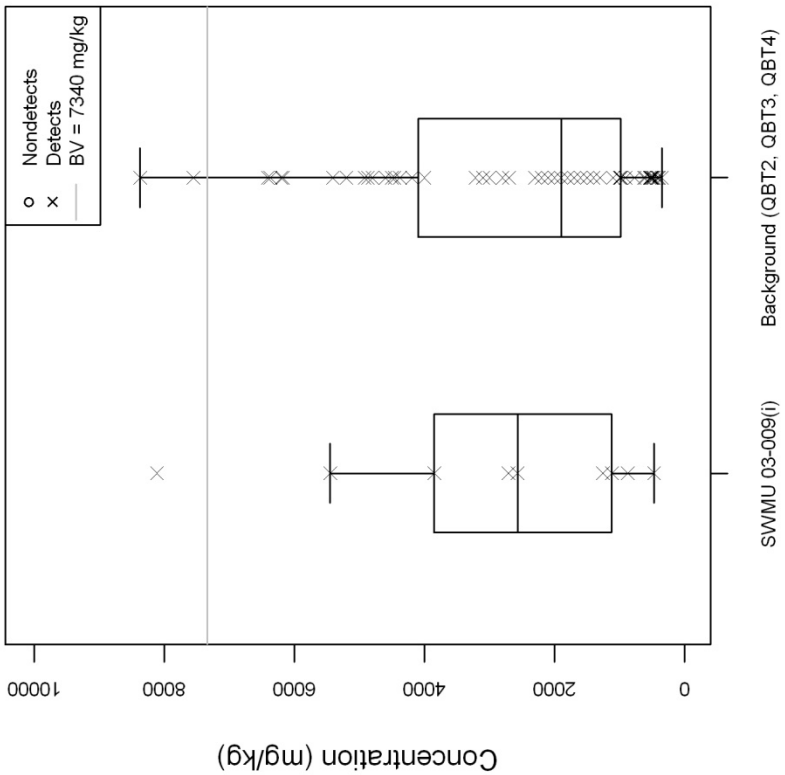
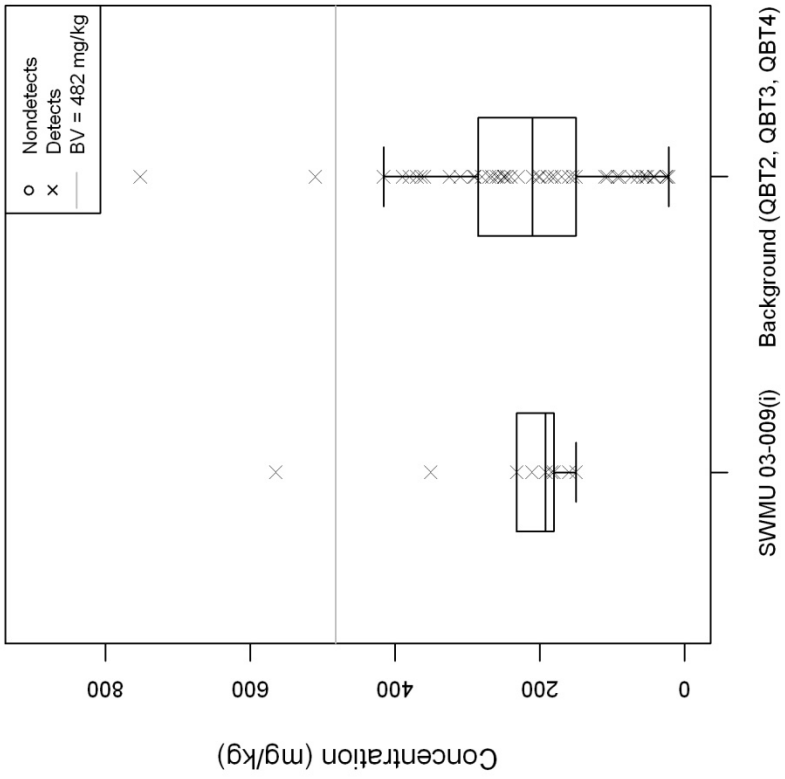




**Figure H-19 Box plots for aluminum and arsenic in tuff at SWMU 03-009(i)**



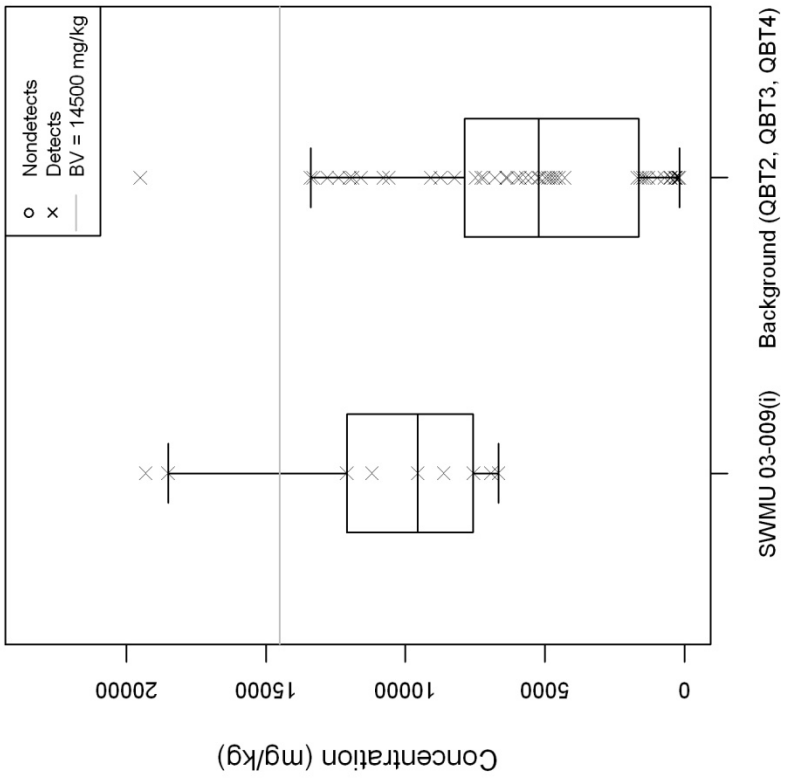




**Figure H-20 Box plots for iron and manganese in tuff at SWMU 03-009(i)**

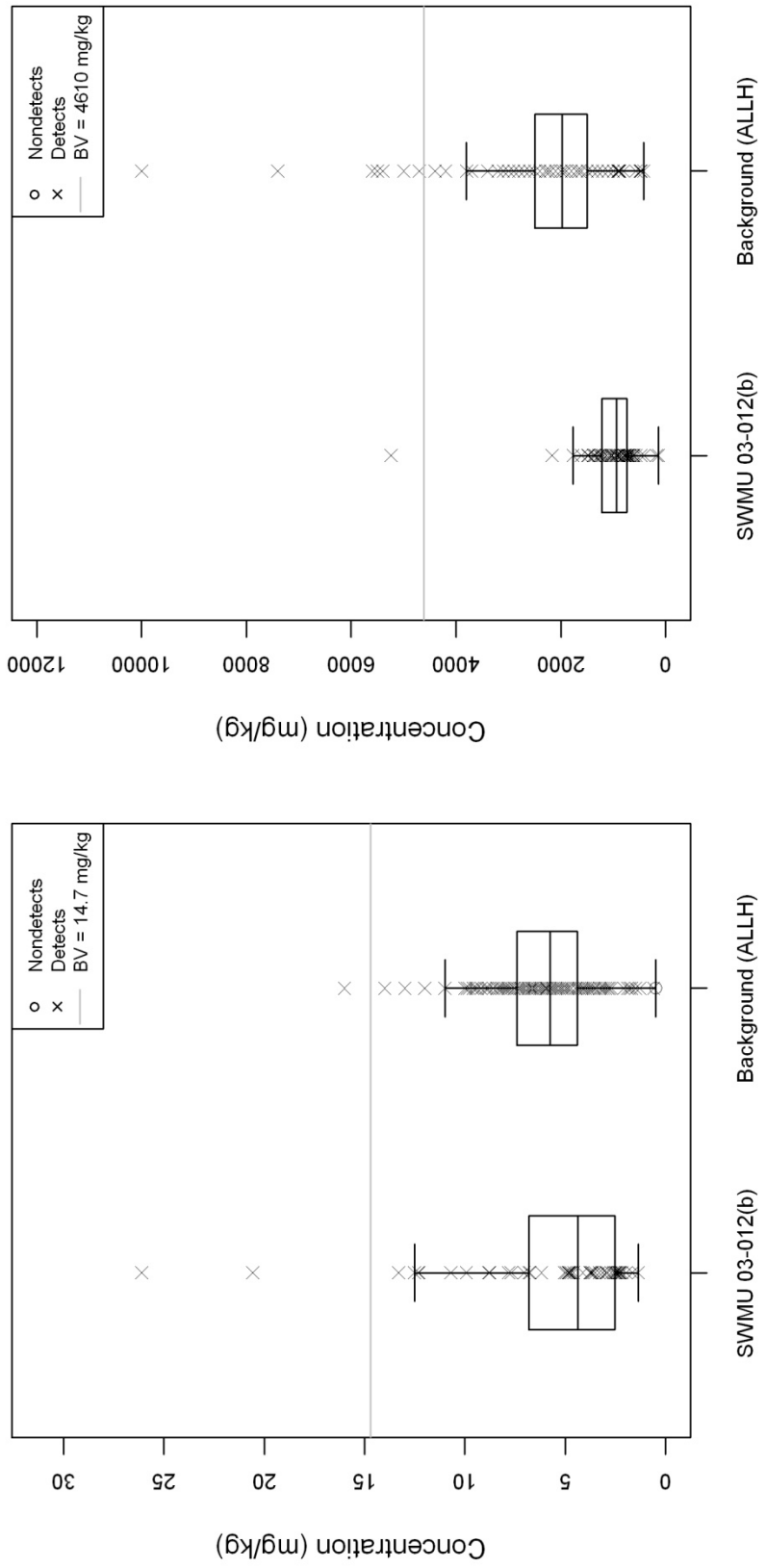



**Figure H-21 Box plots for copper and magnesium in soil at SWMU 03-012(b)**

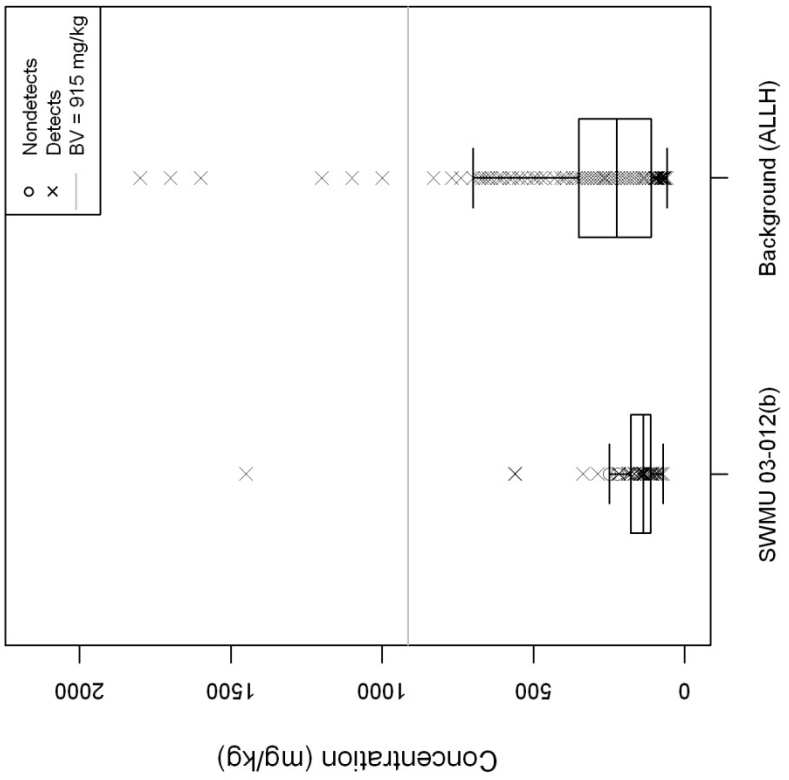



**Figure H-22 Box plot for sodium in soil at SWMU 03-012(b)**

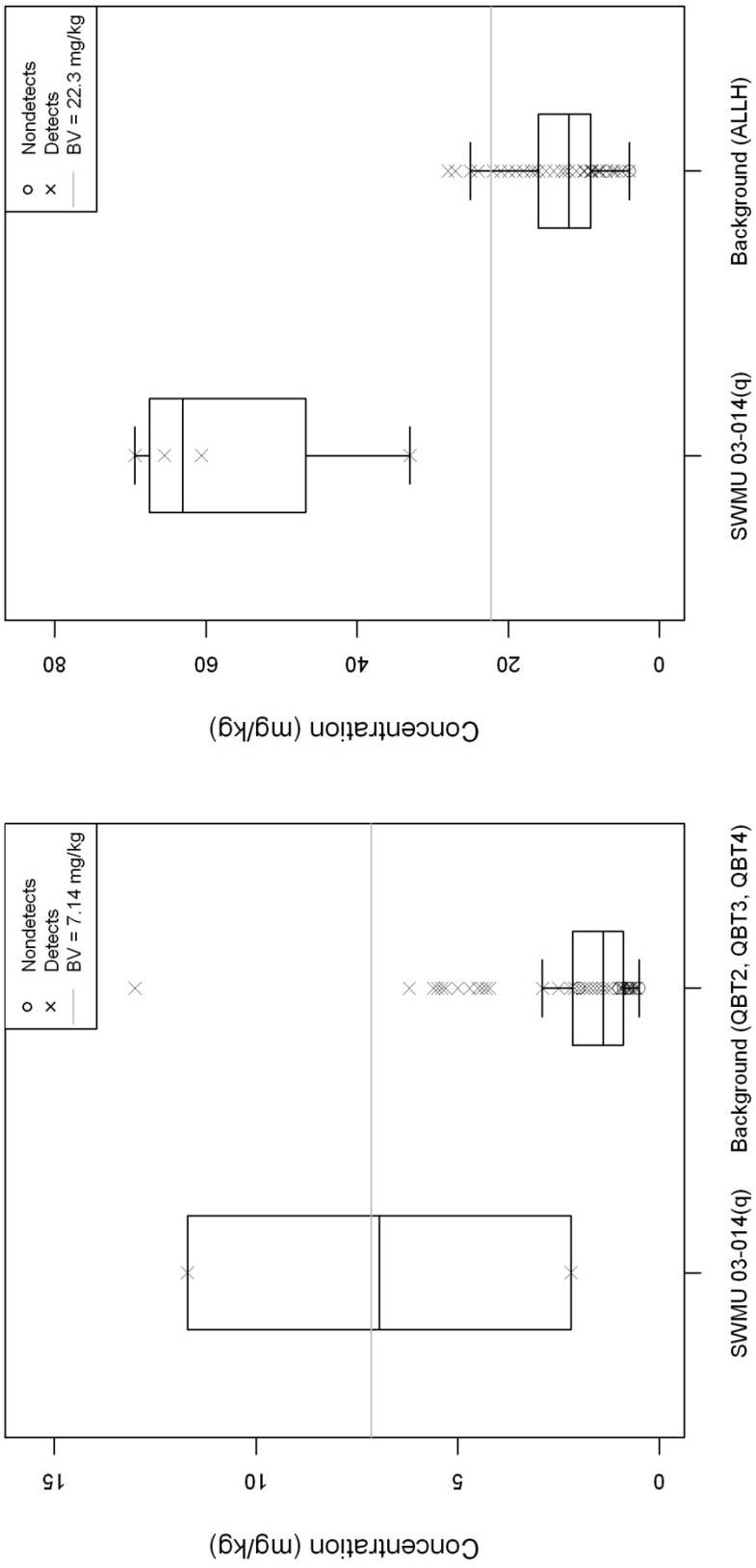



**Figure H-23 Box plots for chromium in tuff and lead in soil at SWMU 03-014(q)**

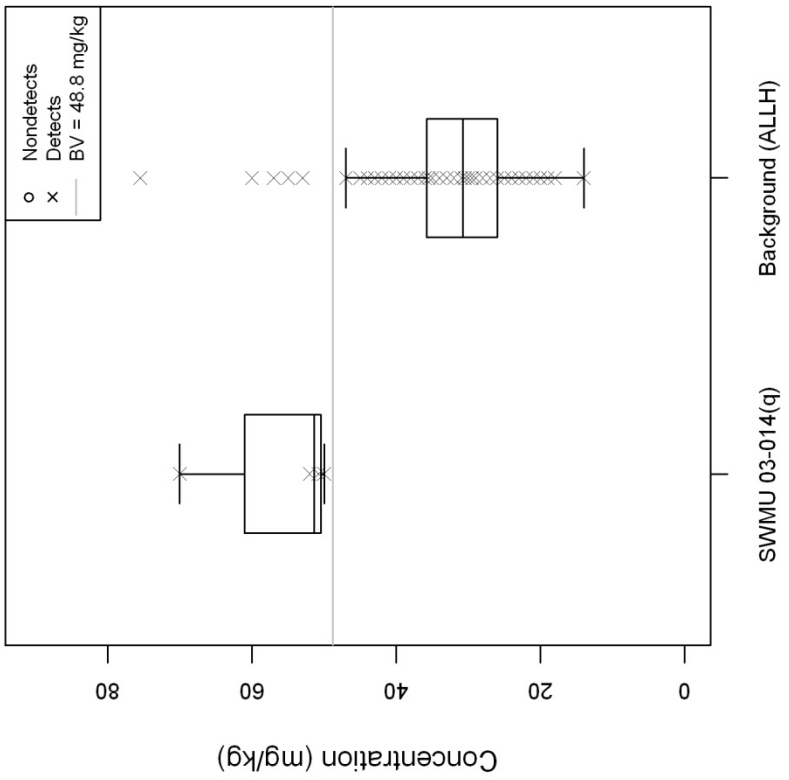



**Figure H-24 Box plot for zinc in soil at SWMU 03-014(q)**

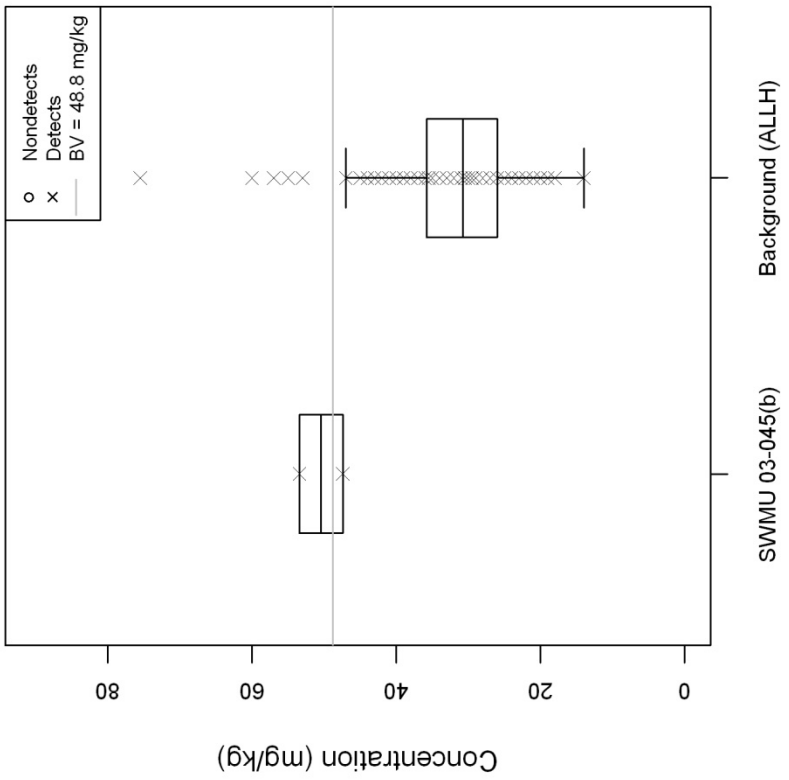



**Figure H-25 Box plot for zinc in soil at SWMU 03-045(b)**

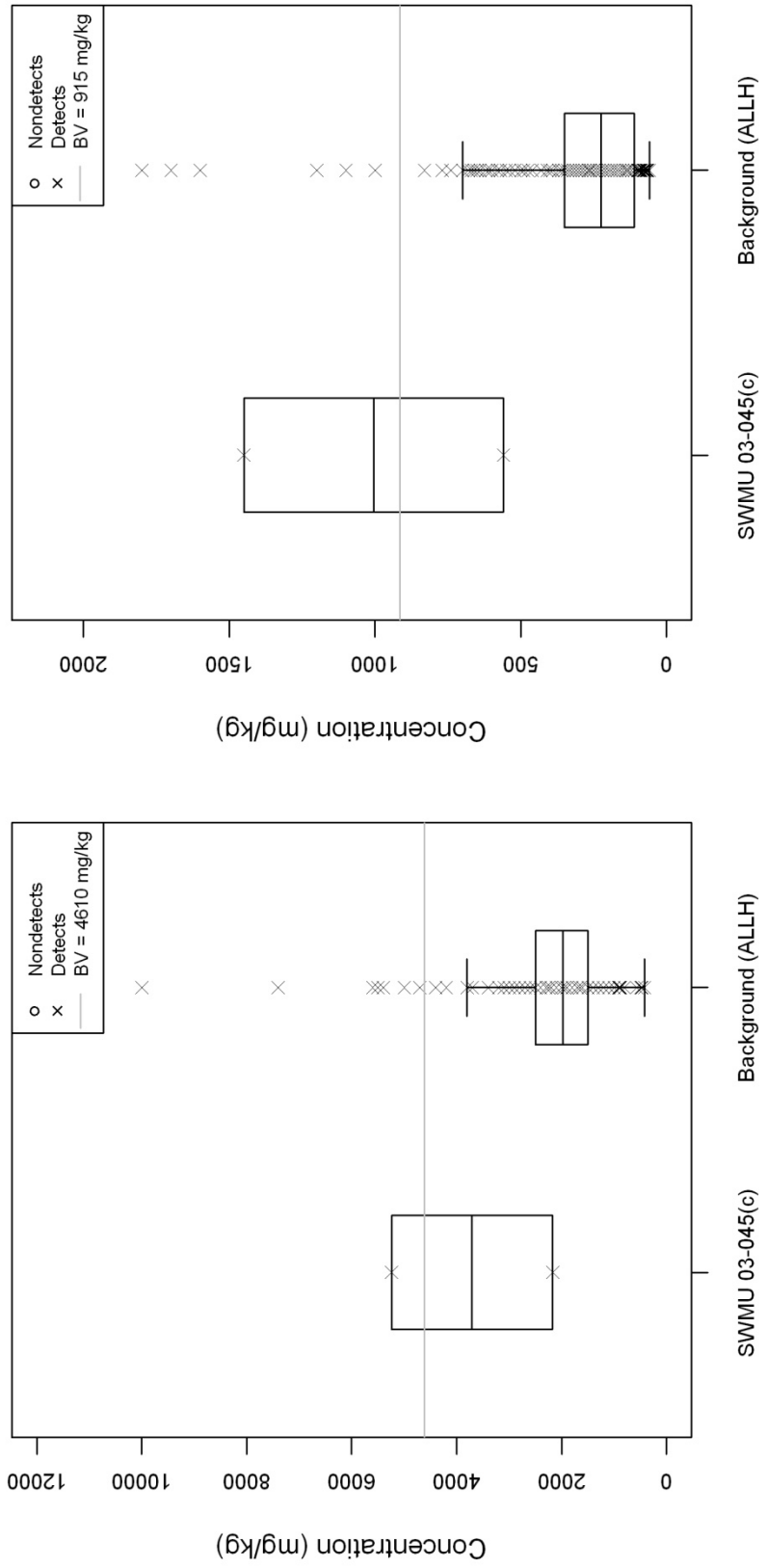



**Figure H-26 Box plots for magnesium and sodium in soil at SWMU 03-045(c)**

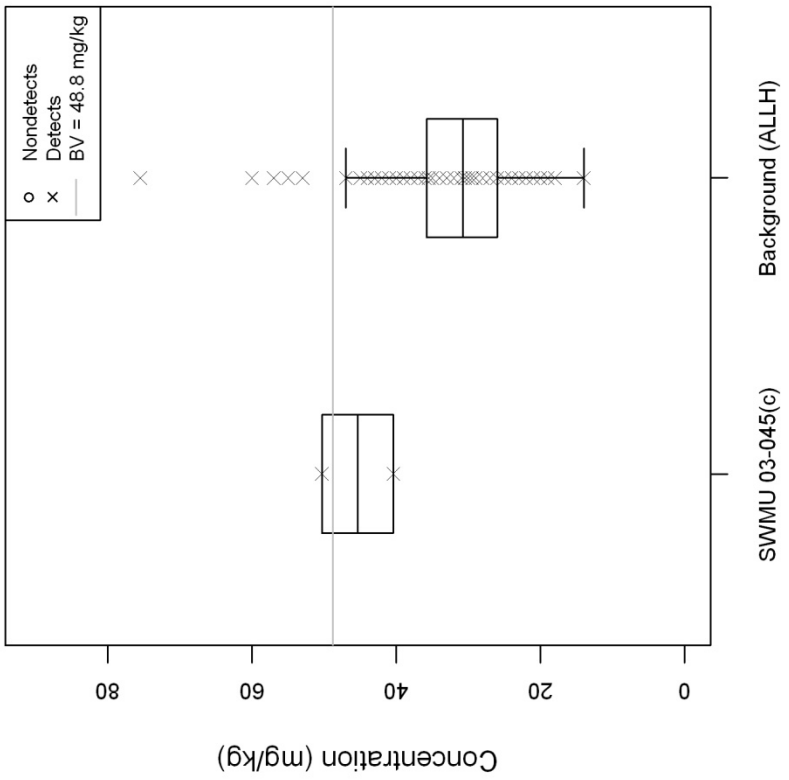



**Figure H-27 Box plot for zinc in soil at SWMU 03-045(c)**

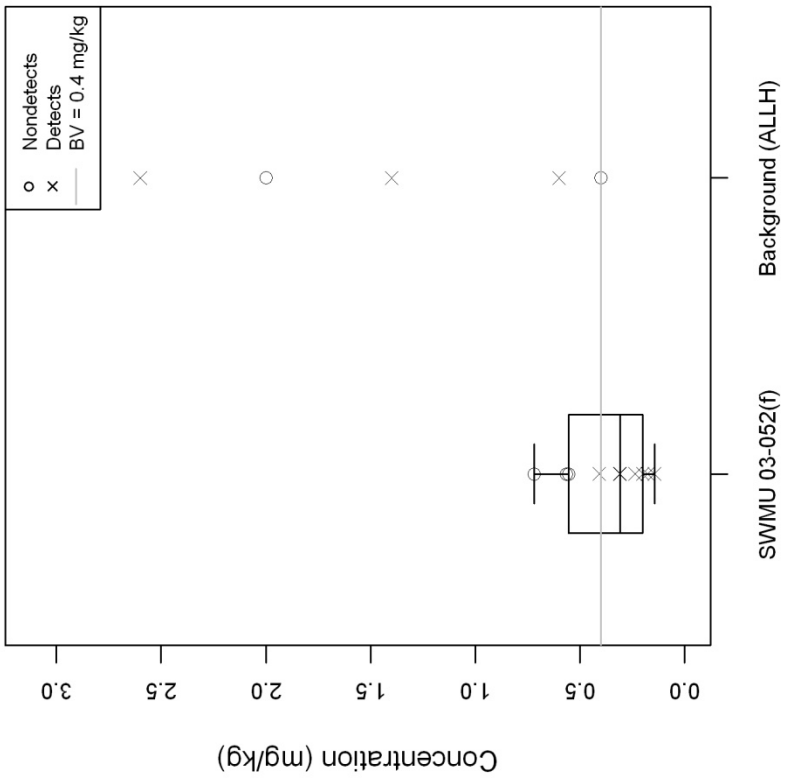



**Figure H-28 Box plot for cadmium in soil at SWMU 03-052(f)**

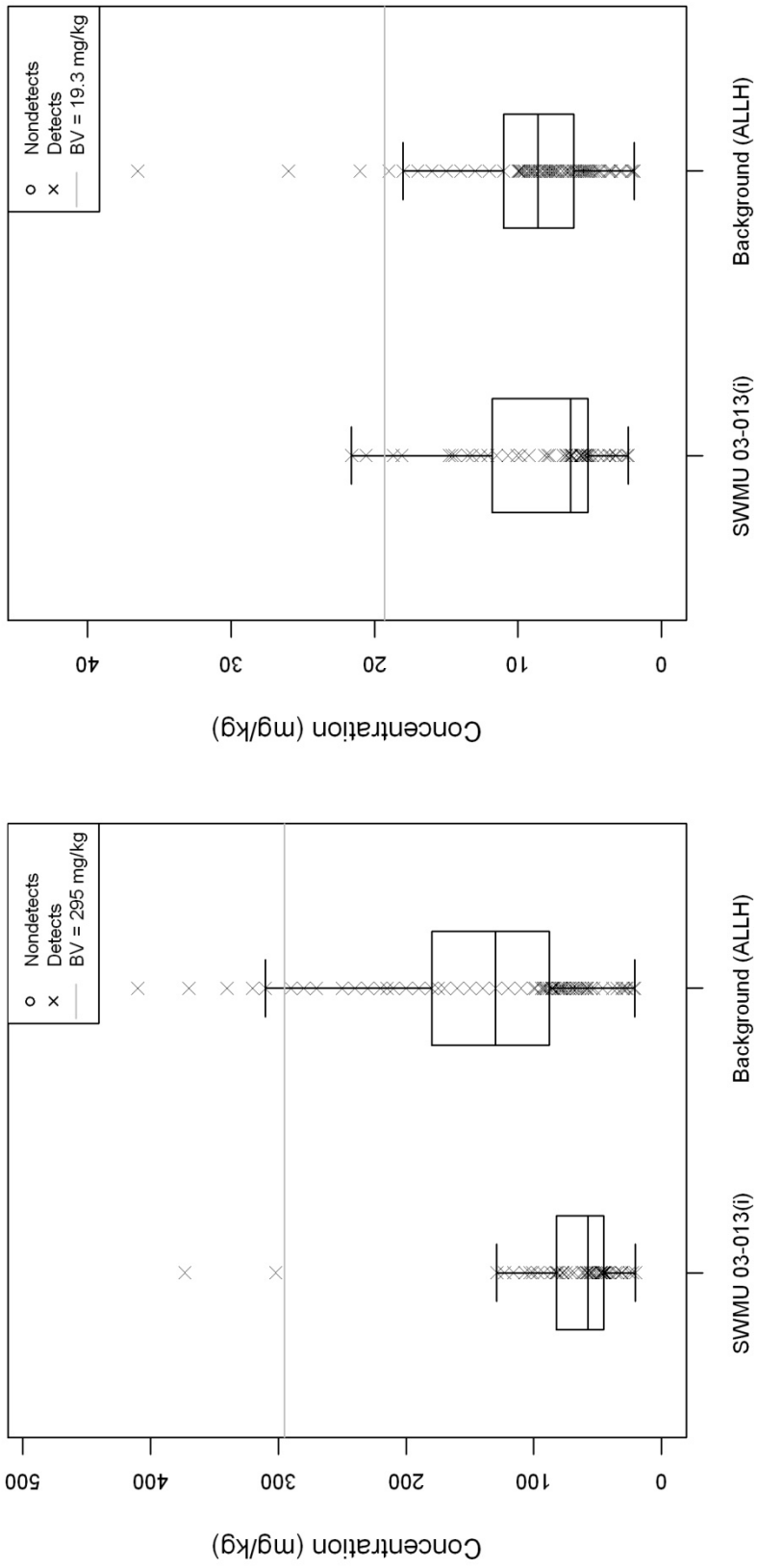



**Figure H-29 Box plots for barium and chromium in soil at SWMU 03-013(i)**

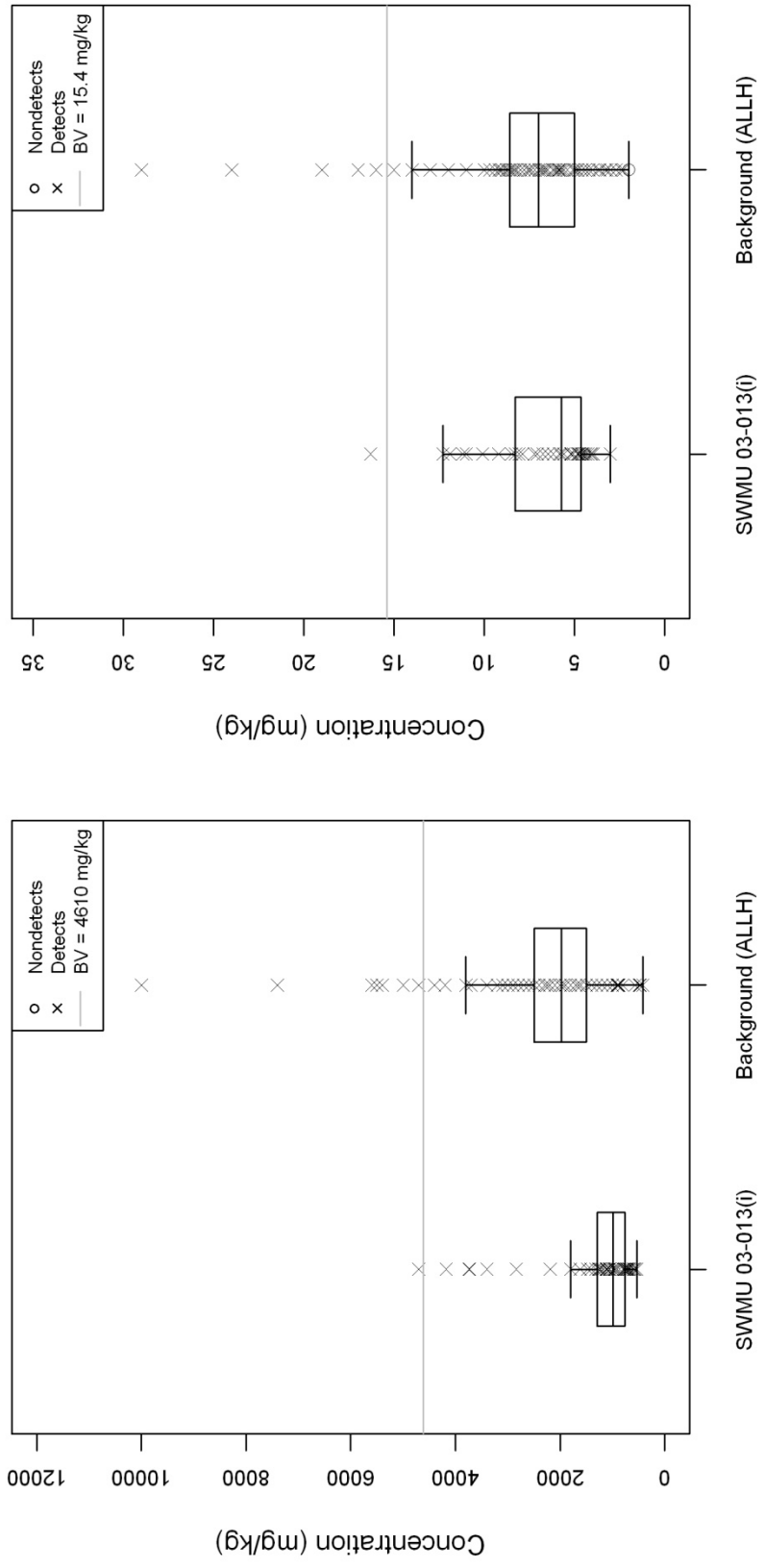



**Figure H-30 Box plots for magnesium and nickel in soil at SWMU 03-013(i)**

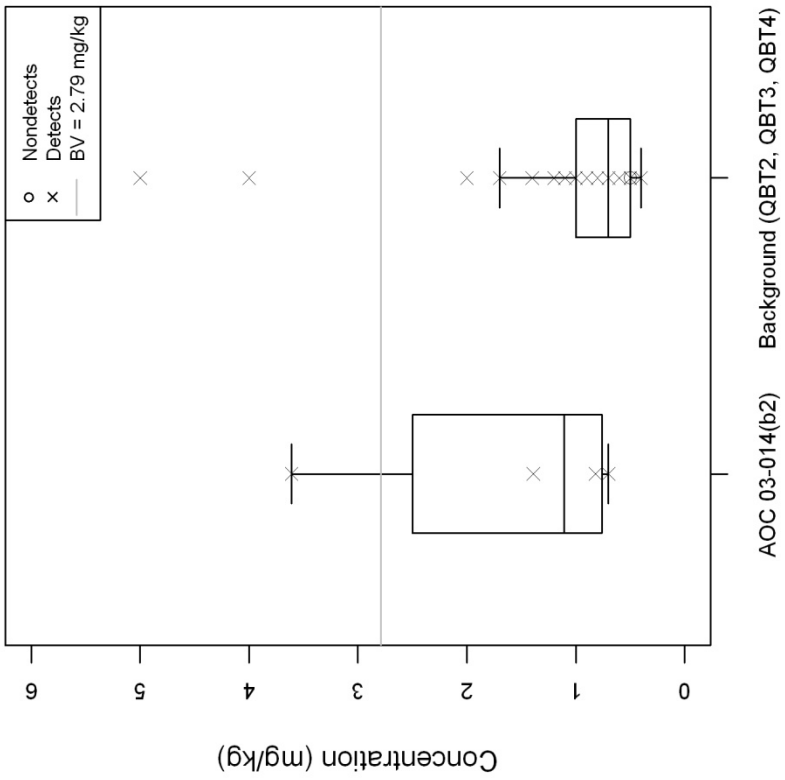



**Figure H-31 Box plot for arsenic in tuff at AOC 03-014(b2)**

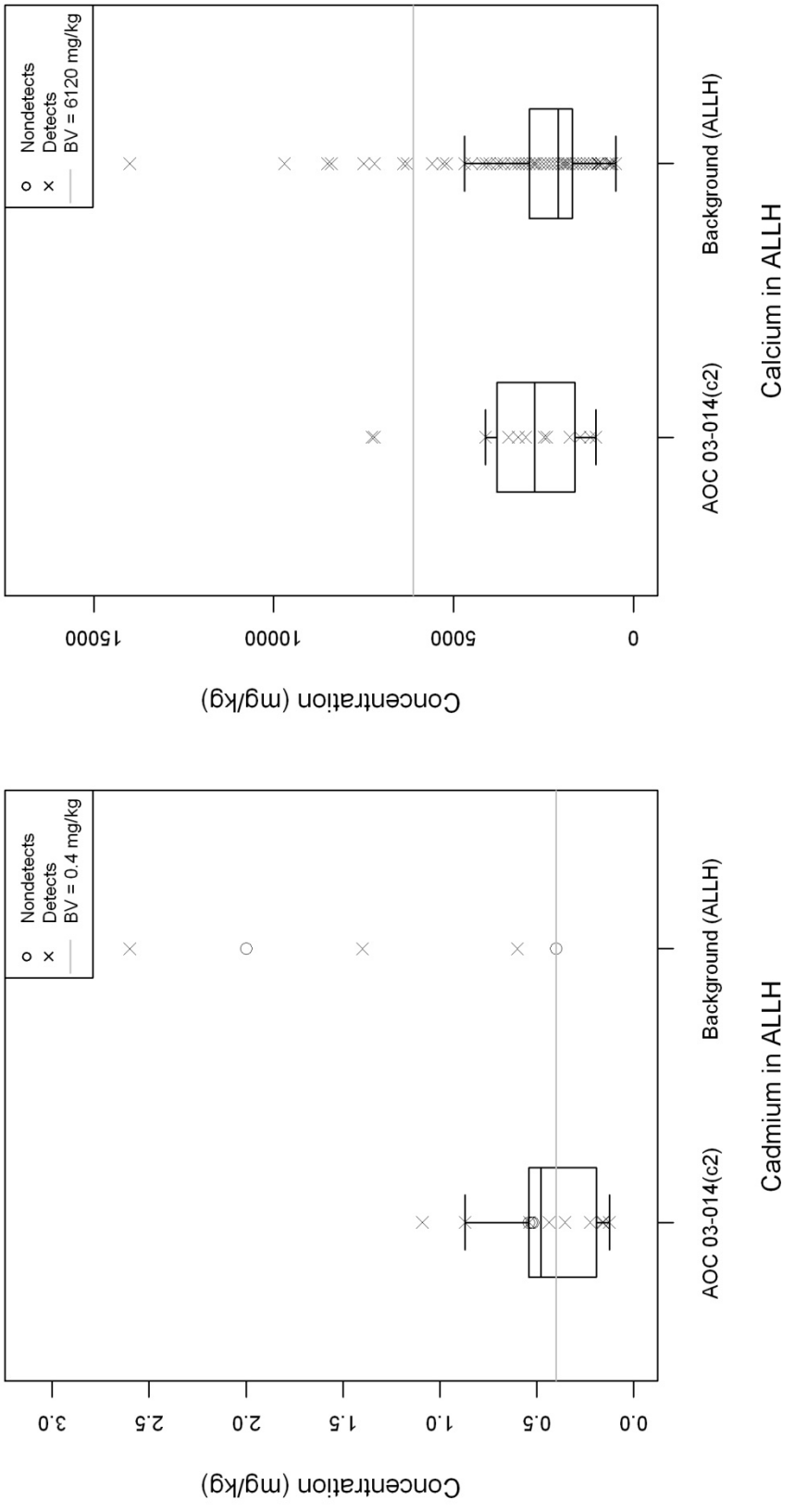



**Figure H-32 Box plots for cadmium and calcium in soil at AOC 03-014(c2)**

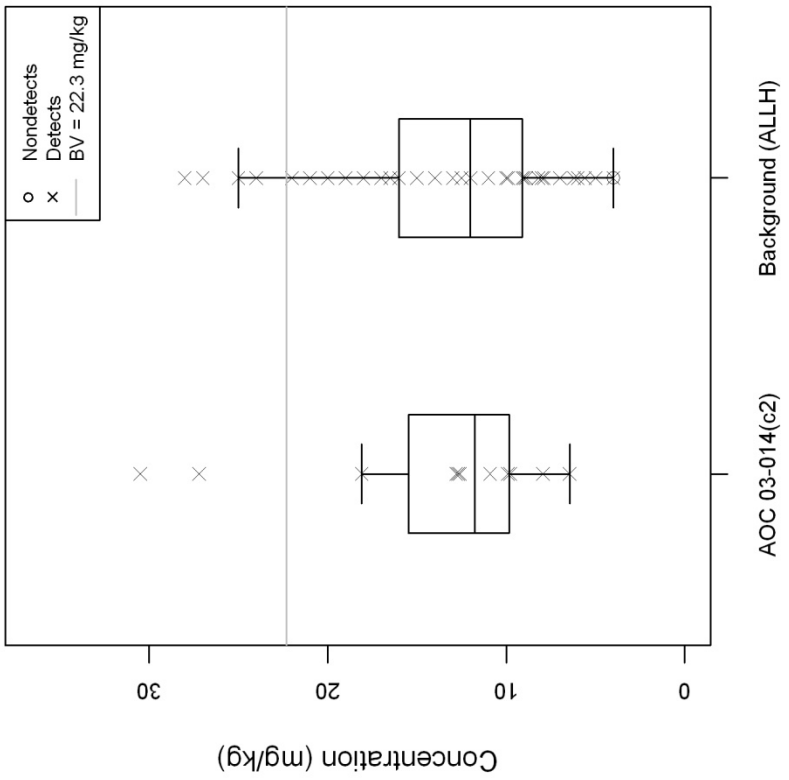
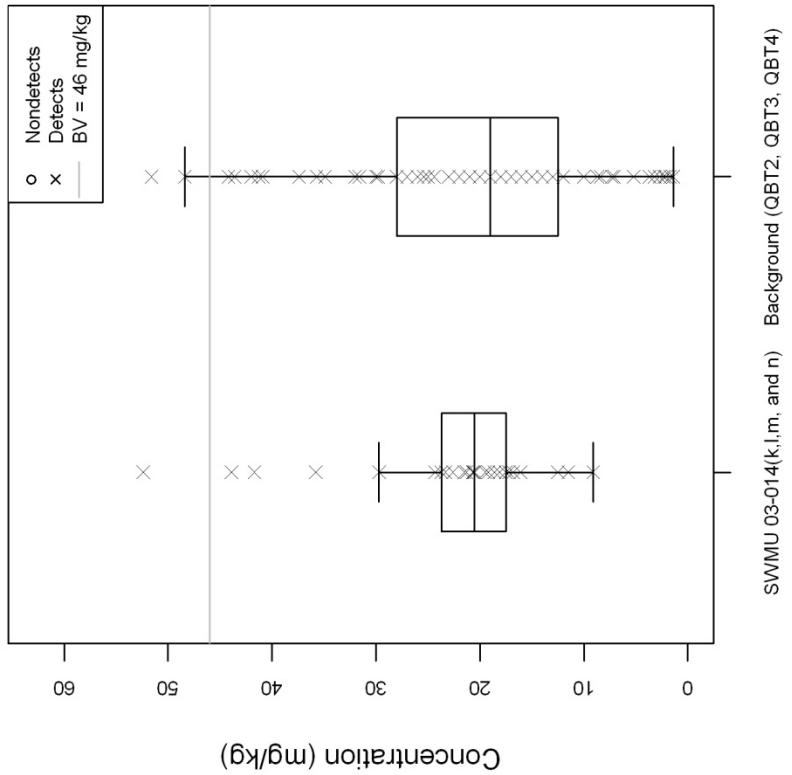



**Figure H-33 Box plot for lead in soil at AOC 03-014(c2)**



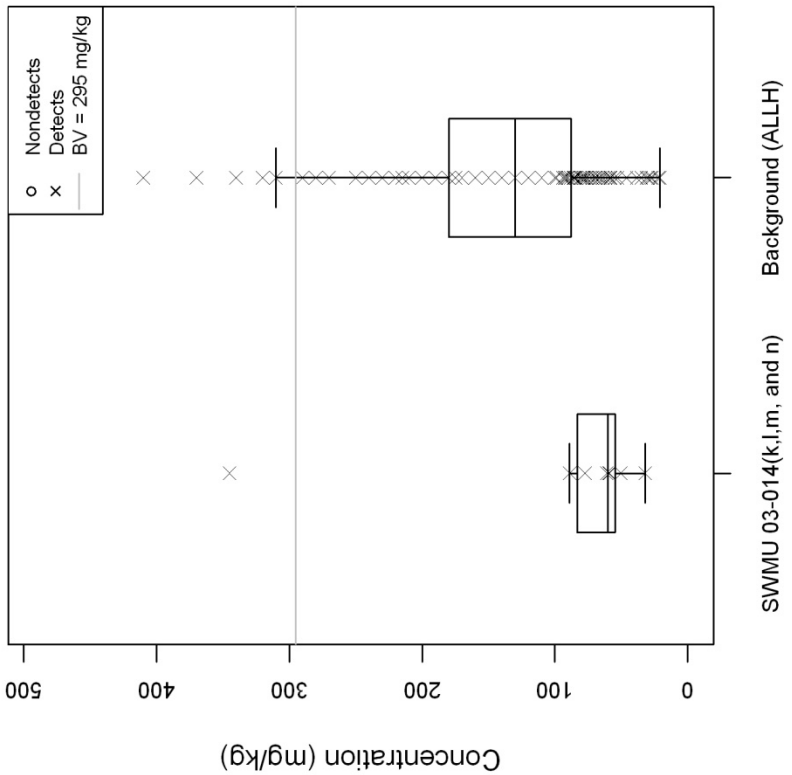




**Figure H-34 Box plots for barium in soil and tuff at SWMU 03-014(k,l,m,n)**

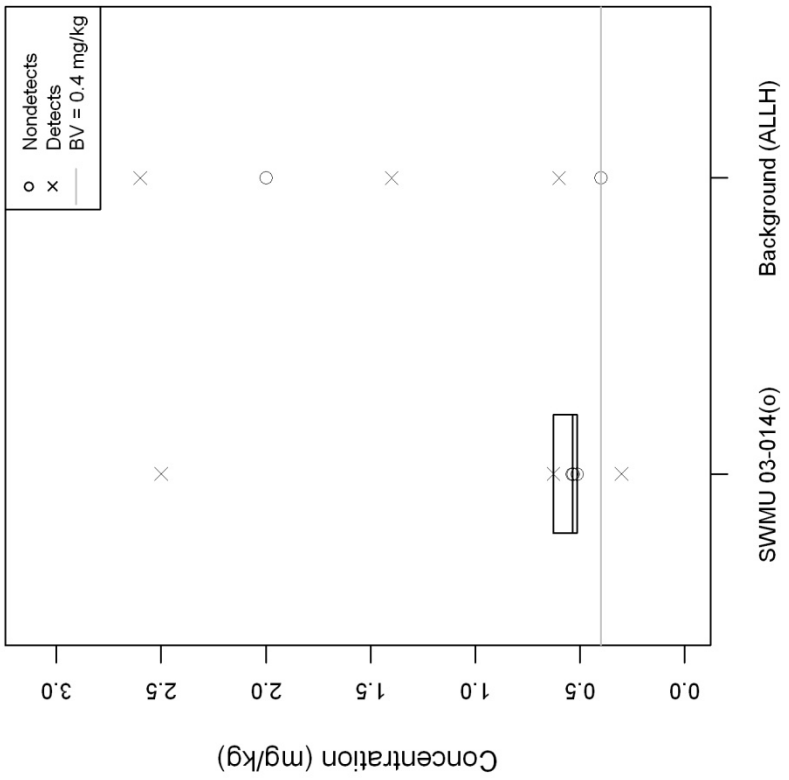



**Figure H-35 Box plot for cadmium in soil at SWMU 03-014(o)**

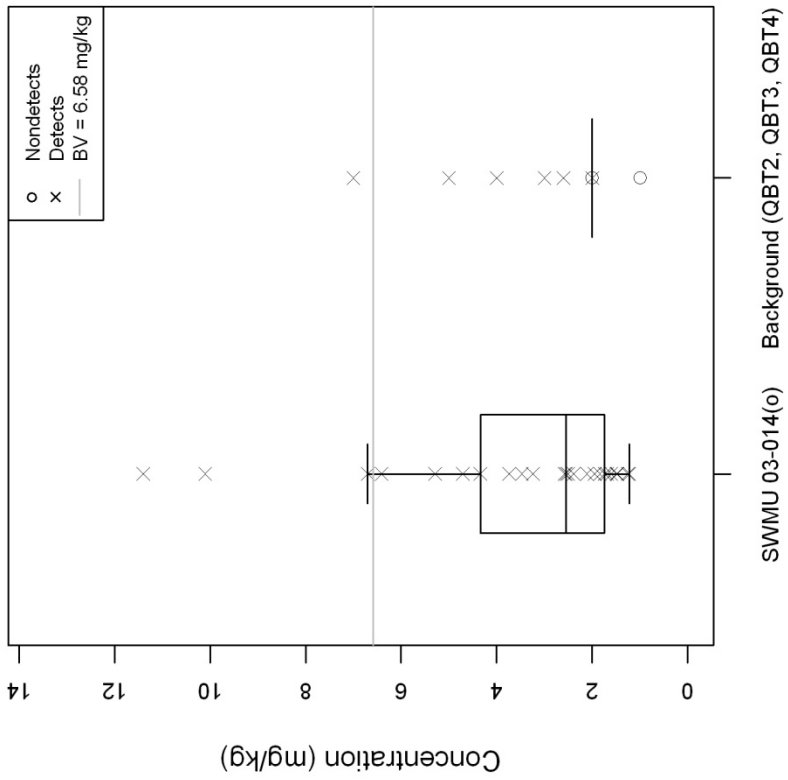



**Figure H-36 Box plot for nickel in tuff at SWMU 03-014(o)**

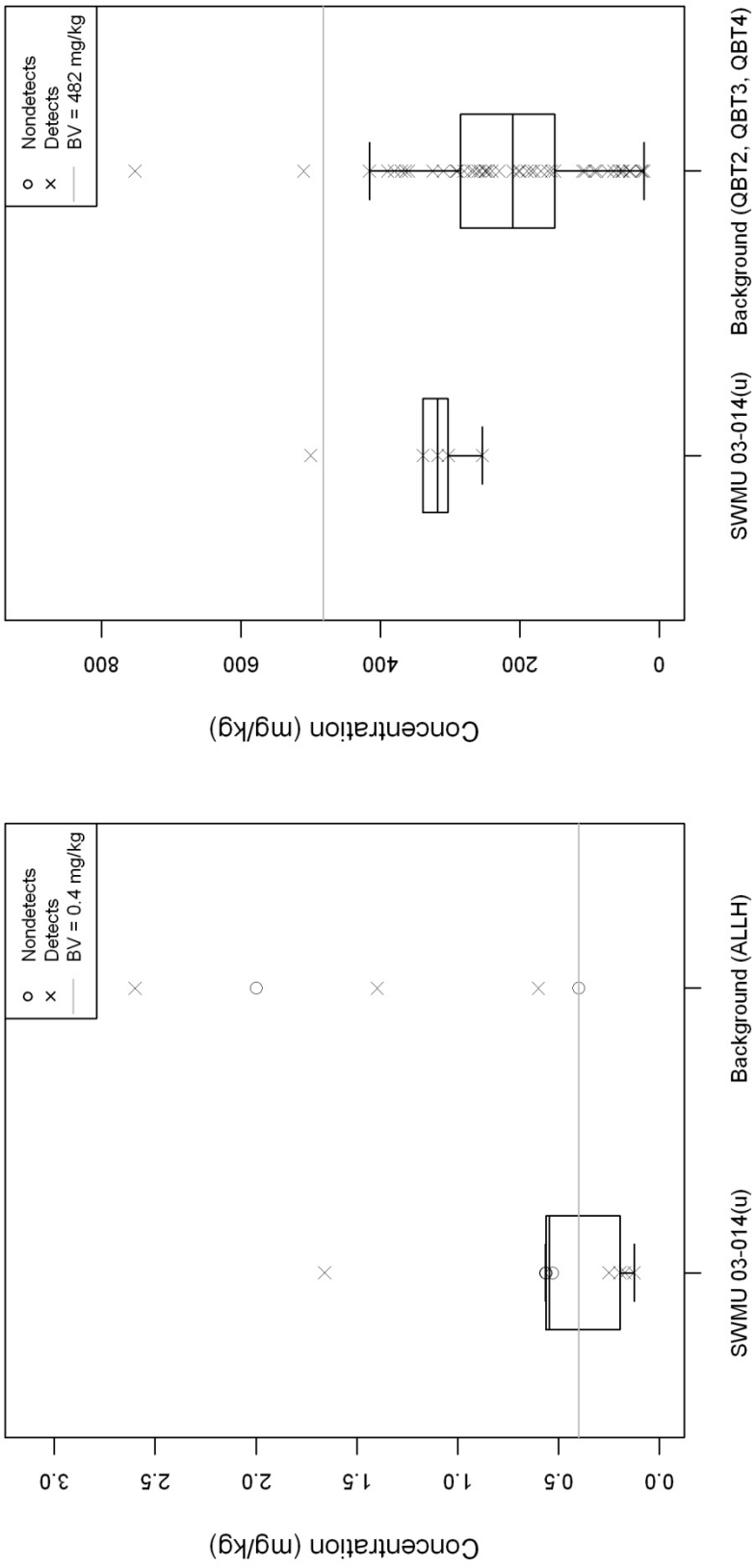



**Figure H-37 Box plots for cadmium in soil and manganese in tuff at SWMU 03-014(u)**

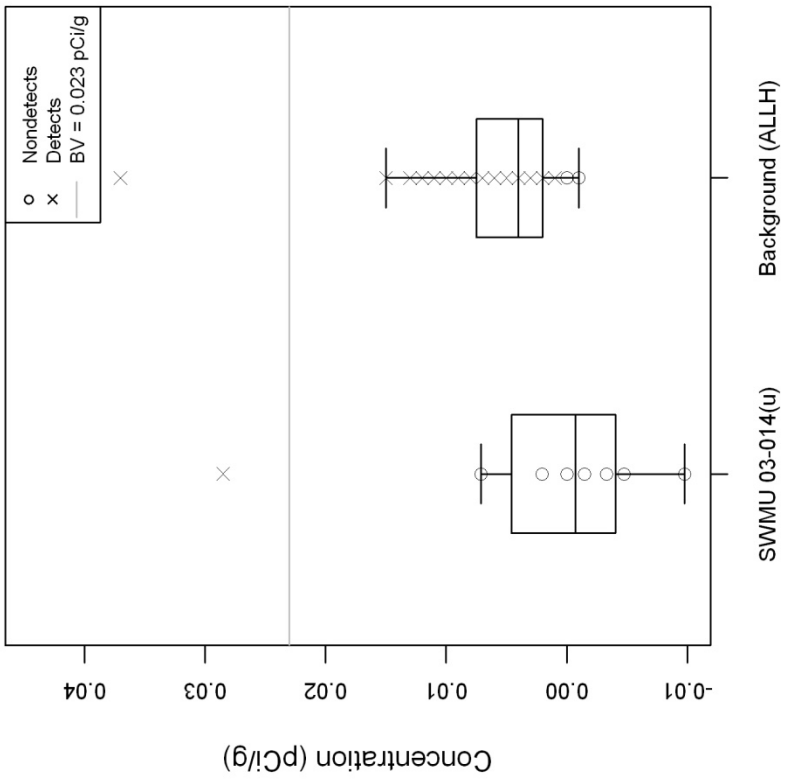



**Figure H-38 Box plot for plutonium-238 in soil at SWMU 03-014(u)**

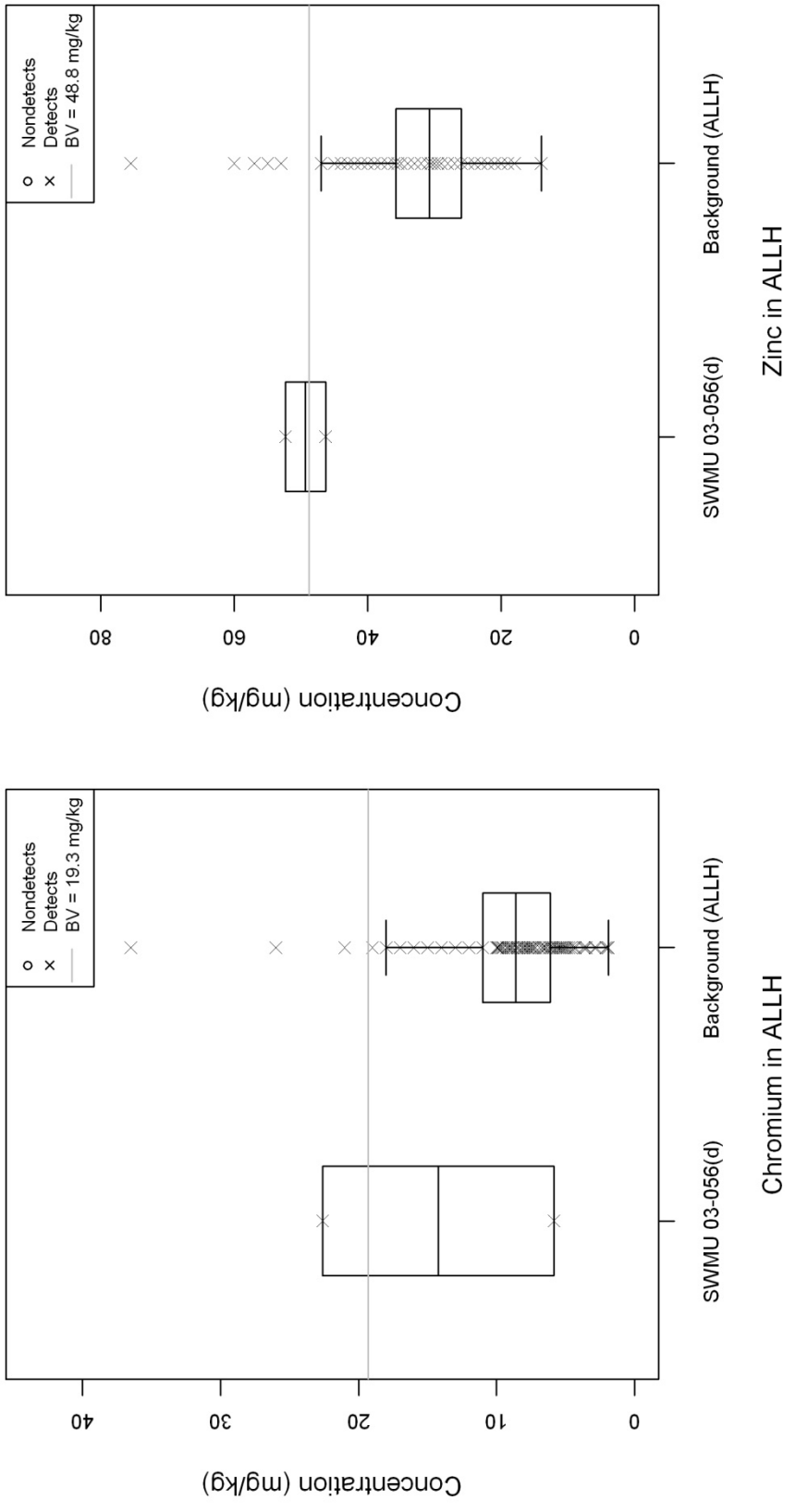



**Figure H-39 Box plots for chromium and zinc in soil at SWMU 03-056(d)**

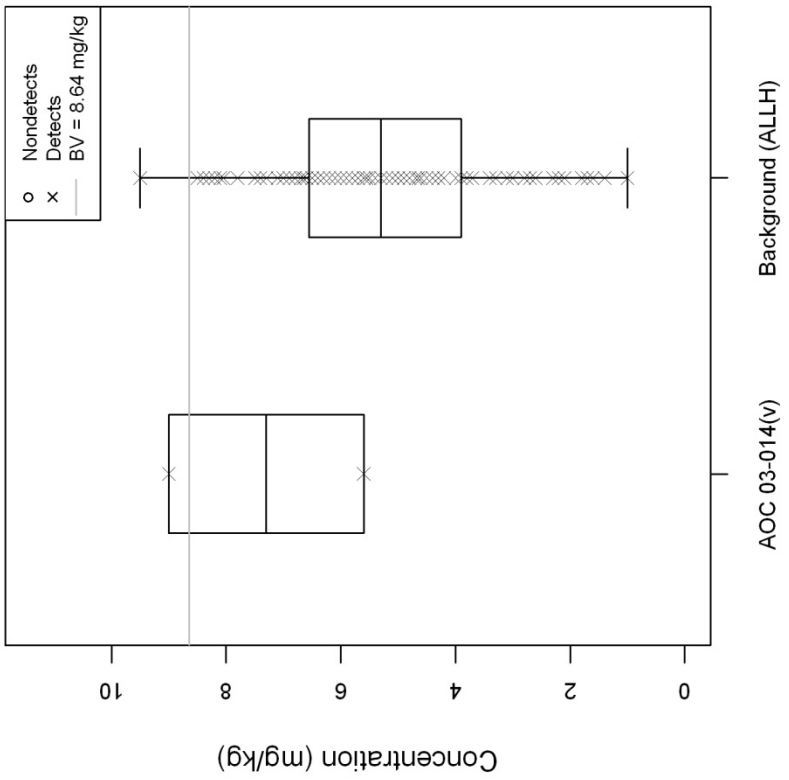
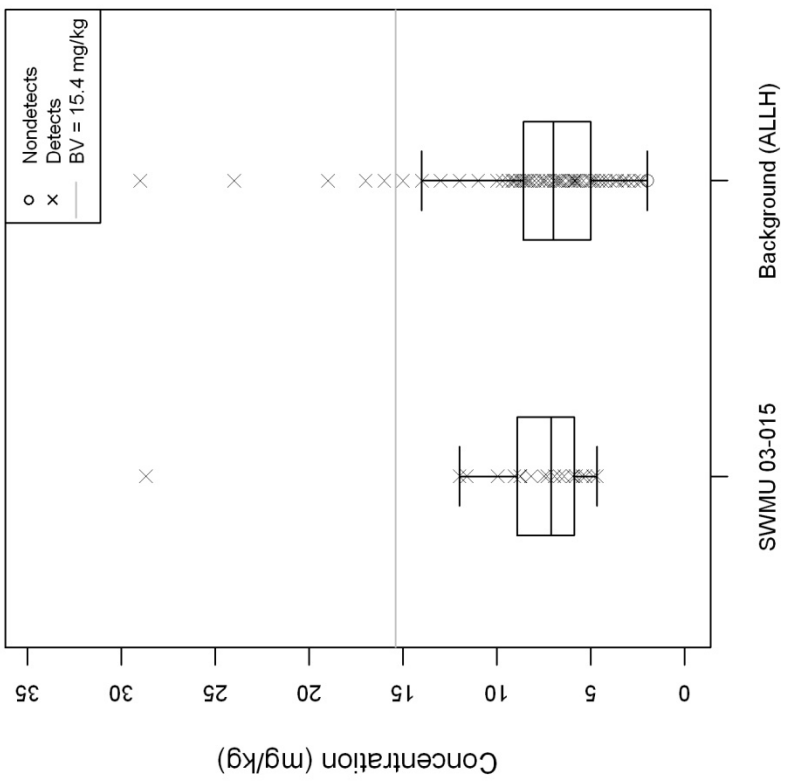



**Figure H-40 Box plot for cobalt in soil at SWMU 03-014(v)**



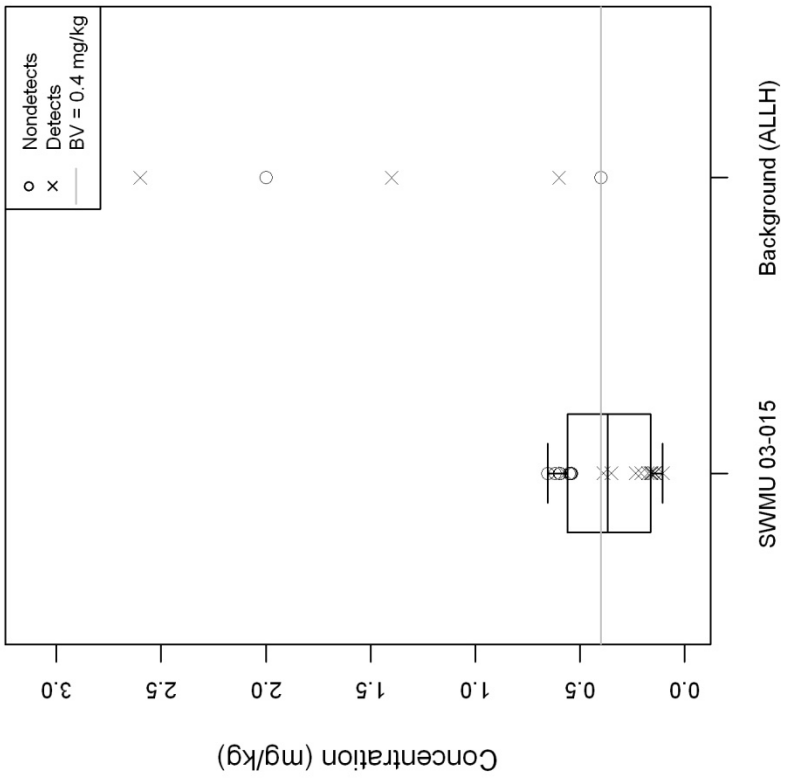
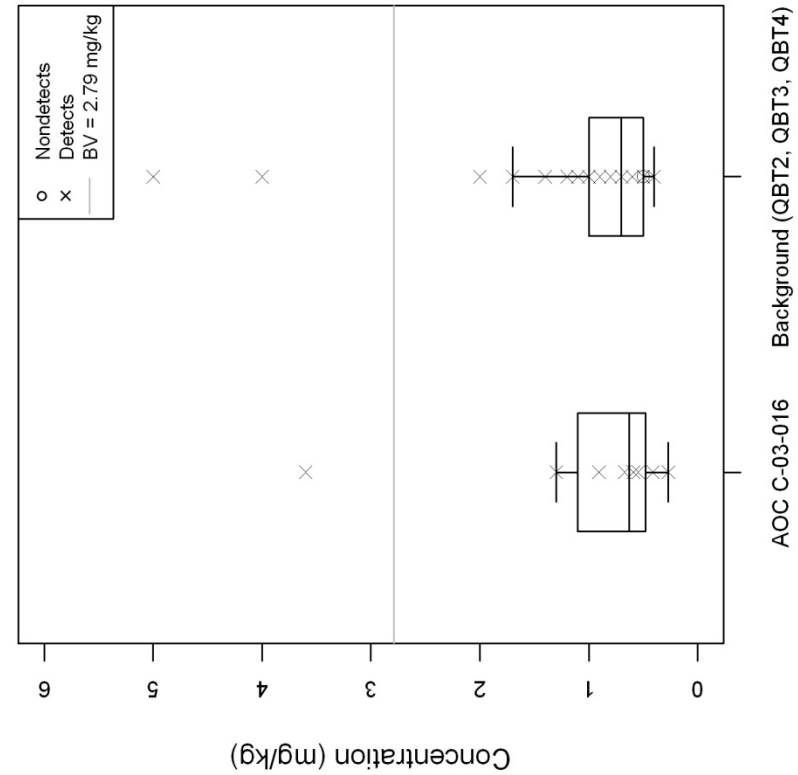




**Figure H-41 Box plots for cadmium and nickel in soil at SWMU 03-015**



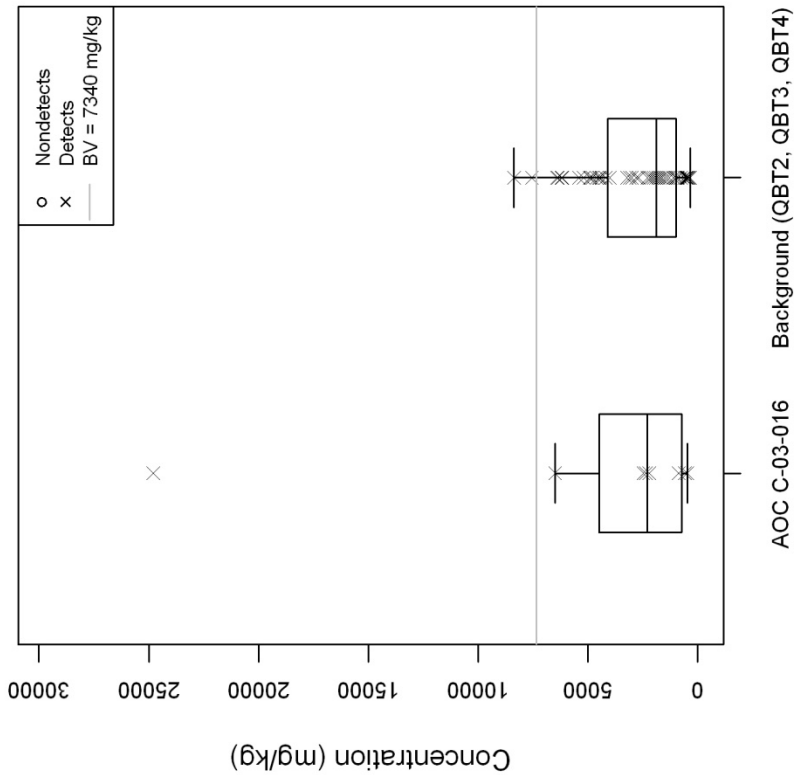
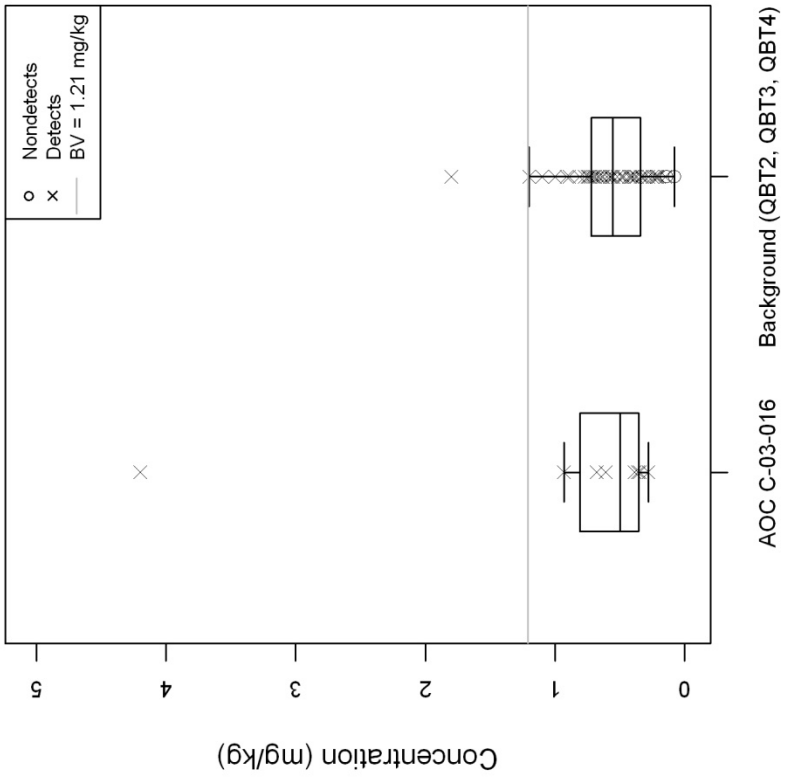




**Figure H-42 Box plots for aluminum and arsenic in tuff at AOC C-03-016**



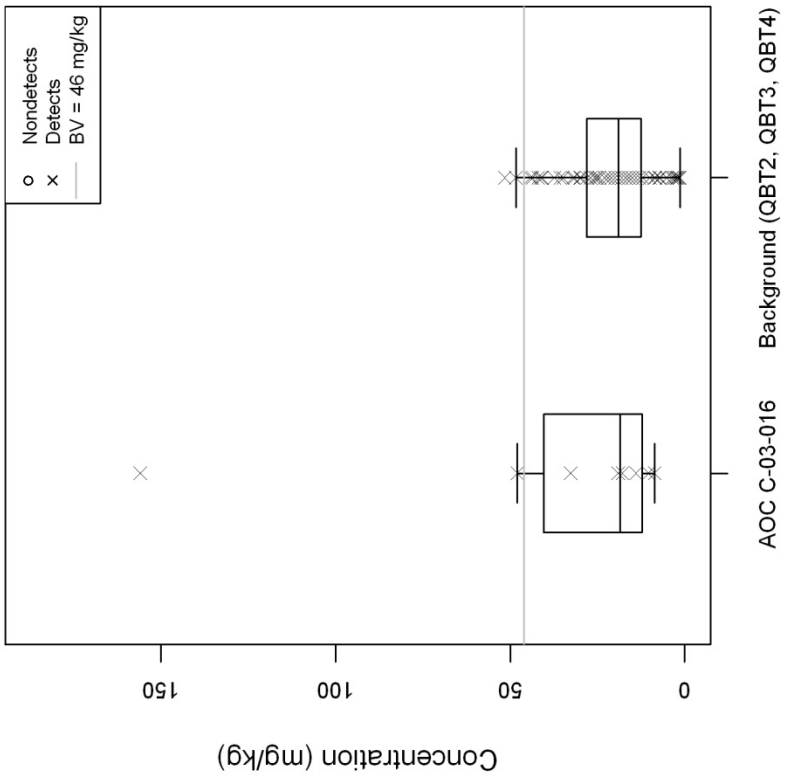
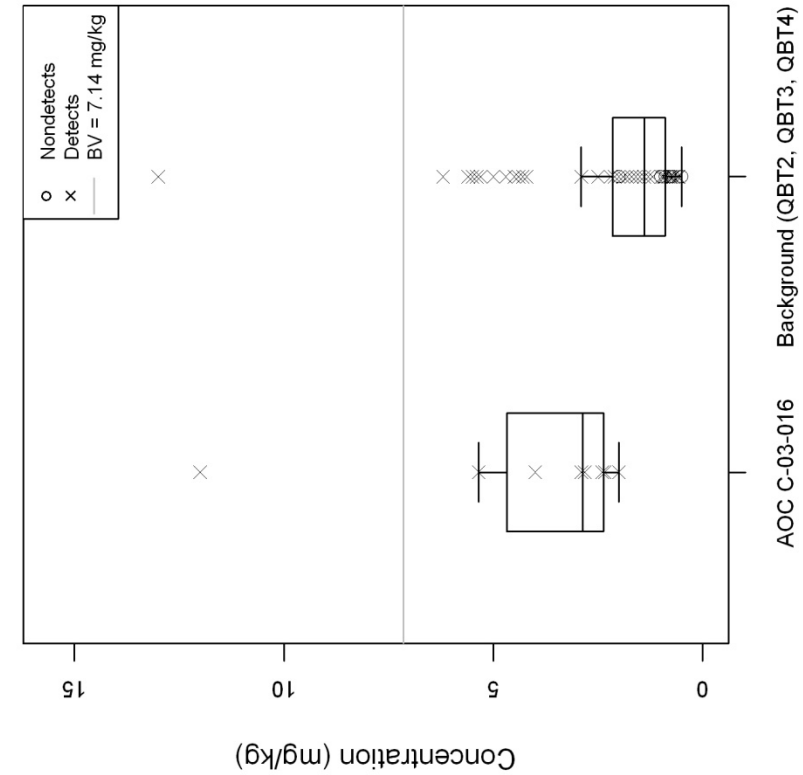




**Figure H-43 Box plots for barium and beryllium in tuff at AOC C-03-016**



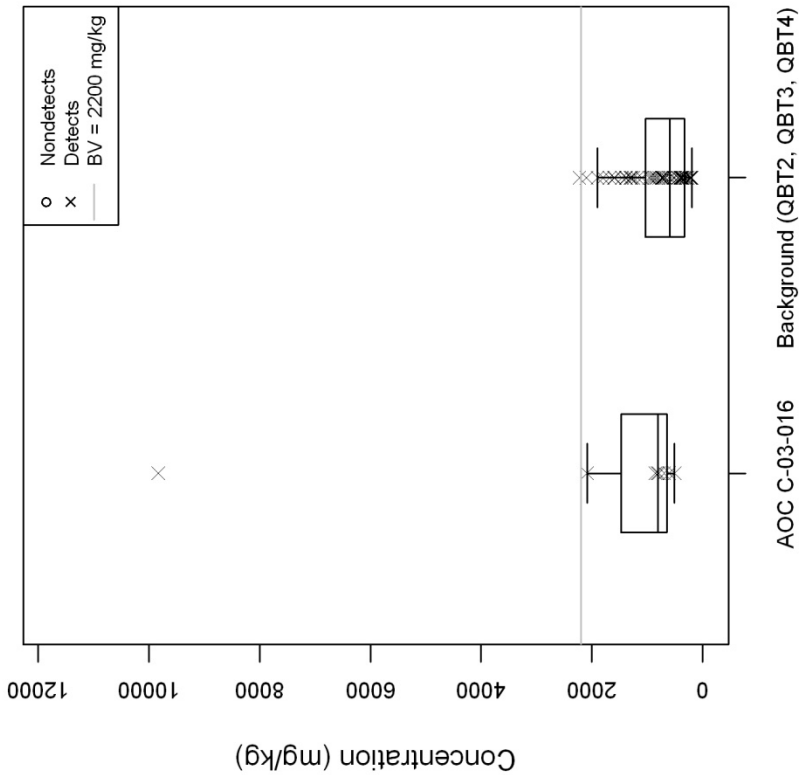
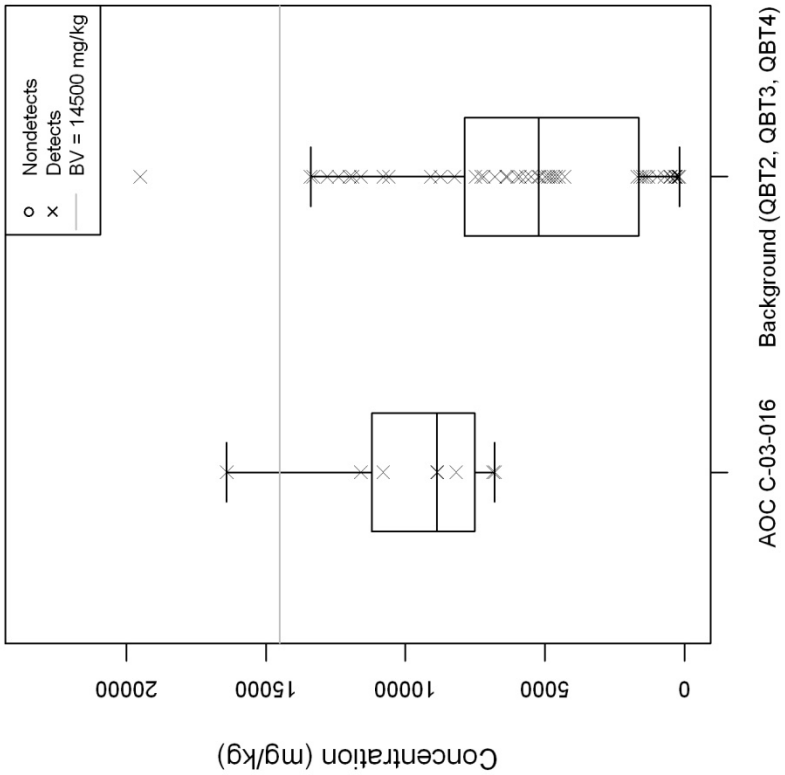




**Figure H-44 Box plots for calcium and chromium in tuff at AOC C-03-016**



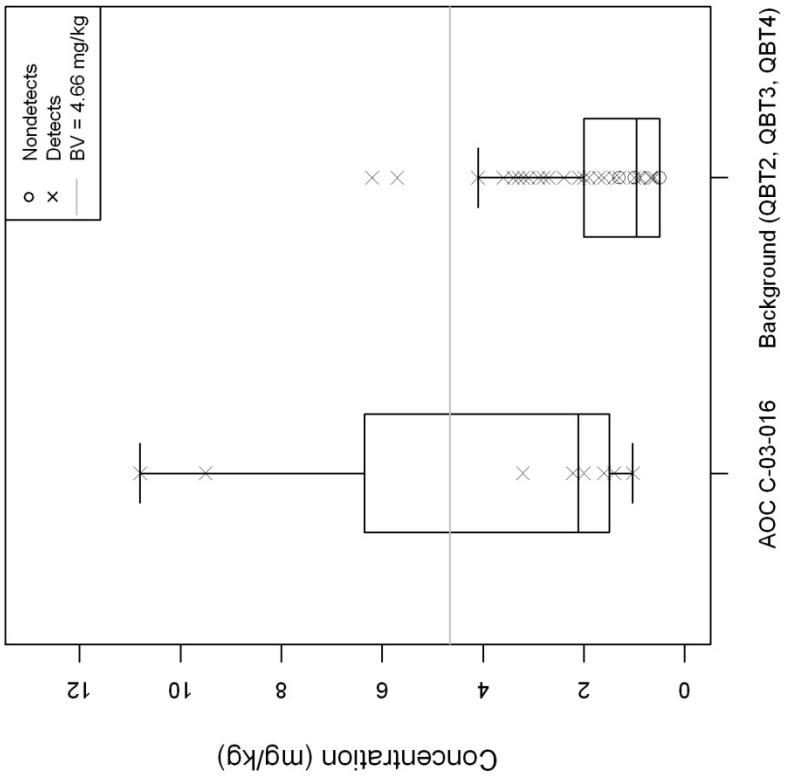
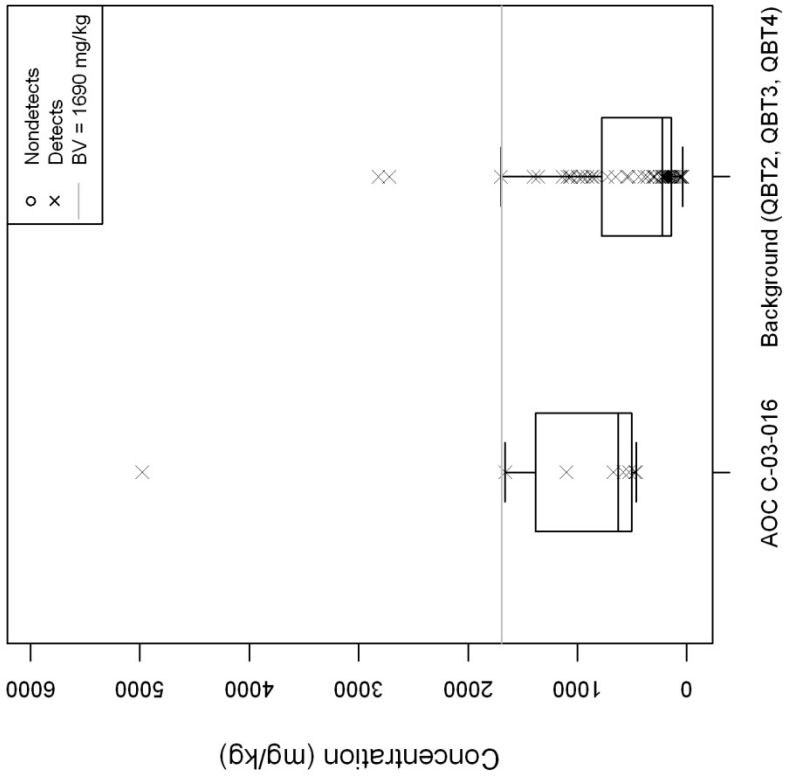




**Figure H-45 Box plots for copper and iron in tuff at AOC C-03-016**



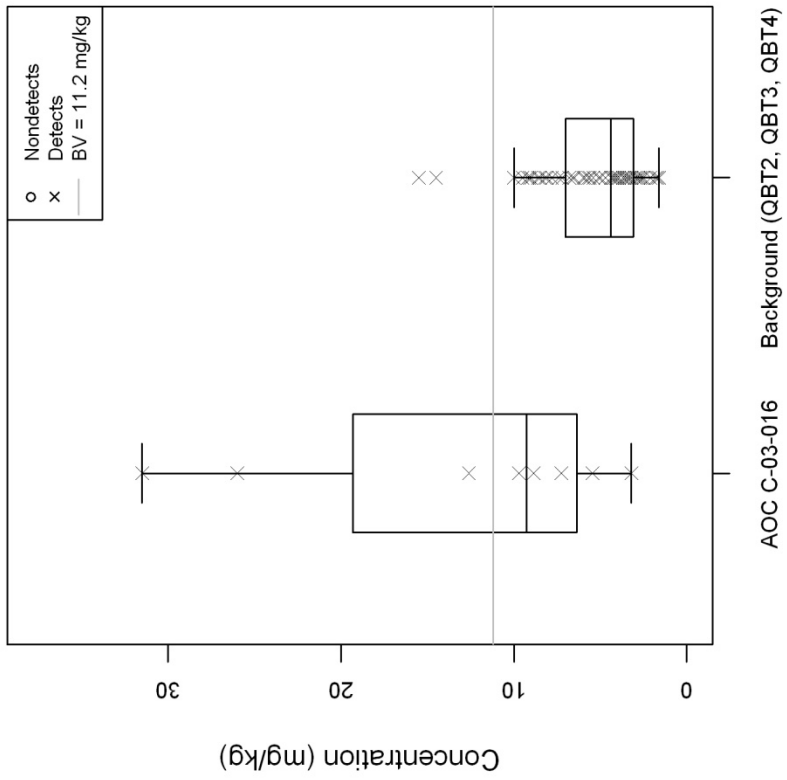
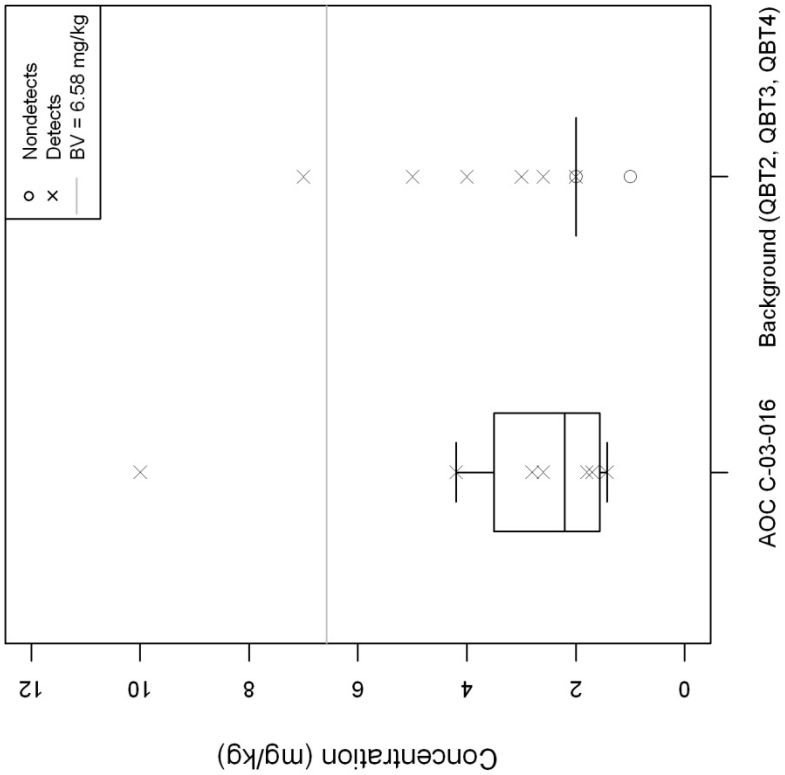




**Figure H-46 Box plots for lead and magnesium in tuff at AOC C-03-016**



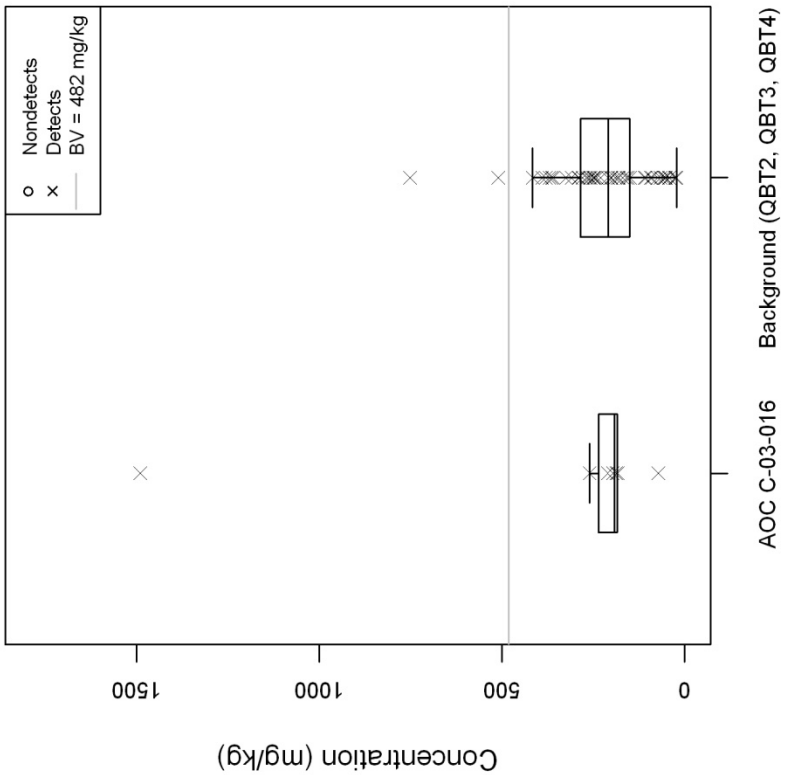




**Figure H-47 Box plots for manganese and nickel in tuff at AOC C-03-016**

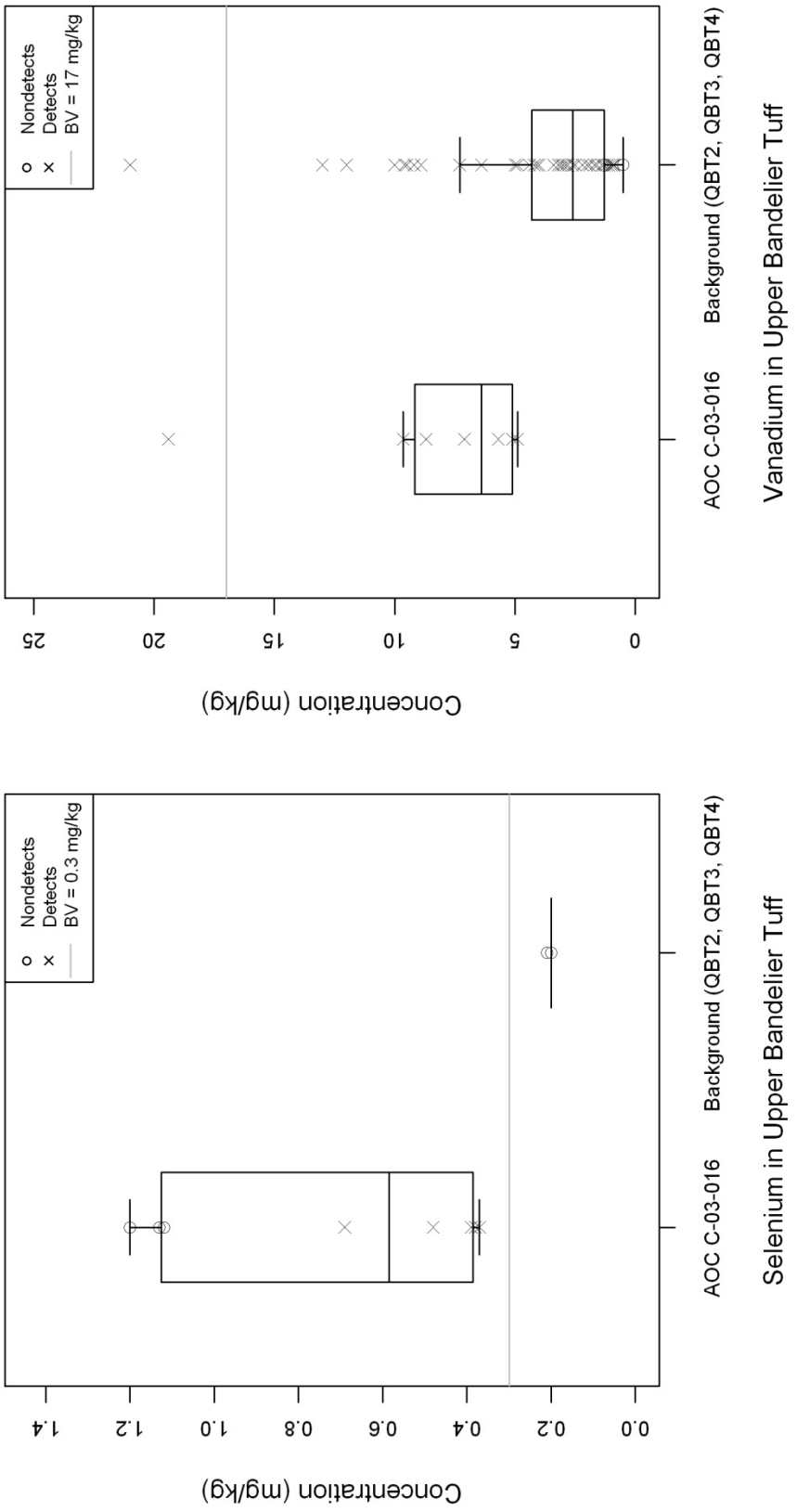
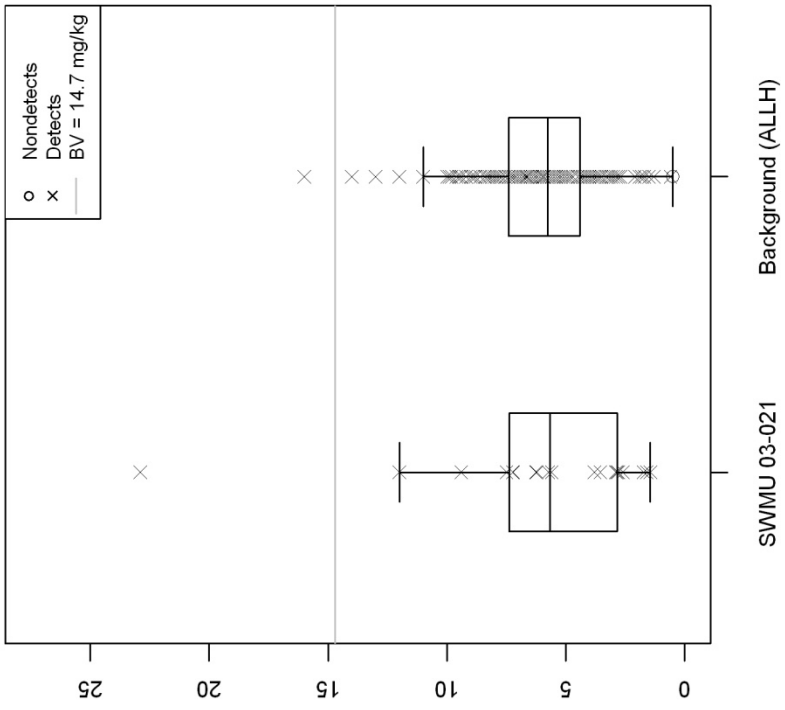



**Figure H-48 Box plots for selenium and vanadium in tuff at AOC C-03-016**



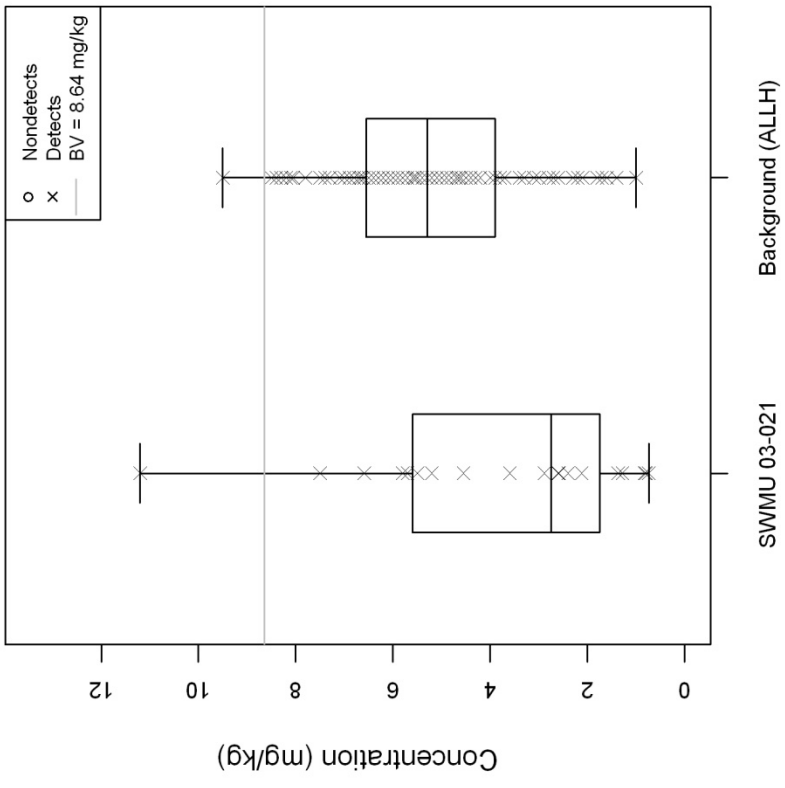




**Figure H-49 Box plots for cobalt and copper in soil at SWMU 03-021**

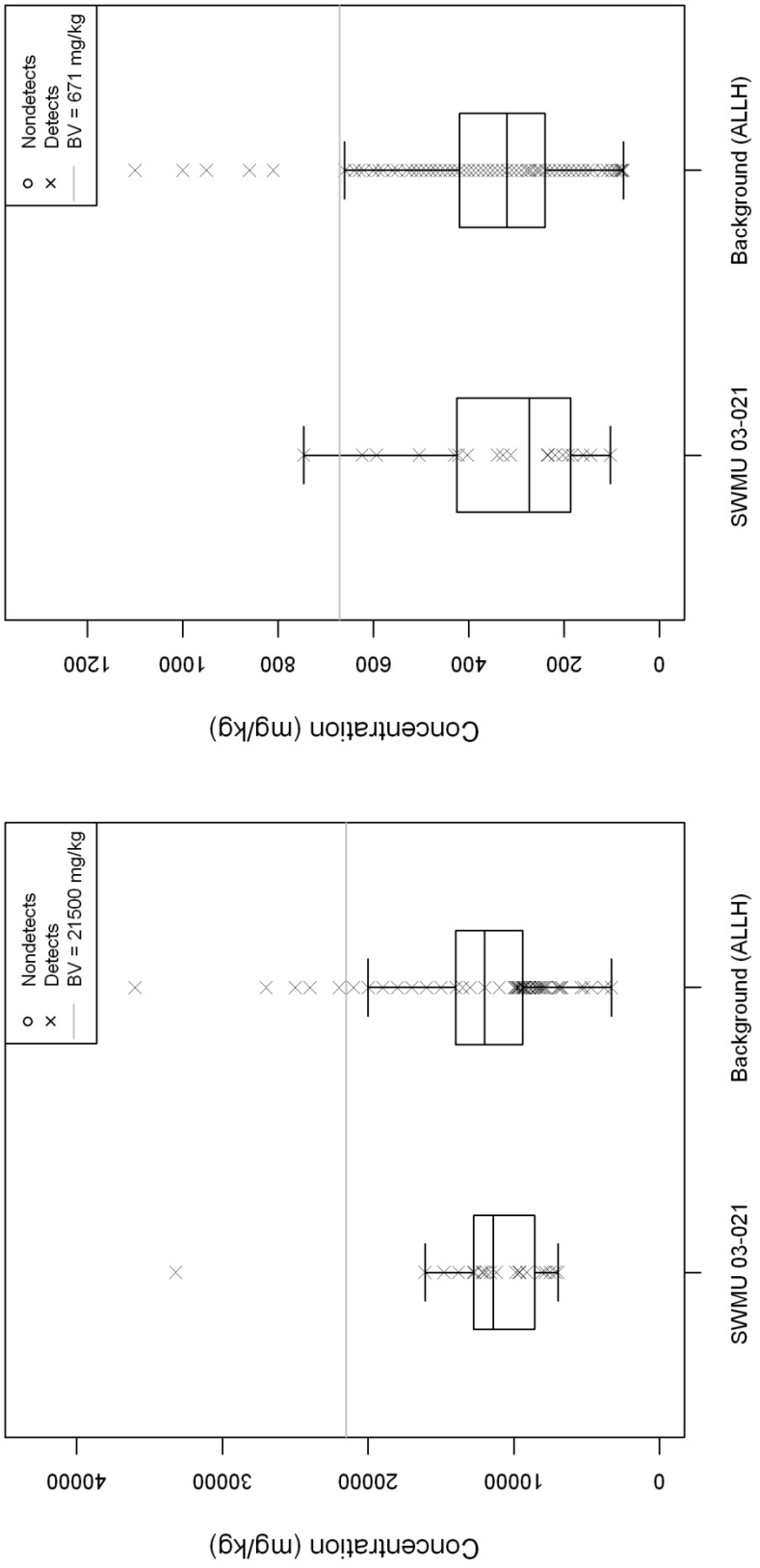



**Figure H-50 Box plots for iron and manganese in soil at SWMU 03-021**

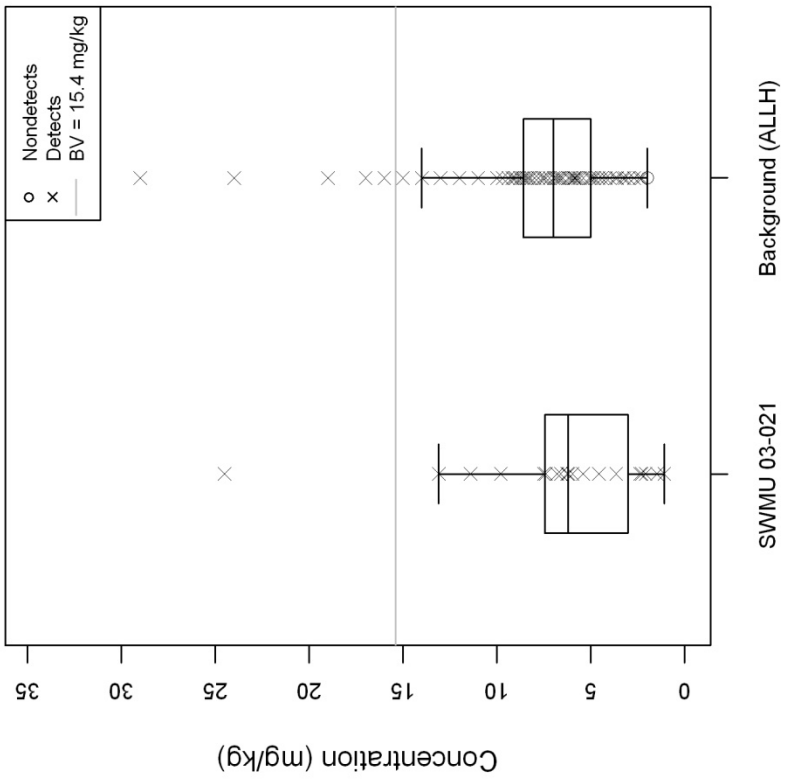



**Figure H-51 Box plot for nickel in soil at SWMU 03-021**

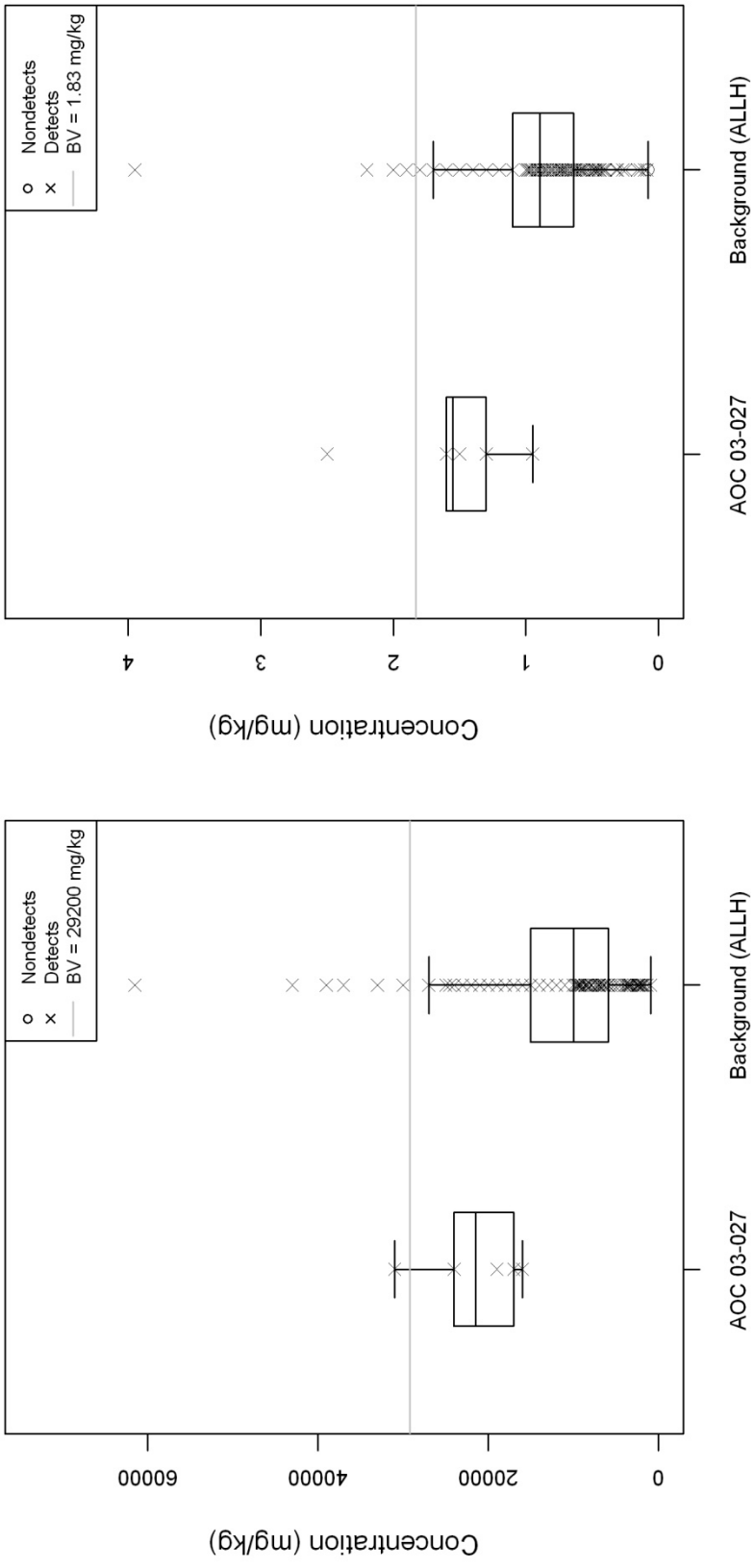



**Figure H-52 Box plots for aluminum and beryllium in soil at AOC 03-027**

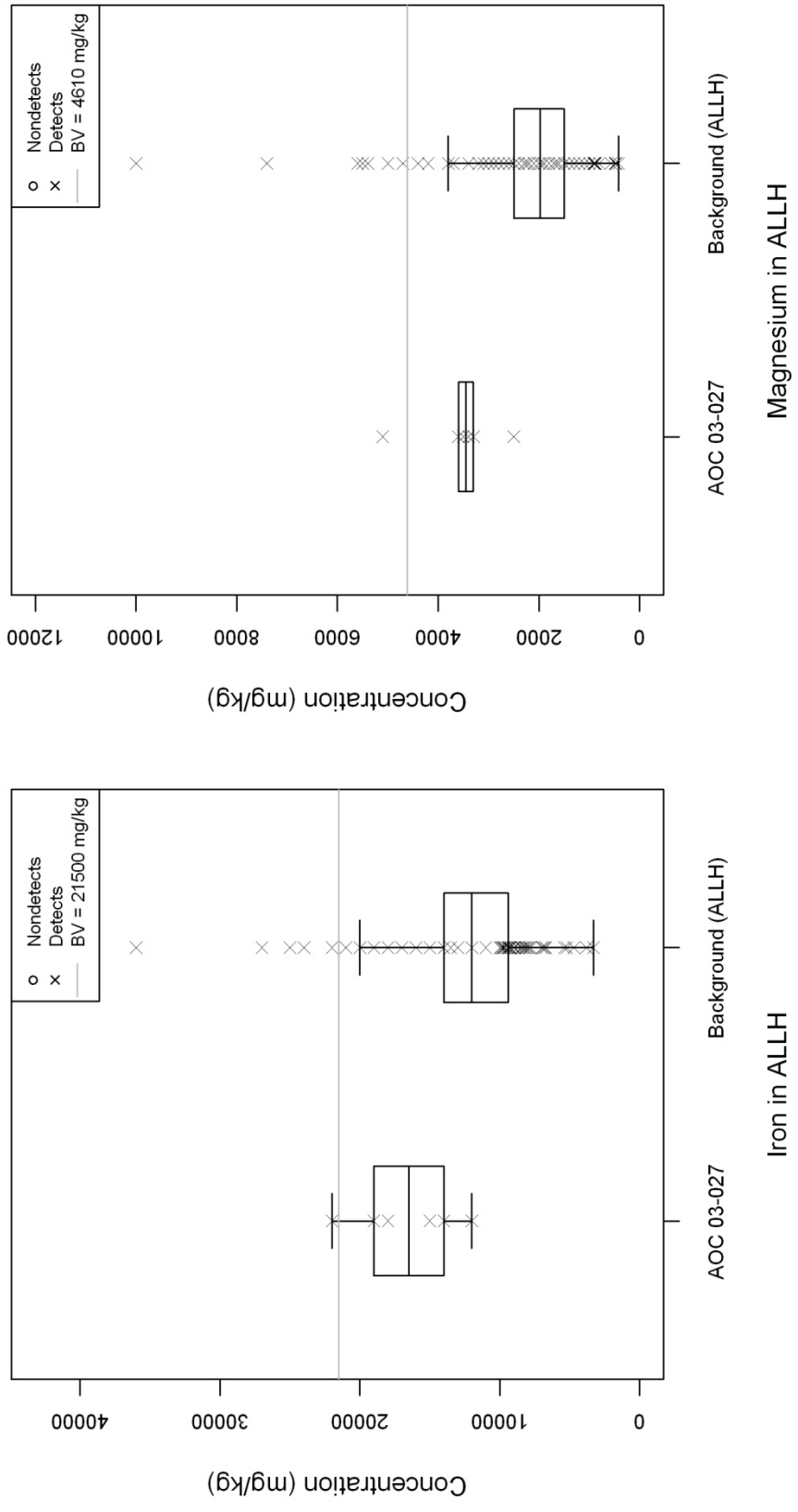
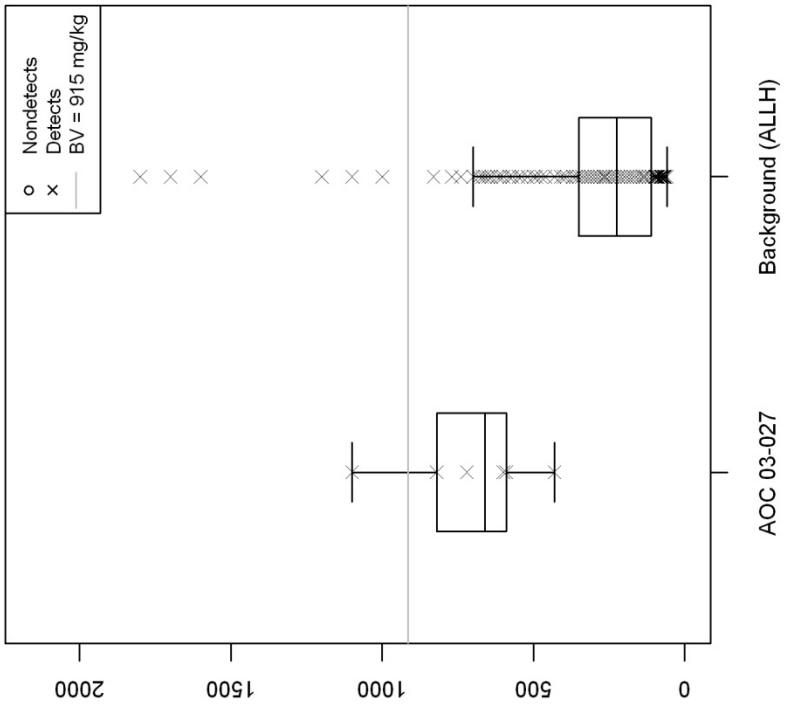



**Figure H-53 Box plots for iron and magnesium in soil at AOC 03-027**



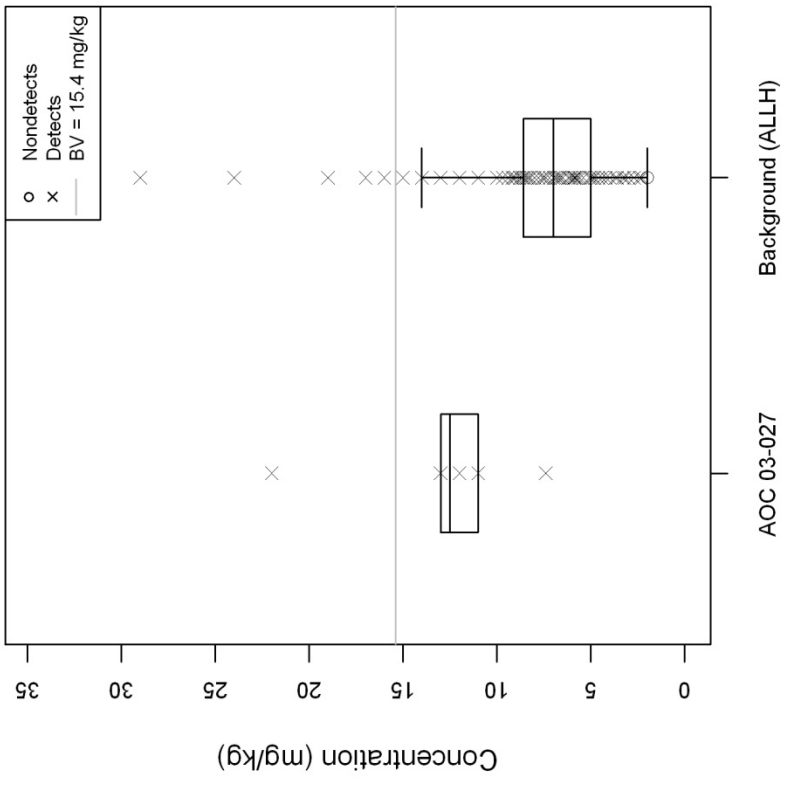




**Figure H-54 Box plots for nickel and sodium in soil at AOC 03-027**

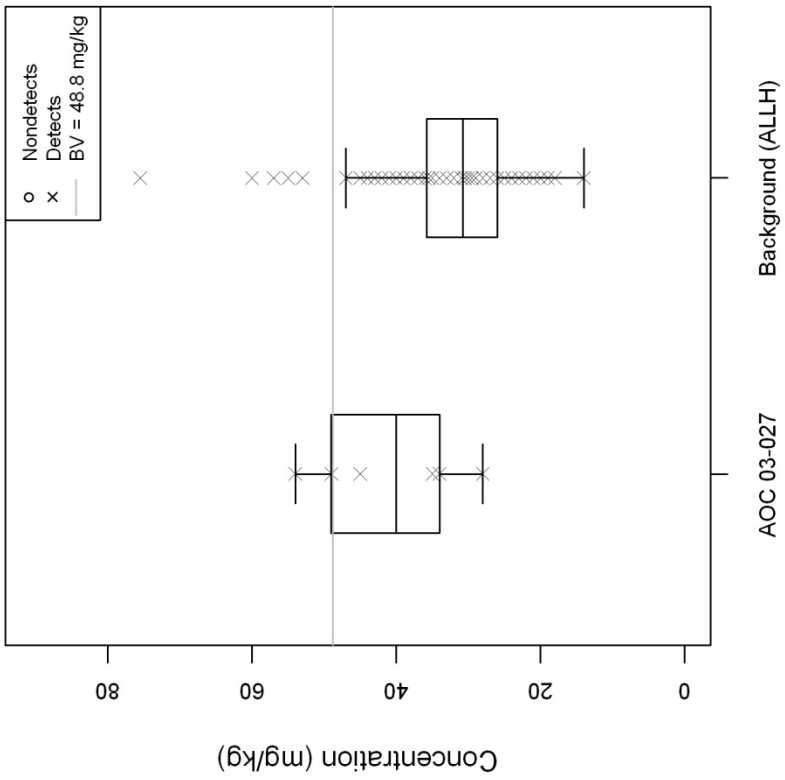



**Figure H-55 Box plots for zinc in soil at AOC 03-027**

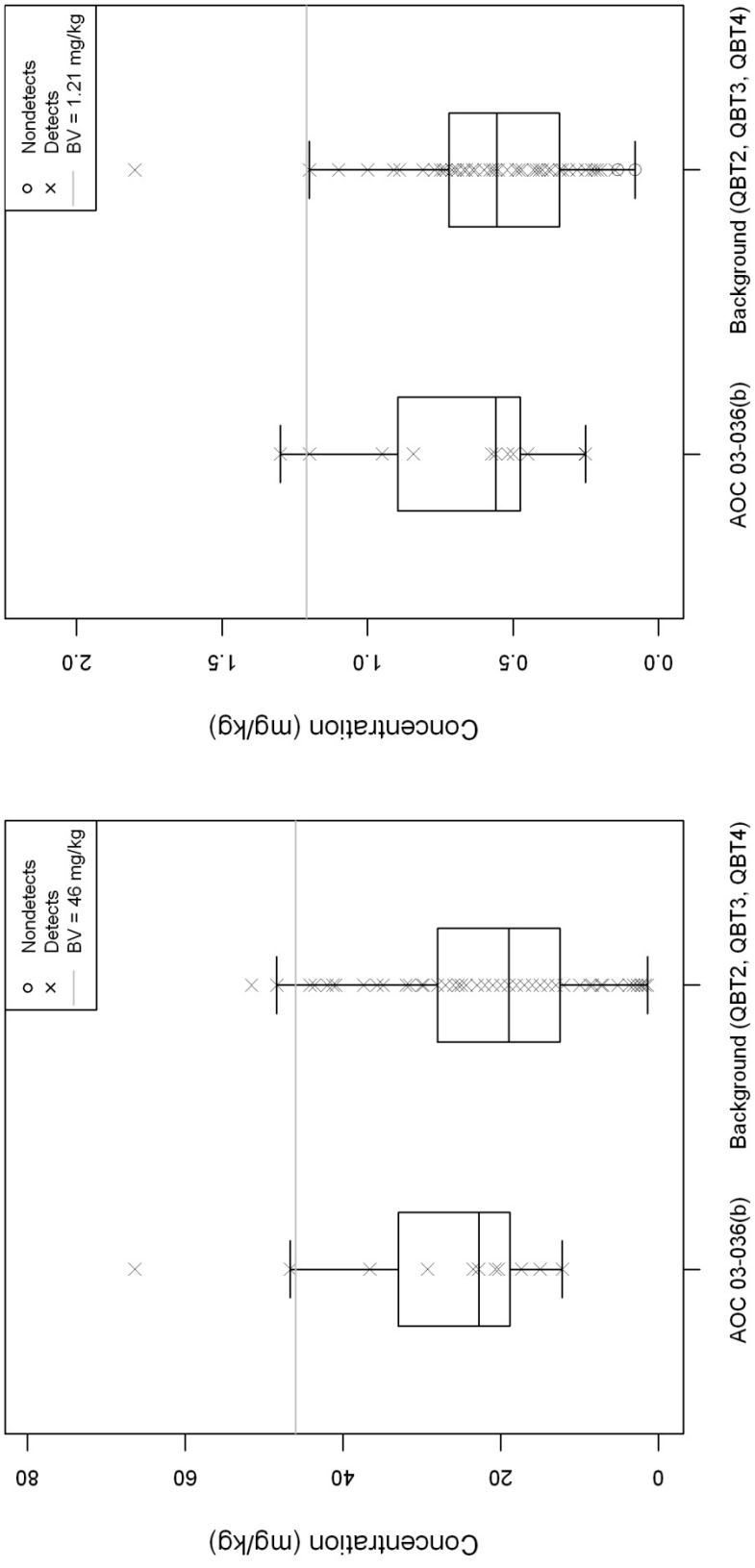
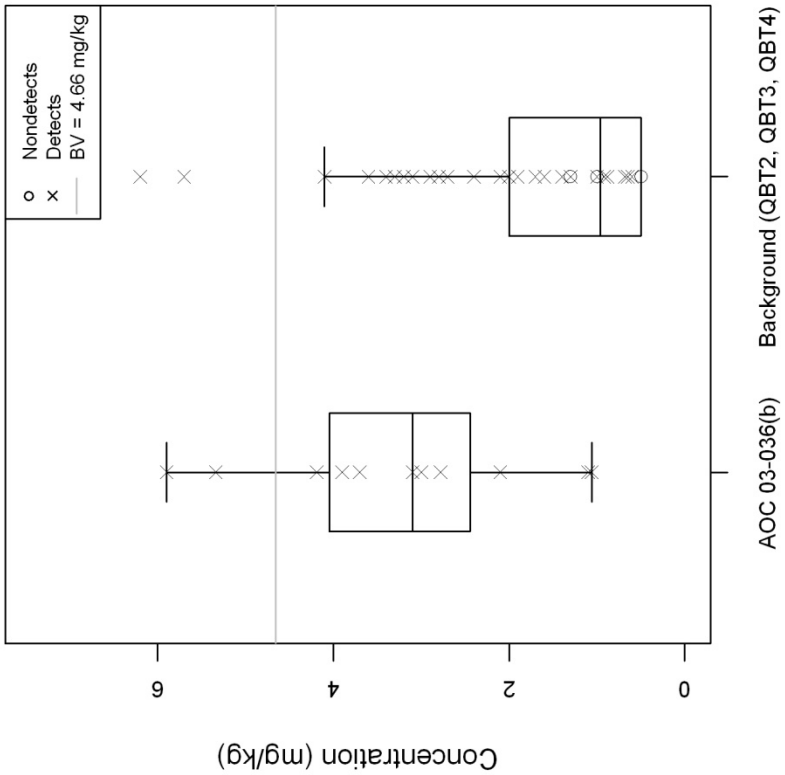



**Figure H-56 Box plots for barium and beryllium in tuff at AOC 03-036(b)**



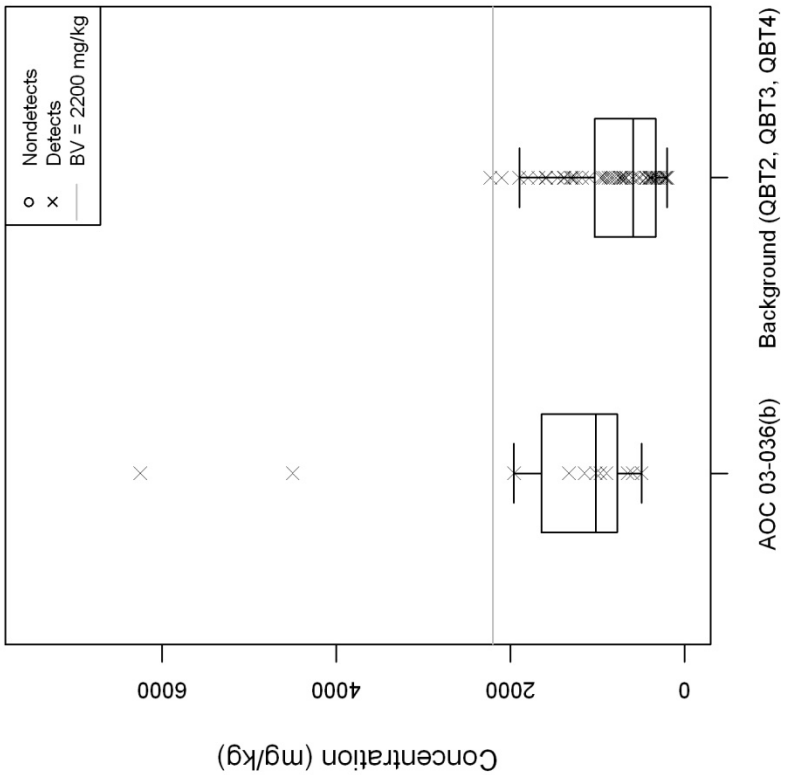
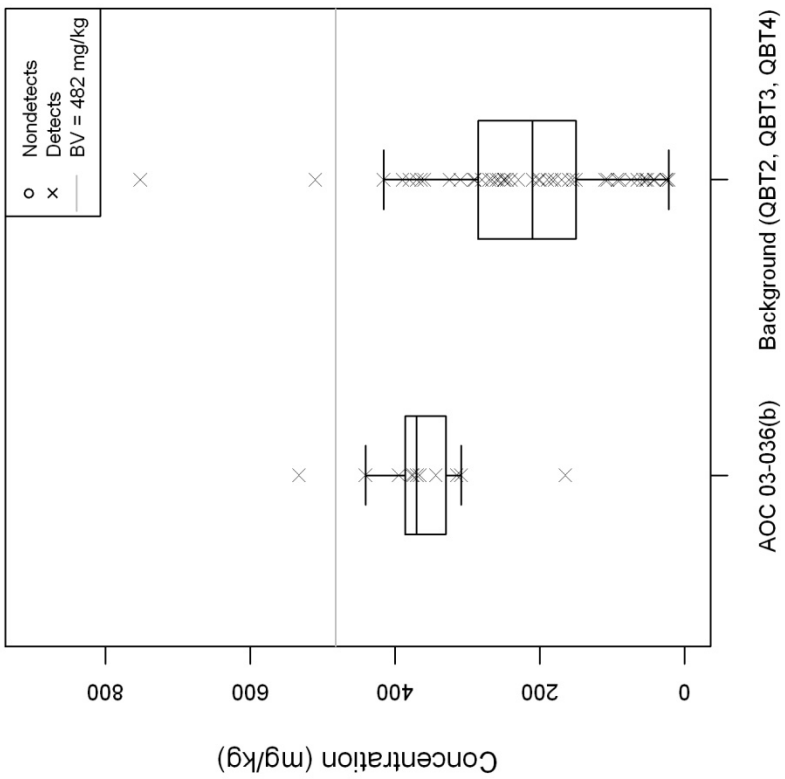




**Figure H-57 Box plots for calcium and copper in tuff at AOC 03-036(b)**



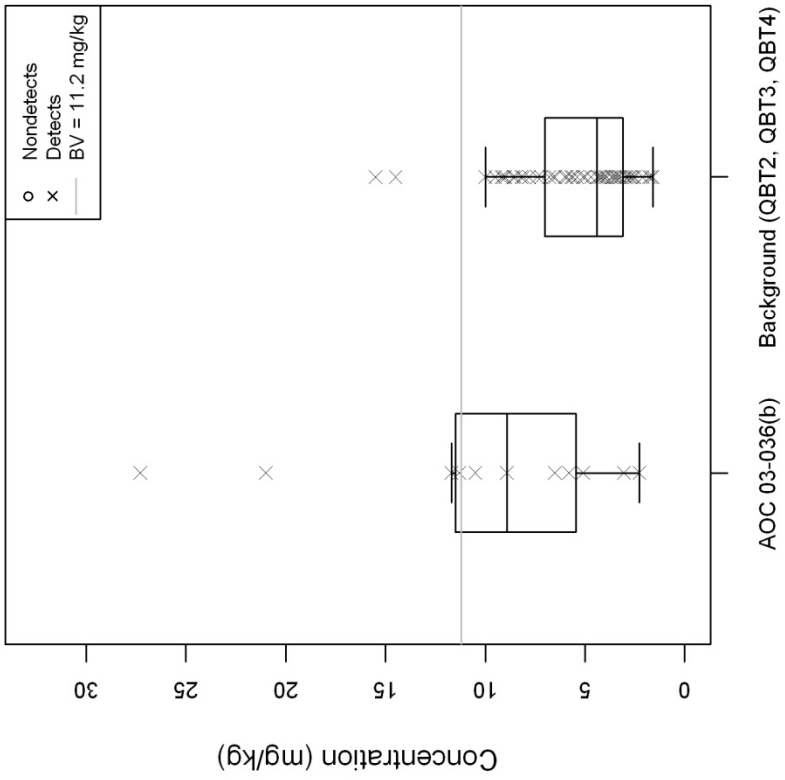
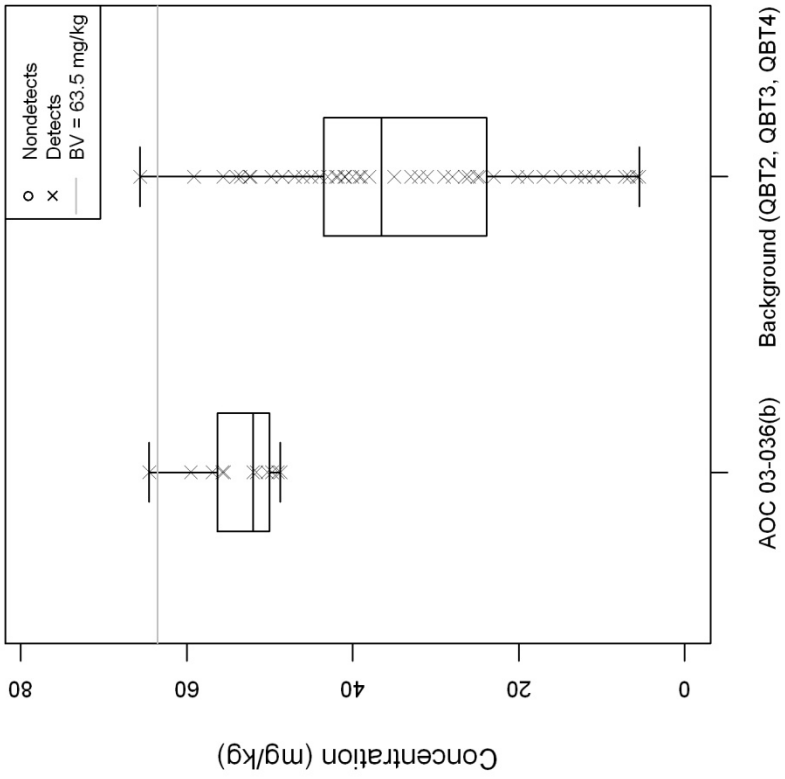




**Figure H-58 Box plots for lead and manganese in tuff at AOC 03-036(b)**



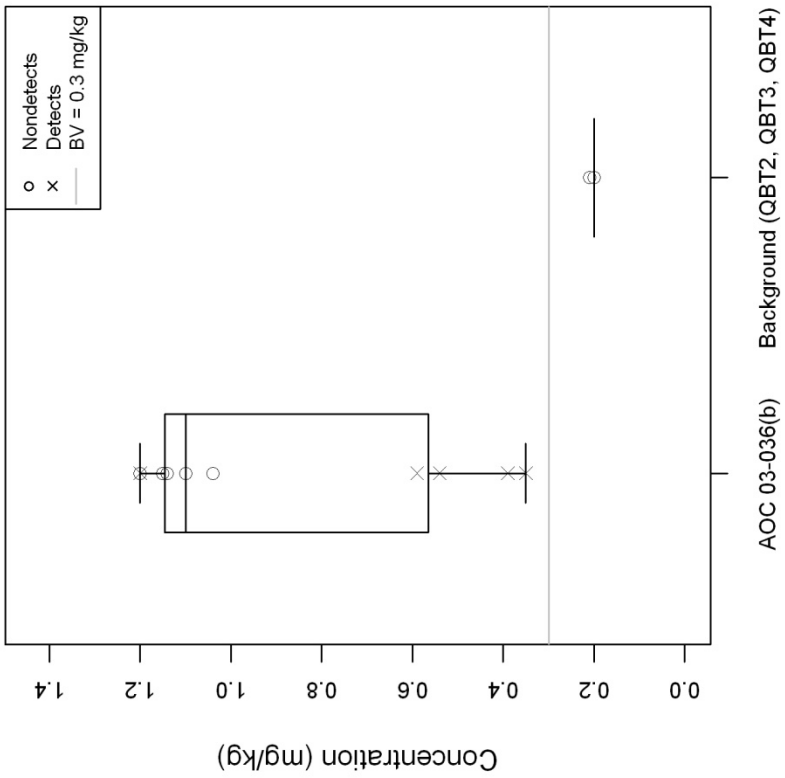




**Figure H-59 Box plots for selenium and zinc in tuff at AOC 03-036(b)**

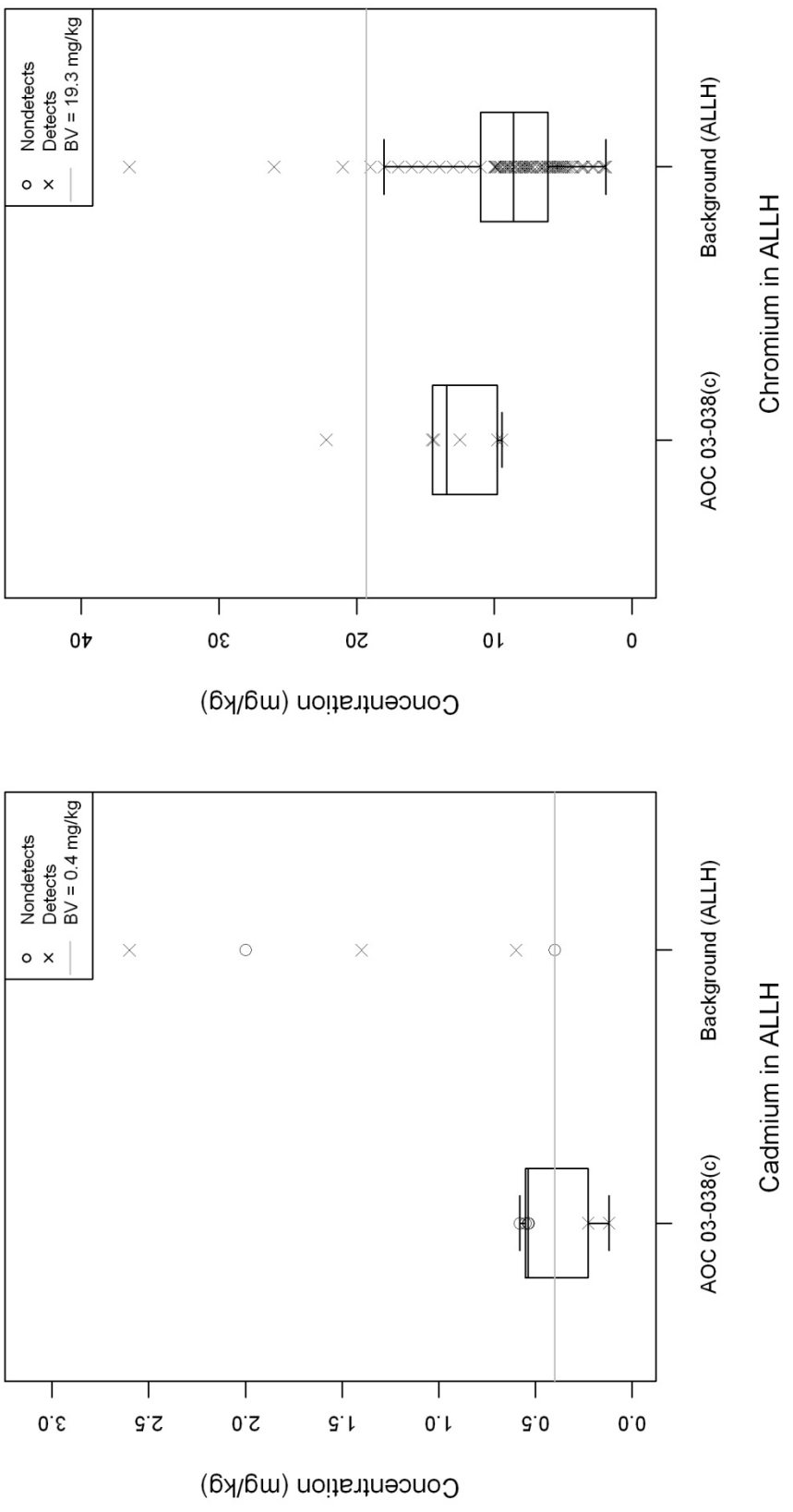
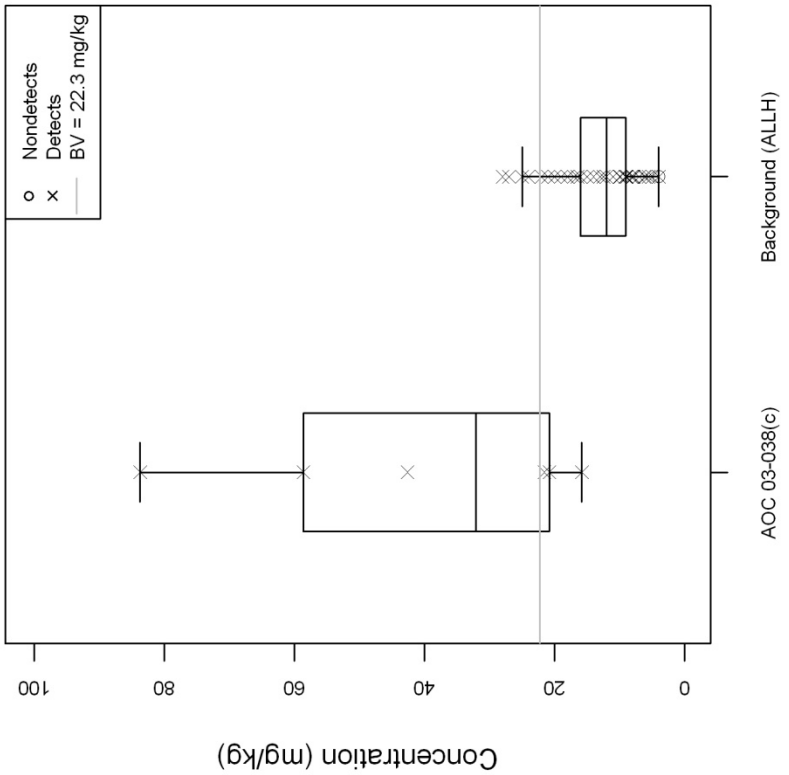



**Figure H-60 Box plots for cadmium and chromium in soil at AOC 03-038(c)**



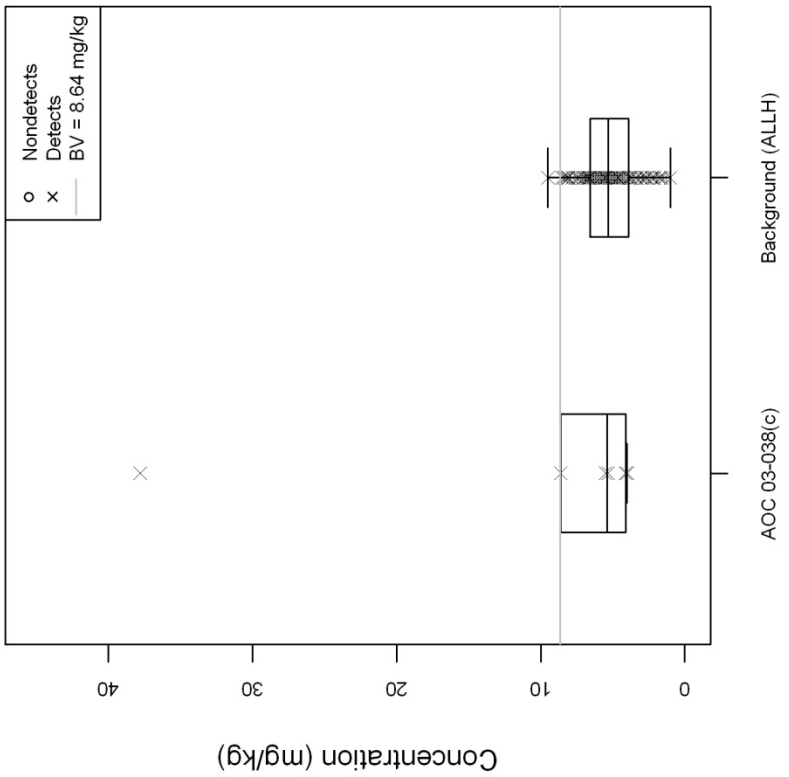




**Figure H-61 Box plots for cobalt and lead in soil at AOC 03-038(c)**

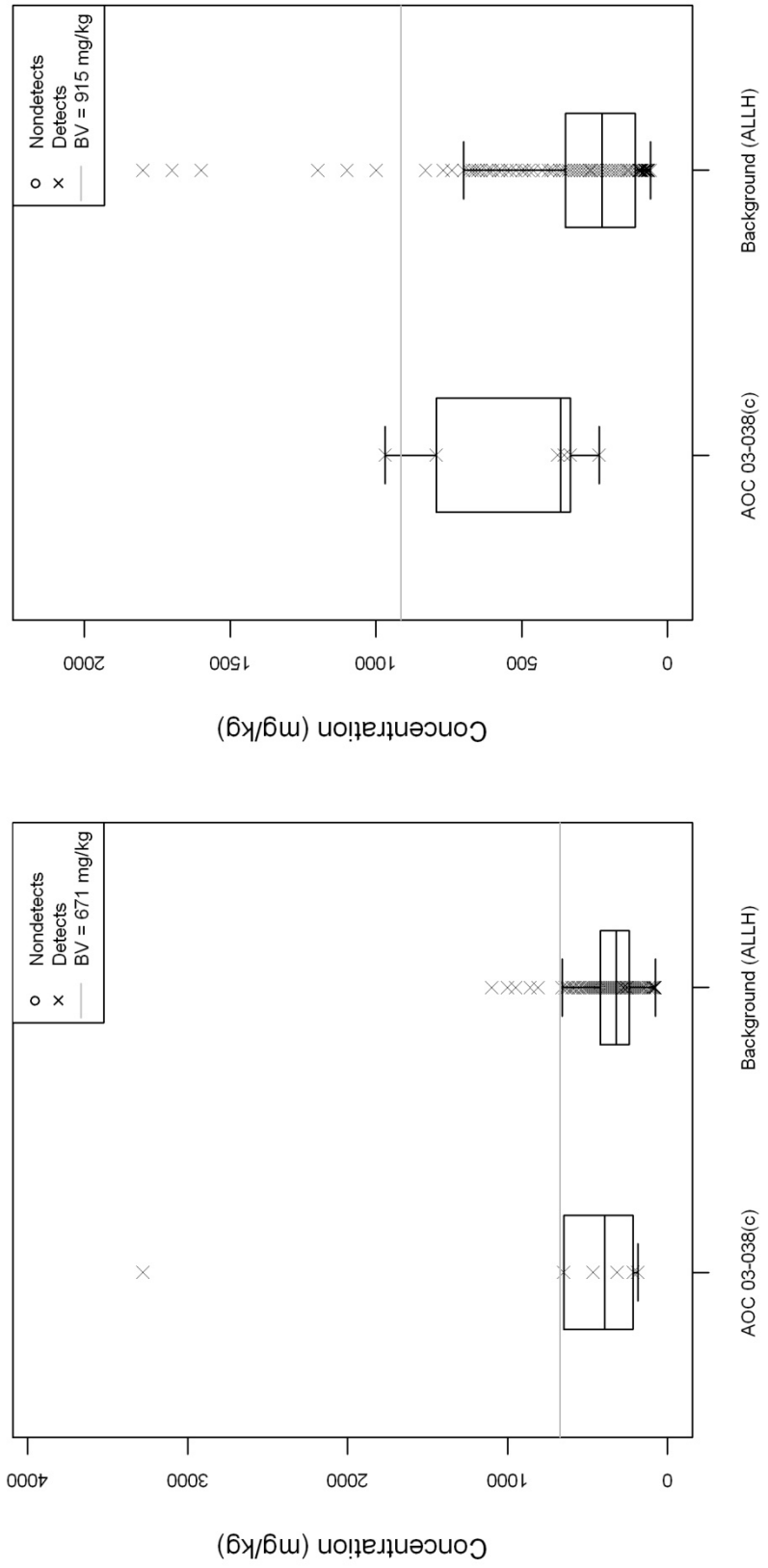



**Figure H-62 Box plots for manganese and sodium in soil at AOC 03-038(c)**

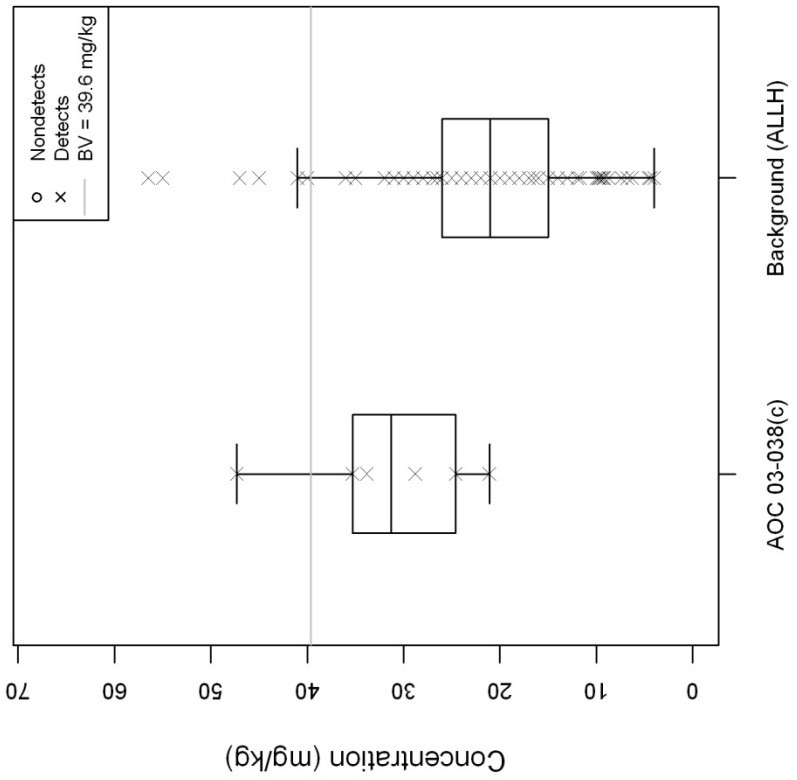
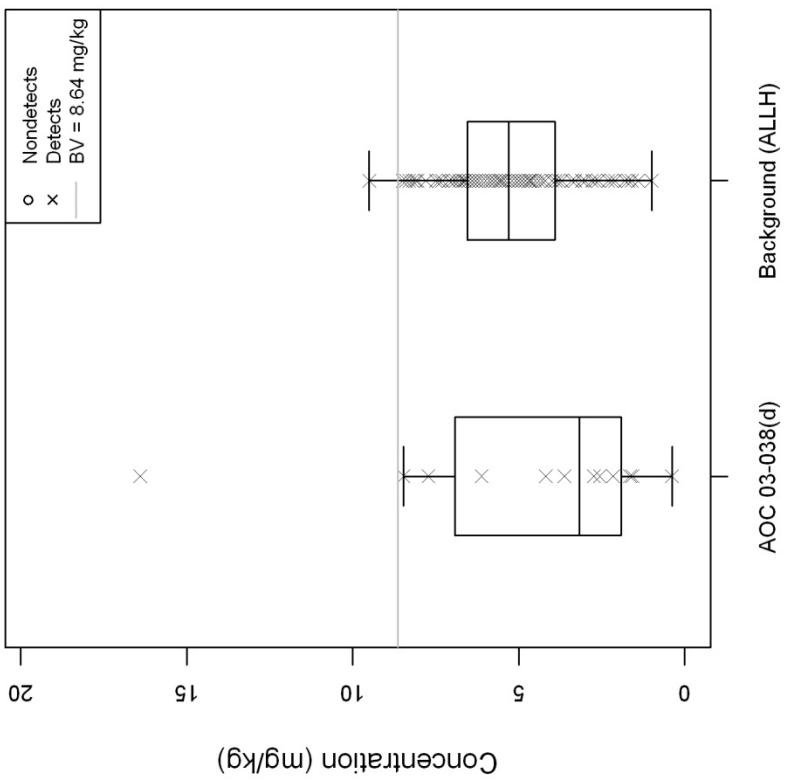



**Figure H-63 Box plot for vanadium in soil at AOC 03-038(c)**



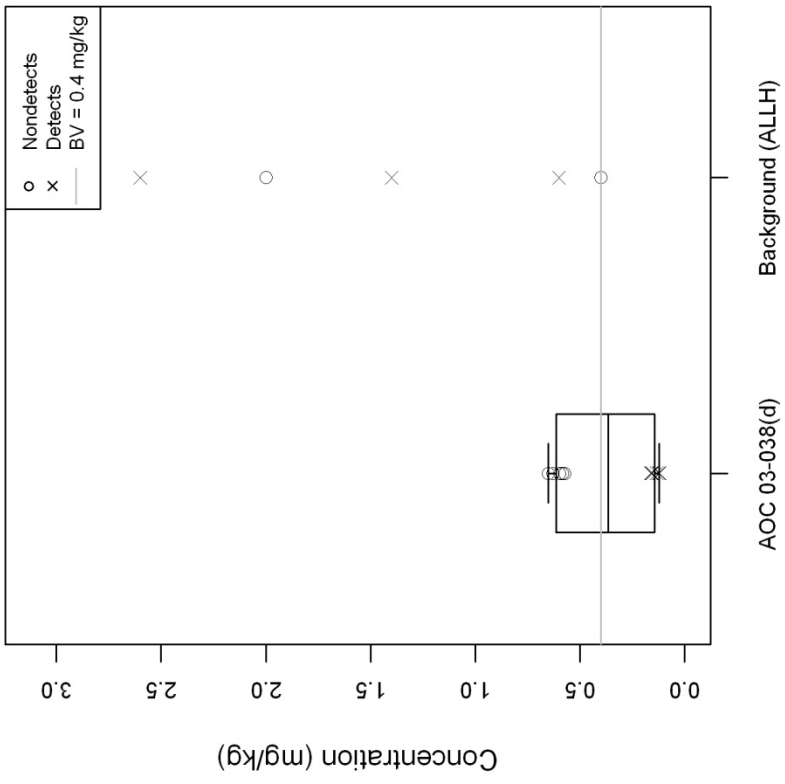




**Figure H-64 Box plots for cadmium and cobalt in soil at AOC 03-038(d)**

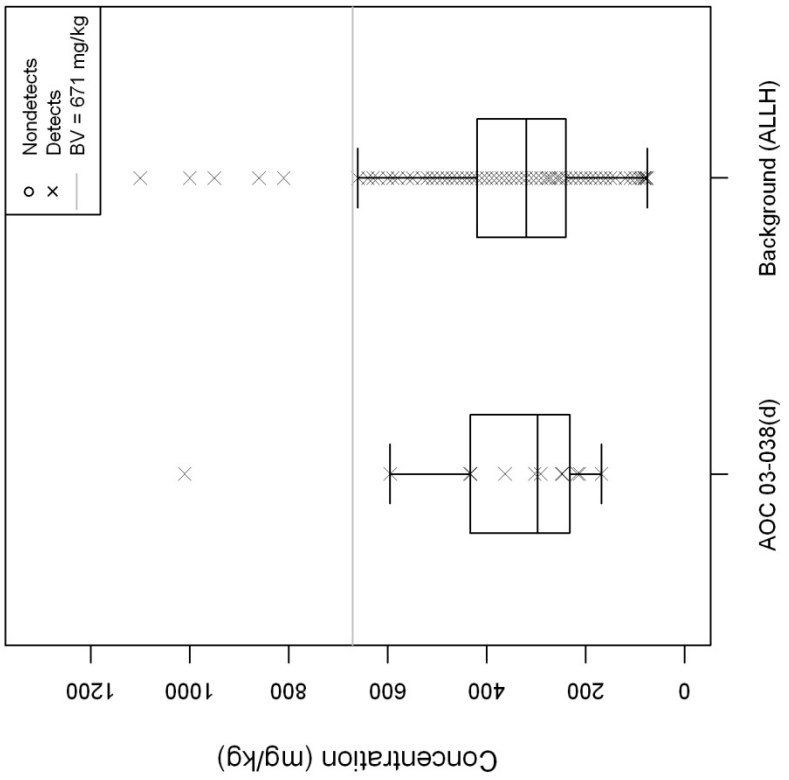



**Figure H-65 Box plot for manganese in soil at AOC 03-038(d)**

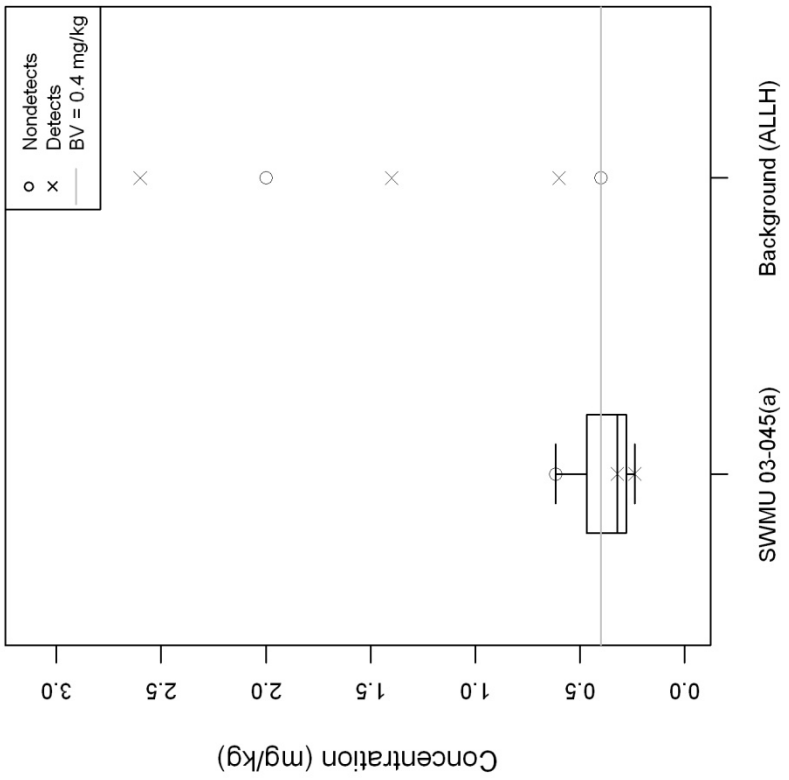
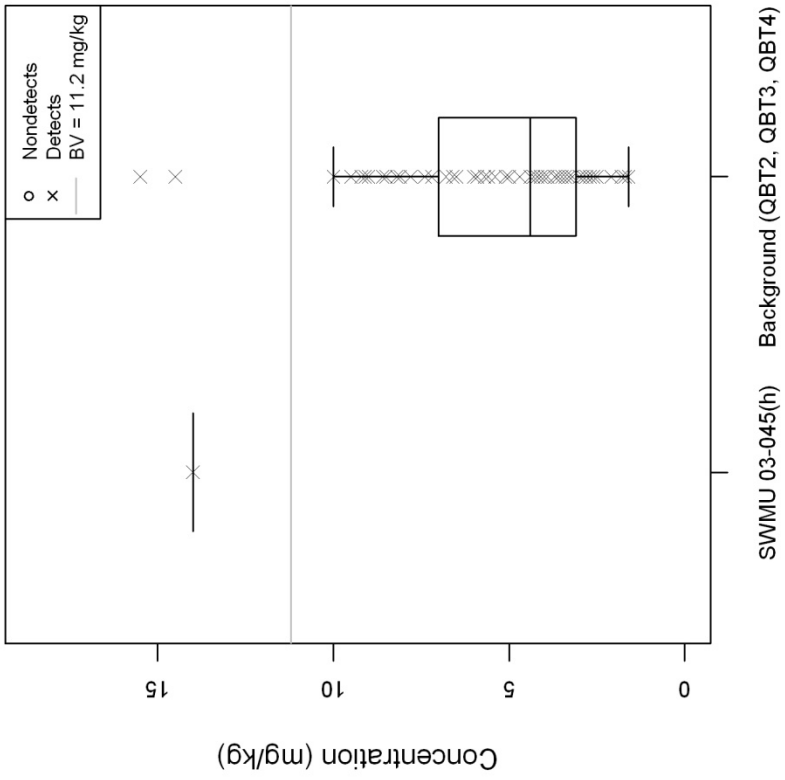



**Figure H-66 Box plot for cadmium in soil at SWMU 03-045(a)**



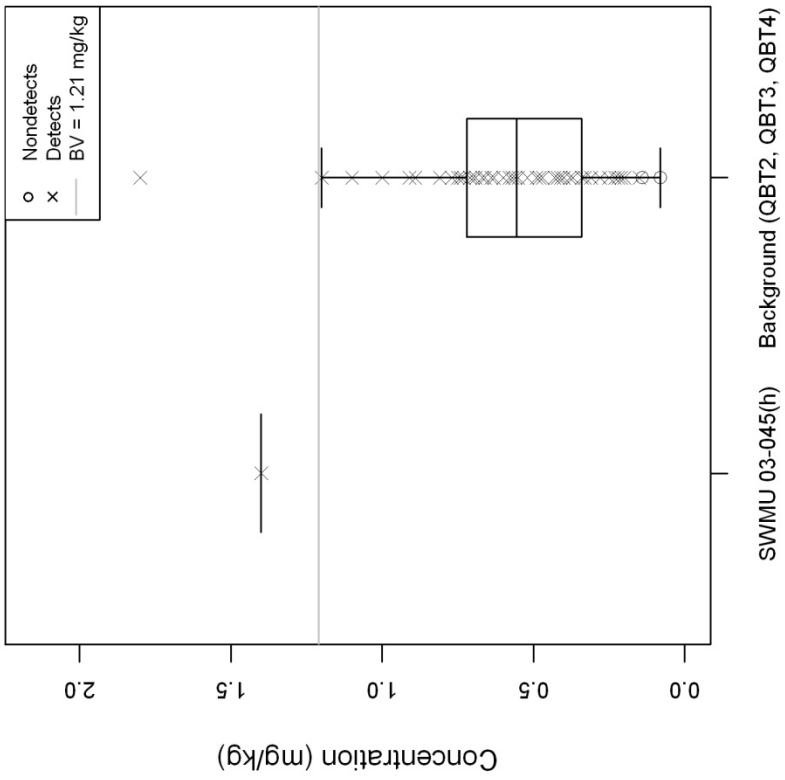




**Figure H-67 Box plots for beryllium and lead in tuff at SWMU 03-045(h)**

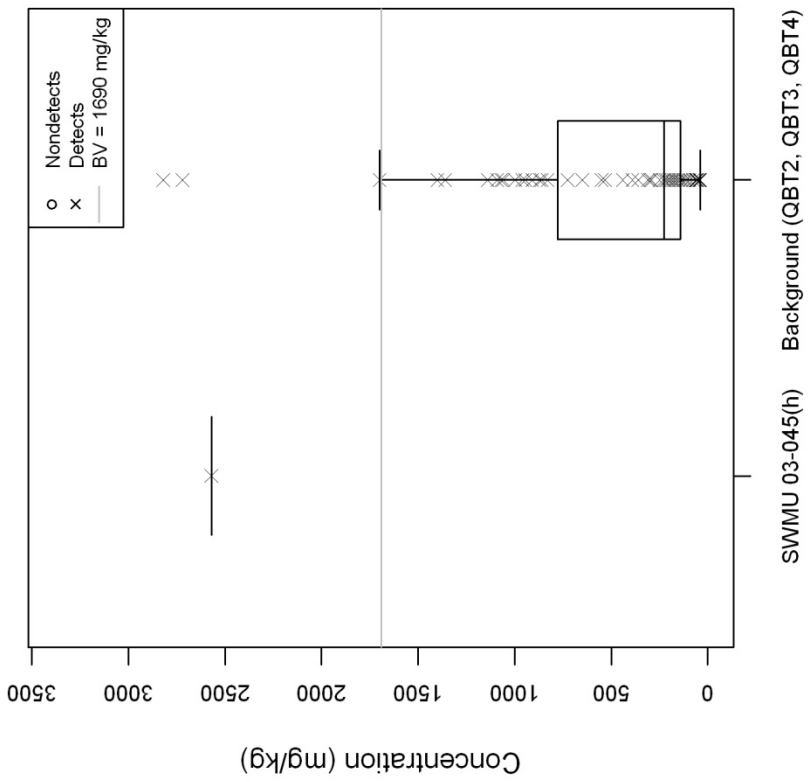



**Figure H-68 Box plot for lead and magnesium in tuff at SWMU 03-045(h)**

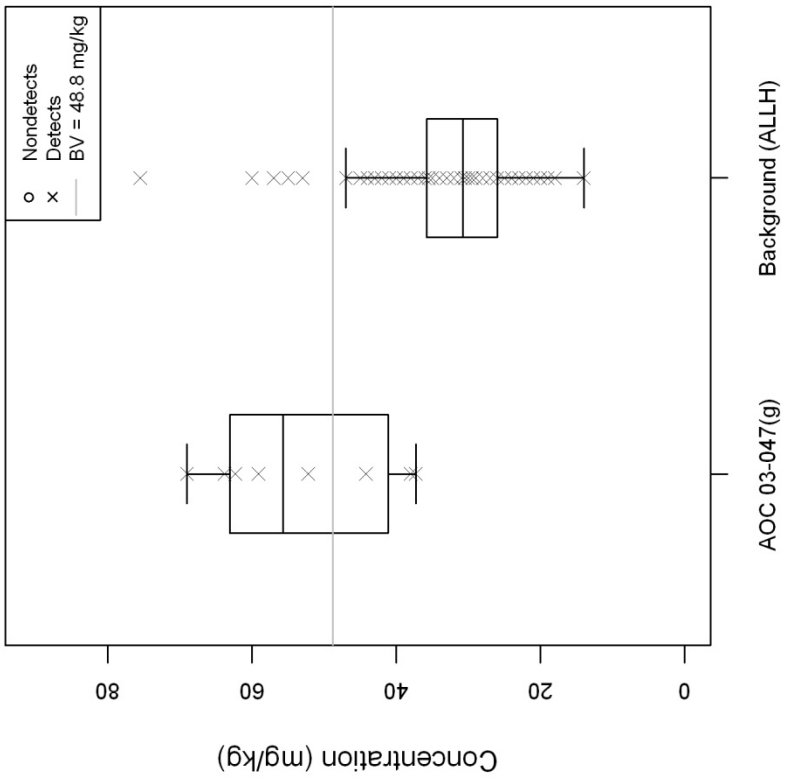



**Figure H-69 Box plot for zinc in soil at AOC 03-047(g)**

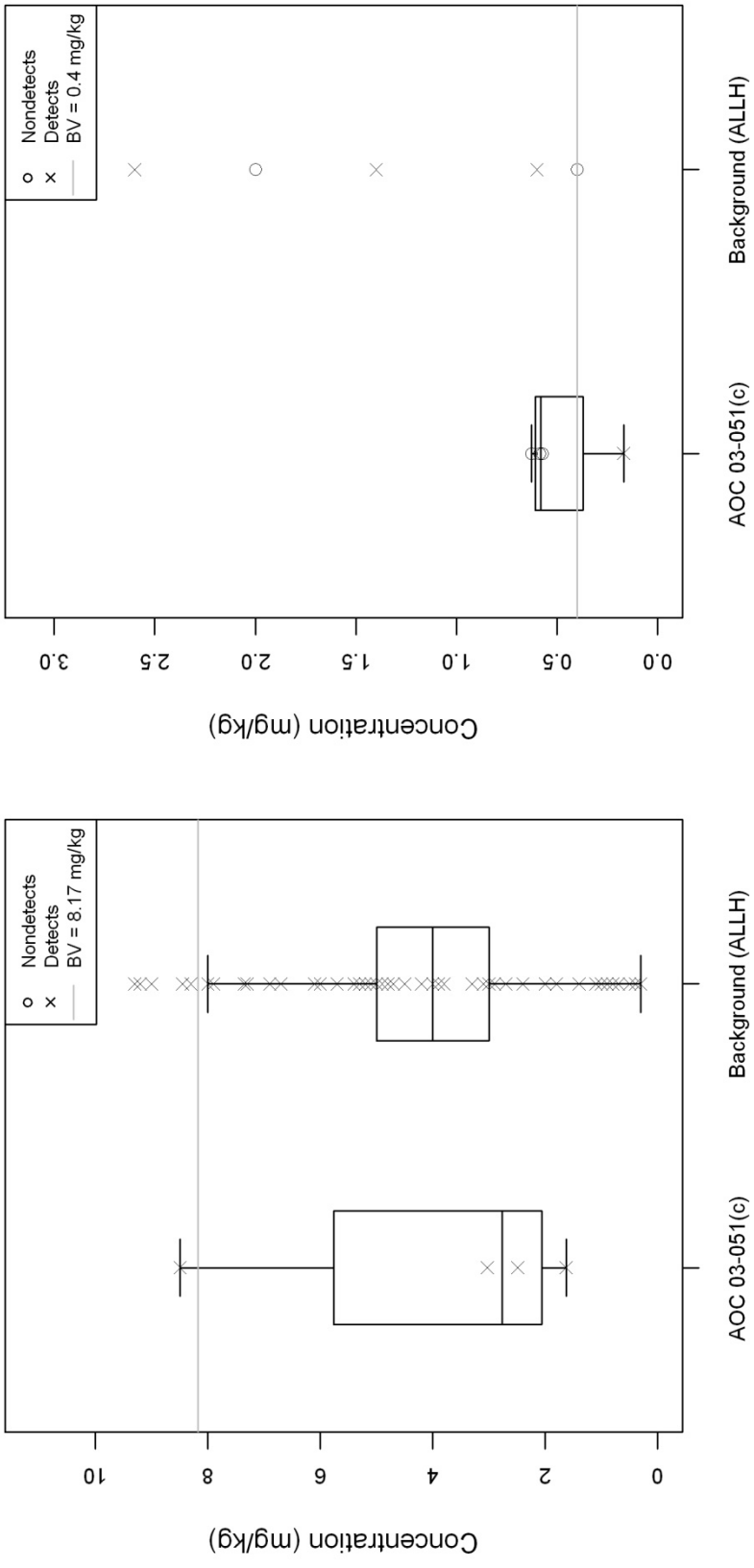



**Figure H-70 Box plots for arsenic and cadmium in soil at AOC 03-051(c)**

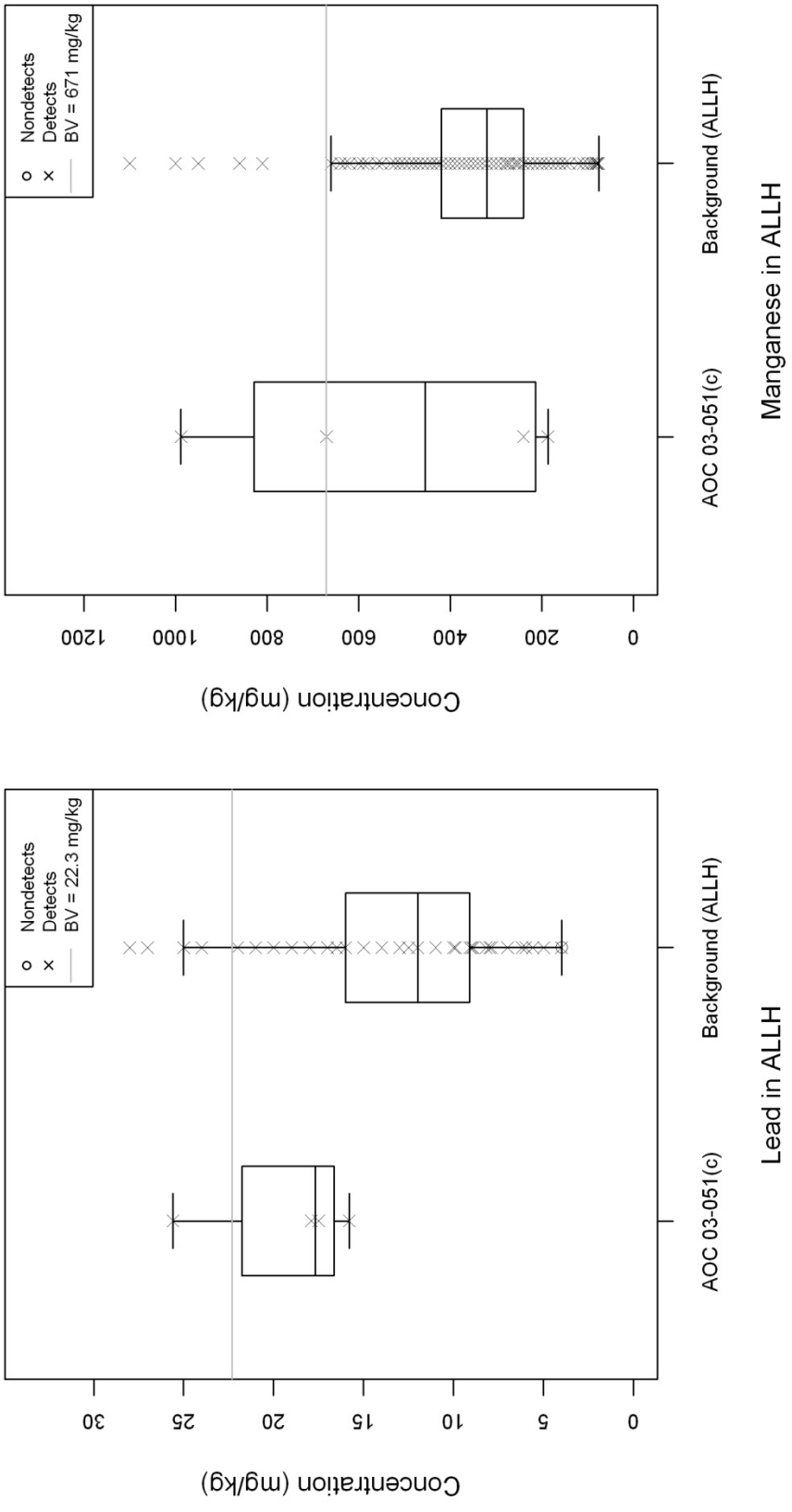
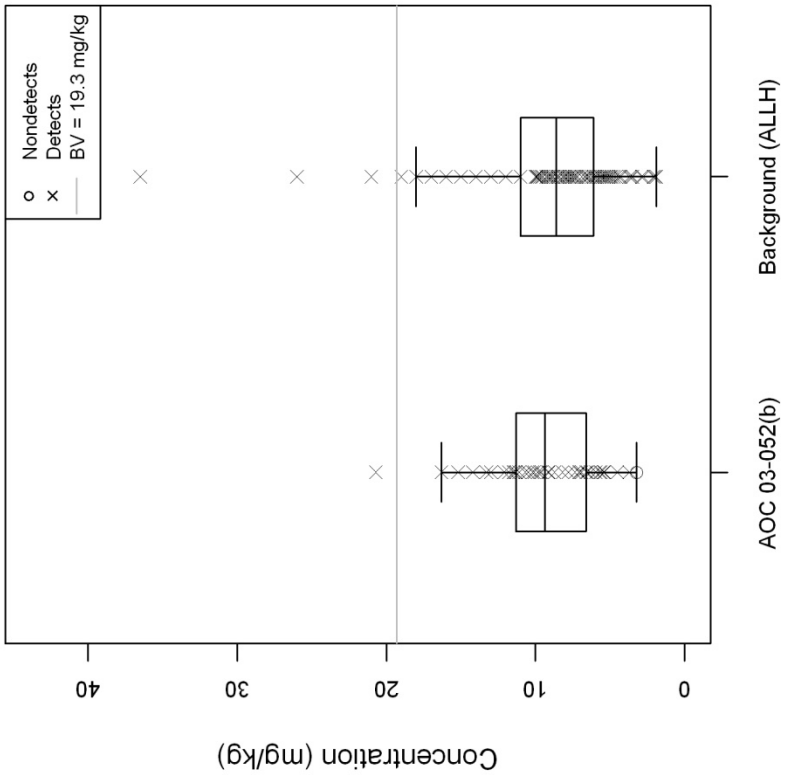



**Figure H-71 Box plots for lead and manganese in soil at AOC 03-051(c)**



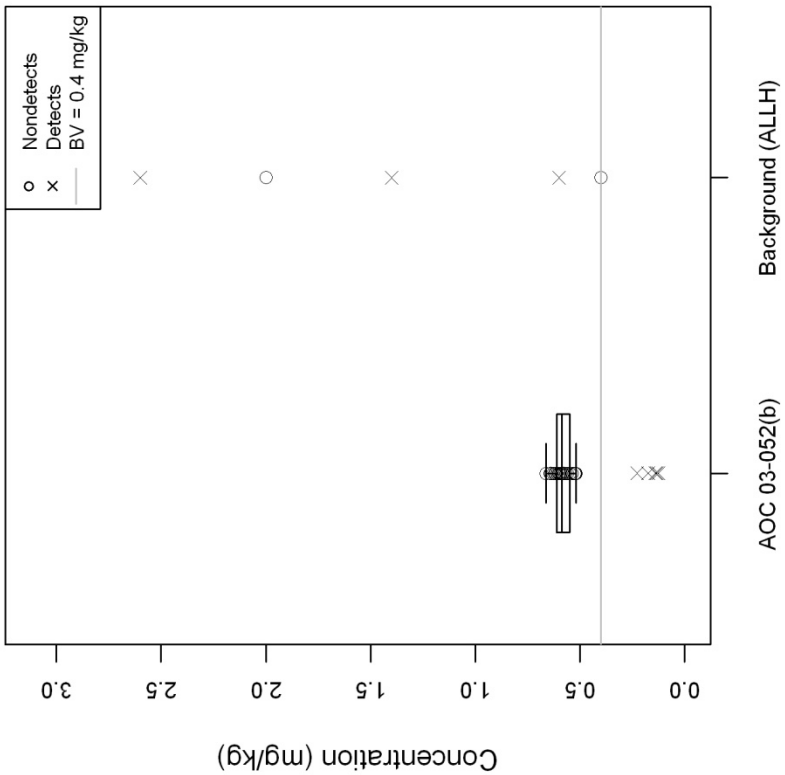




**Figure H-72 Box plots for cadmium and chromium in soil at AOC 03-052(b)**

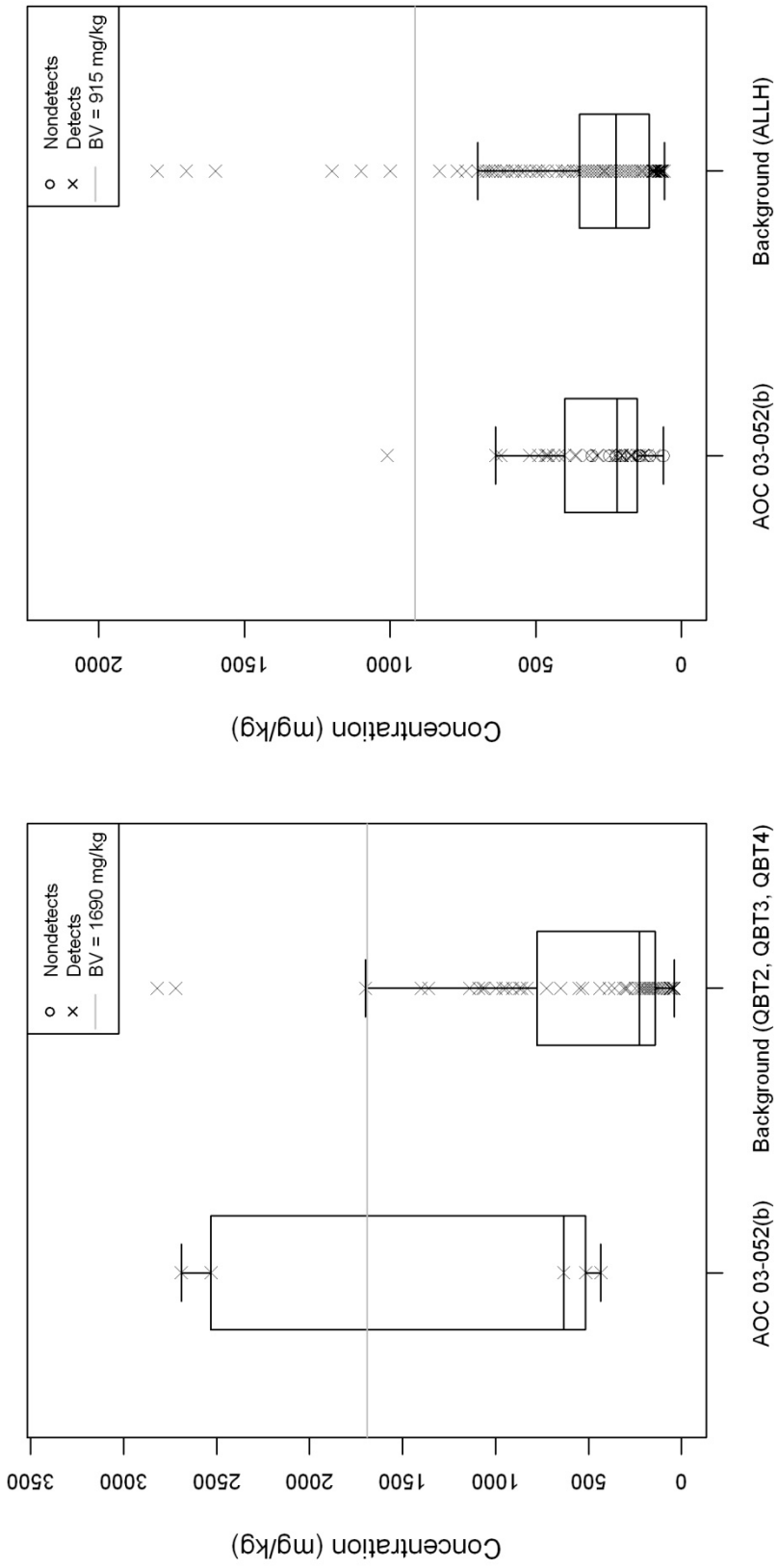



**Figure H-73 Box plots for magnesium in tuff and sodium in soil at AOC 03-052(b)**

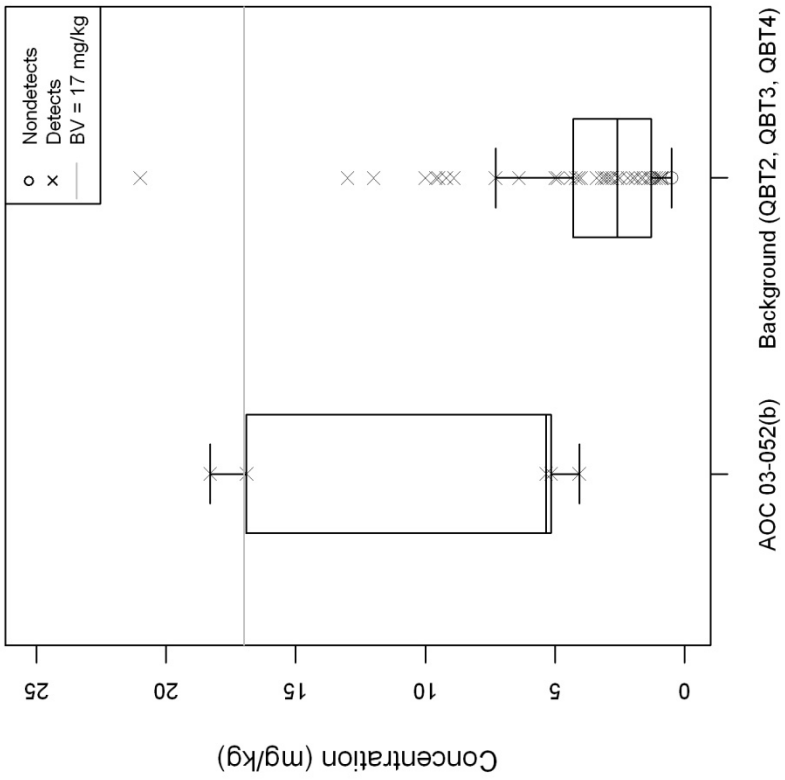
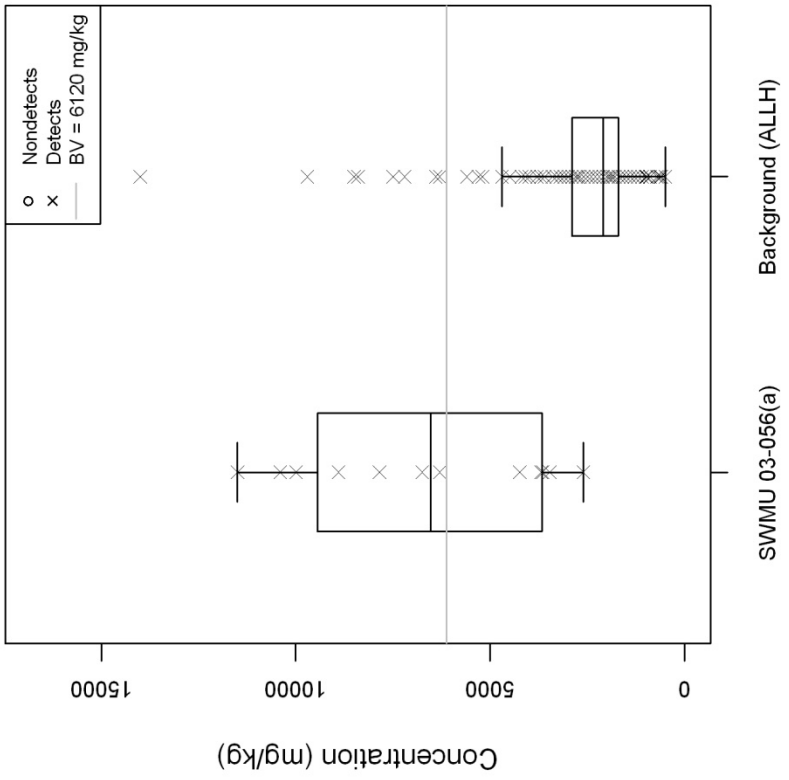



**Figure H-74 Box plot for vanadium in tuff at AOC 03-052(b)**



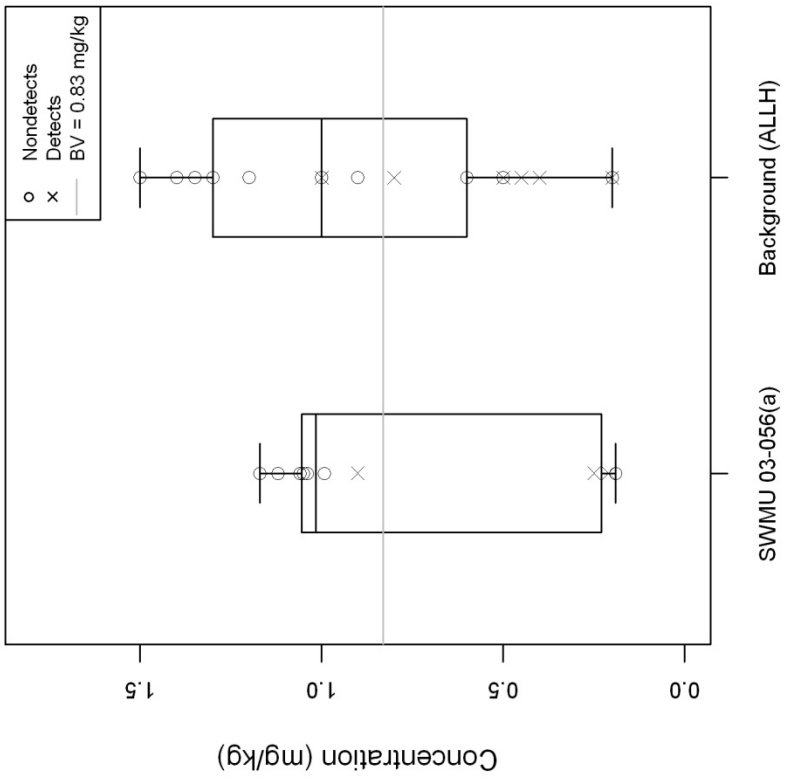
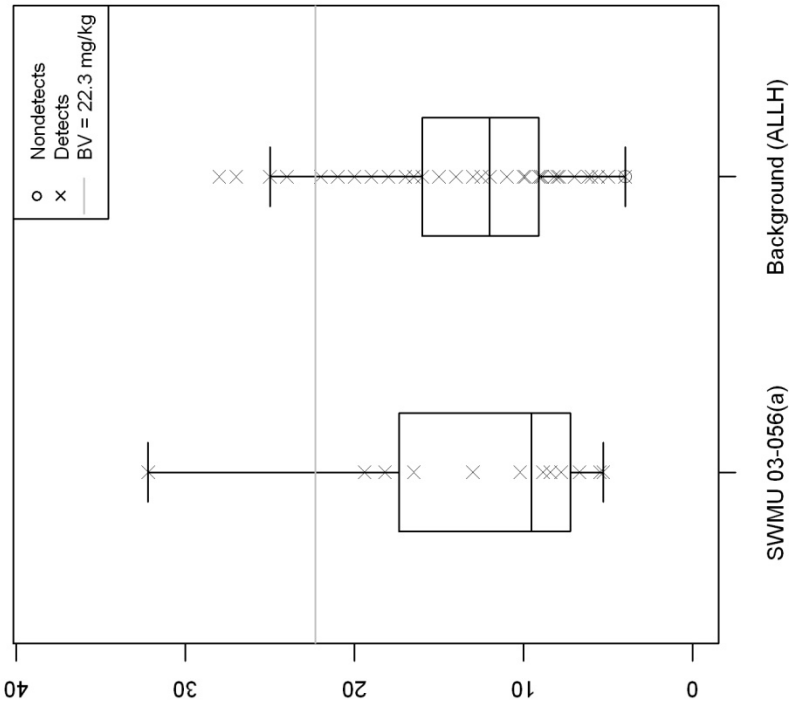




**Figure H-75 Box plots for antimony and calcium in soil at SWMU 03-056(a)**



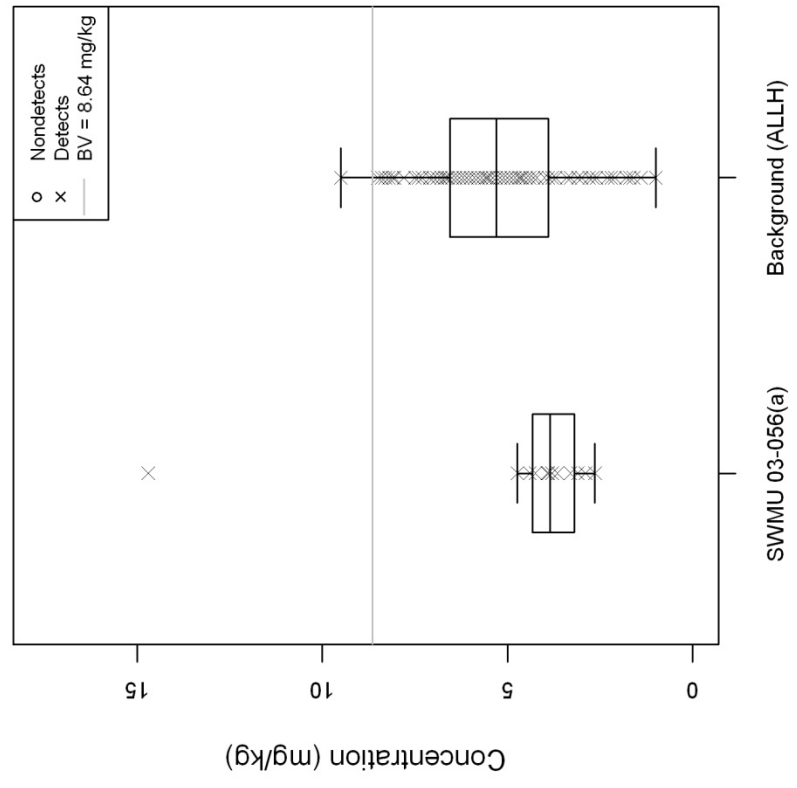




**Figure H-76 Box plots for cobalt and lead in soil at SWMU 03-056(a)**

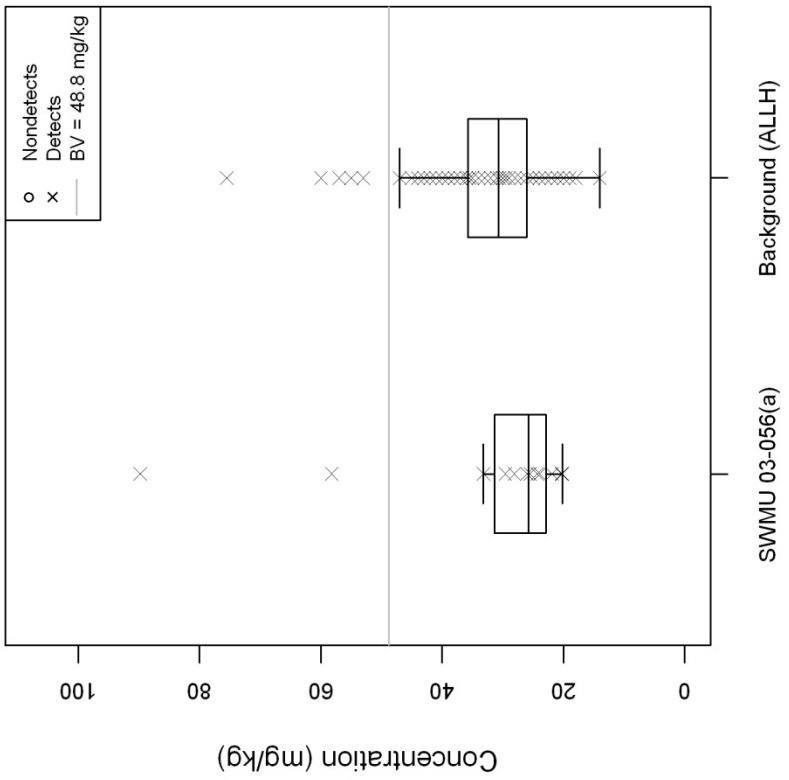



**Figure H-77 Box plot for zinc in soil at SWMU 03-056(a)**

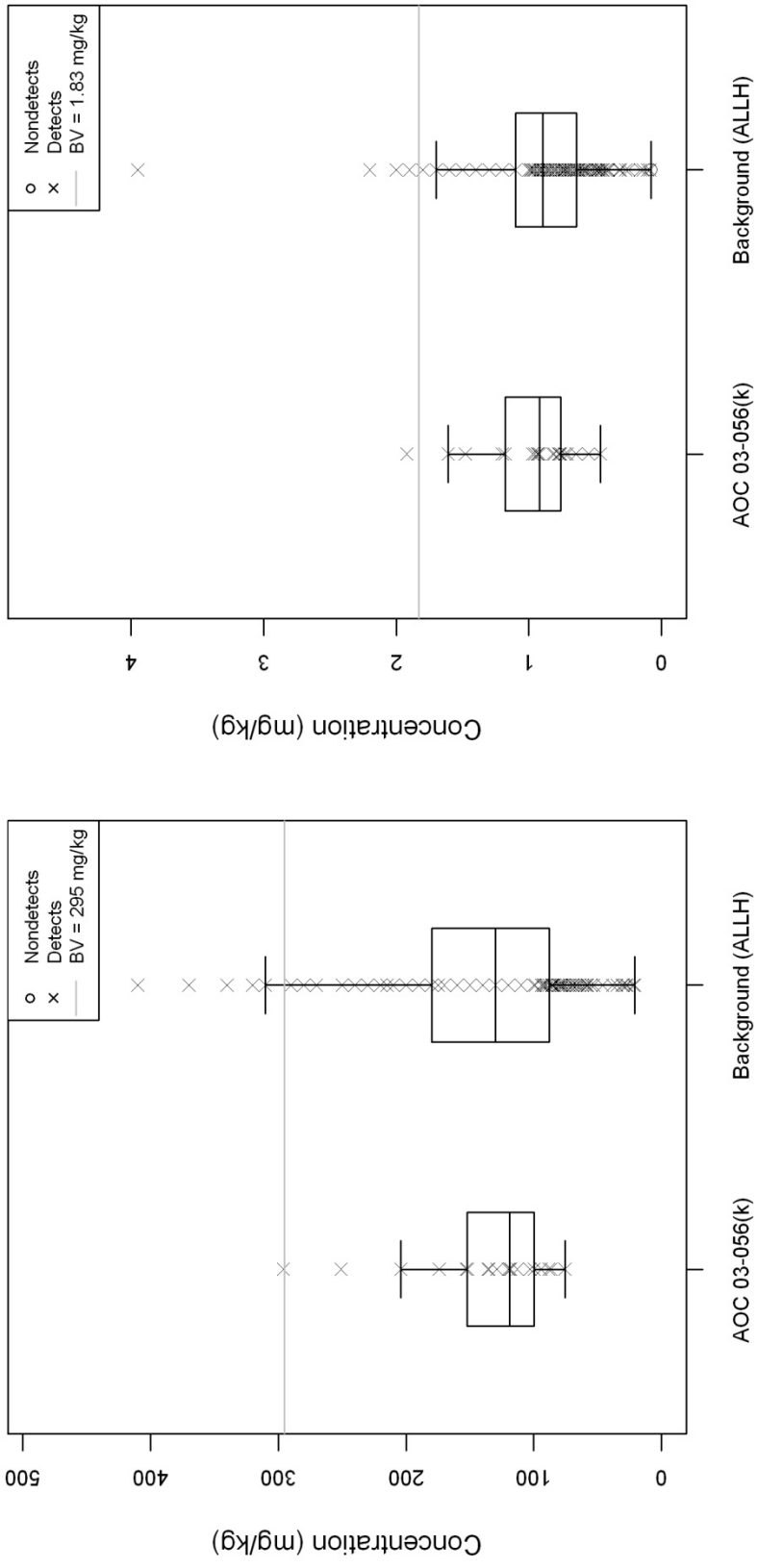



**Figure H-78 Box plots for barium and beryllium in soil at AOC 03-056(k)**

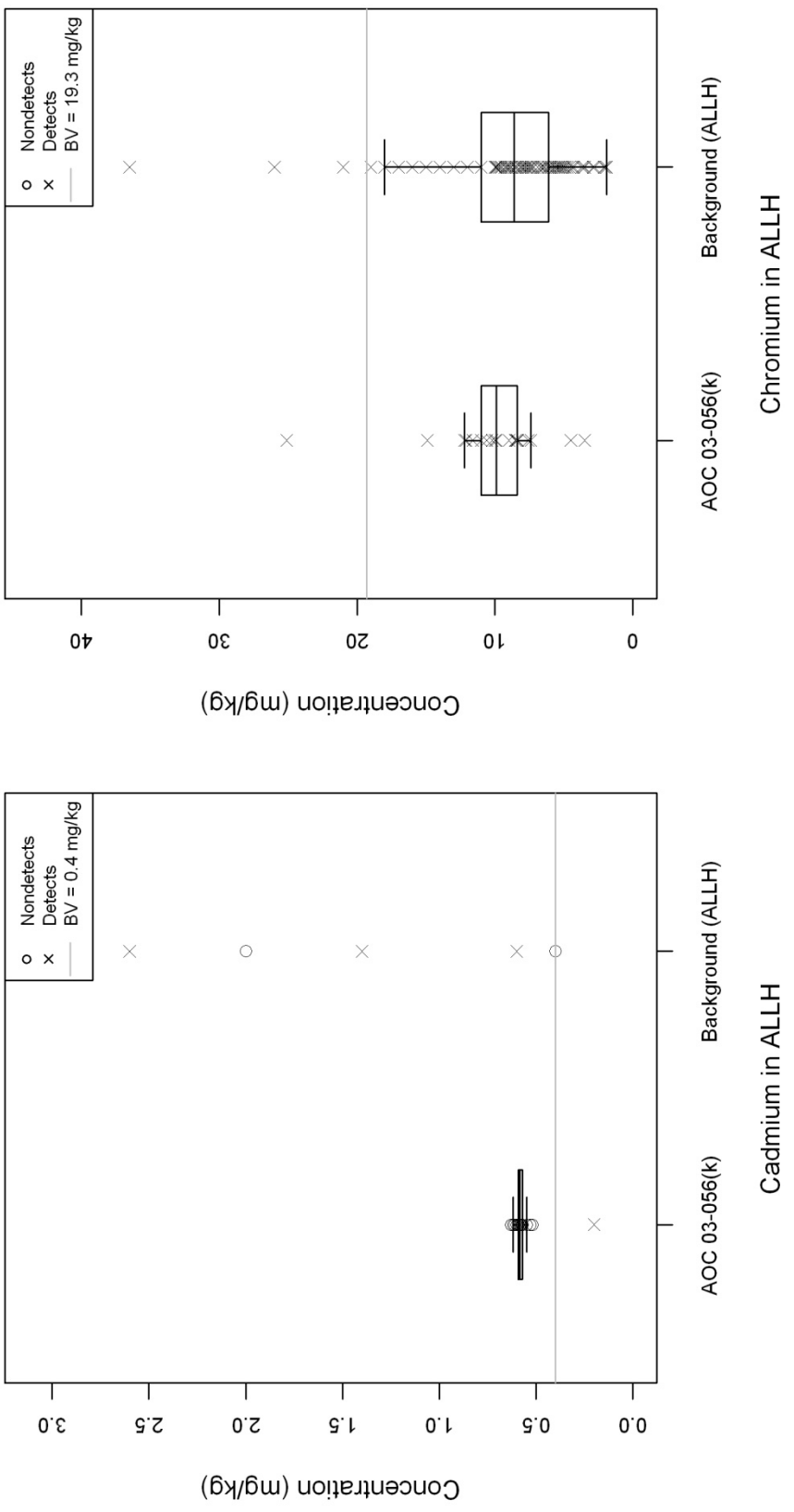



**Figure H-79 Box plots for cadmium and chromium in soil at AOC 03-056(k)**

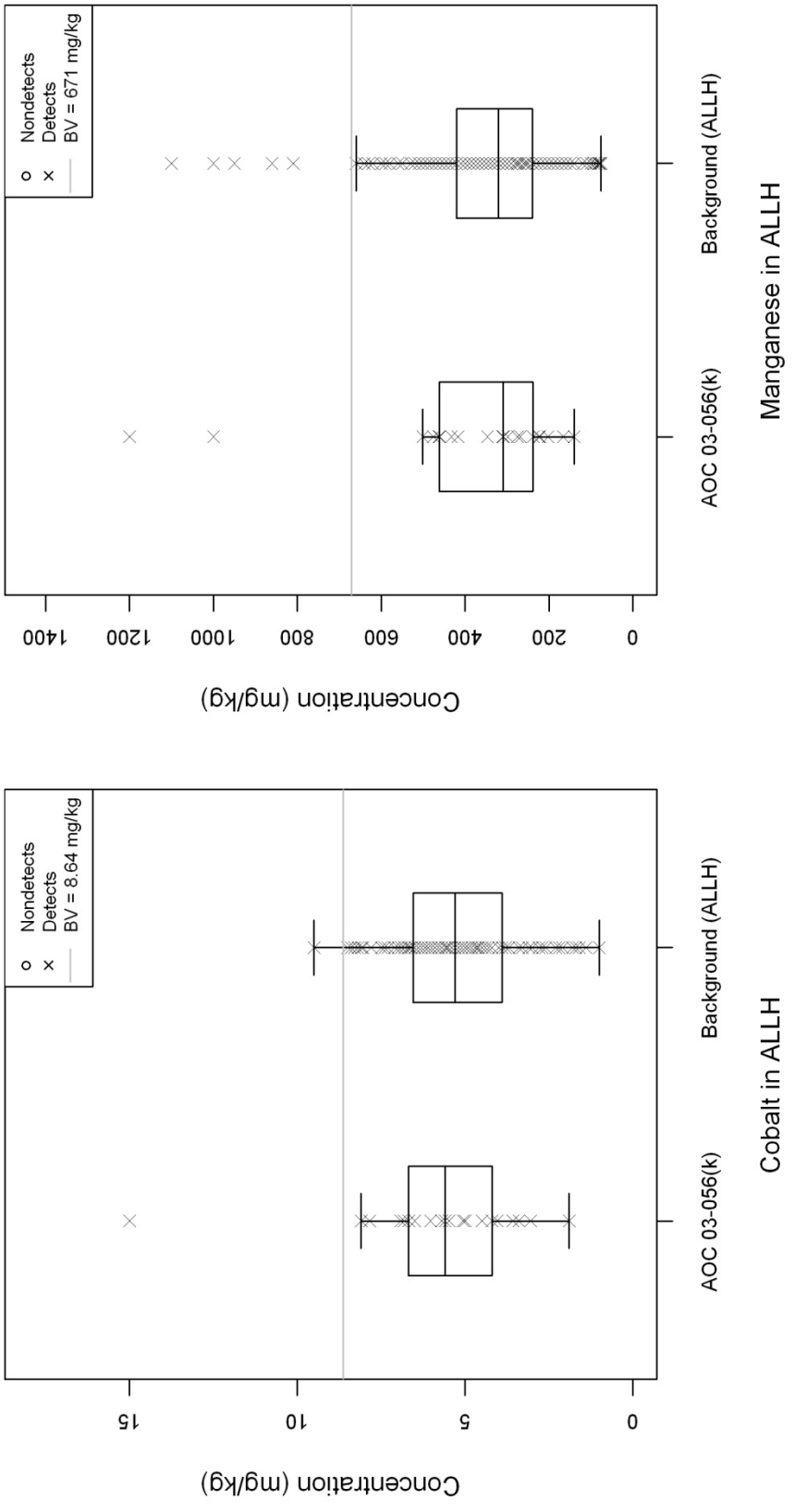



**Figure H-80 Box plots for cobalt and manganese in soil at AOC 03-056(k)**

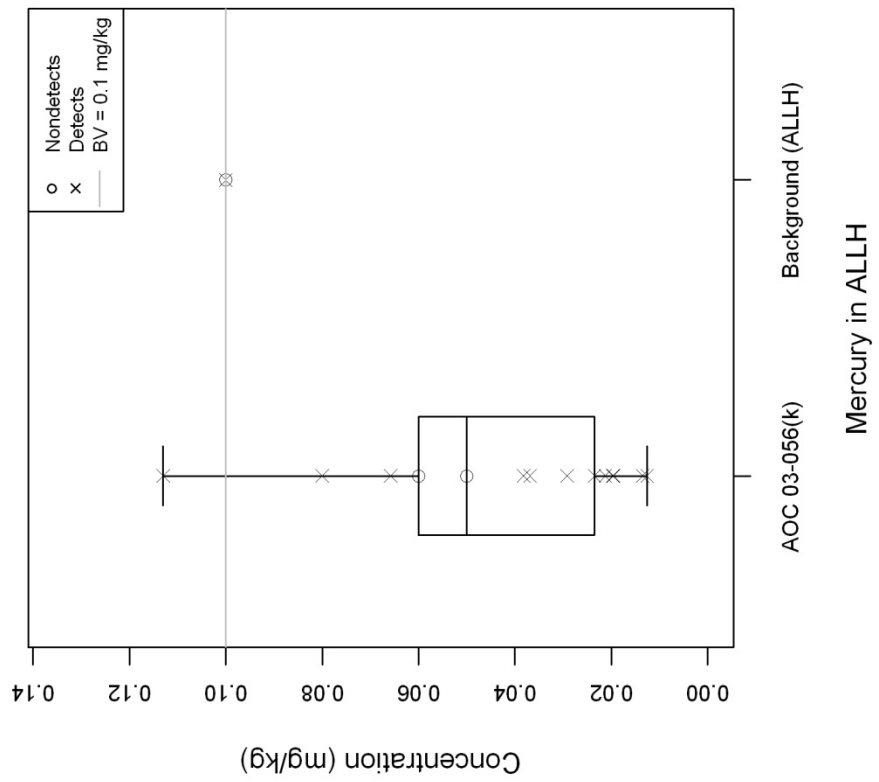



**Figure H-81 Box plot for mercury in soil at AOC 03-056(k)**

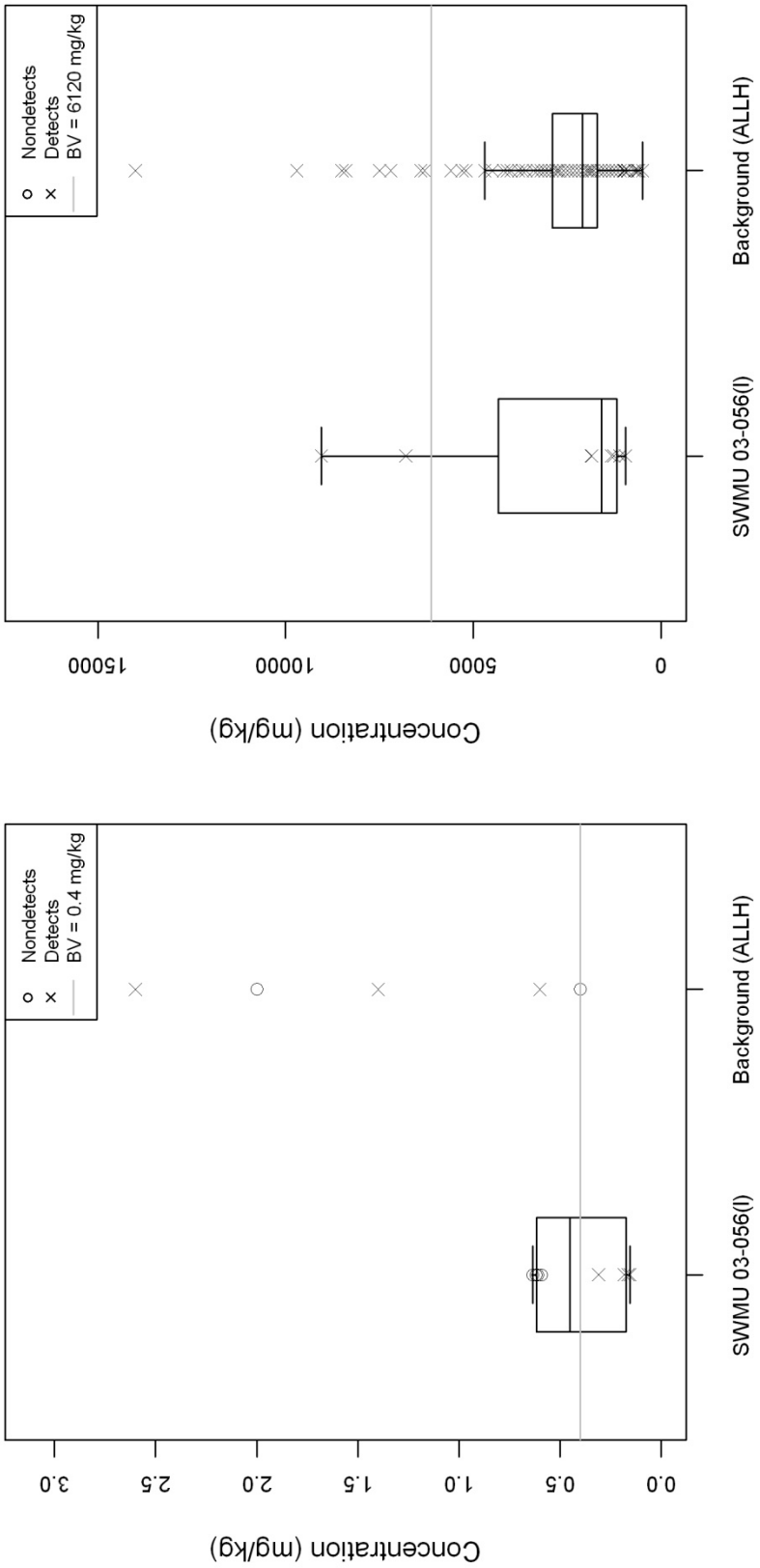



**Figure H-82 Box plots for cadmium and calcium in soil at SWMU 03-056(l)**

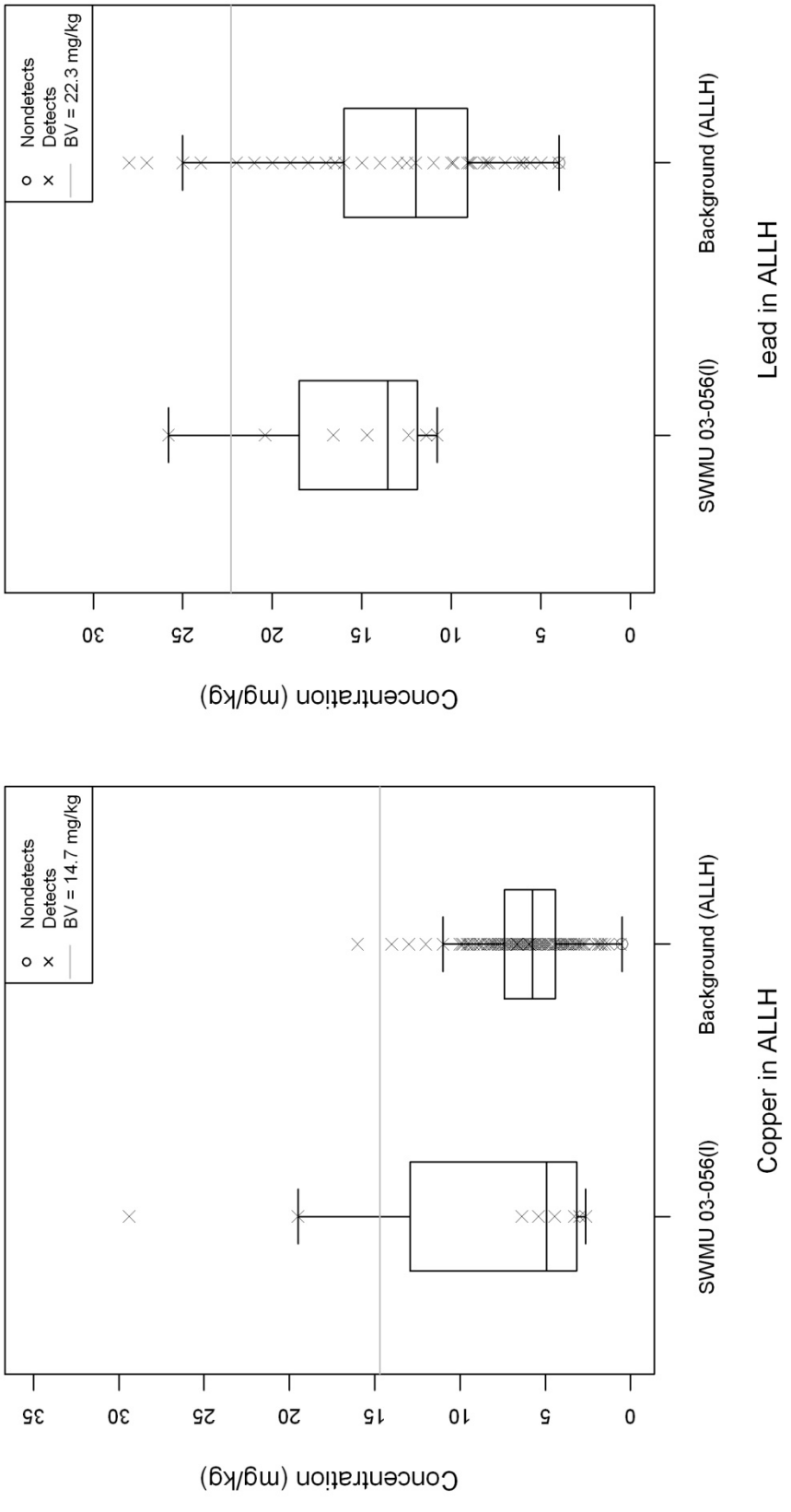



**Figure H-83 Box plots for copper and lead in soil at SWMU 03-056(l)**

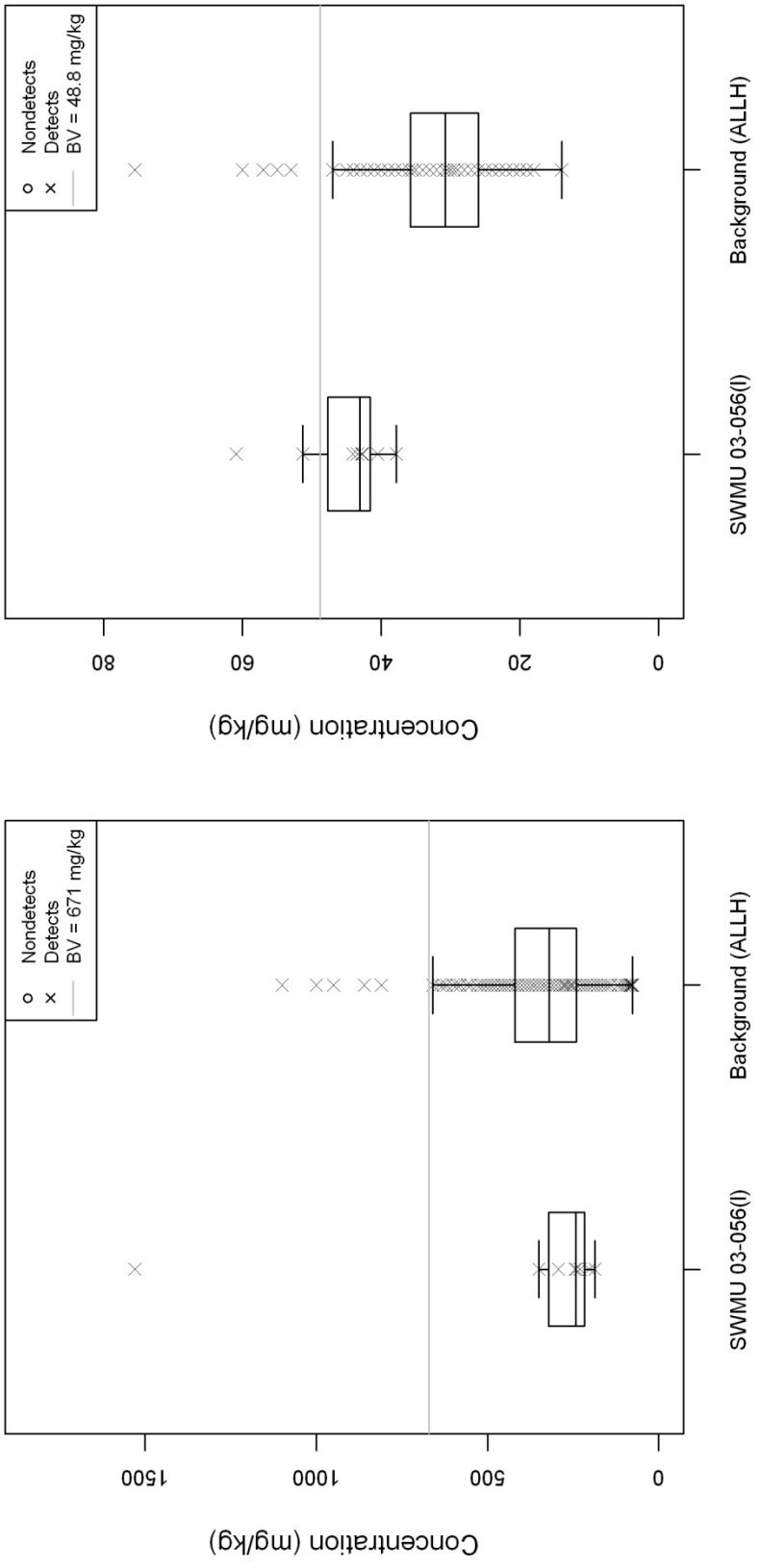
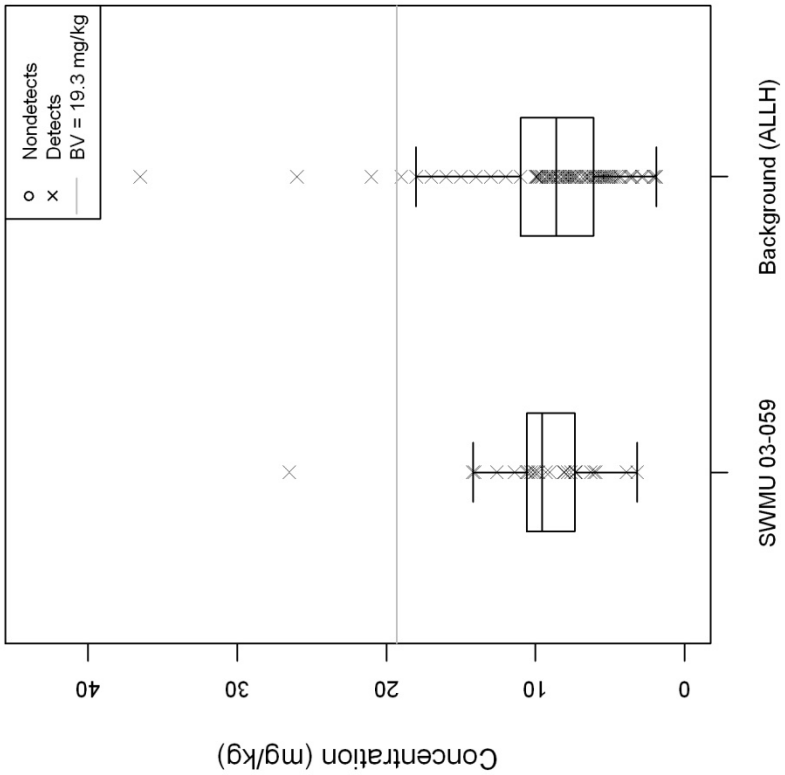



**Figure H-84 Box plots for manganese and zinc in soil at SWMU 03-056(I)**



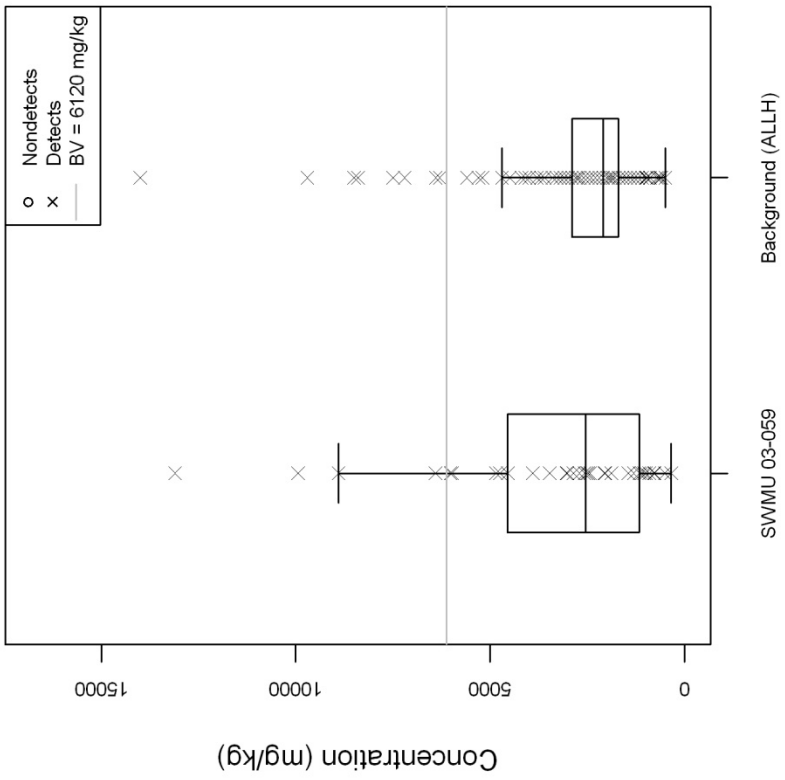




**Figure H-85 Box plots for calcium and chromium in soil at SWMU 03-059**

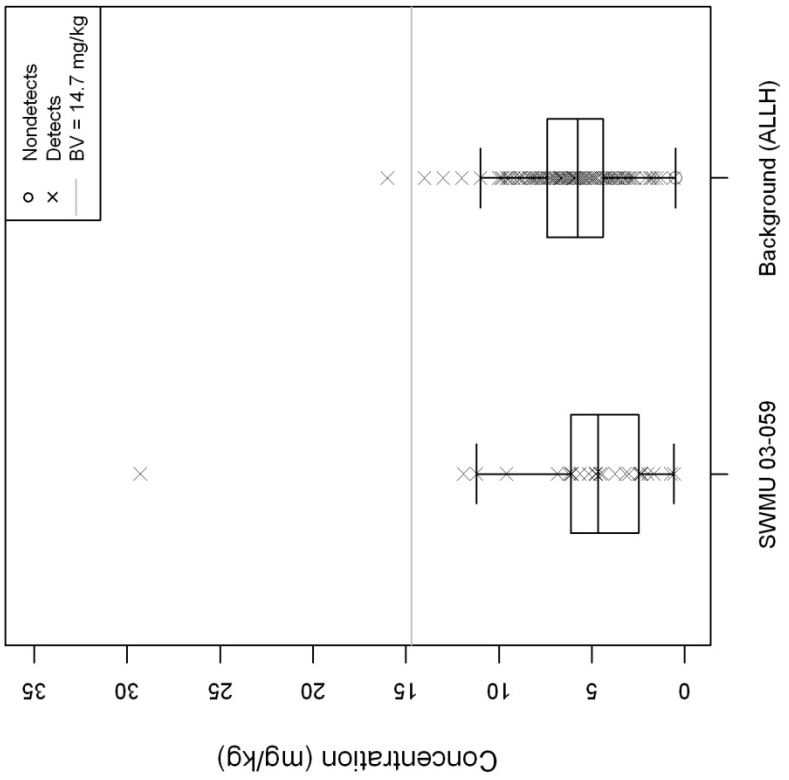



**Figure H-86 Box plot for copper in soil at SWMU 03-059**

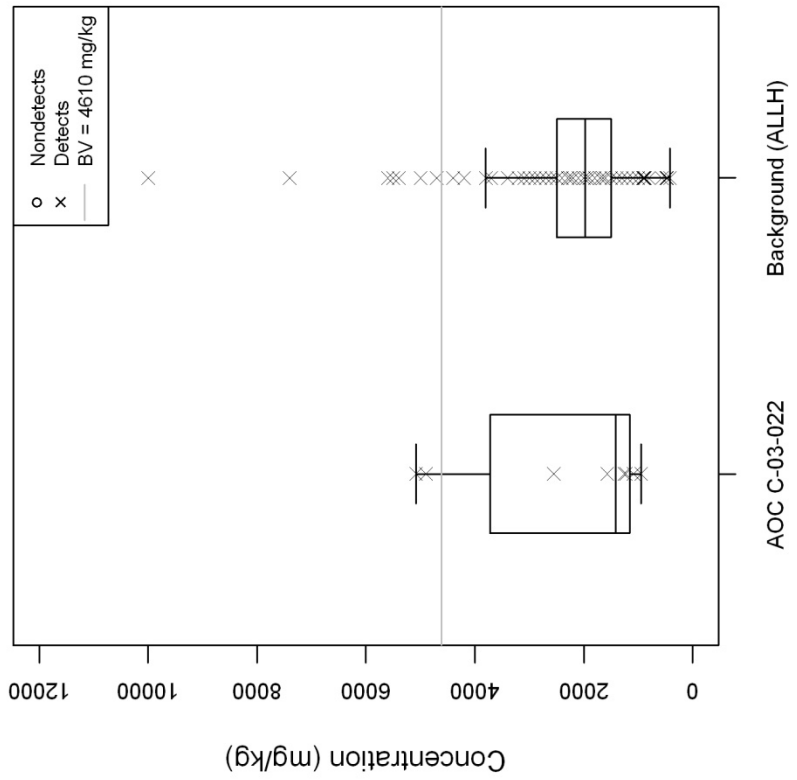



**Figure H-87 Box plot for magnesium in soil at AOC C-03-022**

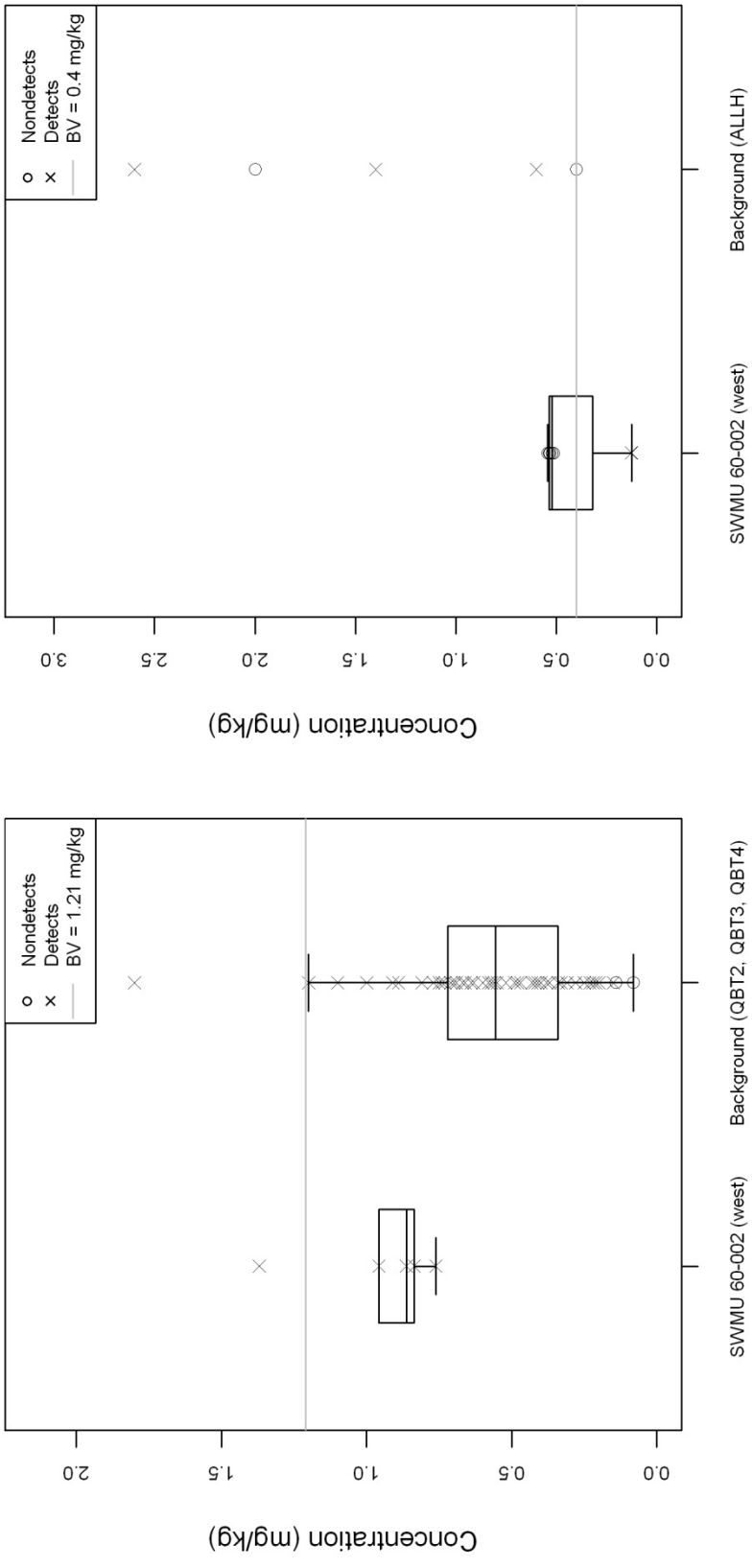
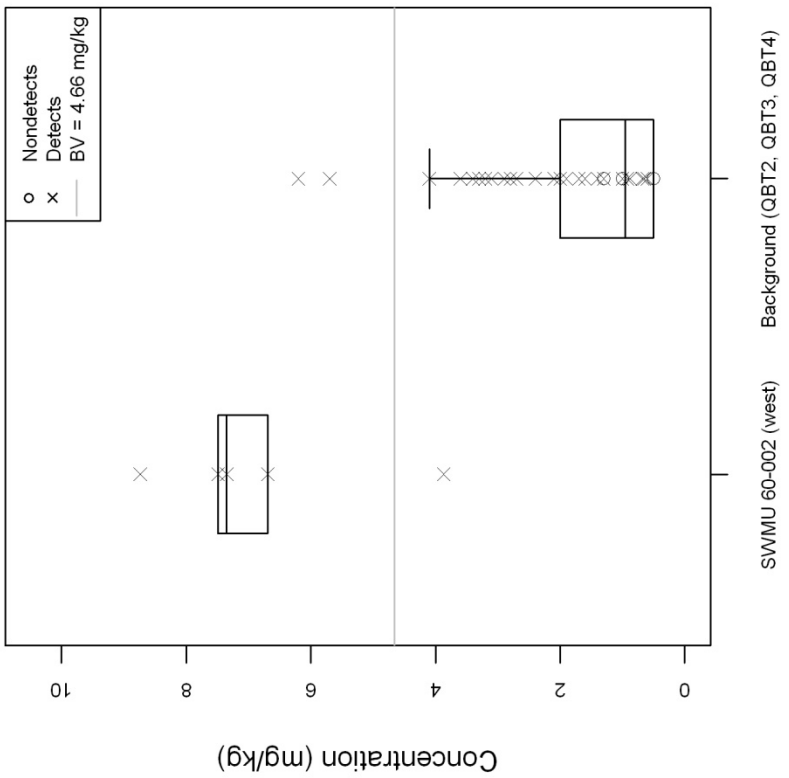



**Figure H-88 Box plots for beryllium in tuff and cadmium in soil at SWMU 60-002 (west)**



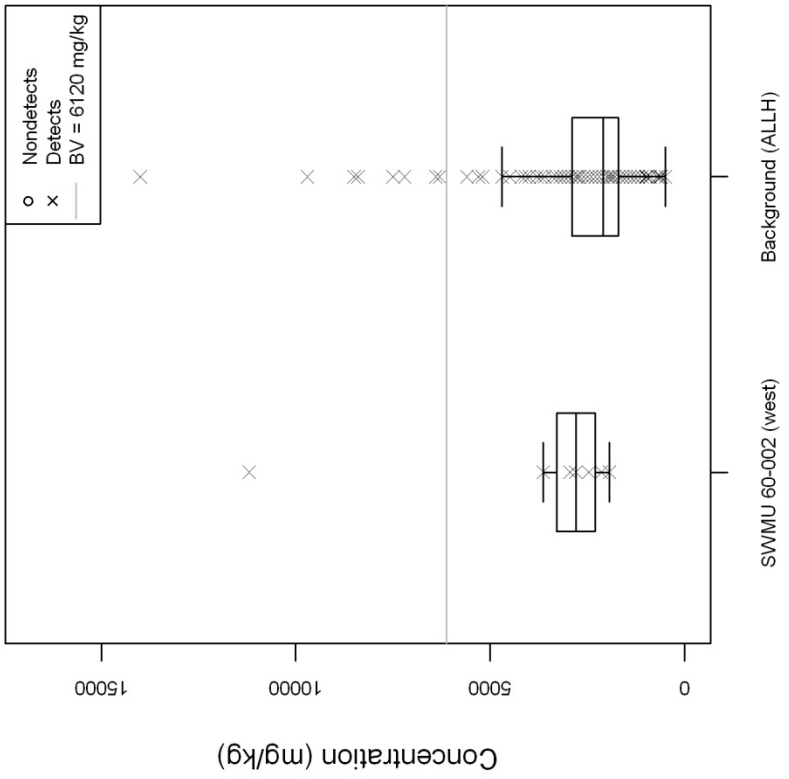
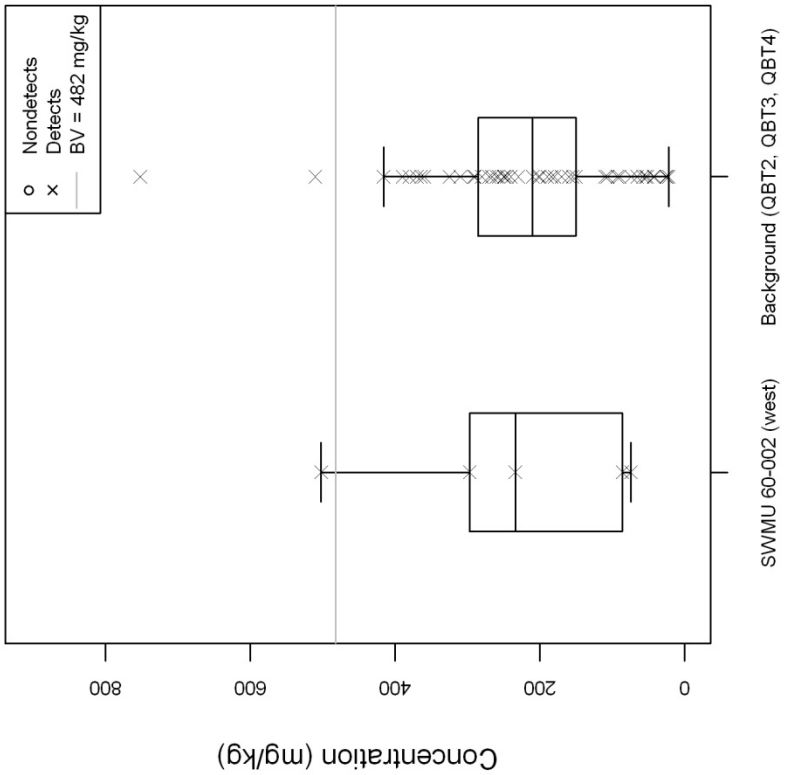




**Figure H-89 Box plots for calcium in soil and copper in tuff at SWMU 60-002 (west)**



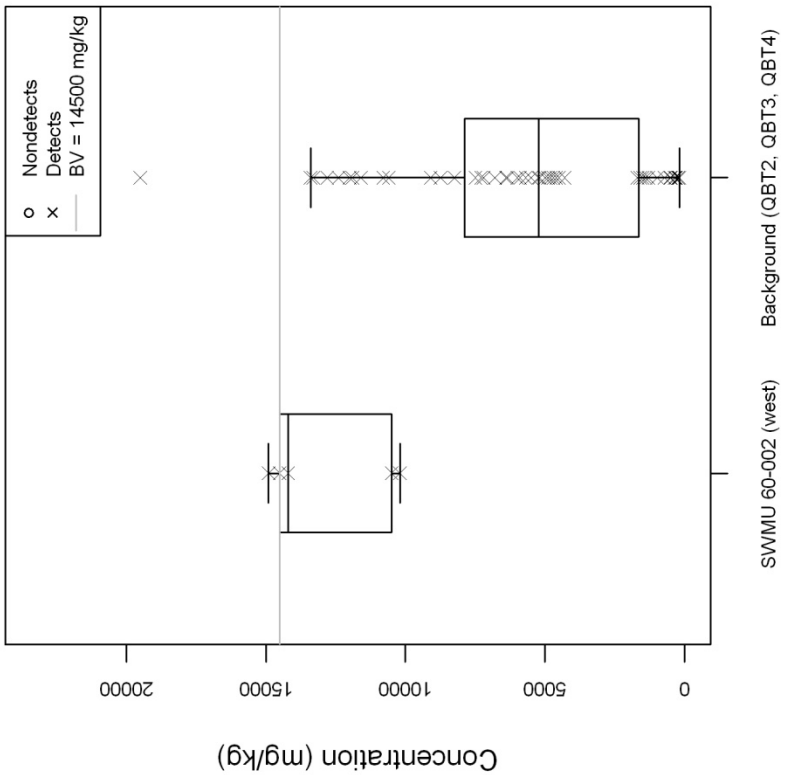
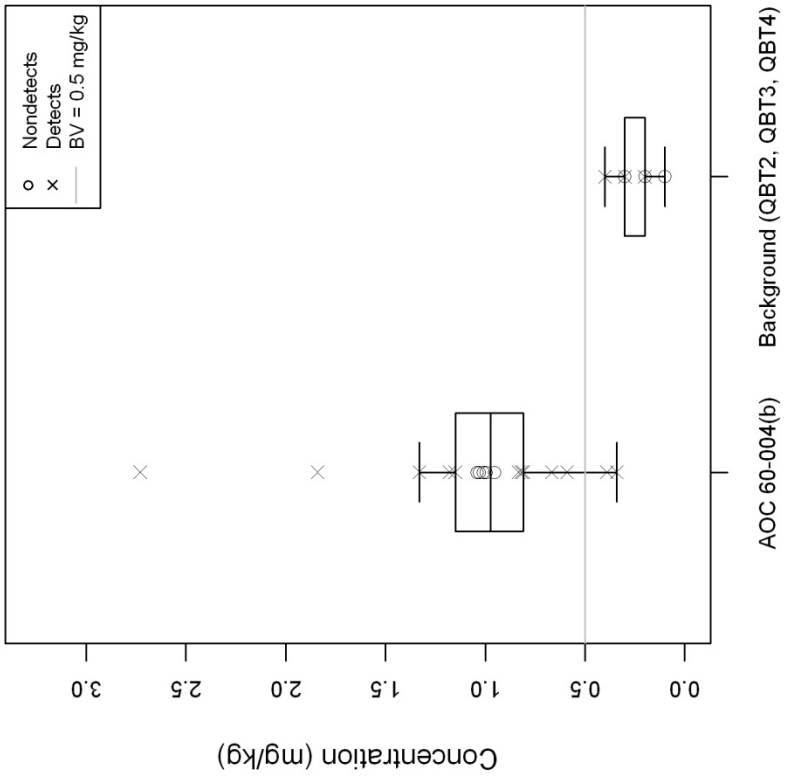




**Figure H-90 Box plots for iron and manganese in tuff at SWMU 60-002 (west)**



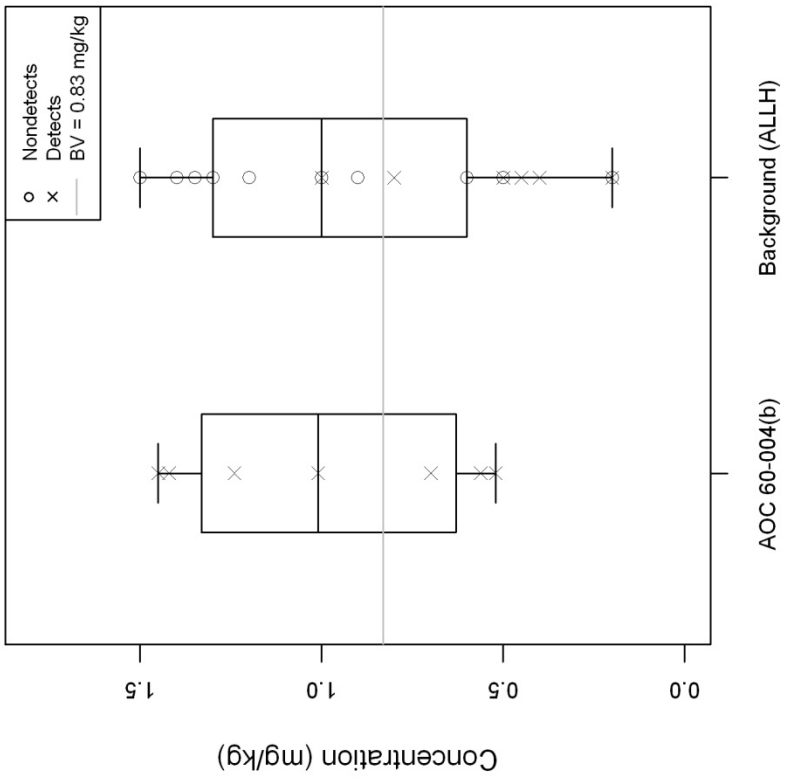
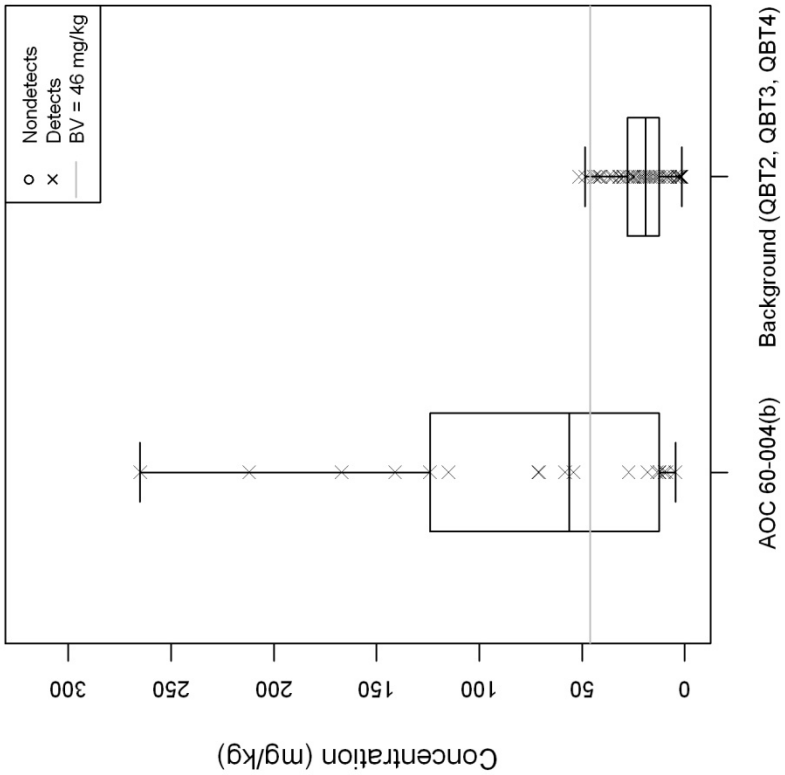




**Figure H-91 Box plots for antimony in soil and tuff at AOC 60-004(b)**



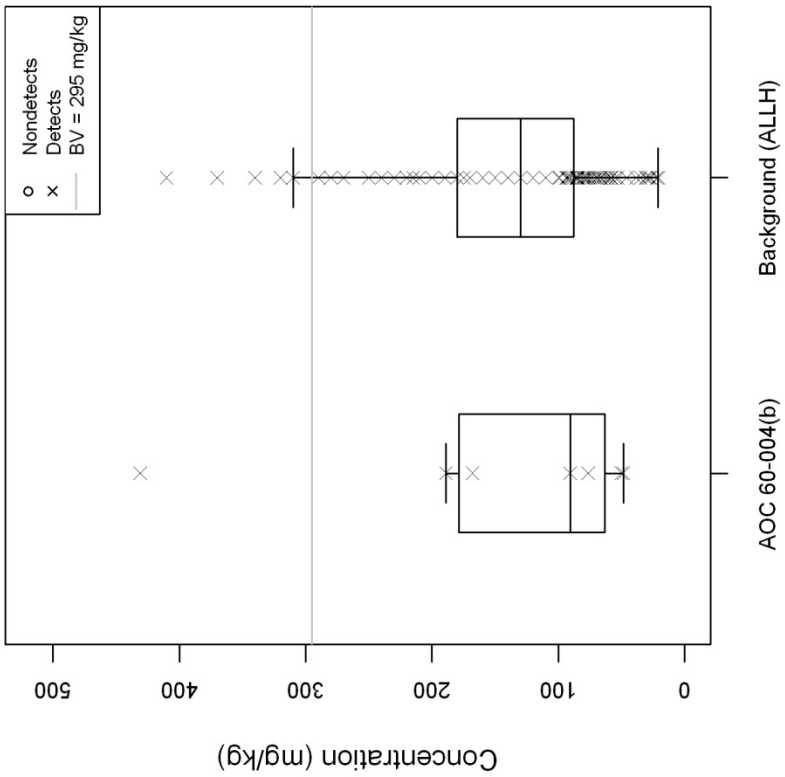




**Figure H-92 Box plots for barium in soil and tuff at AOC 60-004(b)**

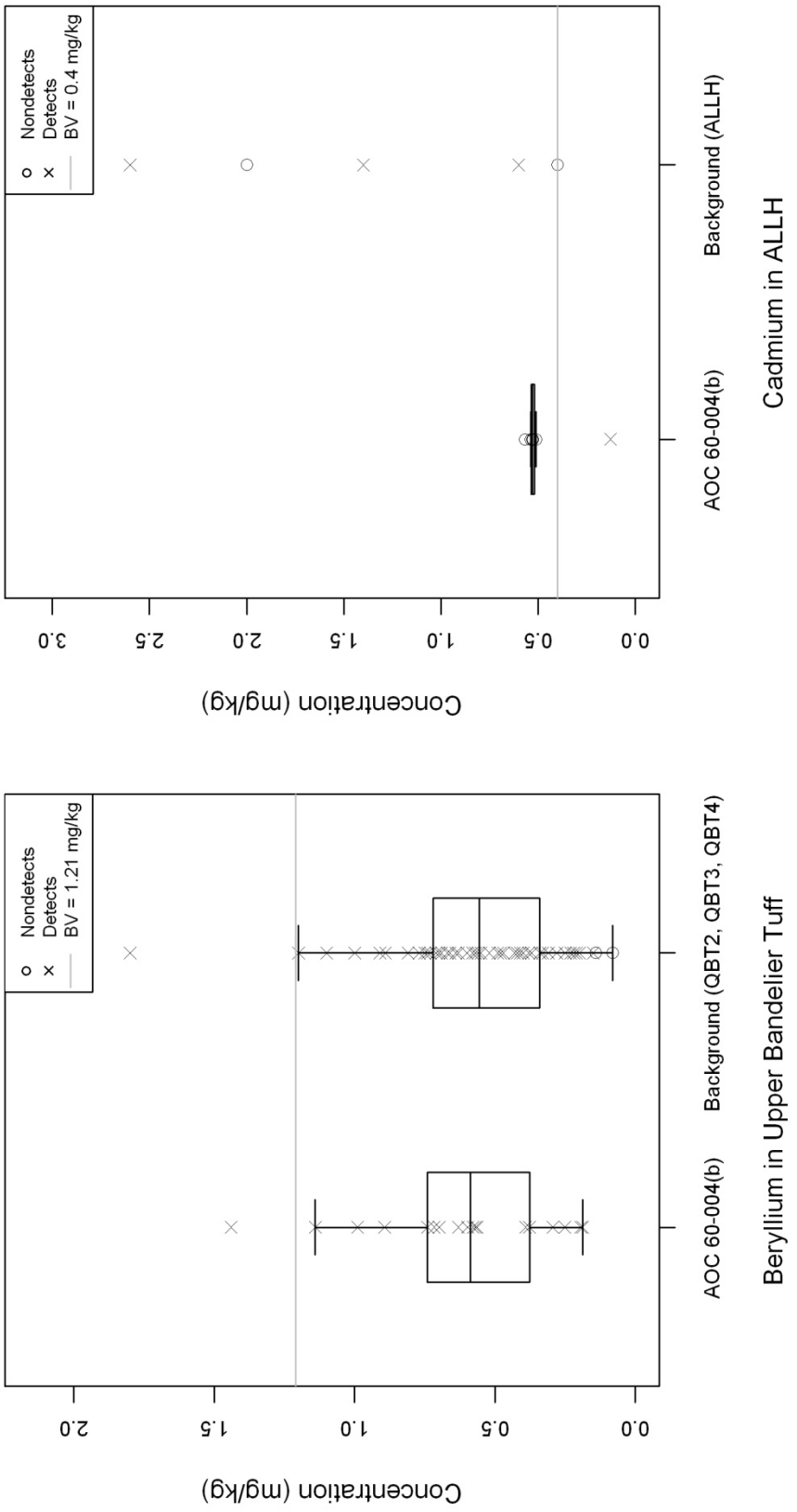
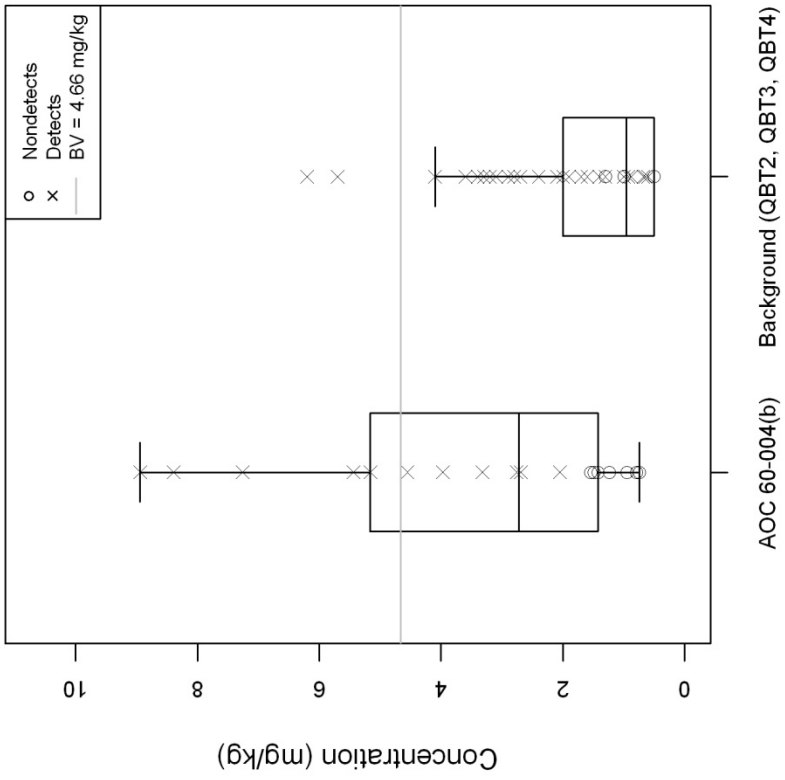



**Figure H-93 Box plots for beryllium in tuff and cadmium in soil at AOC 60-004(b)**



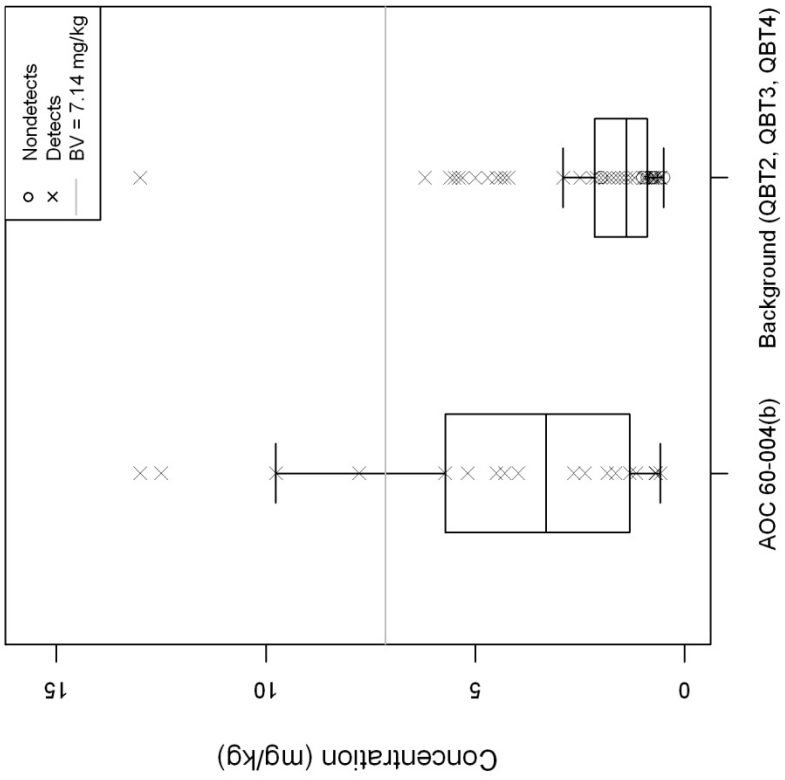
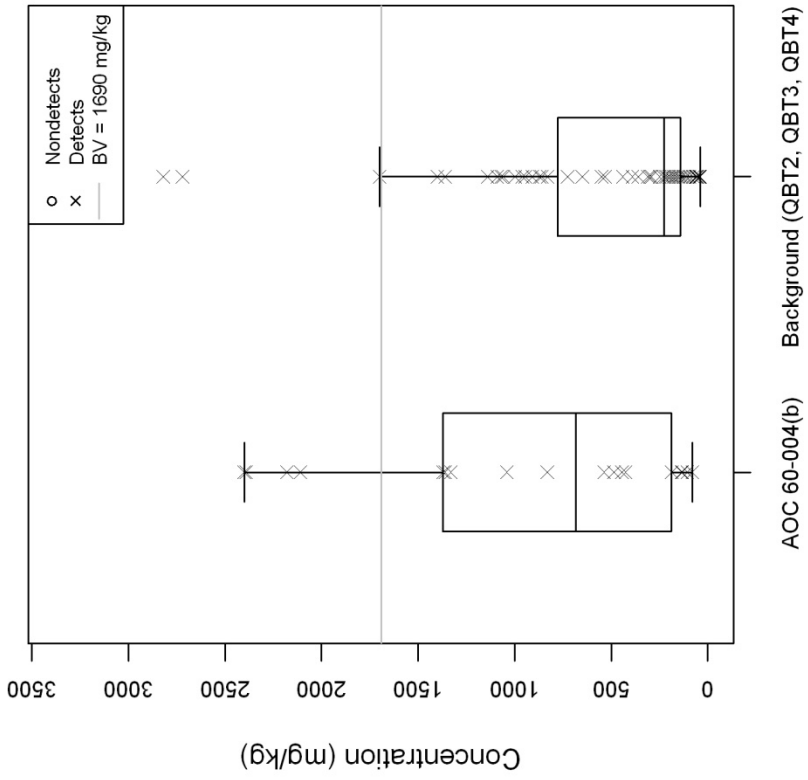




**Figure H-94 Box plots for chromium and copper in tuff at AOC 60-004(b)**



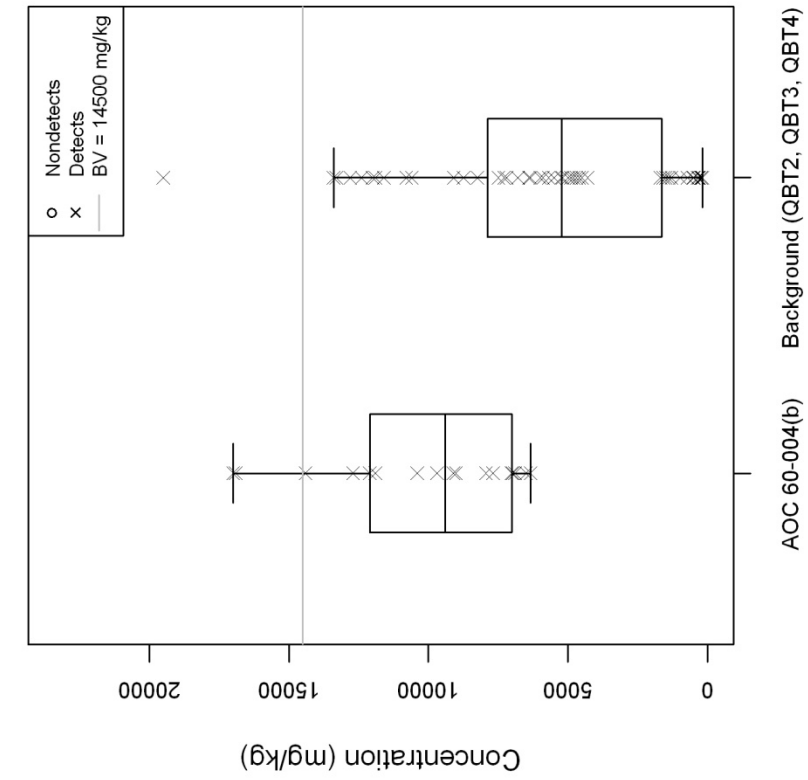
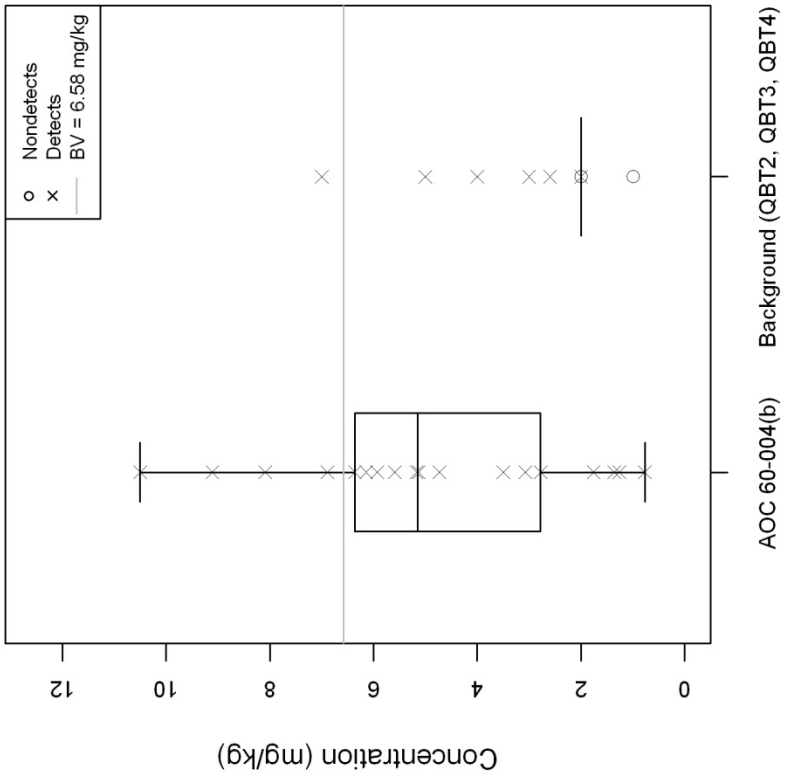




**Figure H-95 Box plots for iron and magnesium in tuff at AOC 60-004(b)**



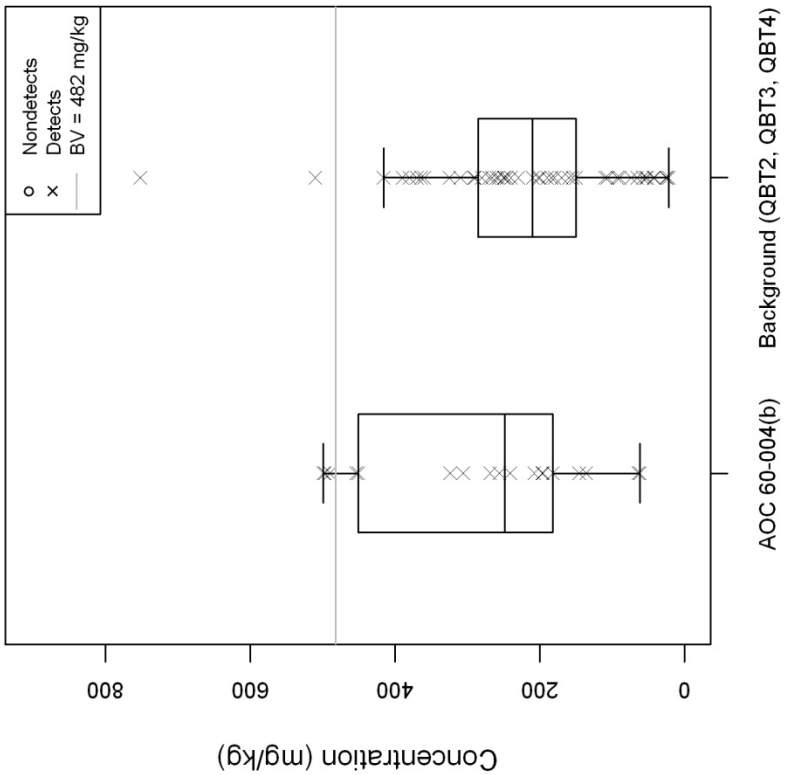




**Figure H-96 Box plots for manganese and nickel in tuff at AOC 60-004(b)**

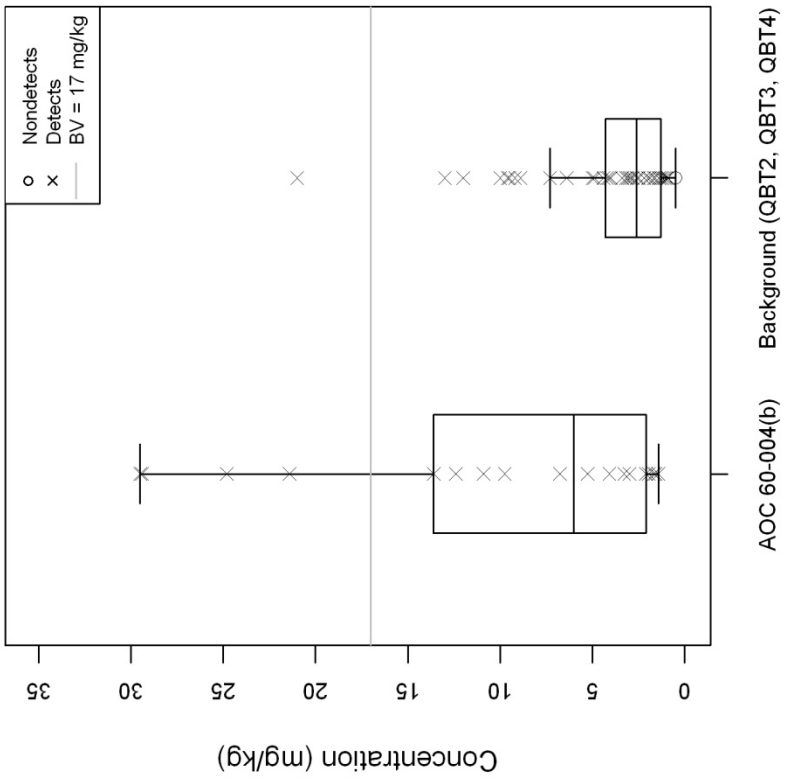
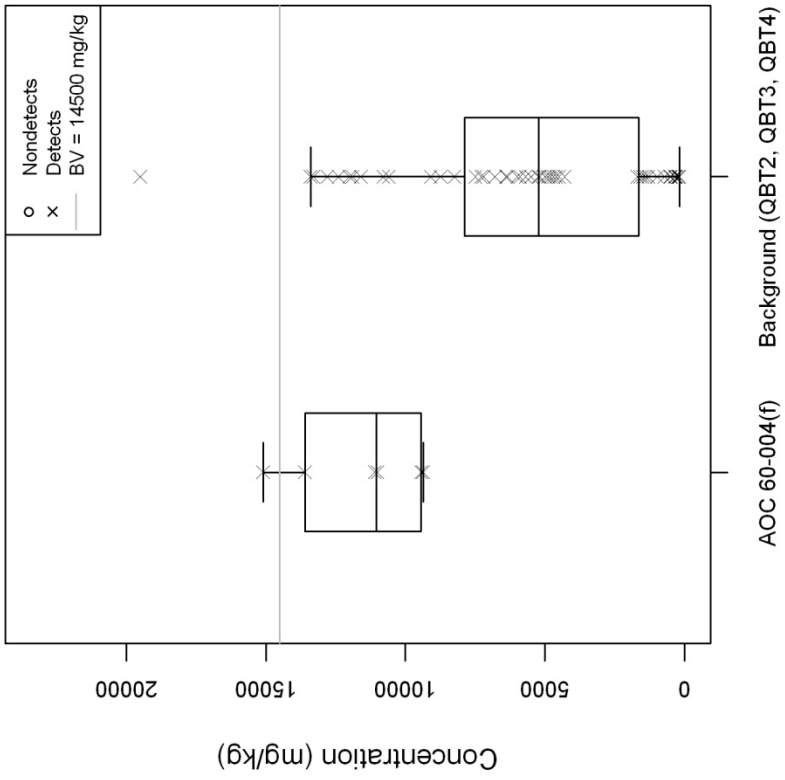



**Figure H-97 Box plot for vanadium in tuff at AOC 60-004(b)**



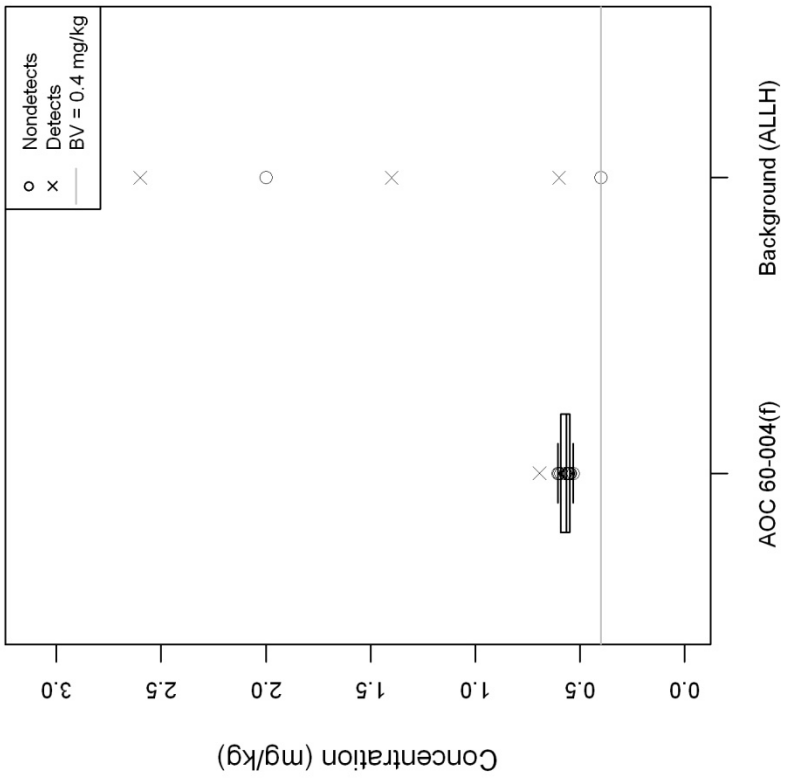




**Figure H-98 Box plots for cadmium in soil and iron in tuff at AOC 60-004(f)**

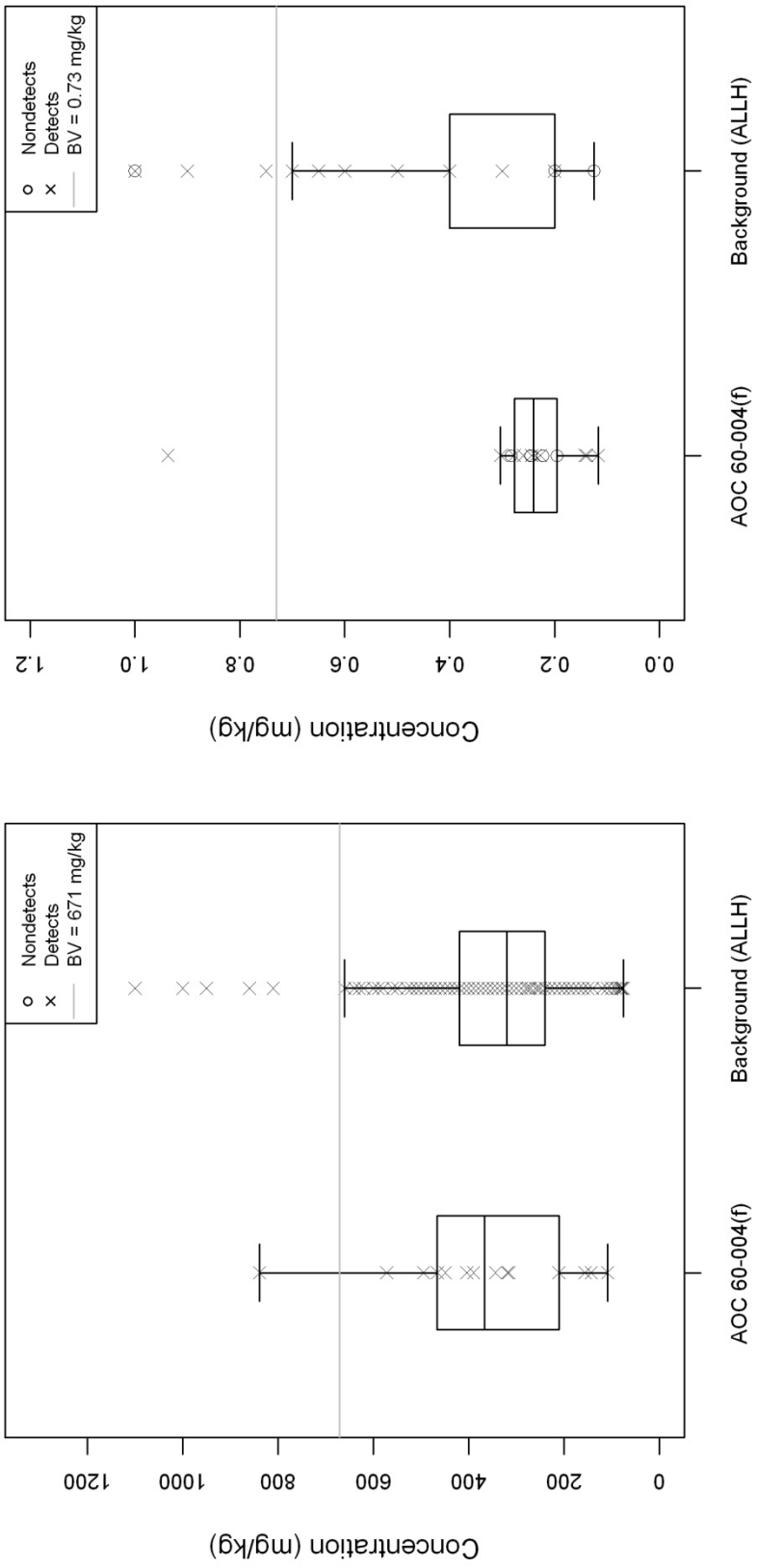



**Figure H-99 Box plots for manganese and thallium in soil at AOC 60-004(f)**

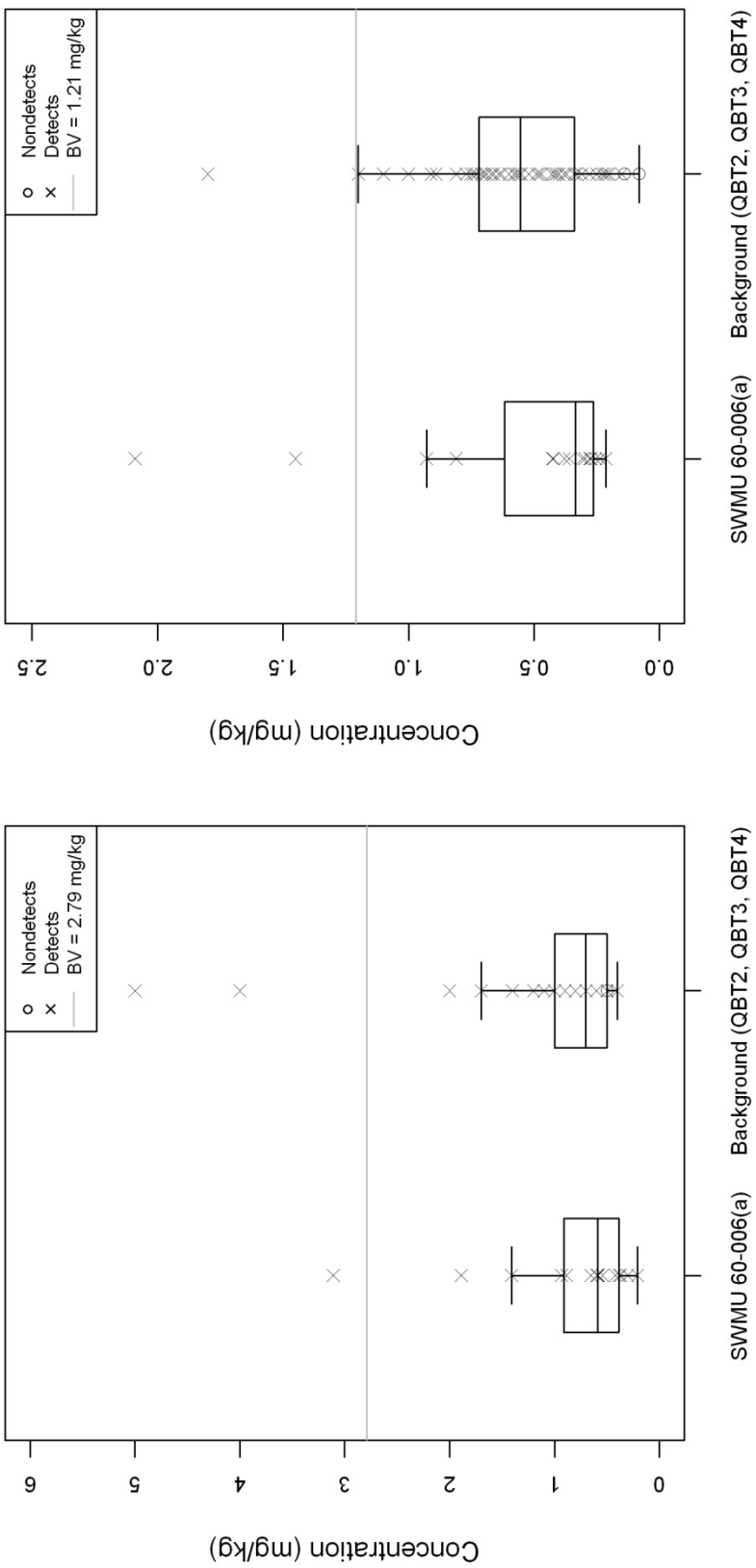
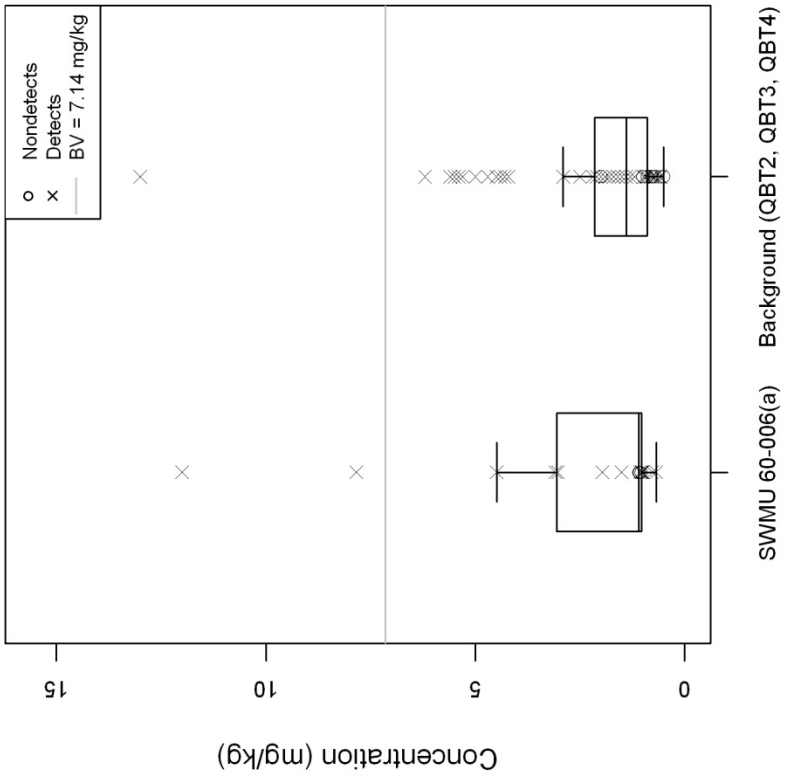



**Figure H-100 Box plots for arsenic and beryllium in tuff at SWMU 60-006(a)**



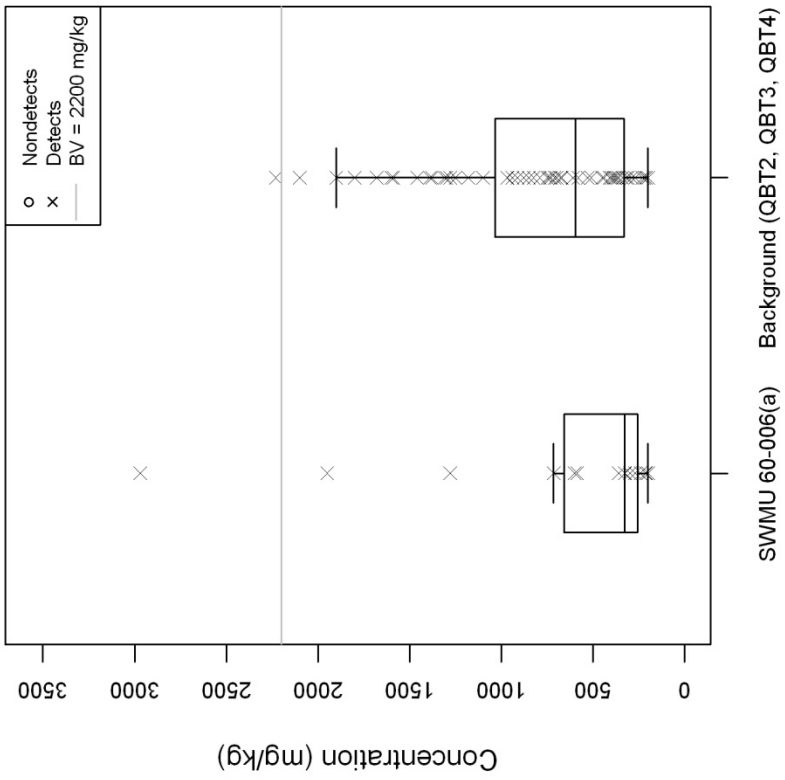




**Figure H-101 Box plots for calcium and chromium in tuff at SWMU 60-006(a)**

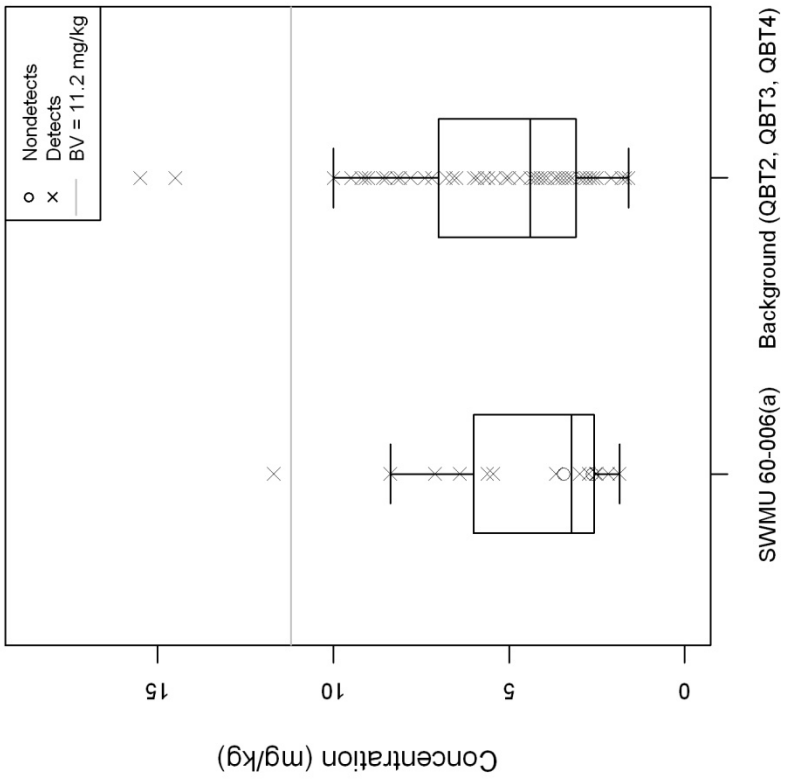



**Figure H-102 Box plot for lead in tuff at SWMU 60-006(a)**

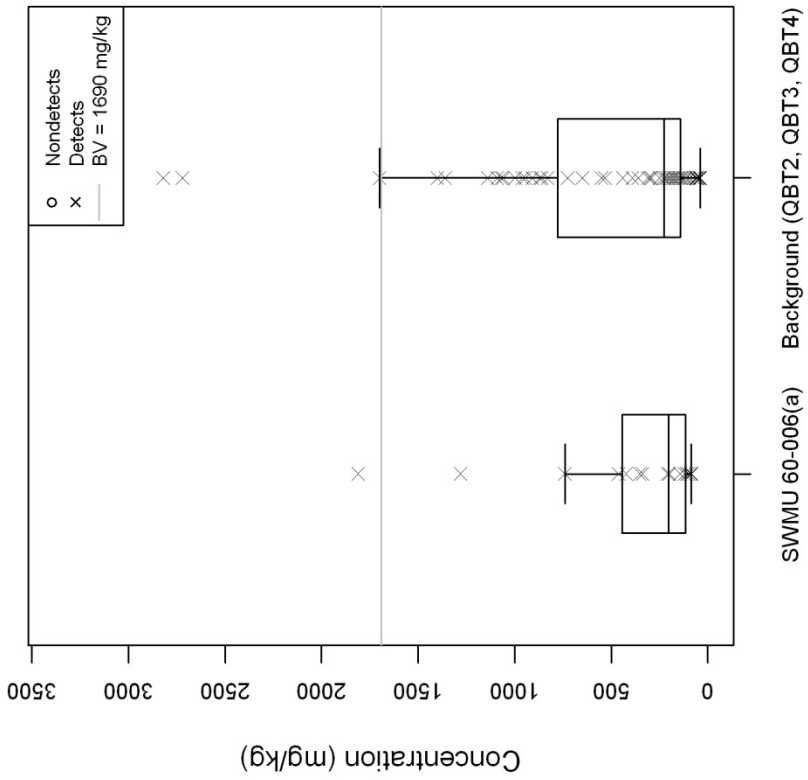



**Figure H-103 Box plot for magnesium in tuff at SWMU 60-006(a)**

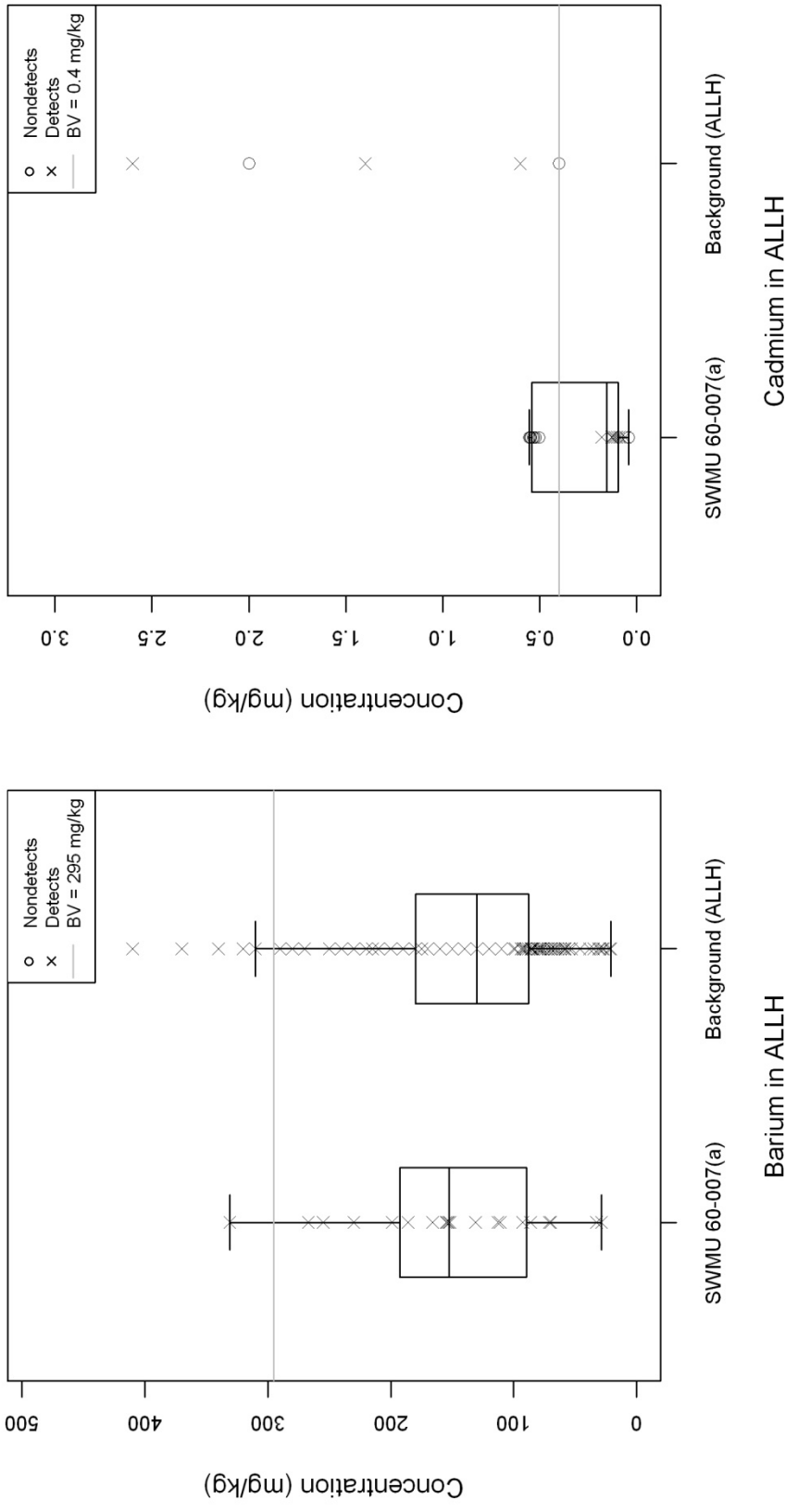



**Figure H-104 Box plots for barium and cadmium in soil at SWMU 60-007(a)**

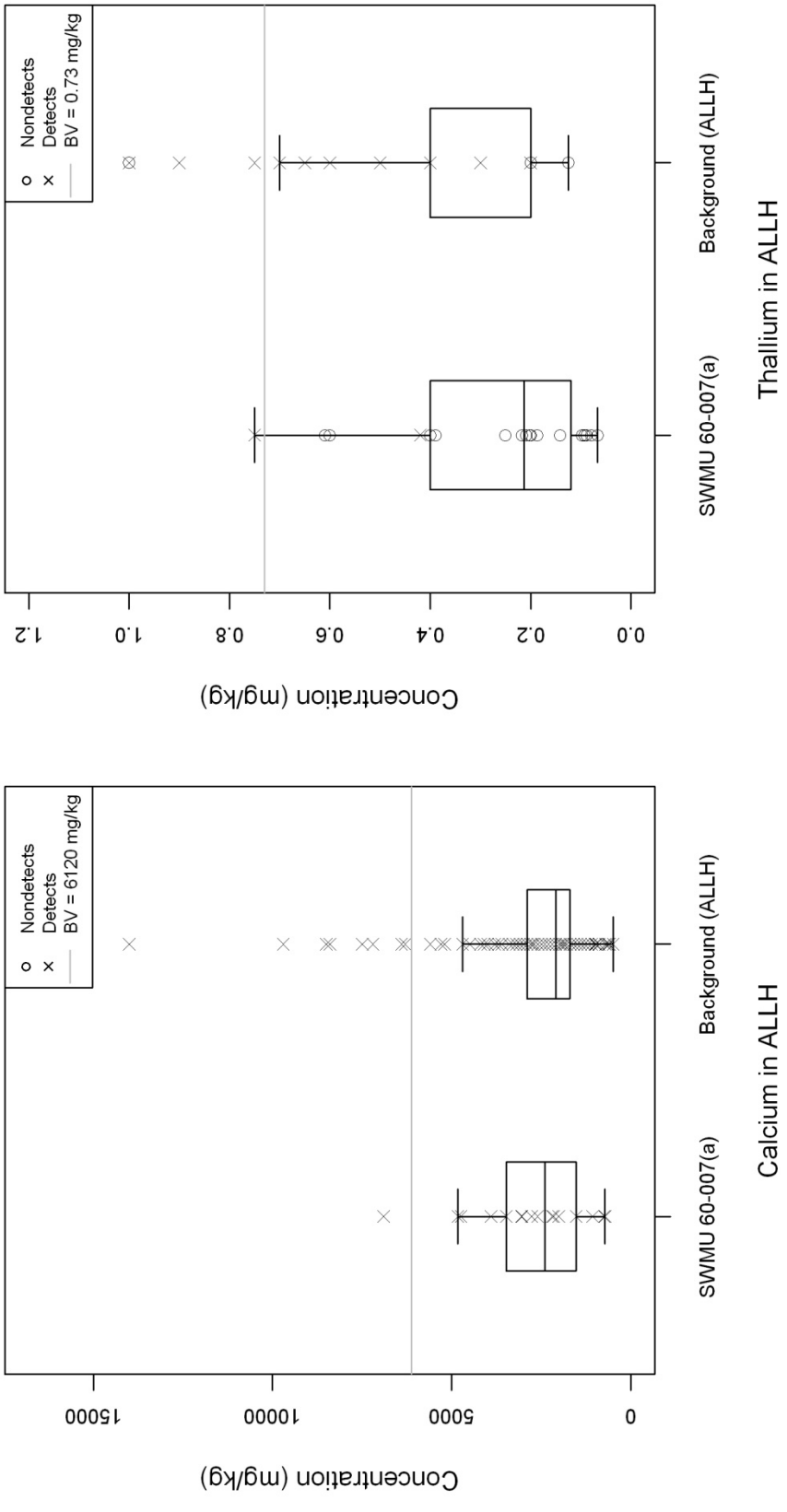
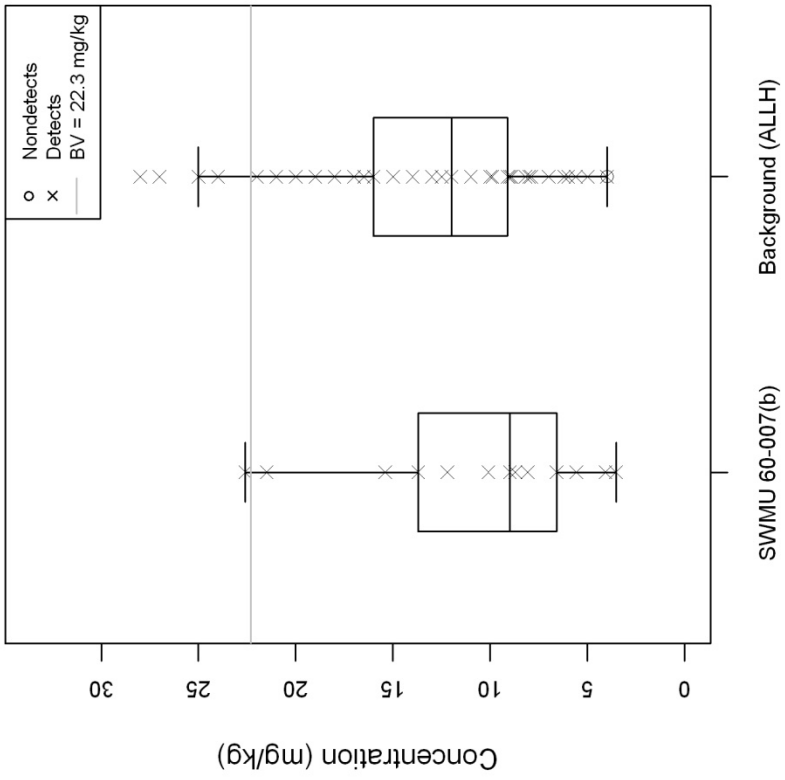



**Figure H-105 Box plots for calcium and thallium in soil at SWMU 60-007(a)**



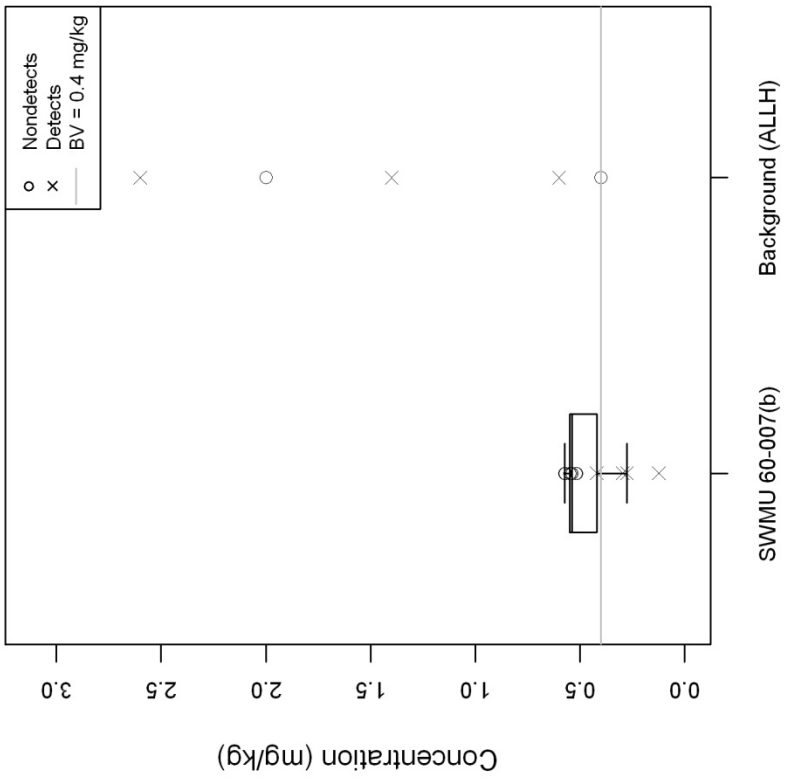




**Figure H-106 Box plots for cadmium and lead in soil at SWMU 60-007(b)**

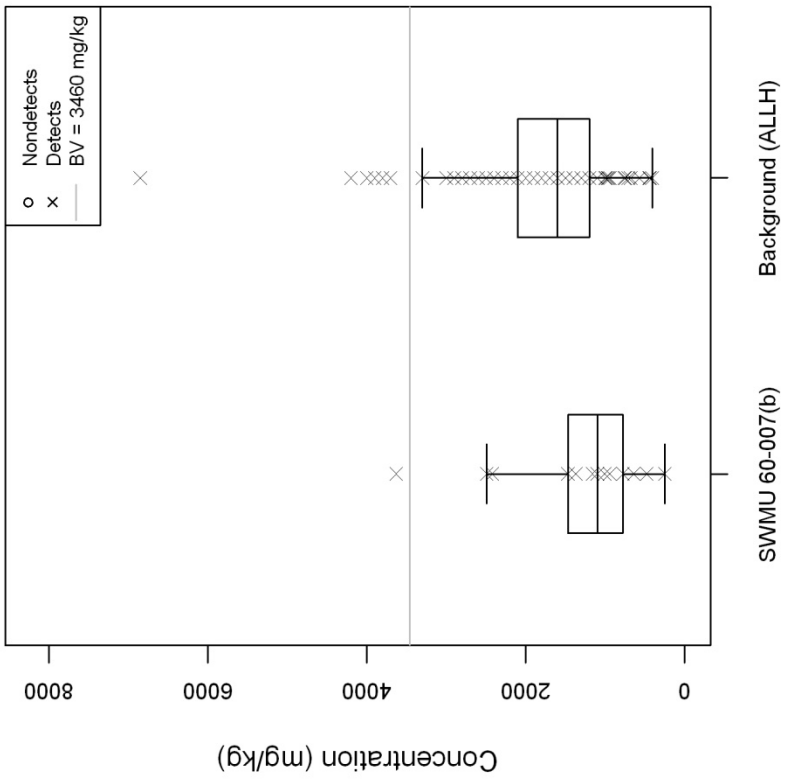



**Figure H-107 Box plot for potassium in soil at SWMU 60-007(b)**

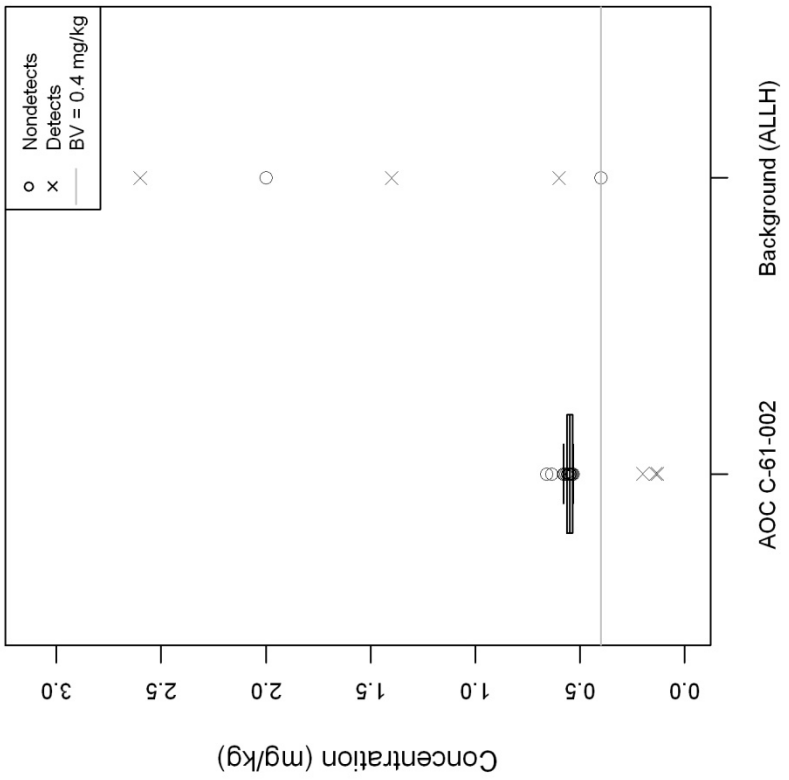



**Figure H-108 Box plot for cadmium in soil at AOC C-61-002**

**Table H-1**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-012(b)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Copper | 0.99916 | 0.11406 | n/a* |
| Magnesium | 1 | 0.99343 | n/a |
| Sodium | 0.99989 | 0.99343 | n/a |

*n/a = Not applicable.

**Table H-2**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-052(f)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cadmium | —* | — | 1 |

* — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-3**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-013(i)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Barium | 1 | 0.94668 | n/a* |
| Chromium | 0.95092 | 0.46471 | n/a |
| Magnesium | 1 | 0.46025 | n/a |
| Nickel | 0.71957 | 0.35215 | n/a |

*n/a = Not applicable.

**Table H-4**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-014(c2)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cadmium | —[a] | — | 1 |
| Calcium | 0.1758 | 0.30359 | n/a[b] |
| Lead | 0.56323 | 0.30359 | n/a |

[a] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

[b] n/a = Not applicable.

**Table H-5**
**Results of Statistical Tests for Inorganic Chemicals in Tuff at SWMU 03-014(k,l,m,n)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Barium | 0.18101 | 0.77205 | n/a* |

*n/a = Not applicable.

**Table H-6**
**Results of Statistical Tests for Inorganic Chemicals in Tuff at SWMU 03-014(o)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Nickel | —* | 0.15394 | 0.07837 |

* — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-7**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-015**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cadmium | —[a] | — | 1 |
| Nickel | 0.14348 | 0.63258 | n/a[b] |

[a] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

[b] n/a = Not applicable.

**Table H-8**
**Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 03-021**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cobalt | 0.99783 | 0.63814 | n/a* |
| Copper | 0.81651 | 0.23416 | n/a |
| Iron | 0.85538 | 0.63258 | n/a |
| Manganese | 0.74394 | 0.63463 | n/a |
| Nickel | 0.84631 | 0.63258 | n/a |

*n/a = Not applicable.

**Table H-9**
**Results of Statistical Tests for Inorganic Chemicals in Tuff at AOC 03-036(b)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value | Retain as COPC? |
|---|---|---|---|---|
| Barium | 0.07433 | 0.24939 | n/a* | No |
| Beryllium | 0.17649 | 0.24227 | n/a | No |
| Copper | 9.00E-05 | n/a | n/a | Yes |
| Manganese | 0.00018 | n/a | n/a | Yes |
| Zinc | 1.00E-05 | n/a | n/a | Yes |

*n/a = Not applicable.

**Table H-10**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at AOC 03-038(d)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cobalt | 0.93599 | 0.29299 | n/a |
| Manganese | 0.46224 | 0.30359 | n/a |

*n/a = Not applicable.

**Table H-11**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at AOC 03-052(b)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Chromium | 0.16339 | 0.71976 | n/a* |
| Sodium | 0.4365 | 0.93085 | n/a |

*n/a = Not applicable.

**Table H-12**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at SWMU 03-056(a)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Cobalt | 0.98921 | 0.86893 | n/a* |
| Lead | 0.7635 | 0.69713 | n/a |
| Zinc | 0.91537 | 0.28004 | n/a |

*n/a = Not applicable.

**Table H-13**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at AOC 03-056(k)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Barium | 0.61105 | 0.65158 | n/a[a] |
| Beryllium | 0.27627 | 0.25051 | n/a |
| Chromium | 0.06226 | 0.65158 | n/a |
| Cobalt | 0.27399 | 0.6548 | n/a |
| Manganese | 0.40644 | 0.25248 | n/a |
| Mercury | —[b] | — | 0.35 |

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-14**
**Results of Statistical Tests for Inorganic Chemicals**
**in Soil at SWMU 03-059**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Chromium | 0.14631 | 0.62983 | n/a* |
| Copper | 0.98757 | 0.3687 | n/a |
| Lead | 0.48906 | 0.16328 | n/a |

*n/a = Not applicable.

**Table H-15**
**Results of Statistical Tests for Inorganic Chemicals in Tuff at AOC 60-004(b)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value | Retain as COPC? |
|---|---|---|---|---|
| Beryllium | 0.23664 | 0.48162 | n/a[a] | No |
| Chromium | 0.00338 | n/a | n/a | Yes |
| Copper | 0.0085 | n/a | n/a | Yes |
| Iron | 5.00E-05 | n/a | n/a | Yes |
| Magnesium | 0.01198 | n/a | n/a | Yes |
| Manganese | 0.1068 | 0.00486 | n/a | Yes |
| Nickel | —[b] | 0.0401 | n/a | Yes |
| Vanadium | 0.00146 | n/a | n/a | Yes |

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-16**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at AOC 60-004(f)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Manganese | 0.24007 | 0.42812 | n/a[a] |
| Thallium | 0.53908 | —[b] | 1 |

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-17**
**Results of Statistical Tests for**
**Inorganic Chemicals in Tuff at SWMU 60-006(a)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Arsenic | 0.78391 | 0.8584 | n/a* |
| Beryllium | 0.89012 | 0.67072 | n/a |
| Calcium | 0.96673 | 0.8584 | n/a |
| Chromium | 0.33569 | 0.4249 | n/a |
| Lead | 0.94634 | 0.86519 | n/a |
| Magnesium | 0.64541 | 0.8584 | n/a |

*n/a = Not applicable.

**Table H-18**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at SWMU 60-007(a)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Barium | 0.30734 | 0.63463 | n/a[a] |
| Cadmium | —[b] | — | 1 |
| Calcium | 0.27553 | 0.59791 | n/a |
| Thallium | — | — | 1 |

[a] n/a = Not applicable.

[b] — = Test could not be performed due to the frequency of nondetections in the site and/or background datasets.

**Table H-19**
**Results of Statistical Tests for**
**Inorganic Chemicals in Soil at SWMU 60-007(b)**

| Analyte | Gehan Test p-Value | Quantile Test p-Value | Slippage p-Value |
|---|---|---|---|
| Lead | 0.92573 | 0.39217 | n/a* |
| Potassium | 0.98959 | 0.76364 | n/a |

*n/a = Not applicable.

# Appendix I

*Risk Assessments*

## CONTENTS

**Figures**



**Tables**

**Attachments**

## I-1.0 INTRODUCTION

This appendix presents the results of the human health and ecological risk screening evaluations conducted in support of environmental characterization of Upper Sandia Canyon Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). The solid waste management units (SWMUs) and areas of concern (AOCs) presented in this appendix are located in Technical Area 03 (TA-03) and TA-60 (Figure 1.1-1). This appendix presents the evaluation of potential risk at 15 sites based on decision-level data from historical and 2009 investigations.

## I-2.0 BACKGROUND

Descriptions of the SWMUs and AOCs comprising Upper Sandia Canyon Aggregate Area are included in sections 6.0, 7.0, and 8.0 of the investigation report and in section 4.0 of the approved investigation work plan (LANL 2008, 103404). Brief descriptions of the Upper Sandia Canyon Aggregate Area SWMUs and AOCs assessed for potential risk are presented in this section.

### I-2.1 Site Descriptions and Operational History

TA-03 occupies a large area near the western end of South Mesa between Los Alamos Canyon to the north and Twomile Canyon to the south. Sandia and Mortandad Canyons originate within TA-03 and divide the eastern two-thirds of the area into fingerlike projections. The middle mesa where most of TA-03 is located is called Sigma Mesa (LANL 1999, 064617, p. 2-11). TA-03 contains most of the Laboratory's administrative buildings and public and corporate access facilities. In addition, TA-03 houses several Laboratory activities such as experimental sciences, special nuclear materials, theoretical/computations, and physical support operations.

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

In the early 1950s, operational facilities from TA-01 (located in the Los Alamos townsite) were relocated to TA-03. Early TA-03 facilities included the Van de Graaff accelerator building, a laboratory and support structures; the communications building; the Chemistry and Metallurgy Research Building; the general and chemical warehouses; the cryogenics laboratory; the administration building; the Sigma Building, a fire house, and the physics building. Additional new building construction continued through the 1960s and 1970s, when storage areas, shops, office buildings, a wastewater treatment plant (WWTP), a cement batch plant, and other transportable structures were added.

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

TA-60 was created in 1989 when the Laboratory redefined its technical areas. As part of this effort, a portion of TA-03 was redesignated TA-60, a relatively small area that houses physical support and maintenance operations structures. TA-60, also known as Sigma Mesa Site, was created from the eastern portion of TA-03 and lies on the fingerlike mesa, Sigma Mesa, between Sandia and Mortandad Canyons. All buildings at TA-60 are located on the western end of the mesa and contain Laboratory

support and maintenance operations and subcontractor-service facilities. The Nevada Test Site (NTS) Test Fabrication Facility; the NTS test tower (buildings 60-17 and 60-18); several small abandoned experimental areas, including a solar pond, a test drill hole, and storage sites for pesticides, topsoil, and recyclable asphalt, are also located at TA-60 (LANL 1999, 064617, p. 2-25).

The specific SWMUs and AOCs evaluated as part of the 2009 investigation at Upper Sandia Canyon Aggregate Area and assessed for ecological and human health risk include the following sites.

### I-2.1.1 Former Storage Area: AOC 03-003(n)

AOC 03-003(n) is the location of a one-time polychlorinated biphenyl (PCB) spill in the salvage yard (SWMU 03-059) located on the south side of building 03-271. The perimeter is fenced, except for the part that abuts building 03-271. With the exception of two small portions of the area, most of the area is asphalt-paved. The salvage yard was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. Small and weather-sensitive items were stored inside building 03-271. All other items were placed in and around the former salvage yard. The spill area, identified as AOC 03-003(n), is approximately 20 ft south of the northwest corner of building 03-271. At that location, a transformer ruptured in 1977 and leaked an estimated 10 gal. of PCB-contaminated oil into the soil. The drainage pattern west of building 03-271 was altered in 1991 when the parking lot was regraded and base course was applied. The entire area received additional base course at least once since 1991. The former salvage-yard area is used as a parking lot and storage area for empty containers (LANL 1995, 057590, pp. 5-19-1, 5-19-3).

### I-2.1.2 Former Effluent Holding Tank: SWMU 03-014(q)

SWMU 03-014(q) is the former effluent sewage storage tank (former structure 03-336) for the power plant (building 03-22) (LANL 1990, 007511, p. 3-014). Between 1951 and 1985, the tank received and stored effluent from the former WWTP for use as cooling water for the power plant cooling towers (structures 03-25 and 03-58). The effluent was pumped to the holding tank and treated to hinder bacteria growth. In the past, chromates were used to treat the effluent. A one-time release of sulfuric acid to the SWMU 03-012(b) outfall from the power plant holding tank, structure 03-336 [SWMU 03-014(q)], occurred in 1990 (LANL 1995, 057590, p. 5-27-1). Low pH values were reported in a 2.5-mi section of the watercourse below the outfall. Soda ash was added along the watercourse to raise the pH. A subsequent survey detected no measurements below pH 6.9 (LANL 1996, 052930, p. 56).

### I-2.1.3 Drain Associated with Former Waste Water Treatment Plant: AOC 03-014(v)

AOC 03-014(v) was a floor drain within a former garage (former building 03-36). The drain was connected to the sanitary sewer line that flowed to the WWTP. The drain was installed in 1953 (LANL 1990, 007511, p. 3-014). Former building 03-36 was removed in 1999 to prepare for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. In preparation for this construction, approximately 60 $yd^3$ of contaminated soil was removed, including AOCs 03-014(v) and 03-027. Additional soil was also excavated from the area to accommodate the foundation of building 03-2327. The area was excavated to a depth of approximately 15 ft below grade. Consequently, the site was remediated during the construction of the computing center building (building 03-2327).

### I-2.1.4 Lift Wells: AOC 03-027

AOC 03-027 consisted of two former concrete-block-lined lift wells located in the floor below the hydraulic lifts at a former garage, former building 03-36. The lift wells collected wash water and residual oil from the

floor of vehicle maintenance bays. Lift well contents were manually pumped to 55-gal. containers emptied into the station's oil/water separator before they were discharged to the sanitary sewer. A bottle-washing operation was conducted in former building 03-36 from 1976 to 1980. New sample vial bottles were immersed in a 35% concentration nitric acid bath and triple-rinsed with deionized water. The rinse water was reused several times before it was discharged to floor drains. The floor drains eventually discharged to storm drains (LANL 1995, 057590, pp. 6-54–6-55).

AOC 03-027 was excavated to a depth of approximately 15 ft below grade to accommodate construction of the computing center building (building 03-2327).

### I-2.1.5 Surface Impoundment: SWMU 03-028

SWMU 03-028 is a former 12-ft × 15-ft × 6-ft-deep concrete holding pond at the northeast corner of the former asphalt batch plant. The site was used as a settling pond for mineral dust and particulates from gravel captured by scrubber water from the asphalt batch plant (former structure 03-73). Scrubber water from the holding pond was not directly discharged to the SWMU 03-045(g) outfall. The pond had an overflow pipe that discharged onto the ground surface. The surface drainage then flowed to a culvert inlet pipe connected to the SWMU 03-045(g) outfall. Water from the pond was recycled to the scrubber system and was replenished with potable water.

Sediment from the gravel used in the asphalt batch plant was periodically removed from the bottom of the holding pond and disposed of in the former landfill area located southeast of the plant [SWMU 03-009(a)]. The Roads and Grounds Group removed all sediment and water from the pond in early August 2003 during decommissioning of the asphalt batch plant. The empty pond was photographed and surveyed on August 19, 2003, and the pond was filled with clean soil and gravel on August 20, 2003, to allow a crane to be placed on the site to dismantle the batch plant (former structure 03-73). The surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

### I-2.1.6 Former Aboveground Asphalt Emulsion Tanks: SWMU 03-036(a)

SWMU 03-036(a) is the location of two former asphalt emulsion product tanks (former structures 03-75 and 03-0076), located at the former asphalt batch plant. The tanks were approximately 25 to 30 ft in diameter and 8 to 12 ft high, with a capacity of 30,000 to 50,000 gal. (LANL 1993, 020947, p. 6-30). The tanks were located within a soil-bermed secondary containment area approximately 225 ft southwest of building 03-70 (LANL 1995, 057590, p. 6-19). Plant operations resulted in some small spills that were contained within the berms. In 1987, former structure 03-75 ruptured near its base and released 1500 gal. of asphalt emulsion. The spill was contained within the berm, mixed with sand, and disposed of at the Los Alamos County landfill. Between October 1988 and April 1989, both tanks were removed, cut up, and disposed of in the Los Alamos County landfill. All soil around and beneath the tanks was also removed, mixed with sand, hardened, and deposited at the Los Alamos County landfill (LANL 1993, 020947, p. 6-30). The area was then used to store and prepare crack-sealing machines until batch plant operations ceased in 2002. The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

### I-2.1.7 Former Aboveground Storage Tanks: AOC 03-036(b)

AOC 03-036(b) is the location of two former 25- to 50-gal. aboveground storage tanks that contained No. 2 diesel fuel. The tanks associated with the former asphalt batch plant were located 100 ft west of the plant (building 03-73) and were surrounded by a 3-ft soil berm. To prevent sticking, diesel fuel from the tanks was applied to dump truck beds before they were loaded with asphalt. Residual fuel was collected

in an aboveground metal catch basin on the east side of the berm. Before 1989, kerosene was stored in the tanks and used for the same purpose as the No. 2 diesel fuel. Periodic drips and splashes from the tanks stained the gravel (LANL 1995, 057590, p. 6-27). The tanks began operating in 1960 (LANL 2003, 080912, p. 3), and operations ceased in 2003. In 2002, the two tanks, soil berm, and stained soil were removed during the demolition and decommissioning (D&D) of the former asphalt batch plant.

### I-2.1.8 Former Aboveground Storage Tanks: SWMU 03-036(c)

SWMU 03-036(c) is the location of two former asphalt emulsion storage tanks. The tanks were located approximately 100 ft northeast of former structure 03-73. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL 1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

### I-2.1.9 Former Aboveground Storage Tanks: SWMU 03-036(d)

SWMU 03-036(d) is the location of two former asphalt emulsion storage tanks located approximately 100 ft northeast of former structure 03-73. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked (LANL 1995, 057590, p. 6-19). The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

### I-2.1.10 Waste Lines: AOC 03-038(c)

AOC 03-038(c) is a 2-in. cast-iron drainline that formerly carried rinse solution from a copper electroplating bath in building 03-28 (room 46) to the industrial waste line. The electroplating bath initially operated in the 1960s and was used to plate very small parts of printed circuit boards. By 1971 the operation was terminated and was moved to building 03-40. During the electroplating process, water was sprayed through rows of holes in a manifold on either side of the rinse sink. Minute amounts of plating and acid solutions were washed off the circuit boards and down the drain. Spent plating baths and the spent acid-strip solutions were transported to TA-50 for treatment. These solutions contained cyanide, chromic sulfuric acid, and hydrochloric acid. The amounts and concentrations of contaminants are not known. The electroplating bath met U.S. Environmental Protection Agency (EPA) point-source category standards until it ceased operation in the early 1970s. The drainpipe was cut and capped inside the wall to make it inaccessible. The area has since been covered in asphalt pavement.

### I-2.1.11 Former Aboveground Tank: AOC 03-043(b)

AOC 03-043(b) is the location of a former 10,000-gal. asphalt emulsion storage tank, former structure 03-77, installed in 1948. Sand and gravel were packed around the base of the tank for insulation and stability. In 1980, the tank was cleaned out, removed, cut up, and disposed of at the Los Alamos County landfill. Stained soil beneath and around the tank was excavated and taken to the landfill (LANL 1995, 057590, p. 6-18). The former tank location was used to store aggregate and to mix feed for the asphalt batch plant until it was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot (LANL 2008, 099214).

### I-2.1.12 Storage Area: SWMU 03-056(l)

SWMU 03-056(l) is an outdoor storage facility on the east side of building 03-141. Containers of disposable clothing contaminated with beryllium powder are staged in this area before disposal. Carboys used to store beryllium powder in water were also staged in this area. The carboys were usually in a tray that served as secondary containment. No known releases from the drums or carboys to the environment have occurred (LANL 1995, 057590, p. 6-11).

### I-2.1.13 Storage Area: AOCs 60-004(b,d)

AOC 60-004(b) is a former staging area for 12 containers of diesel sludge removed from underground storage tanks at the power plant. The containers were stored at AOC 60-004(b) in 1988. The storage site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa and is contained within the boundaries of AOC 60-004(d) (LANL 1993, 020947, pp. 1-7, 5-70, 5-76). Because AOC 60-004(b) is contained within AOC 60-004(d) and the data for the sites are identical, the sites are treated as one site.

AOC 60-004(d) is an area formerly used to dismantle decommissioned underground storage tanks and to temporarily stage drums containing fluids removed from underground storage tanks. The site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa. The area was first developed in 1979 during a drilling project for a geothermal well. The northern edge of the area was used to stage building rubble, concrete, and rebar (LANL 1993, 020947, pp. 5-69–5-70).

### I-2.1.14 Oil Metal Bin: AOC C-03-016

AOC C-03-016 is a former oil cleanout bin located within the former asphalt batch plant. The bin was approximately 4 ft wide × 16 ft long × 3 ft deep, had a hinged lid, and was buried with the top flush with the ground surface. The bin was installed in the mid-1970s and contained used asphalt emulsion oil, which was applied to roads before laying asphalt. Photographs from the 1970s and 1980s show extensive stains in the immediate vicinity of the bin. In the late 1980s, the area surrounding the oil cleanout bin was excavated and new sand and gravel fill was put around the bin (LANL 1995, 057590, pp. 6-26–6-27). The bin and stained soil around the bin were removed in the late 1990s (LANL 2003, 080912, p. 4). The surface of the site was paved with asphalt for use as a parking lot in 2003 (LANL 2008, 099214).

## I-2.2 Investigation Sampling

The final dataset used to identify chemicals of potential concern (COPCs) for Upper Sandia Canyon Aggregate Area and used in this appendix to evaluate the potential risks to human health and the environment are the qualified analytical results from both historical sampling activities and the 2009 investigation. Only those data determined to be of decision-level quality following the data quality assessment (Appendix F) are included in the final dataset evaluated in this appendix.

## I-2.3 Determination of COPCs

Section 5.0 of the investigation report summarizes the COPC selection process. Only COPCs detected above background (inorganic chemicals and radionuclides), had detection limits greater than background values (BVs) (inorganic chemicals), and were detected (organic chemicals, inorganic chemicals with no BVs, and radionuclides) were retained. The industrial scenario and the ecological screening utilized data for samples collected from 0–1 ft below ground surface (bgs) and 0–5 ft bgs, respectively. The construction worker and the residential scenarios utilized data for samples collected from 0–10 ft bgs. However, sampling depths often overlapped because of multiple investigations; therefore, all samples

with a starting depth less than the lower bound of the interval for each scenario were included in the risk-screening assessments for a given scenario.

Tables I-2.2-1 to I-2.2-22 summarize the COPCs evaluated for potential risk for each site in the Upper Sandia Canyon Aggregate Area where the extent of contamination is defined. Some of the COPCs identified in this report may not be evaluated for potential risk under one or more scenarios because they were not within the specified depth intervals associated with a given scenario.

## I-3.0 CONCEPTUAL SITE MODEL

The primary mechanisms of release are related to historical contaminant sources described in detail in the Upper Sandia Canyon Aggregate Area historical investigation report (LANL 2008, 100693) and summarized in section 2.3 of the approved investigation work plan (LANL 2008, 103404). Releases at sites within the Upper Sandia Canyon Aggregate Area may have occurred as a result of air emissions, subsurface leaks, or effluent discharges. Previous sampling results indicated contamination from inorganic chemicals, organic chemicals, and radionuclides (LANL 2008, 100693). No sites assessed for ecological or human health risk in the evaluations presented had radionuclide COPCs.

### I-3.1 Receptors and Exposure Pathways

The primary exposure pathway for human receptors is surface soil and subsurface soil/tuff that may be brought to the surface through intrusive activities. Migration of contamination to groundwater through the vadose zone is unlikely given the depth to groundwater (greater than 1000 ft bgs). Human receptors (industrial worker, construction worker, and resident) may be exposed through direct contact with soil or suspended particulates by ingestion, inhalation, dermal contact, and external irradiation pathways. Direct contact exposure pathways from subsurface contamination to human receptors are complete for the resident and the construction worker, where appropriate. Migration of contamination to groundwater through the vadose zone is unlikely given the depth to groundwater (greater than 1000 ft bgs) at the site. The exposure pathways are the same as those for surface soil. Sources, exposure pathways, and receptors are shown in the conceptual site model (CSM) (Figure I-3.1-1).

The sites in the Upper Sandia Canyon Aggregate Area are industrial areas on Laboratory property. The developed sites provide minimal potential habitat for ecological receptors, especially where sites are covered with asphalt. Four of the sites [AOC 03-003(n), SWMU 03-014(q), and AOCs 60-004(b,d)] provide potential habitat for ecological receptors; available habitat for AOC 03-003(n) is, however, limited to a small patch of grass (20 ft by 10 ft) bordered by a parking lot and a building. Of the remaining 11 sites, 2 have been excavated and covered by a structure [AOC 03-014(v) and AOC 03-027], and the rest of the sites are covered with asphalt. Exposure is assessed across the site to a depth of 0–5 ft. Several of these sites [SWMUs 03-028 and 03-036(a) and AOCs 03-027, 03-036(b), and 03-043(b)] are deeper than 5 ft bgs and are not evaluated for ecological risk because no complete exposure pathways exist. Weathering of tuff is the only viable natural process that may result in the exposure of receptors to COPCs in tuff. However, because of the slow rate of weathering expected for tuff, exposure to COPCs in tuff is negligible, although it is included in the assessments. Exposure pathways to subsurface contamination below 5 ft are not complete unless contaminated soil or tuff were excavated and brought to the surface. For the sites covered with asphalt [SWMUs 03-036(c,d) and 03-056(l) and AOCs 03-038(c) and C-03-016], no complete exposure pathways to ecological receptors exist.

Considering unpaved sites or areas where potential habitat is present, exposure pathways are complete to surface soil and tuff for ecological receptors. The potential pathways are root uptake by plants, inhalation of vapors (burrowing animals only), inhalation of dust, dermal contact, incidental ingestion of

soil, external irradiation, and food web transport. Pathways from subsurface releases may be complete for plants. Surface water exposure was not evaluated because of the lack of surface water features. Sources, exposure pathways, and receptors are presented in the CSM (Figure I-3.1-1).

### I-3.2 Environmental Fate and Transport

The evaluation of environmental fate addresses the chemical processes affecting the persistence of chemicals in the environment, and the evaluation of transport addresses the physical processes affecting mobility along a migration pathway. Migration into soil and tuff depends on precipitation or snowmelt, soil moisture content, depth of soil, soil hydraulic properties, and properties of the COPCs. Migration into and through tuff also depends on the unsaturated flow properties of the tuff and the presence of joints and fractures.

The most important factor with respect to the potential for COPCs to migrate to groundwater is the presence of saturated conditions. Downward migration in the vadose zone is also limited by a lack of hydrostatic pressure as well as the lack of a source for the continued release of contamination. Without sufficient moisture and a source, little or no potential migration of materials through the vadose zone to groundwater occurs.

Contamination at depth is addressed in the discussion of nature and extent in the investigation report. Results from the deepest samples collected at most sites showed either no detected concentrations of COPCs or low- to trace-level concentrations of only a few inorganic, radionuclide, and/or organic COPCs in tuff. The limited extent of contamination is related to the absence of the key factors that facilitate migration, as discussed above. Given how long the contamination has been present in the subsurface, the physical and chemicals properties of the COPCs, and the lack of saturated conditions, the potential for contaminant migration to groundwater is very low.

The New Mexico Environment Department (NMED) guidance (NMED 2009, 108070) contains screening levels that consider the potential for contaminants in soil to result in groundwater contamination. These screening levels consider equilibrium partitioning of contaminants among solid, aqueous, and vapor phases and account for dilution and attenuation in groundwater through the use of dilution attenuation factors (DAFs). These DAF soil screening levels (SSLs) may be used to identify chemical concentrations in soil that have the potential to contaminate groundwater (EPA 1996, 059902). Screening contaminant concentrations in soil against these DAF SSLs does not, however, provide an indication of the potential for contaminants to migrate to groundwater. The assumptions used in the development of these DAF SSLs include an assumption of uniform contaminant concentrations from the contaminant source to the water table (i.e., it is assumed that migration to groundwater has already occurred). Furthermore, this assumption is inappropriate for cases such as the Upper Sandia Canyon Aggregate Area where sampling has shown that contamination is vertically bounded near the surface and the distance from the surface to the water table is large. For these reasons, screening of contaminant concentrations in soil against the DAF SSLs was not performed.

The relevant release and transport processes of the COPCs are a function of chemical-specific properties that include the relationship between the physical form of the constituents and the nature of the constituent transport processes in the environment. Specific properties include the degree of saturation and the potential for ion exchange (barium and other inorganic chemicals) or sorption and the potential for natural bioremediation. The transport of volatile organic compounds (VOCs) occurs primarily in the vapor phase by diffusion or advection in subsurface air.

Current potential transport mechanisms that may lead to exposure include

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

Contaminant distributions at the sites indicate that after the initial deposition of contaminants from operational activities and historical remediation efforts, elevated levels of COPCs tend to remain concentrated in the vicinity of the original release points. The primary potential release and transport mechanisms identified for Upper Sandia Canyon Aggregate Area include direct discharge; precipitation, sorption, and mechanical transport; dissolution and advective transport in water; and volatilization, diffusion, and dispersion. Less significant transport mechanisms include wind entrainment and, given the asphalt pavement covering most sites, dispersal of surface soil and uptake of contaminants from soil and water by biota.

Gas or vapor-phase contaminants such as VOCs are likely to volatilize to the atmosphere from near-surface soil and sediment and/or migrate by diffusion through air-filled pores in the vadose zone. Migration of vapor-phase contaminants from tuff into ambient air may occur by diffusion or advection driven by barometric pressure changes.

### I-3.2.1 Inorganic Chemicals

In general, and particularly in a semiarid climate, inorganic chemicals are not highly soluble or mobile in the environment, although there are exceptions. The physical and chemical factors that determine the distribution of inorganic COPCs within the soil and tuff at Upper Sandia Canyon Aggregate Area are the soil-water partition coefficient ($K_d$) of the inorganic chemicals, the pH of the soil, soil characteristics (such as sand or clay content), and the redox potential (Eh). The interaction of these factors is complex, but the $K_d$ values provides a general assessment of the potential for migration through the subsurface; chemicals with higher $K_d$ values are less likely to be mobile than those with lower ones. Chemicals with $K_d$ values greater than 40 are very unlikely to migrate through soil towards the water table (Kincaid et al. 1998, 093270). Table I-3.2-1 presents the $K_d$ values for the inorganic COPCs for the Upper Sandia Canyon Aggregate Area. Based on this criterion, the following COPCs have a low potential to mobilize and migrate through soil and the vadose zone: aluminum, antimony, barium, beryllium, cadmium, chromium, cobalt, lead, manganese, mercury, nickel, thallium, vanadium, and zinc. The $K_d$ values for arsenic, copper, cyanide, iron, selenium, and silver are less than 40 and may indicate a greater potential to mobilize and migrate through soil and the vadose zone beneath the sites.

It is important to note that other factors besides the $K_d$ values (e.g., speciation in soil, oxidation/reduction potential, pH, and soil mineralogy) also play significant roles in the likelihood that inorganic chemicals will migrate. The COPCs with $K_d$ values less than 40 are discussed further below. Information about the fate and transport properties of inorganic chemicals was obtained from individual chemical profiles published by the Agency for Toxic Substances and Disease Registry (ATSDR) (ATSDR 1997, 056531, and http://www.atsdr.cdc.gov/toxpro2).

### Arsenic

Arsenic may undergo a variety of reactions, including oxidation-reduction reactions, ligand exchange, precipitation, and biotransformation. Arsenic forms insoluble complexes with iron, aluminum, and magnesium oxides found in soil and in this form, arsenic is relatively immobile. However, under low pH and reducing conditions, arsenic can become soluble and may potentially leach into groundwater or result in runoff of arsenic into surface waters. Arsenic is expected to have low mobility under the environmental conditions (neutral to alkaline soil pH and oxidizing near-surface conditions) present at the Upper Sandia Canyon Aggregate Area.

### Copper

Copper movement in soil is determined by physical and chemical interactions with the soil components. Most copper deposited in soil will be strongly adsorbed and remains in the upper few centimeters of soil. Copper will adsorb to organic matter, carbonate minerals, clay minerals, or hydrous iron, and manganese oxides. In most temperate soil, pH, organic matter, and ionic strength of the soil solutions are the key factors affecting adsorption. Soil in the area is alkaline to neutral, so the leaching of copper is not a concern at this site. In most temperate soil, pH, organic matter, and ionic strength of the soil solutions are the key factors affecting adsorption. Copper binds to soil much more strongly than other divalent cations, and the distribution of copper in the soil solution is less affected by pH than other metals. Copper is expected to be bound to the soil and move in the system by way of transport of soil particles by water as opposed to movement as dissolved species.

### Cyanide

Cyanide tends to adsorb onto various natural media, including clay and sediment; however, sorption is insignificant relative to the potential for cyanide to volatilize and/or biodegrade. At soil surfaces, volatilization of hydrogen cyanide is a significant mechanism for cyanide loss. Cyanide at low concentrations in subsurface soil is likely to biodegrade under both aerobic and anaerobic conditions. Cyanide is present at the site in trace to low levels and is not expected to be mobile.

### Iron

Iron is naturally occurring in soil and tuff and may be relatively mobile under reducing conditions. Iron is sensitive to soil pH conditions, occurring in two oxidation states, iron(III), the insoluble oxidized form, and iron(II), the reduced soluble form. Most iron in well-drained neutral to alkaline soil is present as precipitates of iron(III) hydroxides and oxides. With time, these precipitates are mineralized and form various iron minerals, such as lepidcrocite, hematite, and goethite. Iron is not expected to be mobile in the neutral, well-drained soil at the Upper Sandia Canyon Aggregate Area.

### Selenium

Selenium is not often found in the environment in its elemental form but is usually combined with sulfide minerals or with silver, copper, lead, and nickel minerals. In soil, pH and Eh are determining factors in the transport and partitioning of selenium. In soil with a pH of greater than 7.5, selenates, which have high solubility and a low tendency to adsorb onto soil particles, are the major selenium species and are very mobile. The soil pH in the Upper Sandia Canyon Aggregate Area is much lower than 7.5, indicating that selenium is not likely to migrate.

**Silver**

Natural processes, such as the weathering of rock and the erosion of soil release silver to air and water. Silver sorbs onto soil and sediment and tends to form complexes with inorganic chemicals and humic substances in soil. Organic matter complexes with silver and reduces its mobility. Silver compounds tend to leach from well-drained soil so that it may potentially migrate into the subsurface. Site conditions are neutral to slightly alkaline and silver is not expected to be mobile.

### I-3.2.2 Organic Chemicals

Table I-3.2-2 presents the physical and chemical properties (organic carbon-water partition coefficient [$K_{oc}$], logarithm to the base 10 octanol/water partition coefficient [log $K_{ow}$], and solubility) of the organic COPCs identified for the Upper Sandia Canyon Aggregate Area. The physical and chemical properties of organic chemicals are important when evaluating their fate and transport. Information in the following paragraphs about the physiochemical properties of organic COPCs is presented to illustrate some aspects of the fate and transport tendencies of the COPCs. The information is summarized from Ney (1995, 058210).

Water solubility is perhaps the most important chemical characteristic used to assess mobility of organic chemicals. The higher the water solubility of a chemical, the more likely it is to be mobile and the less likely it is to accumulate, bioaccumulate, volatilize, or persist in the environment. A highly soluble chemical (water solubility greater than 1000 mg/L) is prone to biodegradation and metabolism that may detoxify the parent chemical. Several solvents identified for the Upper Sandia Canyon Aggregate Area have water solubilities greater than 1000 mg/L, including acetone, benzoic acid, butanone[2-], and hexanone[2-].

The lower the water solubility of a chemical, especially below 10 mg/L, the more likely it will be immobilized by adsorption. Chemicals with lower water solubilities are likely to accumulate or bioaccumulate and persist in the environment, to be slightly prone to biodegradation, and may be metabolized in plants and animals. The COPCs identified as having water solubilities less than 10 mg/L are primarily Aroclor-1254, Aroclor-1260, semivolatile organic compounds (SVOCs), including bis(2-ethylhexyl)phthalate and most of the polycyclic aromatic hydrocarbon (PAH) species.

Vapor pressure is a chemical characteristic used to evaluate the tendency of organic chemicals to volatize. Chemicals with vapor pressure greater than 0.01 mmHg are likely to volatilize and, therefore, concentrations at the site are reduced over time; vapors of these chemicals are more likely to travel toward the atmosphere and not migrate towards groundwater. Acetone, butanone[2-], butylbenzenes, hexanone[2-], isopropylbenzene, isopropyltoluene[4-], naphthalene, propylbenzene[1-], toluene, tetrachloroethene, trimethylbenzenes, and xylene have vapor pressures greater than 0.01 mmHg.

Chemicals with vapor pressures less than 0.000001 mm Hg are less likely to volatilize and, therefore, tend to remain immobile. Many of the PAHs, Aroclor-1254, Aroclor-1260, and bis(2-ethylhexyl)phthalate detected in the Upper Sandia Canyon Aggregate Area have vapor pressures less than 0.000001 mm Hg.

The $K_{ow}$ is an indicator of a chemical's potential to bioaccumulate or bioconcentrate in the fatty tissues of living organisms. The unitless $K_{ow}$ value is an indicator of water solubility, mobility, sorption and bioaccumulation. The higher the $K_{ow}$ above 1000, the greater the affinity the chemical has for bioaccumulation/bioconcentration in the food chain, the greater the potential for sorption in the soil, and the lower the mobility (Ney 1995, 058210). The PAHs, PCBs, phthalates, tetrachloroethene, trimethylbenzenes, isopropylbenzene, propylbenzene[1-], isopropyltoluene[4-], and xylene all have a $K_{ow}$ greater than 1000. A $K_{ow}$ of less than 500 indicates high water solubility, mobility, little to no affinity for

bioaccumulation, and degradability by microbes, plants, and animals. Acetone, benzoic acid, 2-butanone, and hexanone[2-] all have a $K_{ow}$ much less than 500.

The $K_{oc}$ measures the tendency of a chemical to adsorb to organic carbon in soil. $K_{oc}$ values above 500 $cm^3/g$ indicate a strong tendency to adsorb to soil, leading to low mobility (NMED 2009, 108070). Most organic COPCs have $K_{oc}$ values above 500 $cm^3/g$, indicating a very low potential to migrate toward groundwater. The organic COPCs with $K_{oc}$ values less than 500 $cm^3/g$ include acetone, benzoic acid, butanone[2-], hexanone[2-], tetrachloroethene, toluene, and xylene.

### I-3.3 Exposure Point Concentration Calculations

The exposure point concentrations (EPCs) represent upper bound concentrations of COPCs. For comparison to risk-screening levels, the upper confidence limit (UCL) of the arithmetic mean was calculated when possible and used as the EPC. The UCLs were calculated using all available decision-level data within the depth range of interest. If an appropriate UCL of the mean could not be calculated or if the UCL exceeded the maximum concentration, the maximum detected concentration of the COPC was used as the EPC (maximum detection limits were used as the EPCs for some inorganic COPCs). The summary statistics, including the EPC for each COPC for the human health and the ecological risk-screening assessments and the distribution used for the calculation, are presented in Tables I-2.2-1 to I-2.2-22.

Calculation of UCLs of the mean concentrations was done using the EPA ProUCL 4.00.04 software (EPA 2007, 096530), which is based on EPA guidance (EPA 2002, 085640). The ProUCL program calculates 95%, 97.5%, and 99% UCLs and recommends a distribution and UCL. The UCL for the recommended calculation method was used as the EPC. The ProUCL software performs distributional tests on the dataset for each COPC and calculates the most appropriate UCL based on the distribution of the dataset. Environmental data may have a normal, lognormal, or gamma distribution but are often nonparametric (no definable shape to the distribution). Key aspects of the new version of ProUCL are that it tests data against an expanded range of distribution types, contains a larger suite of statistical tests, and can perform analyses on datasets with nondetected values nondetected values. The ProUCL documentation strongly recommends against using the maximum detected concentration for the EPC. The maximum detected concentration was used to represent the EPC for COPCs only when there were too few detects to calculate a UCL. Input and output data files for ProUCL calculations are provided on CD as Attachment I-1.

## I-4.0 HUMAN HEALTH RISK SCREENING ASSESSMENT RESULTS

The human health risk-screening assessments were conducted for each site where extent is defined within the Upper Sandia Canyon Aggregate Area. All sites were screened for the construction worker and residential scenarios using data from 0 to10 ft bgs. Sites were also screened for the industrial scenario using data from 0 to1 ft bgs, where available. The human health risk-screening assessments compare either the UCL of the mean concentration or the maximum detected concentration of each COPC with SSLs for chemicals.

### I-4.1 SSLs

Human health risk-screening assessments for chemicals were conducted using SSLs for the industrial, construction worker, and residential scenarios obtained from NMED guidance (NMED 2009, 108070). The NMED SSLs are based on a target noncarcinogenic hazard quotient (HQ) of 1.0 and a target cancer risk

of $1 \times 10^{-5}$ (NMED 2009, 108070). If SSLs were not available from NMED guidance, values from the EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) were used. The EPA SSLs for carcinogens were multiplied by 10 to adjust from a $10^{-6}$ cancer risk level to the NMED target cancer risk level of $10^{-5}$. EPA regional screening levels are not available for construction workers; therefore, when regional screening levels were used, the construction worker SSLs were calculated using toxicity values from the EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and NMED exposure parameters and equation (NMED 2009, 108070). A surrogate SSL is used for some COPCs based on structural similarity or breakdown products. Exposure parameters used to calculate the industrial, construction worker, and residential SSLs are presented in Table I-4.1-1.

## I-4.2 Results of Human Health Screening Evaluation

The EPC of each COPC in soil was compared with the SSLs for the industrial, construction worker, and residential scenarios. For carcinogenic chemicals, the EPCs were divided by the SSL and multiplied by $1 \times 10^{-5}$. The sum of the carcinogenic risks was compared with the NMED target cancer risk level of $1 \times 10^{-5}$. For noncarcinogenic chemicals, an HQ was generated for each COPC by dividing the EPC by the SSL. The HQs were summed to generate a hazard index (HI). The HI was compared with the NMED target HI of 1.0. No radionuclides were identified as COPCs at the sites evaluated. The results are presented in Tables I-4.2-1 to I-4.2-61 and are described below for each SWMU and AOC evaluated in the Upper Sandia Canyon Aggregate Area.

### I-4.2.1 AOC 03-003(n)

There are no noncarcinogenic COPCs for the industrial scenario. The results of the risk screening assessment for the industrial scenario are presented in Table I-4.2-1. The total excess cancer risk is $2 \times 10^{-8}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070).

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-2 and I-4.2-3. The total excess cancer risk is $1 \times 10^{-9}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is 0.001, which is below the NMED target of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-4 and I-4.2-5. The total excess cancer risk for the residential scenario is approximately $4 \times 10^{-8}$, which is below the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.006, which is below the NMED target of 1.0 (NMED 2009, 108070).

### I-4.2.2 SWMU 03-014(q)

The results of the risk screening assessment for the industrial scenario are presented in Tables I-4.2-6 and I-4.2-7. The total excess cancer risk is $1 \times 10^{-7}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The industrial HI is 0.09, which is below the NMED target of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-8 and I-4.2-9. The total excess cancer risk is $8 \times 10^{-9}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HIs is 0.09, which is below the NMED target of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-10 and I-4.2-11. The total excess cancer risk is $3 \times 10^{-7}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.3 AOC 03-014(v)

The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to human receptors are present at this site. However, because potential risk from this site has not been formally evaluated elsewhere, human health risk was assessed for soil that was excavated.

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for AOC 03-014(v). No carcinogenic or noncarcinogenic COPCs were identified for the construction worker scenarios or for the residential scenario.

The only COPC identified was total petroleum hydrocarbon (TPH) diesel range organic (DRO). New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore the construction worker was evaluated using the industrial screening guideline. The construction worker and residential HQs are 0.03 (Table I-4.2-12) and 0.06 (Table I-4.2-13), respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.4 AOC 03-027

No COPCs were detected in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for AOC 03-027.

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-14 and I-4.2-15. The total excess cancer risk for the construction worker scenario is $2 \times 10^{-11}$, which is less than the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is 0.007, which is below the NMED target of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-16 and I-4.2-17. The total excess cancer risk for the residential scenario is $8 \times 10^{-10}$, which is below the NMED target risk of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.03, which is below the NMED target of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH–gasoline range organic (GRO) were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. Risk for TPH-GRO is based on constituents such as benzene, toluene, ethylbenzene, and xylene (BTEX), but typical constituents associated with gasoline are not identified as COPCs at this site, except for xylene. The xylene EPC is below the SSL. New Mexico State screening guidelines do not provide screening levels for the construction worker scenario; therefore, the construction worker scenario was evaluated using the industrial screening guideline. The construction worker and residential HQs are 0.2 (Table I-4.2-18) and 0.3 (Table I-4.2-19), respectively, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.5 SWMU 03-028

Calcium was retained as a COPC because it was detected above background in soil and tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's Risk Assessment Guidance for Superfund (RAGS) (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an

essential nutrient, calcium may be compared with the recommended daily allowance (RDA) for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at SWMU 03-028 (5020 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.5 mg/d of calcium. At the intake level of 0.5 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at SWMU 03-028 at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 1 mg/d. At the intake level of 1 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 5020 mg/kg, and calcium is eliminated as a COPC.

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for SWMU 03-028.

There are no carcinogenic COPCs identified for the construction worker scenario. The results of the risk screening assessment for the construction worker scenario are presented in Table I-4.2-20. The construction worker HI is 0.3, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-21 and I-4.2-22. The total excess cancer for the residential scenario is $2 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.6 SWMU 03-036(a)

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for SWMU 03-036(a).

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-23 and I-4.2-24. The total excess cancer risk for the construction worker scenario is $2 \times 10^{-11}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is 0.0004, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-25 and I-4.2-26. The total excess cancer for the residential scenario is $8 \times 10^{-10}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.002, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.7 SWMU 03-036(c)

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for SWMU 03-036(c).

There are no carcinogenic COPCs identified for the construction worker scenario. The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-27. The construction worker HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-28 and I-4.2-29. The total excess cancer risk for the residential scenario is $1 \times 10^{-5}$, which is equivalent to

the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.8 SWMU 03-036(d)

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for SWMU 03-036(d).

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-30 and I-4.2-31. The total excess cancer risk for the construction worker scenario is $7 \times 10^{-12}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is 0.0003, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-32 and I-4.2-33. The total excess cancer risk for the residential scenario is $4 \times 10^{-10}$, respectively, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-GRO was identified as a COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. Risk for TPH-GRO is based on constituents such as BTEX but typical constituents associated with gasoline are not identified as COPCs at this site. The EPC for TPH-GRO is very low at 0.86 mg/kg.

### I-4.2.9 AOC 03-038(c)

There are no carcinogenic COPCs identified for the industrial scenario. The results of the risk screening assessment for the industrial scenario are presented in Table I-4.2-34. The industrial HI is 0.3, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the construction worker scenario are presented in Table I-4.2-35. The construction worker HI is 7, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of manganese.

The results of the risk screening assessment for the residential scenario are presented in Table I-4.2-36. The residential HI is approximately 2, which is slightly above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of cobalt and, to a lesser degree, lead and manganese.

### I-4.2.10 AOC 03-043(b)

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for AOC 03-043(b).

No carcinogenic COPCs were identified for the construction worker scenario. The results of the risk screening assessment for the construction worker scenario are presented in Table I-4.2-37. The construction worker HI is 0.06, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

No carcinogenic COPCs were identified for the residential scenario. The results of the risk screening assessment for the residential scenario are presented in Table I-4.2-38. The residential HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.11 SWMU 03-056(l)

Calcium was retained as a COPC because it was detected above background in soil and tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the RDA for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at SWMU 03-056(l) (9920 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 1.4 mg/d of calcium. At the intake level of 1.4 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at SWMU 03-056(l) at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 3.3 mg/d. At the intake level of 3.3 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 9920 mg/kg, and calcium is eliminated as a COPC.

Magnesium was identified as a COPC but does not have a published toxicity value. It is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient. As an essential nutrient, magnesium may be compared to the RDA for adults and children. The RDA is 420 mg/d of magnesium for an adult male, 320 mg/d for an adult female, and 240 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at SWMU 03-056(l) of 1500 mg/kg, at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.2 mg/d of magnesium. At the intake level of 0.1 mg/d of magnesium, the adult's ingestion of magnesium is far less than the RDA for magnesium of 320 mg/d to 420 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at SWMU 03-056(l) of 1500 mg/kg, at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 0.5 mg/d of magnesium. At the intake level of 0.5 mg/d of magnesium, the child's ingestion of magnesium is far less than the RDA for magnesium of 240 mg/d. Therefore, no adverse health effects are expected from magnesium at 1500 mg/kg, and magnesium is eliminated as a COPC.

Sodium was identified as a COPC but does not have a published toxicity value. It is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient. As an essential nutrient, sodium may be compared to the Adequate Intake (AI) (the RDA cannot be calculated) for younger and older adults. The AI is 1500 mg/d of sodium for a younger adult and 1300 mg/d for an older adult (Dietary Reference Intakes for Water, Potassium, Sodium, Chloride, and Sulfate 2005, http://www.nap.edu/catalog.php?record_id=10925#toc. If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at SWMU 03-056(l) of 911 mg/kg, at the EPA default child soil ingestion rate of 200 mg/d of soil, a younger adult would ingest approximately 0.3 mg/d of sodium. At the intake level of 0.3 mg/d of sodium, the younger adult's ingestion of sodium is far less than the AI for sodium of 1500 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at SWMU 03-056(l) of 911 mg/kg, at the EPA default older adult soil ingestion rate of 100 mg/d of soil, an older adult would ingest approximately 0.1 mg/d of sodium. At the intake level of 0.1 mg/d of sodium, the older adult's ingestion of sodium is far less than the AI of 1300 mg/d. Therefore, no adverse health effects are expected from sodium at 911 mg/kg, and sodium is eliminated as a COPC.

No carcinogenic COPCs were identified for the industrial scenario. The results of the risk screening assessment for the industrial scenario are presented in Table I-4.2-39. The industrial HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

No carcinogenic COPCs were identified for the construction worker scenario. The results of the risk screening assessment for the construction worker scenario are presented in Table I-4.2-40. The construction worker HI is approximately 2, which is slightly above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily from manganese.

No carcinogenic COPCs were identified for the residential scenario. The results of the risk screening assessment for the residential scenario are presented in Table I-4.2-41. The residential HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.2.12 AOCs 60-004(b,d)

Sites AOCs 60-004(b,d) are combined for risk screening purposes because the former is contained within the latter and the sites are treated as one site.

Calcium was retained as a COPC because it was detected above background in soil and tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the RDA for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at AOCs 60-004(b,d) (17,700 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 2.5 mg/d of calcium. At the intake level of 2.5 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at AOCs 60-004(b,d) at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 5.9 mg/d. At the intake level of 5.9 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 17700 mg/kg, and calcium is eliminated as a COPC.

Magnesium was identified as a COPC but does not have a published toxicity value. It is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient. As an essential nutrient, magnesium may be compared to the RDA for adults and children. The RDA is 420 mg/d of magnesium for an adult male, 320 mg/d for an adult female, and 240 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at AOCs 60-004(b,d) of 2460 mg/kg, at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.4 mg/d of magnesium. At the intake level of 0.4 mg/d of magnesium, the adult's ingestion of magnesium is far less than the RDA for magnesium of 320 mg/d to 420 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum concentration detected at AOCs 60-004(b,d) of 2460 mg/kg, at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 0.8 mg/d of magnesium. At the intake level of 0.8 mg/d of magnesium, the child's ingestion of magnesium is far less than the RDA for magnesium of 240 mg/d. Therefore, no adverse health effects are expected from magnesium at 2460 mg/kg, and magnesium is eliminated as a COPC.

The results of the risk screening assessment for the industrial scenario are presented in Tables I-4.2-42 and I-4.2-43. The total excess cancer risk for the industrial scenario is $6 \times 10^{-8}$, which is below the NMED

target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The industrial HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the construction worker scenario are presented in Tables I-4.2-44 and I-4.2-45. The total excess cancer risk for the construction worker scenario is $7 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is approximately 1, which is equivalent to the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-46 and I-4.2-47. The total excess cancer risk for the residential scenario is $2 \times 10^{-7}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.7, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO was identified as a COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore the construction worker was evaluated using the industrial screening guideline. The industrial, construction worker, and residential scenario HQs are 0.02 (Table I-4.2-48), 0.007 (Table I-4.2-49) and 0.02 (Table I-4.2-50), which are below the NMED target HI of 1.0.

### I-4.2.13 AOC C-03-016

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for AOC C-03-016.

There are no carcinogenic COPCs identified for the construction worker scenario. The results of the risk screening assessment for the construction worker scenario are presented in Table I-4.2-51. The construction worker HI is 3, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of manganese.

The results of the risk screening assessment for the residential scenario are presented in Tables I-4.2-52 and I-4.2-53. The total excess cancer risk for the residential scenario is $4 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. Risk for TPH-GRO is based on constituents such as BTEX, but typical constituents associated with gasoline are not identified as COPCs at this site. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore, the construction worker was evaluated using the industrial screening guideline. The construction worker and residential scenario HQs for TPH-DRO are 6 (Table I-4.2-54) and 14 (Table I-4.2-55), which are above the NMED target HI of 1.0. Although The TPH-DRO HQs are above 1.0, the constituents of the TPH-DRO (i.e., BTEX and PAHs) were not detected at this site.

### I-4.2.14 AOC 03-036(b)

Calcium was retained as a COPC because it was detected above background in soil and tuff; however, it does not have a published toxicity value. Calcium is among those elements identified in section 5.9.4 of EPA's RAGS (EPA 1989, 008021) as an essential macronutrient, which can be eliminated as a COPC on the basis of best professional judgment. As an essential nutrient, calcium may be compared with the RDA

for adults and children. The RDA is 1200 mg/d of calcium for an adult and 800 mg/d for a child (National Research Council 1989, 064000). If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at AOC 03-036(b) (6250 mg/kg) at the EPA default adult soil ingestion rate of 100 mg/d of soil, an adult would ingest approximately 0.9 mg/d of calcium. At the intake level of 0.9 mg/d, the adult's ingestion of calcium is far less than the RDA for calcium of 1200 mg/d. If all the daily incidental ingestion of soil were to occur at the location of the maximum detected concentration at AOC 03-036(b) at the EPA default child soil ingestion rate of 200 mg/d of soil, a child would ingest approximately 2.1 mg/d. At the intake level of 2.1 mg/d, the child's ingestion of calcium is far less than the RDA for calcium of 800 mg/d. Therefore, no adverse health effects are expected from calcium at 6250 mg/kg, and calcium is eliminated as a COPC.

No COPCs were detected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for AOC 03-036(b).

The results of the risk-screening assessment for the construction worker scenario are presented in Tables I-4.2-56 and I-4.2-57. The total excess cancer risk for the construction worker scenario is $2 \times 10^{-11}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The construction worker HI is 0.9, which below the NMED target HI of 1.0 (NMED 2009, 108070).

The results of the risk-screening assessment for the residential scenario are presented in Tables I-4.2-58 and I-4.2-59. The total excess cancer risk for the residential scenario is $1 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The residential HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening guidelines for TPH-GRO. Risk for TPH-GRO is based on constituents such as BTEX, but typical constituents associated with gasoline are not identified as COPCs at this site. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore, the construction worker was evaluated using the industrial screening guideline. The construction worker and residential scenario HQs are 0.02 (Table I-4.2-60) and 0.04 (Table I-4.2-61), respectively, which are below the NMED target HI of 1.0.

### I-4.3 Uncertainty Analysis

The human health risk screening evaluations are subject to varying degrees and types of uncertainty. Aspects of data evaluation and COPC identification, exposure evaluation, toxicity evaluation, and the additive approach all contribute to uncertainties in the risk evaluation process.

#### I-4.3.1 Data Evaluation and COPC Identification Process

A primary uncertainty associated with the COPC identification process is the possibility that a chemical may be inappropriately identified as a COPC when it is actually not a COPC or that a chemical may not be identified as a COPC when it actually should be identified as a COPC. All detected organic chemicals were retained for analysis. Inorganic chemicals were appropriately identified as COPCs because those either detected or with detection limits above background were retained for further analysis. However, background concentrations may not be representative of certain subunits of the Bandelier Tuff (e.g., fractured, clay-rich material) since such samples are not included in the background dataset.

Other uncertainties may include errors in sampling, laboratory analysis, and data analysis. However, because concentrations used in the risk-screening evaluations include those detected less than estimated

quantitation limits and nondetects above BVs, data evaluation uncertainties are expected to have little effect on the risk-screening results.

### I-4.3.2 Exposure Evaluation

The current and reasonably foreseeable future land use is industrial. To the degree actual activity patterns are not represented by those activities assumed by the industrial scenario, uncertainties are introduced in the assessment, and the evaluation presented in this assessment overestimates potential risk. An individual may be subject to exposures in a different manner than the exposure assumptions used to derive the industrial and construction worker SSLs. For the sites evaluated, individuals might not be on-site at present or in the future for that frequency and duration. The industrial assumptions for the SSLs are that the potentially exposed individual is outside on-site for 8 h/d, 225 d/yr, and 25 yr (NMED 2009, 108070), while the construction worker SSLs are based on exposure of 8 h/d, 250 d/yr, and 1 yr (NMED 2009, 108070). The residential SSLs are based on exposure of 24 h/d, 350 d/yr, and 30 yr (NMED 2009, 108070). As a result, the industrial, construction worker, and residential scenarios evaluated at these sites likely overestimate the exposure and risk.

A number of assumptions are made relative to exposure pathways, including input parameters, completeness of a given pathway, the contaminated media to which an individual may be exposed, and intake rates for different routes of exposure. In the absence of site-specific data, the exposure assumptions used were consistent with default values (NMED 2009, 108070). When several upper-bound values (as are found in NMED 2009, 108070) are combined to estimate exposure for any one pathway, the resulting risk estimate can exceed the 99$^{th}$ percentile, and therefore, can exceed the range of risk that may be reasonably expected. Also, the assumption that residual concentrations of chemicals in the tuff are available and result in exposure in the same manner as if they were in soil overestimates the potential exposure and risk to receptors.

Uncertainty is introduced in the concentration aggregation of data for estimating the EPCs at a site. Risk from a single location or area with relatively high COPC concentrations may be underestimated by using a representative, sitewide value. The use of a UCL is intended to provide a protective, upper-bound (i.e., conservative) COPC concentration and is assumed to be representative of the average exposure to a COPC across the entire site. Potential risk and exposure from a single location or area with relatively high COPC concentrations may be overestimated if a representative sitewide value is used. The use of the maximum detected concentration for the EPC overestimates the exposure to contamination because receptors are not consistently exposed to the maximum detected concentration across the site. In addition, the maximum detection limit was used as the EPC for some inorganic COPCs with elevated detection limits above BVs.

#### Lead

Lead was a COPC for many of the sites evaluated within the Upper Sandia Canyon Aggregate Area with ratios less than 1 for all sites. Lead was generally not a major contributor, with ratios of 0.2 or less for the industrial, construction worker, and resident scenarios. The HIs are less than 1 with and without lead included, indicating no potential risks to receptors from lead or other noncarcinogenic COPCs exist. The exception is at AOC 03-038(c) for the residential scenario, as discussed below, where lead does influence the site HI.

Several sites within the Upper Sandia Canyon Aggregate Area have potential risks that exceed NMED target levels. The potential risks may be overestimated because of uncertainties associated with the EPCs and/or the COPCs at these sites.

**AOC 03-038(c)**

The construction worker HI of approximately 7 (HI of 6.6) is primarily from manganese, which has an HQ of 5.7. Manganese was detected above background at one location (03-608307) at a concentration of 3280 mg/kg (EPC of 2633 mg/kg). Manganese was not detected above BV at an adjacent location (03-608308). In addition, the construction worker SSL (463 mg/kg) is less than the soil BV, (671 mg/kg). Based on these factors, the exposure to manganese is overestimated, and the HI is not representative of the potential risk. If the EPC is divided by the maximum soil background concentration (1100 mg/kg), the ratio is approximately 2. If manganese is not included, the HI for the construction worker is 0.1, which is less than the NMED target HI. Therefore, this SWMU does not require further investigation or remediation, and no potential unacceptable risk for the construction worker scenario from site operations exists.

The residential HI of approximately 2 (HI of 1.6) is primarily from cobalt, which has an HQ of 1.2. Cobalt was detected above background at one location (03-608307) at a concentration of 37.8 mg/kg (EPC of 27.95 mg/kg). Cobalt was not detected above BV at an adjacent location (03-608308). The cobalt EPC, therefore, overestimates the exposure. In addition, lead is a COPC and contributes an HQ of approximately 0.2 to the HI. Because the lead SSL is based upon blood lead levels, lead can be evaluated separately from the other noncarcinogenic COPCs. The lead EPC (62.45 mg/kg) is below the residential SSL (400 mg/kg), and the contribution to the HI is reduced by approximately 0.2. Without lead, the HI for AOC 03-038(c) is 1.4, which is equivalent to the NMED target HI. Without cobalt, the HI is 0.2, which is less than the NMED target HI. Therefore, this SWMU does not require further investigation or remediation, and no potential unacceptable risk for the residential scenario from site operations exists.

**SWMU 03-056(l)**

The construction worker HI of approximately 2 (HI of 2.4) is from manganese, which has an HQ of 2.4. Manganese was detected above background at one location at a concentration of 1530 mg/kg (EPC = 1112 mg/kg). All other concentrations were below the soil BV (671 mg/kg). The maximum detected concentration overestimates the exposure. The EPC is also similar to the maximum soil background concentration (1100 mg/kg) and the construction worker SSL (463 mg/kg) is less than the BV soil (671 mg/kg). If the EPC is divided by the maximum soil background concentration (1100 mg/kg), the ratio is approximately 1. Without manganese, the HI for the construction worker is 0.002, which is less than the NMED target HI. Therefore, SWMU 03-056(l) does not require further investigation or remediation, and no potential unacceptable risk for the construction worker scenario from site operations exists.

**AOC C-03-016**

The construction worker HI of approximately 3 (HI of 3.2) is primarily from manganese, which has an HQ of 3.2. Manganese was detected above background at one location at a concentration and EPC of 1490 mg/kg (maximum detected concentration was the EPC). All other concentrations were below the tuff BV (482 mg/kg). The maximum detected concentration overestimates the exposure. In addition, the construction worker SSL (463 mg/kg) is similar to or less than the BVs for Qbt 2, 3, 4, and soil (482 mg/kg and 671 mg/kg). If the EPC is divided by the maximum tuff or soil background concentrations (752 mg/kg and 1100 mg/kg), the ratios are approximately 2 and 1, respectively. Without manganese, the HI for the construction worker is 0.05, which is less than the NMED target HI. Therefore, this AOC does not require further investigation or remediation, and no potential unacceptable risk for the construction worker scenario from site operations exists.

### I-4.3.3 Toxicity Evaluation

The primary uncertainty associated with the SSLs is related to the derivation of toxicity values used in their calculation. Toxicity values (reference doses [RfDs] and slope factors [SFs]) were used to derive the SSLs used in this risk screening evaluation (NMED 2009, 108070). Uncertainties were identified in five areas with respect to the toxicity values: (1) extrapolation from other animals to humans, (2) interindividual variability in the human population, (3) the derivation of RfDs and SFs, (4) the chemical form of the COPC, and (5) the use of surrogate chemicals.

*Extrapolation from Animals to Humans.* The SFs and RfDs are often determined by extrapolation from animal data to humans, which may result in uncertainties in toxicity values because differences exist in chemical absorption, metabolism, excretion, and toxic responses between animals and humans. Differences in body weight, surface area, and pharmacokinetic relationships between animals and humans are taken into account to address these uncertainties in the dose-response relationship. However, conservatism is usually incorporated in each of these steps, resulting in the overestimation of potential risk.

*Individual Variability in the Human Population.* For noncarcinogenic effects, the degree of variability in human physical characteristics is important both in determining the risks that can be expected at low exposures and in defining the no-observed-adverse-effect level (NOAEL). The NOAEL uncertainty factor approach incorporates a 10-fold factor to reflect individual variability within the human population that can contribute to uncertainty in the risk evaluation; this factor of 10 is generally considered to result in a conservative estimate of risk to noncarcinogenic COPCs.

*Derivation of RfDs and SFs.* The RfDs and SFs for different chemicals are derived from experiments conducted by different laboratories that may have different accuracy and precision that could lead to an over- or underestimation of the risk. The uncertainty associated with the toxicity factors for noncarcinogens is measured by the uncertainty factor, the modifying factor, and the confidence level. For carcinogens, the weight of evidence classification indicates the likelihood that a contaminant is a human carcinogen. Toxicity values with high uncertainties may change as new information is evaluated.

*Chemical Form of the COPC.* COPCs may be bound to the environment matrix and not available for absorption into the human body. However, it is assumed that the COPCs are bioavailable. This assumption can lead to an overestimation of the total risk.

*Use of Surrogate Chemicals.* The use of surrogates for some chemicals that do not have EPA-approved or provisional toxicity values also contributes to uncertainty in risk assessment. In this assessment, a surrogate was used to establish toxicity values based on structural similarity (NMED 2003, 081172) for benzo(g,h,i)perylene, hexanone[2-], and isopropyltoluene[4-]. The overall impact of surrogates on the risk assessment is minimal because these COPCs were detected at low concentrations and the HQs were below 0.1.

### I-4.3.4 Additive Approach

For noncarcinogens, the effects of exposure to multiple chemicals are generally not known and possible interactions could be synergistic or antagonistic, resulting in either an overestimation or underestimation of the potential risk. Additionally, RfDs used in the risk calculations typically are not based on the same endpoints with respect to severity, effects, or target organs. Therefore, the potential for noncarcinogenic effects may be overestimated for individual COPCs that act by different mechanisms and on different target organs but are addressed additively.

## I-4.4 Interpretation of Human Health Risk Screening Results

### I-4.4.1 AOC 03-003(n)

#### Industrial Scenario

No noncarcinogenic COPCs were identified for the industrial scenario. The total excess cancer risk for the industrial scenario is $2 \times 10^{-8}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070).

#### Construction Worker Scenario

The total excess cancer risk for the construction worker scenario is $1 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

#### Residential Scenario

The total excess cancer risk for the residential scenario is $4 \times 10^{-8}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.006, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.2 SWMU 03-014(q)

#### Industrial Scenario

The total excess cancer risk for the industrial scenario is $1 \times 10^{-7}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

#### Construction Worker Scenario

The total excess cancer risk for the construction worker scenario is $8 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

#### Residential Scenario

The total excess cancer risk for the residential scenario is $3 \times 10^{-7}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI for the residential scenario is 0.2, which below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.3 AOC 03-014(v)

The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to humans and ecological receptors are present at this site. Because potential risk from this site has not been formally evaluated elsewhere, human risk was assessed on soil that had been excavated.

#### Industrial Scenario

Sampling was not performed in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for AOC 03-014(v).

#### Construction Worker Scenario

TPH-DRO was the only COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario. Therefore, the construction worker was evaluated using the industrial screening guideline. The construction worker HQ is 0.03, which is below the NMED target HI of 1.0.

#### Residential Scenario

TPH-DRO was the only COPC. New Mexico State screening guidelines (NMED 2006, 094614) were used for the residential scenario. The residential HQ is 0.06, which is below the NMED target HI of 1.0.

### I-4.4.4 AOC 03-027

The area was excavated to a depth of approximately 15 ft below grade. Therefore, no complete exposure pathways to humans and ecological receptors are present at this site. Because potential risk from this site has not been formally evaluated elsewhere, human risk was assessed on soil that was excavated.

#### Industrial Scenario

Sampling was not performed in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for AOC 03-027

#### Construction Worker Scenario

The total excess cancer risk for the construction worker is $2 \times 10^{-11}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI for the construction worker is 0.007, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents like BTEX. Typical constituents associated with fuels (e.g., PAHs and BTEX) are not identified as COPCs, except for xylene, which is below the SSL. For TPH-DRO, New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore, the construction worker scenario was evaluated using the industrial screening guidelines. The construction worker HQ is 0.2, which is below the NMED target HI of 1.0.

#### Residential Scenario

The total excess cancer risk for the residential scenario is $8 \times 10^{-10}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI for the residential scenario is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for gasoline-range organics. If gasoline is present, risk is based on gasoline constituents like benzene and toluene. Typical constituents associated with fuels (e.g., PAHs and BTEX) are not identified as COPCs at

this site, except for xylene, which is below the SSL. For TPH-DRO, the residential HQ is 0.3, which is below the NMED target HI of 1.0.

### I-4.4.5 SWMU 03-028

#### Industrial Scenario

Sampling was not performed in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-028.

#### Construction Worker Scenario

No carcinogenic COPCs were identified for the construction worker scenario. The HI is 0.3, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

#### Residential Scenario

The total excess cancer for the residential scenario is $2 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.2, below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.6 SWMU 03-036(a)

#### Industrial Scenario

Sampling was not performed in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(a).

#### Construction Worker Scenario

The total excess cancer risks for the construction worker scenario is $2 \times 10^{-11}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.0004, which are below the NMED target HI of 1.0 (NMED 2009, 108070).

#### Residential Scenario

The total excess cancer risk for the residential scenario is $8 \times 10^{-10}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.002, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.7 SWMU 03-036(c)

#### Industrial Scenario

Sampling was not performed in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(c).

**Construction Worker Scenario**

No carcinogenic COPCs were identified for the construction worker scenario. The HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

**Residential Scenario**

The total excess cancer risk for the residential scenario is $1 \times 10^{-5}$, which is equivalent to the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.8 SWMU 03-036(d)

**Industrial Scenario**

Samples were not collected in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for SWMU 03-036(d).

**Construction Worker Scenario**

The total excess cancer risk is $7 \times 10^{-12}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.0003, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-GRO was identified as a COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents like benzene and toluene. Typical constituents associated with gasoline (e.g., PAHs and BTEX) are not identified as COPCs at this site.

**Residential Scenario**

The total excess cancer risk for the residential scenario is $4 \times 10^{-10}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-GRO was identified as a COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents like benzene and toluene. Typical constituents associated with gasoline (e.g., PAHs and BTEX) are not identified as COPCs at this site.

### I-4.4.9 AOC 03-038(c)

**Industrial Scenario**

No carcinogenic COPCs were identified for the industrial scenario. The HI is 0.3, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

**Construction Worker Scenario**

No carcinogenic COPCs were identified for the construction worker scenario. The HI is approximately 7, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of

manganese. Based on the uncertainty discussion in section I-4.3.2, the exposure and risk from manganese are overestimated because the SSL is similar to or less than BVs; the EPC for manganese is biased high based on one sampling result, and the HI is substantially lower when compared with the maximum soil background concentration. Without manganese, the HI is reduced to 0.1 for AOC 03-038(c). Therefore, this SWMU does not require further investigation or remediation and there is no potential unacceptable risk for the construction worker scenario from site operations.

**Residential Scenario**

No carcinogenic COPCs were identified for the residential scenario. The HI is approximately 2, which is slightly above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of cobalt and, to a lesser degree, lead. Based on the uncertainty discussion in section I-4.3.2, the exposure and risk from cobalt are overestimated because exposure and risk are based on one sampling result. In addition, because the lead SSL is based upon blood lead levels, lead is evaluated separately from the other noncarcinogenic COPCs. Without the lead contribution, the HI is reduced by approximately 0.2 and becomes 1.4, which is equivalent to the NMED target HI. Therefore, this SWMU does not require further investigation or remediation and there is no potential unacceptable risk for the residential scenario from site operations.

### I-4.4.10 AOC 03-043(b)

**Industrial Scenario**

Sampling did not occur in the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for AOC 03-043(b).

**Construction Worker Scenario**

No carcinogenic COPCs were identified for the construction worker scenario. The HI is 0.06, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

**Residential Scenario**

No carcinogenic COPCs were identified for the residential scenario. The HI is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.11 SWMU 03-056(l)

**Industrial Scenario**

No carcinogenic COPCs were identified for the industrial scenario. The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

**Construction Worker Scenario**

No carcinogenic COPCs were identified for the construction worker scenario. The HI is approximately 2, which is slightly above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is from manganese. Based on the uncertainty discussion in section I-4.3.2, the exposure and risk from manganese are overestimated because the SSL is less than the soil BV; the EPC for manganese is

biased high based on one sampling result, and the HI is substantially lower when compared with the maximum soil background concentration. Without manganese, the HI is reduced to 0.002 for SWMU 03-056(l). Therefore, this AOC does not require further investigation or remediation and there is no potential unacceptable risk for the construction worker scenario from site operations.

#### Residential Scenario

No carcinogenic COPCs were identified for the residential scenario. The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

### I-4.4.12 AOCs 60-004(b,d)

Sites AOCs 60-004(b,d) are combined for risk screening purposes because the former is contained within the latter, and the sites are treated as one site.

#### Industrial Scenario

The total excess cancer risk for the industrial scenario is $6 \times 10^{-8}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO was identified as a COPC. New Mexico State screening guideline (NMED 2006, 094614) for industrial exposure was used to compare to the TPH-DRO EPC. The HQ is 0.02, which is below the NMED target HI of 1.0.

#### Construction Worker Scenario

The total excess cancer risks for the construction worker scenario is $7 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is approximately 1, which is equivalent to the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO was identified as a COPC. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore, the construction worker was evaluated using the industrial screening guideline. The construction worker HQ is 0.007, which is below the NMED target HI of 1.0.

#### Residential Scenario

The total excess cancer risk for the residential scenario is $2 \times 10^{-7}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.7, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO was identified as a COPC. New Mexico State screening guideline (NMED 2006, 094614) for residential exposure was used to compare with the TPH-DRO EPC. The HQ is 0.02, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

### I-4.4.13 AOC C-03-016

#### Industrial Scenario

No samples were collected in the 0- to 1-ft depth interval and the industrial scenario was not evaluated for AOC C-03-016.

#### Construction Worker Scenario

No carcinogenic COPCs were identified for the construction worker scenario. The construction worker HI is approximately 3, which is above the NMED target HI of 1.0 (NMED 2009, 108070). The elevated HI is primarily the result of manganese. The maximum detected concentration overestimates the exposure. In addition, the construction worker SSL (463 mg/kg) is similar to or less than the BVs for Qbt 2, 3, 4, and soil (482 mg/kg and 671 mg/kg). If the EPC is divided by the maximum tuff or soil background concentrations (752 mg/kg and 1100 mg/kg), the ratios are approximately 2 and 1, respectively. Without manganese, the HI for the construction worker is 0.05, which is less than the NMED target HI. Therefore, this AOC does not require further investigation or remediation, and no potential unacceptable risk for the construction worker scenario from site operations exists.

TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents like benzene and toluene. Typical constituents associated with gasoline (e.g., PAHs and BTEX) are not identified as COPCs at this site. For TPH-DRO, New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for the construction worker scenario; therefore, the construction worker was evaluated using the industrial screening guideline. The construction worker HQ is 6, which is above the NMED target HI of 1.0. However, no constituents of TPH-DRO (e.g., PAHs and BTEX) were detected at the site.

#### Residential Scenario

The total excess cancer risk for the residential scenario is $4 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI is 0.2, which is below the NMED target HI of 1.0 (NMED 2009, 108070).

TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents like benzene and toluene. Typical constituents associated with gasoline (e.g., PAHs and BTEX) are not identified as COPCs at this site. The New Mexico State screening guideline (NMED 2006, 094614) for residential exposure was used to compare to the TPH-DRO EPC. The residential HQ is 14, which is above the NMED target HI of 1.0. However, no constituents of TPH-DRO (e.g., PAHs and BTEX) were detected at the site.

### I-4.4.14 AOC 03-036(b)

Samples were collected below 10 ft, ranging from 11 ft to 24 ft below grade. Therefore, no complete exposure pathways to human and ecological receptors are present at this site. Because potential risk from this site has not been formally evaluated elsewhere, human health risk was assessed.

### Industrial Scenario

Samples were not collected from the 0- to 1-ft depth interval, and the industrial scenario was not evaluated for AOC 03-036(b).

### Construction Worker Scenario

The total excess cancer risk for the construction worker is $2 \times 10^{-11}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI for the construction worker is 0.9, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening guidelines for TPH-GRO. If gasoline is present, risk is based on gasoline constituents. Typical constituents associated with diesel fuel (e.g., PAHs and BTEX) are not identified as COPCs. For TPH-DRO, New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening guidelines for the construction worker scenario; therefore, the construction worker was evaluated using the industrial screening guidelines. The construction worker HQ is 0.02, which is below the NMED target HI of 1.0.

### Residential Scenario

The total excess cancer risk for the residential scenario is $1 \times 10^{-9}$, which is below the NMED target risk level of $1 \times 10^{-5}$ (NMED 2009, 108070). The HI for the residential scenario is 0.09, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO and TPH-GRO were identified as COPCs. New Mexico State screening guidelines (NMED 2006, 094614) do not provide screening levels for TPH-GRO. If gasoline is present, risk is based on gasoline constituents. Typical constituents associated with diesel fuel (e.g., PAHs and BTEX) are not identified as COPCs at this site. For TPH-DRO, the residential HQ is 0.04, which is below the NMED target HI of 1.0.

## I-5.0 ECOLOGICAL RISK SCREENING EVALUATIONS

The approach for conducting ecological evaluations is described in the “Screening Level Ecological Risk Evaluation Methods, Revision 2” (LANL 2004, 087630). The evaluation consists of four parts: a scoping evaluation, a screening evaluation, an uncertainty analysis, and an interpretation of the results.

### I-5.1 Scoping Evaluation

The scoping evaluation establishes the breadth and focus of the screening evaluation. The ecological scoping checklist (Attachment I-2) is a useful tool for organizing existing ecological information. The information was used to determine whether ecological receptors might be affected, identify the types of receptors that might be present, and develop the ecological conceptual site model for Upper Sandia Canyon Aggregate Area (Attachment I-2). Most of the area on the mesa top is developed and typically provides minimal potential habitat for ecological receptors. The quality of the habitat varies and, in some cases, includes minimal amounts of native grasses, forbs, and trees that can be suitable habitat for ecological receptors.

The scoping evaluation indicated that terrestrial receptors were appropriate for evaluating the concentrations of COPCs in soil and tuff. Aquatic receptors were not evaluated because no aquatic communities and no aquatic habitat or perennial source of water exist at any of the sites. The depth of the regional aquifer (greater than 1000 ft bgs) and the semiarid climate limits transport to groundwater. The potential exposure pathways for terrestrial receptors in soil and tuff are root uptake, inhalation, soil

ingestion, dermal contact, external irradiation, and food web transport (Attachment I-2). The weathering of tuff is the only viable natural process that may result in the exposure of receptors to contaminants in tuff. Because of the slow rate of weathering expected for tuff, exposure in tuff is negligible, although it is included in the assessment. Plant exposure in tuff is largely limited to fractures near the surface, which does not produce sufficient biomass to support an herbivore population. Consequently, the contaminants in tuff are unavailable to receptors.

The potential risk was evaluated in the risk-screening assessments for the following ecological receptors representing several trophic levels:

- a plant
- soil dwelling invertebrates (represented by the earthworm)
- the deer mouse (mammalian omnivore)
- the montane shrew (mammalian insectivore)
- desert cottontail (mammalian herbivore)
- red fox (mammalian carnivore)
- American robin (avian insectivore, avian omnivore, and avian herbivore)
- American kestrel (avian insectivore and avian carnivore [surrogate for threatened and endangered [T&E] species (primarily the Mexican spotted owl)])

The rationale for using these receptors is presented in "Screening Level Ecological Risk Evaluation Methods, Revision 2" (LANL 2004, 087630). The Mexican spotted owl is the only T&E species known to frequent the Laboratory area. The owl's primary habitat is densely forested canyons, and it has not been observed roosting in Sandia Canyon. However, the owl may use the canyons and surrounding areas to forage.

### I-5.2 Assessment Endpoints

An assessment endpoint is an explicit expression of the environmental value to be protected. These endpoints are ecologically relevant and help sustain the natural structure, function, and biodiversity of an ecosystem or its components (EPA 1998, 062809). In a screening-level evaluation, assessment endpoints are any adverse effects on ecological receptors, where receptors are populations and communities (EPA 1997, 059370). The purpose of the ecological screening evaluation is to protect populations and communities of biota rather than individual organisms, except for listed or candidate T&E species or treaty-protected species (EPA 1999, 070086) because populations of protected species tend to be small and the loss of an individual adversely affects the species as a whole (EPA 1997, 059370).

In accordance with this guidance, the Laboratory developed generic assessment endpoints (LANL 1999, 064137) to ensure that values at all levels of ecological organization are considered in the ecological screening process. These general assessment endpoints can be measured using impacts on reproduction, growth, and survival to represent categories of effects that may adversely impact populations. In addition, specific receptor species were chosen to represent each functional group. The receptor species were chosen because of their presence at the site, their sensitivity to the COPCs, and their potential for exposure to those COPCs. These categories of effects and the chosen receptor species were used to select the types of effects seen in toxicity studies considered in the development of the toxicity reference values (TRVs). Toxicity studies used in the development of TRVs included only studies in which the adverse effect evaluated affected reproduction, survival, and/or growth.

The selection of receptors and assessment endpoints is designed to be protective of both the representative species used as screening receptors and the other species within their feeding guilds and the overall food web for the terrestrial and aquatic ecosystems. Focusing the assessment endpoints on the general characteristics of species that affect populations (rather than the biochemical and behavioral changes that may affect only the studied species) also ensures the applicability to the ecosystem of concern.

### I-5.3 Screening Evaluation

The ecological screening evaluation identifies chemicals of potential ecological concern (COPECs) and is based on the comparison of EPCs (95% UCLs, maximum detected concentrations, or maximum detection limits) to ecological screening levels (ESLs). The EPCs used in the assessment for Upper Sandia Canyon Aggregate Area are presented in Tables I-2.2-1 through Table I-2.2-28.

Ecological risk-screening assessments were not conducted for AOC 03-014(v) or AOC 03-027. These areas were excavated to a depth of approximately 15 ft below grade and no complete exposure pathways to ecological receptors are present at the sites. Ecological risk-screening assessments were also not conducted for SWMUs 03-028 and 03-036(a) and AOCs 03-036(b) and 03-043(b) because samples were collected below 5 ft bgs and, therefore, no complete pathways for exposure to ecological receptors exist. Because asphalt pavement covers SWMUs 03-036(c,d) and 03-056(l) and AOCs C-03-016 and 03-038(c), ecological risk-screening assessments were also not conducted because no complete exposure pathways to ecological receptors exist.

ESLs were obtained from the ECORISK Database, Version 2.4 (LANL 2009, 107524) and are presented in Table I-5.3-1. The ESLs are based on similar species and are derived from experimentally determined NOAELs, lowest observed adverse effect levels (LOAELs), or doses determined lethal to 50% of the test population. Information relevant to the calculation of ESLs, including concentration equations, dose equations, bioconcentration factors, transfer factors, and TRVs are presented in the ECORISK Database, Version 2.4 (LANL 2009, 107524).

The analysis begins with a comparison of the minimum ESL for a given COPC to the EPC. The HQ is defined as the ratio of the EPC to the concentration that has been determined to be acceptable to a given ecological receptor (i.e., the ESL). The higher the contaminant levels relative to the ESLs, the higher the potential risk to receptors; conversely, the higher the ESLs relative to the contaminant levels, the lower the potential risk to receptors. HQs greater than 0.3 are used to identify COPECs requiring additional evaluation (LANL 2004, 087630). Individual HQs for a receptor are summed to derive an HI; COPCs without ESLs are retained as COPECs and evaluated further in the uncertainty section. An HI greater than 1.0 is an indication that further assessment may be needed to ensure exposure to multiple COPECs at a site will not lead to potential adverse impacts to a given receptor population. The HQ and HI analysis is a conservative indication of potential adverse effects and is designed to minimize the potential of overlooking possible COPECs at the site.

#### I-5.3.1 AOC 03-003(n)

The results of the minimum ESL comparisons are presented in Table H-5.3-2. Neither Aroclor-1254 nor Aroclor-1260 was retained as a COPEC because the HQs were less than 0.3. No COPECs are present at AOC 03-003(n) based on this comparison.

### I-5.3.2 SWMU 03-014(q)

The results of the minimum ESL comparisons are presented in Table H-5.3-3. Antimony, lead, selenium, Aroclor-1254, and Aroclor-1260 are retained as COPECs because the HQs were greater than 0.3.

The HQs and HIs for each COPEC and receptor combination are presented in Table H-5.3-4. The HI analysis indicates that robin (all feeding guilds), deer mouse, montane shrew, and plant have HIs greater than 1. The COPECs and receptors are discussed in the uncertainty section.

### I-5.3.3 AOCs 60-004(b,d)

AOCs 60-004(b,d) are combined for risk screening purposes because the former is contained within the latter, and the sites are treated as one site.

The results of the minimum ESL comparisons are presented in Table H-5.3-5. Antimony, barium, chromium, cobalt, copper, lead, manganese, nickel, selenium, and vanadium are retained as COPECs because the HQs were greater than 0.3.

Calcium, iron, and TPH-DRO do not have ESLs, are retained as a COPECs, and are discussed in the uncertainty section.

Potential ecological risks associated with aluminum are based on soil pH. Aluminum is retained only in soil with a pH lower than 5.5, in accordance with EPA guidance (EPA 2003, 085645). Aluminum was eliminated as a COPEC and was not evaluated further because the mean soil pH for the Sandia Canyon Reach S-1 is 6.6.

The HQs and HIs for each COPEC and receptor combination are presented in Table H-5.3-6. The HI analysis indicates that the robin (all feeding guilds), deer mouse, montane shrew, earthworm, and plant have HIs greater than 1. The COPECs and receptors are discussed in the uncertainty section.

## I-5.4 Uncertainty Analysis

The uncertainty analysis describes the key sources of uncertainty related to the screening evaluations. This analysis can result in either adding or removing chemicals from the list of COPECs for sites. The following narrative contains a qualitative uncertainty analysis of the issues relevant to evaluating the potential ecological risk at Upper Sandia Canyon Aggregate Area sites.

### I-5.4.1 Chemical Form

The assumptions used in the ESL derivations were conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum bodyweight, and additive effects of multiple COPECs. Most of these factors tend to result in conservative estimates of the ESLs, which may lead to an overestimation of the potential risk. The assumption of additive effects for multiple COPECs may result in an over- or underestimation of the potential risk to receptors.

The chemical form of the individual COPCs was not determined as part of the investigation, largely a limitation on analytical quantitation of individual chemical species. Toxicological data are typically based on the most toxic and bioavailable chemical species not likely found in the environment. The inorganic, radionuclide, and organic COPECs are generally not 100% bioavailable to receptors in the natural environment because of the adsorption of chemical constituents to matrix surfaces (e.g., soil), or rapid

oxidation or reduction changes that render harmful chemical forms unavailable to biotic processes. The ESLs were calculated to ensure a conservative indication of potential risk (LANL 2004, 087630), and the values were biased toward overestimating the potential risk to receptors.

### I-5.4.2 Exposure Assumptions

The EPCs used in the calculations of HQs were the 95% UCL or the maximum detected concentration in the soil/fill/tuff to a depth of 5 ft for Upper Sandia Canyon Aggregate Area, thereby conservatively estimating the exposure to each COPC. As a result, the exposure of individuals within a population was evaluated using this specific concentration, which was assumed constant throughout the exposure area. The sampling also focused on areas of known contamination, and receptors were assumed to ingest 100% of their food and spend 100% of their time at the site. The assumptions made regarding exposure for terrestrial receptors results in an overestimation of the potential exposure and risk because COPECs varied across the site and were infrequently detected.

### I-5.4.3 Toxicity Values

The HQs were calculated using ESLs, which are based on NOAELs as threshold effect levels; actual risk for a given COPEC/receptor combination occurs at a higher level, somewhere between the NOAEL-based threshold and the threshold based on the LOAEL. The use of NOAELs leads to an overestimation of potential risk to ecological receptors. ESLs are based on laboratory studies requiring extrapolation to wildlife receptors. Laboratory studies are typically based on “artificial” and maintained populations with genetically similar individuals and are limited to single chemical exposures in isolated and controlled conditions using a single exposure pathway. Wild species are concomitantly exposed to a variety of chemical and environmental stressors, potentially rendering them more susceptible to chemical stress. On the other hand, wild populations are likely more genetically diverse than laboratory populations, making wild populations, as a whole, less sensitive to chemical exposure than laboratory populations. The uncertainties associated with the ESLs may result in an under- or overestimation of potential risk.

### I-5.4.4 Comparison with Background Concentrations

#### SWMU 03-014(q)

The ecological screening assessment is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs of the following inorganic COPECs are similar to background concentrations for soil and tuff: antimony and selenium (Table I-5.4-1). These inorganic chemicals are not retained as COPECs because their EPCs are similar to background concentrations, indicating exposure to these inorganic chemicals across the site is similar to background. Lead is retained as a COPEC for further evaluation.

#### AOCs 60-004(b,d)

The ecological screening assessment is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs of the following inorganic COPECs are similar to background concentrations for soil and tuff: antimony, barium, calcium, chromium, cobalt, copper, iron, lead, manganese, nickel, selenium, and vanadium (Table I-5.4-2). These inorganic chemicals are not retained as COPECs because their EPCs are similar to background concentrations, indicating exposure to these inorganic chemicals across the site is similar to background. No inorganic chemicals are retained as COPECs for further evaluation.

### I-5.4.5 Area Use Factors

In addition to the direct comparison of the EPCs with the ESLs, area use factors (AUFs) are used to account for the amount of time that a receptor is likely to spend within the contaminated areas based on the size of the receptor's home range (HR). The AUFs for individual organisms were developed by dividing the size of the site by the HR for that receptor. The area of SWMU 03-014(q) is approximately 0.031 ha. The HR for the Mexican spotted owl is 366 ha; therefore, the AUF for the Mexican spotted owl is 0.000085. Based on the application of the AUF for the Mexican spotted owl to the HI for the carnivorous kestrel, which is a surrogate for the owl, there is no potential for ecological risk to the Mexican spotted owl.

### I-5.4.6 Population Area Use Factors

EPA guidance is to manage the ecological risk to populations rather than to individuals, with the exception of T&E species (EPA 1999, 070086). One approach to address the potential effects on populations at Upper Sandia Canyon Aggregate Area is to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. The population area for a receptor is based on the individual receptor HR and its dispersal distance (Bowman et al. 2002, 073475) estimate that the median dispersal distance for mammals is 7 times the linear dimension of the HR (i.e., the square root of the HR area). If only the dispersal distances for the mammals with HRs within the range of the screening receptors are used (Bowman et al. 2002, 073475), the median dispersal distance becomes 3.6 times the square root of the HR ($R^2$=0.91). If it is assumed that the receptors can disperse the same distance in any direction, the population area is circular and the dispersal distance is the radius of the circle. Therefore, the population area can be derived by $\pi(3.6\sqrt{HR})^2$ or approximately 40HR.

#### SWMU 03-014(q)

The area of SWMU 03-014(q) is approximately 0.031 ha. The population area use factors (PAUFs) are estimated by dividing the site area by the population area of each receptor population (Table I-5.4-3). The HIs are recalculated minus the COPECs eliminated based on similarity to background (section I-5.4.4) and adjusted by the PAUFs. The HIs for the plant and earthworm are not adjusted by PAUFs because these receptors do not have HRs.

Based on the reevaluation, the adjusted HIs for SWMU 03-014(q) are less than 1 for all receptors (Table I-5.4-4).

### I-5.4.7 Chemicals without ESLs

Several COPECs do not have ESLs for any receptor in version 2.4 of the ECORISK Database (LANL 2009, 107524). In an effort to address this uncertainty and to provide a quantitative assessment of potential ecological risk, several online toxicity databases searches were conducted to determine if any relevant toxicity information is available. The online searches of the following databases were conducted: EPA Ecotox Database, EPA Office of Pesticide Programs Aquatic Life Benchmarks, U.S. Army Corps of Engineers/EPA Environmental Residue-Effects, California Cal/Ecotox Database, Pesticide Action Network Pesticide Database, U.S. Army Wildlife Toxicity Assessment Program, U.S. Department of Agriculture Integrated Pesticide Management Database, American Bird Conservancy Pesticide Toxicity Database, and Oak Ridge National Laboratory Risk Assessment Information System. Some COPECs without ESLs do not have chemical-specific toxicity data or surrogate chemicals to be used in the screening assessments and cannot be assessed quantitatively for potential ecological risk. These COPECs are infrequently detected across the site.

Several COPECs detected at AOCs 60-004(b,d) do not have ESLs. These COPECs cannot be assessed quantitatively for potential ecological risk. Toxicity data are not available for calcium and TPH-DRO, and no surrogate or other toxicity information is available.

Calcium was detected above tuff BV (2200 mg/kg) in six samples at AOCs 60-004(b,d), with a maximum concentration of 17,700 mg/kg at location 03-608401 at a depth of 4.0–5.0 ft bgs. Calcium concentrations decreased with depth. As presented in section I-4.2.12, calcium at the maximum concentration is not a health issue for an adult or a child. In addition, as noted in section I-5.4.4 above, the calcium EPC (7810 mg/kg) is similar to soil background concentrations (Table I-5.4-2). Therefore, calcium is eliminated as a COPEC.

Iron was detected above tuff BV (14500 mg/kg) in two samples at AOCs 60-004(b,d), with a maximum concentration of 17,000 mg/kg at location 03-608401 at a depth of 4.0–5.0 ft bgs. The detected concentrations of iron were less than the maximum tuff background concentration (19500 mg/kg). As noted in section I-5.4.4 above, the iron EPC (13745 mg/kg) is also similar to soil and tuff background concentrations (Table I-5.4-2). Therefore, iron is eliminated as a COPEC.

TPH-DRO was detected in six soil samples with a maximum concentration of 24.8 mg/kg and an EPC of 9.89 mg/kg. This concentration is well below any of the NMED screening guidelines (NMED 2006, 094614),and the detected constituents of TPH-DRO do not pose a potential risk to receptors. Therefore, TPH-DRO is eliminated as a COPEC.

### I-5.5 Comparison with Results of Previous Field and Laboratory Studies

Biota investigations have been conducted in canyon reaches in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453). Field and laboratory studies included collecting and analyzing soil, sediment, and water samples; monitoring cavity-nesting birds and analyzing eggs; trapping small mammal and analyzing whole organisms; testing earthworm bioaccumulation (measuring growth and survival and analyzing whole organisms); laboratory testing of sensitive organisms; and testing seedling germination.

The field and laboratory results included reaches with similar COPEC concentrations as detected at sites within the Upper Sandia Canyon Aggregate Area. The studies found no effects from exposure to COPECs in any of the canyon reaches further supporting the conclusion that there is no potential ecological risk at these sites.

### I-5.6 Interpretation of Ecological Risk Screening Results

#### I-5.6.1 Receptor Lines of Evidence

Based on the ecological risk-screening assessments, several COPECs (including COPECs without an ESL) were identified within the Upper Sandia Canyon Aggregate Area. Receptors were evaluated using several lines of evidence: minimum ESL comparisons, HI analyses, comparison to background concentrations, potential effects to populations (individuals for T&E species), and comparisons to previous field and laboratory canyon investigations.

**Plant**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the plant, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- Field and laboratory studies on plants in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion no potential ecological risk to the plants exists at the Upper Sandia Canyon Aggregate Area.

**Earthworm (Invertebrate)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the earthworm, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- Laboratory studies on earthworms in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion no potential ecological risk to the earthworm exists at the Upper Sandia Canyon Aggregate Area.

**Montane Shrew (Insectivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the shrew, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HI was greater than 1.0 for the shrew at SWMU 03-014(q). The HI was adjusted by the PAUF, which is the ratio of the site area to the shrew's population area. The adjusted HI was less than 1.0.
- Field studies and laboratory analyses on small mammals in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); Cañon de Valle (LANL 2003, 077965); and Sandia Canyon (LANL 2009, 107453) included reaches with similar concentrations of COPECs and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the montane shrew exists at the Upper Sandia Canyon Aggregate Area.

**Deer Mouse (Omnivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the deer mouse, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HI was greater than 1.0 for the deer mouse at SWMU 03-014(q). The HI was adjusted by the PAUF, which is the ratio of the site area to the deer mouse's population area. The adjusted HI was less than 1.0.
- Field studies and laboratory analyses on small mammals in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); Cañon de Valle (LANL 2003, 077965); and Sandia Canyon (LANL 2009, 107453) included reaches with similar concentrations of COPECs and found no effects from exposure except for SWMU 21-027(a).

These lines of evidence support the conclusion that no potential ecological risk to the deer mouse exists at the Upper Sandia Canyon Aggregate Area.

**Desert Cottontail (Herbivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the cottontail, were less than 0.3.
- HIs were equivalent to or less than 1.0 for the cottontail at all sites.

These lines of evidence support the conclusion that no potential ecological risk to the cottontail exists at the Upper Sandia Canyon Aggregate Area.

**Red Fox (Carnivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the fox, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- HI were less than 1.0 for the fox

These lines of evidence support the conclusion that no potential ecological risk to the fox exists at the Upper Sandia Canyon Aggregate Area.

**Robin (All Feeding Guilds)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the robin, were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- HIs were greater than 1.0 for the robin (all feeding guilds) at two sites. HIs were adjusted by the PAUF, which is the ratio of the site area to the robin's population area. The adjusted HIs were less than 1.0.

- Field studies and laboratory analyses on birds in Los Alamos/Pueblo Canyon (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453) included reaches with similar COPEC concentrations and found no effects from exposure.

These lines of evidence support the conclusion that no potential ecological risk to the robin (all feeding guilds) exists at the Upper Sandia Canyon Aggregate Area.

**Kestrel (Intermediate Carnivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the kestrel (intermediate carnivore), were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- HIs were equivalent to or less than 1.0 for the kestrel (intermediate carnivore) at two sites.

These lines of evidence support the conclusion that no potential ecological risk to the kestrel (intermediate carnivore) exists at the Upper Sandia Canyon Aggregate Area.

**Kestrel (Top Carnivore)**

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the kestrel (top carnivore), were less than 0.3.
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- HIs were less than 1.0 for the kestrel (top carnivore) at two sites.
- The kestrel (top carnivore) is a surrogate for the Mexican spotted owl. The HIs were adjusted for the owl's AUF. The adjusted HIs were less than 1.0.

These lines of evidence support the conclusion that no potential ecological risks to the kestrel (top carnivore) and the Mexican spotted owl exist at the Upper Sandia Canyon Aggregate Area.

### I-5.6.2 COPECs with No ESLs

COPECs with no ESLs were not evaluated for each receptor. All COPECs without ESLs were eliminated based on comparisons to human health and background concentrations. The analysis of COPECs with no ESLs supports the conclusion that no potential ecological risk to receptors exists at the Upper Sandia Canyon Aggregate Area.

### I-5.6.3 Summary

Based on evaluations of the minimum ESL, HI analysis, comparisons to background, potential effects to populations (individuals for T&E species), and previous canyon studies, no potential ecological risk to the earthworm, plant, American robin, American kestrel, deer mouse, shrew, desert cottontail, red fox, and Mexican spotted owl exists at the sites evaluated within the Upper Sandia Canyon Aggregate Area.

## I-6.0 CONCLUSIONS AND RECOMMENDATIONS

### I-6.1 Human Health Risk

The human health risk-screening assessments found no unacceptable risks under the construction worker and residential scenarios for SWMUs 03-014(q), 03-028, and 03-036(a,c,d) and AOCs 03-003(n), 03-014(v), 03-027, 03-036(b), 03-043(b), and 60-004(b,d). In addition, SWMU 03-056(l) and AOC C-03-016 did not pose potential unacceptable risk under the residential scenario.

SWMUs 03-028 and 03-036(a,c,d) and AOCs 03-014(v), 03-027, 03-036(b), 03-043(b), and C-03-016 were not evaluated for the industrial scenario because no COPCs were in the 0- to 1-ft depth interval. SWMUs 03-014(q) and 03-056(l) and AOCs 03-003(n), 03-038(c), and 60-004(b,d) had no unacceptable risk under the industrial scenario.

SWMU 03-056(l) and AOCs 03-038(c) and C-03-016 had potential risk issues associated with manganese for the construction worker scenario. However, the risk was overestimated by the SSL and the EPC. Overall, no potential unacceptable risk to the construction worker exists at the SWMU and AOCs. For the residential scenario, AOC 03-038(c) also had potential risk issues associated with cobalt. The risk was overestimated by the EPC, and without lead included in the HI, the HI is equivalent to the target HI of 1.0. No potential unacceptable risk to the resident exists at this site.

Sites at TA-03 and TA-60 are not accessible by the public and are not planned for release by the U.S. Department of Energy (DOE) in the foreseeable future. Therefore, an as low as reasonably achievable (ALARA) evaluation for radiological exposure to the public is not currently required. Should DOE's plans for releasing these areas change, an ALARA evaluation will be conducted at that time. It should be noted that the Laboratory addresses considerations for radiation exposures to workers under the Laboratory's occupational radiological protection program in compliance with 10 Code of Federal Regulations 835. The Laboratory's radiation protection program implements ALARA and consists of the following elements: management commitment, training, design review, radiological work review, performance assessments, and documentation.

### I-6.2 Ecological Risk

Based on evaluations of the minimum ESL, HI analysis, comparisons to background, potential effects to populations (individuals for T&E species), and previous canyon studies, there is no potential ecological risk to the earthworm, plant, American robin, American kestrel, deer mouse, shrew, desert cottontail, red fox, and Mexican spotted owl at the sites evaluated. Field and laboratory studies conducted and reported as part of the ecological investigations in Los Alamos and Pueblo Canyons (LANL 2004, 087390); Mortandad Canyon (LANL 2006, 094161; LANL 2007, 098279); Cañon de Valle (LANL 1993, 077965); Pajarito Canyon (LANL 2008, 104909; LANL 2009, 106939); and Sandia Canyon (LANL 2009, 107453) found similar concentrations of COPCs have not adversely impacted small mammal, bird, earthworm, and plant populations, and individual Mexican spotted owls. Therefore, no potential risks exist to ecological receptors at the Upper Sandia Canyon Aggregate Area sites evaluated.

## I-7.0 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.*

ATSDR (Agency for Toxic Substances and Disease Registry), 1997. ATSDR's Toxicology Profiles on CD-ROM. (ATSDR 1997, 056531)

Bowman, J., J.A.G. Jaeger, and L. Fahrig, 2002. "Dispersal Distance of Mammals is Proportional to Home Range Size," *Ecology,* Vol. 83, No. 7, pp. 2049-2055. (Bowman et al. 2002, 073475)

EPA (U.S. Environmental Protection Agency), December 1989. "Risk Assessment Guidance for Superfund, Volume I: Human Health Evaluation Manual (Part A), Interim Final," EPA/540/1-89/002, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1989, 008021)

EPA (U.S. Environmental Protection Agency), December 1993. "Wildlife Exposure Factors Handbook," Vol. I of II, EPA/600/R-93/187a, Office of Research and Development, Washington, D.C. (EPA 1993, 059384)

EPA (U.S. Environmental Protection Agency), May 1996. "Soil Screening Guidance: Technical Background Document," EPA/540/R-95/128, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1996, 059902)

EPA (U.S. Environmental Protection Agency), June 5, 1997. "Ecological Risk Assessment Guidance for Superfund: Process for Designing and Conducting Ecological Risk Assessments, Interim Final," Office of Emergency and Remedial Response, Washington, D.C. (EPA 1997, 059370)

EPA (U.S. Environmental Protection Agency), April 1998. "Guidelines for Ecological Risk Assessment," EPA/630/R-95/002F, Risk Assessment Forum, Washington, D.C. (EPA 1998, 062809)

EPA (U.S. Environmental Protection Agency), October 7, 1999. "Issuance of Final Guidance: Ecological Risk Assessment and Risk Management Principles for Superfund Sites," OSWER Directive No. 9285.7-28 P, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 1999, 070086)

EPA (U.S. Environmental Protection Agency), December 2002. "Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites," OSWER Directive No. 9285.6-10, Office of Emergency and Remedial Response, Washington, D.C. (EPA 2002, 085640)

EPA (U.S. Environmental Protection Agency), November 2003. "Ecological Soil Screening Level for Aluminum, Interim Final," OSWER Directive No. 9285.7-60, Office of Solid Waste and Emergency Response, Washington, D.C. (EPA 2003, 085645)

EPA (U.S. Environmental Protection Agency), April 2007. "ProUCL Version 4.0 User Guide," EPA/600/R-07/038, Office of Research and Development, Washington, D.C. (EPA 2007, 096530)

EPA (U.S. Environmental Protection Agency), December 2007. "EPA Region 6 Human Health Medium-Specific Screening Levels," U.S. EPA Region 6, Dallas, Texas. (EPA 2007, 099314)

Kincaid, C.T., M.P. Bergeron, C.R. Cole, M.D. Freshley, N. Hassig, V.G. Johnson, D.I. Kaplan, R.J. Serne, G.P. Steile, D.L. Strenge, P.D. Thorne, L.W. Vail, G.A. Whyatt, and S.K. Wurstner, March 1998. "Composite Analysis for Low-Level Waste Disposal in the 200 Area Plateau of the Hanford Site," Pacific Northwest Laboratory report PNNL-11800, Richland, Washington. (Kincaid et al. 1998, 093270)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. I of IV (TA-0 through TA-9), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007511)

LANL (Los Alamos National Laboratory), July 1993. "RFI Work Plan for Operable Unit 1114," Los Alamos National Laboratory document LA-UR-93-1000, Los Alamos, New Mexico. (LANL 1993, 020947)

LANL (Los Alamos National Laboratory), July 1995. "RFI Work Plan for Operable Unit 1114, Addendum 1," Los Alamos National Laboratory document LA-UR-95-731, Los Alamos, New Mexico. (LANL 1995, 057590)

LANL (Los Alamos National Laboratory), February 1996. "RFI Report for 53 Potential Release Sites in TA-3, TA-59, TA-60, TA-61," Los Alamos National Laboratory document LA-UR-96-726, Los Alamos, New Mexico. (LANL 1996, 052930)

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

LANL (Los Alamos National Laboratory), June 1999. "General Assessment Endpoints for Ecological Risk Assessment at Los Alamos National Laboratory," report prepared for Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1999, 064137)

LANL (Los Alamos National Laboratory), September 1999. "Work Plan for Sandia Canyon and Cañada del Buey," Los Alamos National Laboratory document LA-UR-99-3610, Los Alamos, New Mexico. (LANL 1999, 064617)

LANL (Los Alamos National Laboratory), September 2003. "Field Implementation Plan for Asphalt Batch Plant Solid Waste Management Units and Areas of Concern at Technical Areas 3 and 60," Los Alamos National Laboratory document LA-UR-03-6161, Los Alamos, New Mexico. (LANL 2003, 080912)

LANL (Los Alamos National Laboratory), September 2003. "Phase III RFI Report for Solid Waste Management Unit 16-021(c)-99," Los Alamos National Laboratory document LA-UR-03-5248, Los Alamos, New Mexico. (LANL 2003, 077965)

LANL (Los Alamos National Laboratory), April 2004. "Los Alamos and Pueblo Canyons Investigation Report," Los Alamos National Laboratory document LA-UR-04-2714, Los Alamos, New Mexico. (LANL 2004, 087390)

LANL (Los Alamos National Laboratory), December 2004. "Screening-Level Ecological Risk Assessment Methods, Revision 2," Los Alamos National Laboratory document LA-UR-04-8246, Los Alamos, New Mexico. (LANL 2004, 087630)

LANL (Los Alamos National Laboratory), October 2006. "Mortandad Canyon Investigation Report," Los Alamos National Laboratory document LA-UR-06-6752, Los Alamos, New Mexico. (LANL 2006, 094161)

LANL (Los Alamos National Laboratory), June 2007. "Revised Risk Assessments for Mortandad Canyon," Los Alamos National Laboratory document LA-UR-07-4010, Los Alamos, New Mexico. (LANL 2007, 098279)

LANL (Los Alamos National Laboratory), March 2008. "Historical Investigation Report for Upper Sandia Canyon Aggregate Area," Los Alamos National Laboratory document LA-UR-08-1851, Los Alamos, New Mexico. (LANL 2008, 100693)

LANL (Los Alamos National Laboratory), March 21, 2008. "Structure Searches for 3-287, 3-2422, and 3-36," online search results from the MOADS internal database at Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2008, 099214)

LANL (Los Alamos National Laboratory), July 2008. "Investigation Work Plan for Upper Sandia Canyon Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-4798, Los Alamos, New Mexico. (LANL 2008, 103404)

LANL (Los Alamos National Laboratory), September 2008. "Pajarito Canyon Investigation Report," Los Alamos National Laboratory document LA-UR-08-5852, Los Alamos, New Mexico. (LANL 2008, 104909)

LANL (Los Alamos National Laboratory), August 2009. "Pajarito Canyon Investigation Report, Revision 1," Los Alamos National Laboratory document LA-UR-09-4670, Los Alamos, New Mexico. (LANL 2009, 106939)

LANL (Los Alamos National Laboratory), October 2009. "Investigation Report for Sandia Canyon," Los Alamos National Laboratory document LA-UR-09-6450, Los Alamos, New Mexico. (LANL 2009, 107453)

LANL (Los Alamos National Laboratory), December 2009. "Ecorisk Database (Release 2.4)," on CD, LA-UR-09-7834, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2009, 107524)

National Research Council, 1989. Excerpted pages from *Recommended Dietary Allowances*, 10th Ed., National Academy Press, Washington, D.C. (National Research Council 1989, 064000)

Ney, R.E., 1995. Excerpted pages from *Fate and Transport of Organic Chemicals in the Environment: A Practical Guide*, 2nd Ed., Government Institutes, Inc., Rockville, Maryland. (Ney 1995, 058210)

NMED (New Mexico Environment Department), November 24, 2003. “LANL's Risk Reduction and Environmental Stewardship (RRES) Remediation Services Project Use of Surrogate Chemicals in Risk Assessments,” New Mexico Environment Department letter to D. Gregory (DOE-LASO) and G.P. Nanos (LANL Director) from J.E. Kieling (NMED-HWB), Santa Fe, New Mexico. (NMED 2003, 081172)

NMED (New Mexico Environment Department), October 2006. “New Mexico Environment Department TPH Screening Guidelines,” Santa Fe, New Mexico. (NMED 2006, 094614)

NMED (New Mexico Environment Department), December 2009. “Technical Background Document for Development of Soil Screening Levels, Revision 5.0,” with revised Table A-1, New Mexico Environment Department, Hazardous Waste Bureau and Ground Water Quality Bureau Voluntary Remediation Program, Santa Fe, New Mexico. (NMED 2009, 108070)

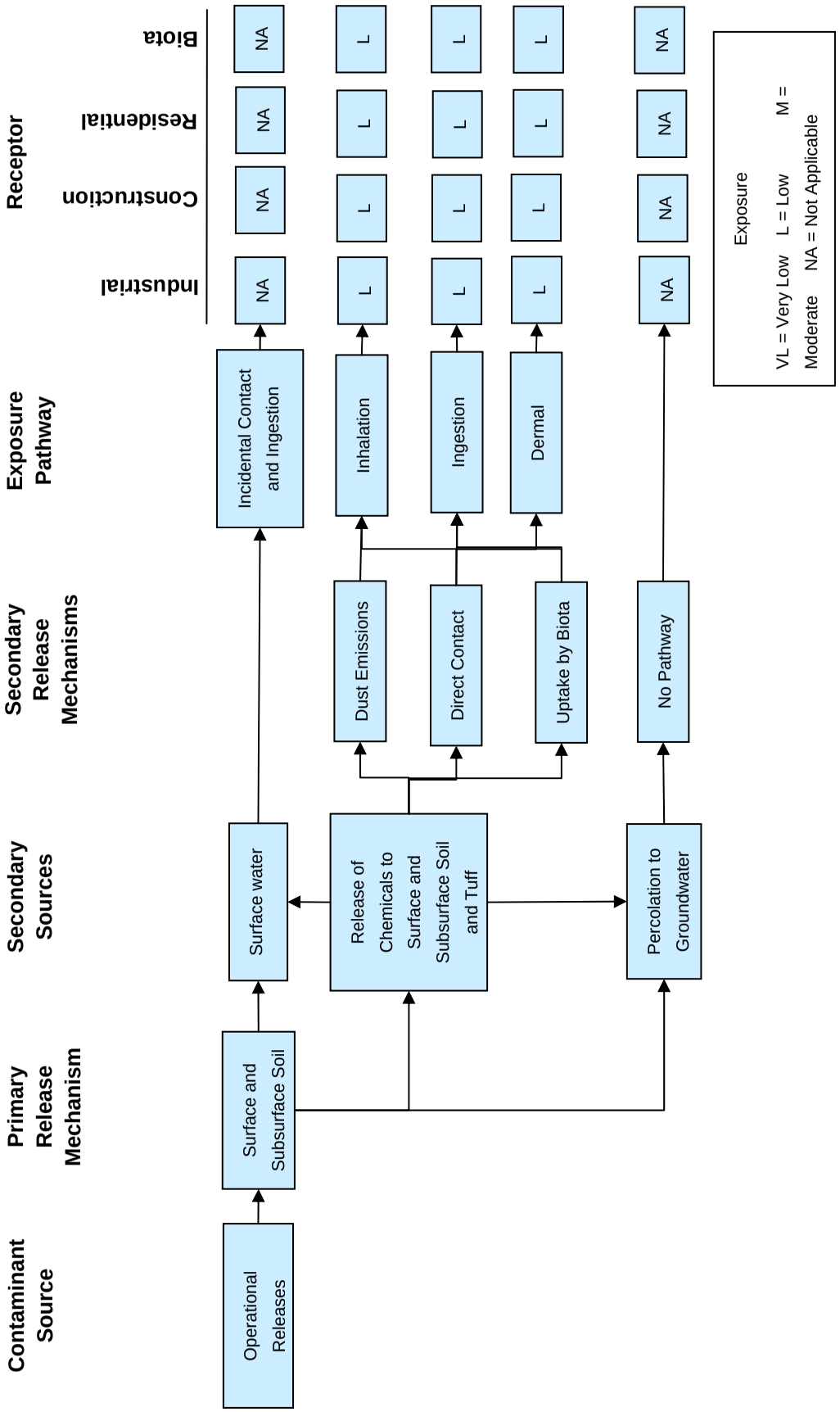



**Figure I-3.1-1 Conceptual site model for Upper Sandia Canyon Site Aggregate Area**

**Table I-2.2-1**
**EPCs for AOC 03-003(n) for the Industrial Scenario**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 4 | 1 | 0.00352(U) | 0.0371(U) | n/a* | 0.0063 | Maximum detected concentration |
| Aroclor-1260 | 4 | 2 | 0.00363(U) | 0.0371(U) | n/a | 0.0095 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-2**
**EPCs for AOC 03-003(n) for Ecological Risk**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 8 | 1 | 0.00352(U) | 0.0371(U) | n/a* | 0.0063 | Maximum detected concentration |
| Aroclor-1260 | 8 | 3 | 0.00363(U) | 0.0371(U) | Normal | 0.00852 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-3**
**EPCs for AOC 03-003(n) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 8 | 1 | 0.00352(U) | 0.0371(U) | n/a* | 0.0063 | Maximum detected concentration |
| Aroclor-1260 | 8 | 3 | 0.00363(U) | 0.0371(U) | Normal | 0.00852 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-4**
**EPCs for SWMU 03-014(q) for the Industrial Scenario**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 3 | 0 | 0.417(U) | 1.02(U) | n/a* | 1.02(U) | Maximum detection limit |
| Lead | 3 | 3 | 60.6 | 69.4 | n/a | 69.4 | Maximum detected concentration |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 3 | 3 | 0.0034 (J) | 0.0256 | n/a | 0.0256 | Maximum detected concentration |
| Aroclor-1260 | 3 | 3 | 0.0092 | 0.123 | n/a | 0.123 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-5**
**EPCs for SWMU 03-014(q) for Ecological Risk**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 6 | 0 | 0.417(U) | 1.02(U) | n/a* | 1.02(U) | Maximum detection limit |
| Lead | 6 | 6 | 7.06 | 69.4 | Normal | 64.1 | 95% Student's-t UCL |
| Selenium | 6 | 0 | 0.959(U) | 1.06(U) | n/a | 1.06(U) | Maximum detection limit |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 6 | 4 | 0.0014 (J) | 0.0256 | Gamma | 0.0146 | 95% KM (BCA) UCL |
| Aroclor-1260 | 6 | 6 | 0.0024(J) | 0.123 | Lognormal | 0.0631 | 95% Chebyshev (MVUE) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-6**
**EPCs for SWMU 03-014(q) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 6 | 0 | 0.417(U) | 1.02(U) | n/a* | 1.02(U) | Maximum detection limit |
| Lead | 6 | 6 | 7.06 | 69.4 | Normal | 64.1 | 95% Student's-t UCL |
| Selenium | 6 | 0 | 0.959(U) | 1.06(U) | n/a | 1.06(U) | Maximum detection limit |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 6 | 4 | 0.0014(J) | 0.0256 | Gamma | 0.0146 | 95% KM (BCA) UCL |
| Aroclor-1260 | 6 | 6 | 0.0024(J) | 0.123 | Lognormal | 0.0631 | 95% Chebyshev (MVUE) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-7**
**EPCs for AOC 03-014(v) for Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Organic Chemicals (mg/kg)** | | | | | | | |
| TPH-DRO | 2 | 2 | 5.7 | 31(J-) | n/a* | 31 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-8**
**EPCs for AOC 03-027 for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 6 | 3 | 0.12(J) | 3.1(U) | Normal | 0.864 | 95% KM (t) UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Butanone[2-] | 6 | 1 | 0.0027(J) | 0.024(U) | n/a* | 0.0027 | Maximum detected concentration |
| Butylbenzene[n-] | 6 | 3 | 0.0003(J) | 0.006(U) | Normal | 0.00117 | 95% KM (t) UCL |
| Butylbenzene[sec-] | 6 | 2 | 0.00035(J) | 0.006(U) | Nonparametric | 0.000847 | 95% KM (t) UCL |
| Isopropylbenzene | 6 | 1 | 0.00021(J) | 0.006(U) | n/a | 0.00021 | Maximum detected concentration |
| Isopropyltoluene[4-] | 6 | 2 | 0.00043(J) | 0.006(U) | Nonparametric | 0.000927 | 95% KM (t) UCL |
| Propylbenzene[1-] | 6 | 2 | 0.00064(J) | 0.006(U) | Nonparametric | 0.000987 | 95% KM (t) UCL |
| Tetrachloroethene | 6 | 1 | 0.00057(J) | 0.006(U) | n/a | 0.00057 | Maximum detected concentration |
| TPH-DRO | 9 | 8 | 1.8(J) | 240(J-) | Gamma | 178.6 | 95% KM (Chebyshev) UCL |
| TPH-GRO | 6 | 3 | 0.038(J-) | 0.17(J-) | Normal | 0.112 | 95% KM (t) UCL |
| Trimethylbenzene[1,2,4-] | 6 | 4 | 0.00044(J) | 0.0058(U) | Normal | 0.00411 | 95% KM (t) UCL |
| Trimethylbenzene[1,3,5-] | 6 | 3 | 0.0011(J) | 0.006(U) | Normal | 0.0052 | 95% KM (t) UCL |
| Xylene (Total) | 6 | 2 | 0.001(J) | 0.006(U) | n/a | 0.001 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-9**
**EPCs for SWMU 03-028 for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Aluminum | 2 | 2 | 6980 | 10500 | n/a* | 10500 | Maximum detected concentration |
| Barium | 2 | 2 | 83.9 | 148 | n/a | 148 | Maximum detected concentration |
| Calcium | 2 | 2 | 2950 | 5020 | n/a | 5020 | Maximum detected concentration |
| Nickel | 2 | 2 | 5.2 | 7.7 | n/a | 7.7 | Maximum detected concentration |
| Selenium | 2 | 2 | 0.47(J-) | 0.68(J-) | n/a | 0.68 | Maximum detected concentration |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Benzoic acid | 2 | 1 | 0.28(J) | 1.9(U) | n/a | 0.28 | Maximum detected concentration |
| Bis(2-ethylhexyl)phthalate | 2 | 1 | 0.079(J) | 0.3 (U) | n/a | 0.079 | Maximum detected concentration |
| Methylene chloride | 2 | 1 | 0.0036(J) | 0.0041(U) | n/a | 0.0036 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-10**
**EPCs for SWMU 03-036(a) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Selenium | 1 | 1 | 0.67(J-) | 0.67(J-) | n/a* | 0.67 | Maximum detected concentration |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Acetone | 1 | 1 | 0.0062(J) | 0.0062(J) | n/a | 0.0062 | Maximum detected concentration |
| Tetrachloroethene | 1 | 1 | 0.00053(J) | 0.00053(J) | n/a | 0.00053 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-11**
**EPCs for SWMU 03-036(c) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Arsenic | 1 | 1 | 5.7 | 5.7 | n/a* | 5.7 | Maximum detected concentration |
| Selenium | 1 | 1 | 0.43(J-) | 0.43(J-) | n/a | 0.43 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-12**
**EPCs for SWMU 03-036(d) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Selenium | 1 | 1 | 0.51(J-) | 0.51(J-) | n/a* | 0.51 | Maximum detected concentration |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Tetrachloroethene | 1 | 1 | 0.00025(J) | 0.00025(J) | n/a | 0.00025 | Maximum detected concentration |
| TPH-GRO | 1 | 1 | 0.86 | 0.86 | n/a | 0.86 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-13**
**EPCs for AOC 03-038(c) for the Industrial Scenario**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 3 | 0 | 1.08(UJ) | 1.12(UJ) | n/a* | 1.12(U) | Maximum detection limit |
| Cobalt | 3 | 3 | 4(J-) | 37.8(J-) | n/a | 37.8 | Maximum detected concentration |
| Lead | 3 | 3 | 21.6(J-) | 83.7(J-) | n/a | 83.7 | Maximum detected concentration |
| Manganese | 3 | 3 | 316(J) | 3280(J) | n/a | 3280 | Maximum detected concentration |
| Silver | 3 | 3 | 0.41(J) | 1.17 | n/a | 1.17 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-14**
**EPCs for AOC 03-038(c) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 6 | 0 | 1.07(UJ) | 1.16(UJ) | n/a* | 1.16(U) | Maximum detection limit |
| Cobalt | 6 | 6 | 4(J-) | 37.8(J-) | Gamma | 27.95 | 95% Approximate Gamma UCL |
| Lead | 6 | 6 | 15.8(J-) | 83.7(J-) | Normal | 62.45 | 95% Student's-t UCL |
| Manganese | 6 | 6 | 186(J) | 3280(J) | Gamma | 2633 | 95% Approximate Gamma UCL |
| Silver | 6 | 6 | 0.352(J) | 1.17 | Normal | 0.911 | 95% Student's-t UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-15**
**EPCs for AOC 03-043(b) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Barium | 1 | 1 | 67.5 | 67.5 | n/a* | 67.5 | Maximum detected concentration |
| Lead | 1 | 1 | 31.7 | 31.7 | n/a | 31.7 | Maximum detected concentration |
| Selenium | 1 | 1 | 0.66(J-) | 0.66(J-) | n/a | 0.66 | Maximum detected concentration |
| Zinc | 1 | 1 | 115 | 115 | n/a | 115 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-16**
**EPCs for SWMU 03-056(l) for the Industrial Scenario**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Copper | 4 | 4 | 5.39 | 29.4 | n/a* | 29.4 | Maximum detected concentration |
| Manganese | 4 | 4 | 240 | 1530 | n/a | 1530 | Maximum detected concentration |

*n/a = Not applicable.

**Table I-2.2-17**
**EPCs for SWMU 03-056(l) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 8 | 0 | 0.05(UJ) | 1.27(U) | n/a* | 1.27(U) | Maximum detection limit |
| Copper | 8 | 8 | 2.62 | 29.4 | Lognormal | 26.77 | 95% H-UCL |
| Manganese | 8 | 8 | 186 (J+) | 1530 | Nonparametric | 1112 | 95% Chebyshev (Mean, Sd) UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Aroclor-1254 | 5 | 1 | 0.0911(U) | 0.0019(J) | n/a | 0.0019 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-18**
**EPCs for AOCs 60-004(b,d) for the Industrial Scenario**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 5 | 5 | 0.521(J) | 1.42 | Normal | 1.33 | 95% Student's-t UCL |
| Barium | 5 | 5 | 50.3 | 431 | Normal | 316.6 | 95% Student's-t UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Benzo(a)anthracene | 5 | 1 | 0.0187(J) | 0.0382(U) | n/a* | 0.0187 | Maximum detected concentration |
| Benzo(b)fluoranthene | 5 | 1 | 0.0347(U) | 0.122 | n/a | 0.122 | Maximum detected concentration |
| Benzo(g,h,i)perylene | 5 | 1 | 0.0133(J) | 0.0382(U) | n/a | 0.0133 | Maximum detected concentration |
| Chrysene | 5 | 1 | 0.018(J) | 0.0382(U) | n/a | 0.018 | Maximum detected concentration |
| Fluoranthene | 5 | 1 | 0.0347(U) | 0.0398 | n/a | 0.0398 | Maximum detected concentration |
| Naphthalene | 5 | 1 | 0.0168(J) | 0.0382(U) | n/a | 0.0168 | Maximum detected concentration |
| Phenanthrene | 5 | 1 | 0.0347(U) | 0.0464 | n/a | 0.0464 | Maximum detected concentration |
| Pyrene | 5 | 1 | 0.0323(J) | 0.0382(U) | n/a | 0.0323 | Maximum detected concentration |
| TPH-DRO | 5 | 4 | 5.54(J) | 24.8 | Normal | 19.87 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-19**
**EPCs for AOCs 60-004(b,d) for Ecological Risk**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 15 | 15 | 0.521(J) | 2.73 | Gamma | 1.451 | 95% Approximate Gamma UCL |
| Barium | 15 | 15 | 48.4 | 431 | Gamma | 200.4 | 95% Approximate Gamma UCL |
| Calcium | 15 | 15 | 793 | 17700 | Nonparametric | 7810 | 95% Chebyshev (Mean, Sd) UCL |
| Chromium | 15 | 15 | 2.58 | 13 | Normal | 8.892 | 95% Student's-t UCL |
| Cobalt | 15 | 15 | 1.21 | 7.83 | Gamma | 5.51 | 95% Approximate Gamma UCL |
| Copper | 15 | 15 | 2.68 | 8.94(J) | Normal | 6.827 | 95% Student's-t UCL |
| Iron | 15 | 15 | 7160 | 17000 | Normal | 13745 | 95% Student's-t UCL |
| Lead | 15 | 15 | 4.33 | 23.9 | Normal | 14.19 | 95% Student's-t UCL |
| Manganese | 15 | 15 | 136 | 499 | Normal | 381.7 | 95% Student's-t UCL |
| Nickel | 15 | 15 | 2.18 | 10.5 | Normal | 7.493 | 95% Student's-t UCL |
| Selenium | 15 | 0 | 0.98(U) | 1.13(U) | n/a* | 1.13(U) | Maximum detection limit |
| Vanadium | 15 | 15 | 7.44 | 30 | Gamma | 23.03 | 95% Approximate Gamma UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Acetone | 15 | 6 | 0.00174(J) | 0.0147(J) | Normal | 0.0063 | 95% KM (t) UCL |
| Benzo(a)anthracene | 15 | 1 | 0.0187(J) | 0.0382(U) | n/a | 0.0187 | Maximum detected concentration |
| Benzo(b)fluoranthene | 15 | 1 | 0.0342(U) | 0.122 | n/a | 0.122 | Maximum detected concentration |
| Benzo(g,h,i)perylene | 15 | 1 | 0.0133(J) | 0.0382(U) | n/a | 0.0133 | Maximum detected concentration |
| Butanone[2-] | 15 | 3 | 0.00288(J) | 0.00792(J) | Normal | 0.00411 | 95% KM (t) UCL |
| Chrysene | 15 | 1 | 0.018(J) | 0.0382(U) | n/a | 0.018 | Maximum detected concentration |
| Fluoranthene | 15 | 1 | 0.0342(U) | 0.0398 | n/a | 0.0398 | Maximum detected concentration |
| Naphthalene | 15 | 1 | 0.0168(J) | 0.0382(U) | n/a | 0.0168 | Maximum detected concentration |
| Phenanthrene | 15 | 1 | 0.0342(U) | 0.0464 | n/a | 0.0464 | Maximum detected concentration |
| Pyrene | 15 | 1 | 0.0323(J) | 0.0382(U) | n/a | 0.0323 | Maximum detected concentration |
| TPH-DRO | 15 | 6 | 3.49(J) | 24.8 | Gamma | 9.887 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-20**
**EPCs for AOCs 60-004(b,d) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Aluminum | 20 | 20 | 671(J+) | 23700(J+) | Gamma | 10757 | 95% Approximate Gamma UCL |
| Antimony | 20 | 18 | 0.341(J) | 2.73 | Gamma | 1.236 | 95% KM (BCA) UCL |
| Barium | 20 | 20 | 12.4(J) | 431 | Gamma | 167.7 | 95% Approximate Gamma UCL |
| Beryllium | 20 | 20 | 0.251 | 1.44 | Normal | 0.832 | 95% Student's-t UCL |
| Calcium | 20 | 20 | 498 | 17700 | Nonparametric | 6199 | 95% Chebyshev (Mean, Sd) UCL |
| Chromium | 20 | 20 | 1.16 | 13 | Gamma | 7.885 | 95% Approximate Gamma UCL |
| Cobalt | 20 | 20 | 0.253(J) | 7.83 | Gamma | 4.751 | 95% Approximate Gamma UCL |
| Copper | 20 | 18 | 0.949(U) | 8.94(J) | Gamma | 5.945 | 95% KM (BCA) UCL |
| Iron | 20 | 20 | 6980 | 17000 | Normal | 12616 | 95% Student's-t UCL |
| Lead | 20 | 20 | 3.43 | 23.9 | Normal | 13.23 | 95% Student's-t UCL |
| Magnesium | 20 | 20 | 187 | 2460 | Normal | 1655 | 95% Student's-t UCL |
| Manganese | 20 | 20 | 62 | 499 | Normal | 355.7 | 95% Student's-t UCL |
| Nickel | 20 | 20 | 1.76 | 10.5 | Normal | 6.79 | 95% Student's-t UCL |
| Selenium | 20 | 2 | 0.567(J) | 1.13(U) | n/a* | 0.613 | Maximum detected concentration |
| Vanadium | 20 | 20 | 1.95 | 30 | Gamma | 19.72 | 95% Approximate Gamma UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Acetone | 20 | 6 | 0.0017 (J) | 0.0147(J) | Normal | 0.00561 | 95% KM (t) UCL |
| Benzo(a)anthracene | 20 | 1 | 0.0187(J) | 0.0382(U) | n/a | 0.0187 | Maximum detected concentration |
| Benzo(b)fluoranthene | 20 | 1 | 0.0336(U) | 0.122 | n/a | 0.122 | Maximum detected concentration |
| Benzo(g,h,i)perylene | 20 | 1 | 0.0133(J) | 0.0382(U) | n/a | 0.0133 | Maximum detected concentration |
| Butanone[2-] | 20 | 3 | 0.00288(J) | 0.00792(J) | Normal | 0.00387 | 95% KM (t) UCL |
| Chrysene | 20 | 1 | 0.018(J) | 0.0382(U) | n/a | 0.018 | Maximum detected concentration |
| Fluoranthene | 20 | 1 | 0.0336(U) | 0.0398 | n/a | 0.0398 | Maximum detected concentration |
| Hexanone[2-] | 20 | 1 | 0.00202(J) | 0.00573(UJ) | n/a | 0.00202 | Maximum detected concentration |

**Table I-2.2-20 (continued)**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| Naphthalene | 20 | 1 | 0.0168(J) | 0.0382(U) | n/a | 0.0168 | Maximum detected concentration |
| Phenanthrene | 20 | 1 | 0.0336(U) | 0.0464 | n/a | 0.0464 | Maximum detected concentration |
| Pyrene | 20 | 1 | 0.0323(J) | 0.038 (U) | n/a | 0.0323 | Maximum detected concentration |
| TPH-DRO | 20 | 8 | 3.49(J) | 24.8 | Lognormal | 8.398 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-21**
**EPCs for AOC C-03-16 for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 4 | 1 | 0.2(J) | 1.15(U) | n/a* | 0.2 | Maximum detected concentration |
| Copper | 4 | 4 | 1.03(J) | 9.5 | n/a | 9.5 | Maximum detected concentration |
| Lead | 4 | 4 | 5.46 | 31.5 | n/a | 31.5 | Maximum detected concentration |
| Manganese | 4 | 4 | 72.5 (J) | 1490 | n/a | 1490 | Maximum detected concentration |
| Selenium | 4 | 3 | 0.37(J-) | 1.2(U) | n/a | 0.48 | Maximum detected concentration |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Bis(2-ethylhexyl)phthalate | 4 | 2 | 0.13(J) | 0.52(U) | n/a | 0.15 | Maximum detected concentration |
| TPH-DRO | 4 | 2 | 8(U) | 7100 | n/a | 7100 | Maximum detected concentration |
| TPH-GRO | 4 | 3 | 0.0196(J) | 770 | n/a | 770 | Maximum detected concentration |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-2.2-22**
**EPCs for AOC 03-036(b) for the Construction Worker and Residential Scenarios**

| COPC | Number of Analyses | Number of Detects | Minimum Concentration | Maximum Concentration | Distribution | EPC | EPC Method |
|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | |
| Antimony | 12 | 2 | 0.19 | 0.537 | Nonparametric | 0.388 | 95% KM (t) UCL |
| Calcium | 12 | 12 | 496 | 6250 | Gamma | 3243 | 95% Approximate Gamma UCL |
| Copper | 12 | 12 | 1.06 | 5.9 | Normal | 4.175 | 95% Student's-t UCL |
| Lead | 12 | 12 | 2.28 | 27.3 | Normal | 15 | 95% Student's-t UCL |
| Manganese | 12 | 12 | 165 | 533 | Normal | 400.7 | 95% Student's-t UCL |
| Selenium | 12 | 5 | 0.35 | 1.2 | Nonparametric | 0.689 | 95% KM (t) UCL |
| Zinc | 12 | 12 | 38.4 | 64.5 | Normal | 56.04 | 95% Student's-t UCL |
| **Organic Chemicals (mg/kg)** | | | | | | | |
| Acetone | 12 | 2 | 0.0026(J) | 0.026(U) | n/a* | 0.00432 | Maximum detected concentration |
| Isopropyltoluene[4-] | 12 | 1 | 0.00103(U) | 0.0066(U) | n/a | 0.00527 | Maximum detected concentration |
| Methylene chloride | 12 | 2 | 0.00263(J) | 0.0066(U) | Nonparametric | 0.0027 | 95% KM (t) UCL |
| Methylnaphthalene[2-] | 12 | 2 | 0.0362(U) | 0.61 | n/a | 0.61 | Maximum detected concentration |
| Phenanthrene | 12 | 1 | 0.0362(U) | 0.42(U) | n/a | 0.092 | Maximum detected concentration |
| Tetrachloroethene | 12 | 1 | 0.00075(J) | 0.0066(U) | n/a | 0.00075 | Maximum detected concentration |
| TPH-DRO | 12 | 3 | 2.69(J) | 51 | Nonparametric | 21.18 | 95% KM (t) UCL |
| TPH-GRO | 12 | 9 | 0.0142(J) | 0.64 | Nonparametric | 0.306 | 95% KM (t) UCL |
| Trimethylbenzene[1,2,4-] | 12 | 2 | 0.000474 | 0.0066(U) | Nonparametric | 0.000869 | 95% KM (t) UCL |

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

**Table I-3.2-1**
**Physical and Chemical Properties of**
**Inorganic COPCs for Upper Sandia Canyon Aggregate Area**

| COPC | $K_d$[a] ($cm^3/g$) | Water Solubility[a,b] (g/L) |
|---|---|---|
| Aluminum | 1500 | Insoluble |
| Antimony | 45 | Insoluble |
| Arsenic | 29 | Insoluble |
| Barium | 41 | Insoluble |
| Beryllium | 790 | Insoluble |
| Cadmium | 75 | Insoluble |
| Calcium | na[c] | na |
| Chromium | 850 | Insoluble |
| Cobalt | 45 | Insoluble |
| Copper | 35 | Insoluble |
| Cyanide (total) | 9.9 | na |
| Iron | 25 | Insoluble |
| Lead | 900 | Insoluble |
| Manganese | 65 | Insoluble |
| Mercury | 52 | Insoluble |
| Nickel | 65[d] | Insoluble |
| Selenium | 5 | Insoluble |
| Silver | 8.3 | Insoluble |
| Thallium | 71[e] | Insoluble |
| Vanadium | 1000 | Insoluble |
| Zinc | 62 | Insoluble |

[a] Information from http://rais.ornl.gov/cgi-bin/tox/TOX_select?select=nrad.

[b] Denotes reference information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] na = Not available.

[d] As nickel salts.

[e] As thallium salts.

**Table I-3.2-2**
**Physical and Chemical Properties of Organic COPCs for Upper Sandia Canyon Aggregate Area**

| COPC | Water Solubility[a] (mg/L) | Organic Carbon Coefficient $K_{oc}$[a] (L/kg) | Log Octanol-Water Partition Coefficient $K_{ow}$[a] | Vapor Pressure[a] (mm Hg at 25°C) |
|---|---|---|---|---|
| Acetone | 1.00E+06[b] | 1.98E+00 | -2.40E-01[b] | 2.31E+02[b] |
| Aroclor-1254 | 3.40E-03[b] | 5.30E+05[c] | 6.79E+00[b] | 6.53E-06[b] |
| Aroclor-1260 | 2.84E-04[b] | 5.30E+05[c] | 8.27E+00[b] | 4.05E-05[b] |
| Benzo(a)anthracene | 9.40E-03[b] | 2.31E+05 | 5.76+00[b] | 1.90E-06[b] |
| Benzo(b)fluoranthene | 1.50E-03[b] | 8.03E+05 | 5.78E+00[b] | 5.00E-07[b] |
| Benzo(g,h,i)perylene | 2.60E-04[b] | 2.68E+06 | 6.63E+00[b] | 1.00E-10[b] |
| Benzoic acid | 3.40E+03[b] | 1.45E+01 | 1.87E+00[b] | 7.00E-04[b] |
| Bis(2-ethylhexyl)phthalate | 2.70E-01[b] | 1.65E+05 | 7.60E+00[b] | 1.42E-07[b] |
| Butanone[2-] | 2.23E+05 | 3.83E+00 | 2.90E-01 | 9.06E+01 |
| Butylbenzene[n-] | 1.18E+01 | 1.76E+03 | 4.38E+00 | 1.06E+00 |
| Butylbenzene[sec] | 1.76E+01 | 1.58E+03 | 4.57E+00 | 1.75E+00 |
| Chrysene | 6.30E-03[b] | 2.36E+05 | 5.81E+00[b] | 6.23E-09[b] |
| Fluoranthene | 2.06E-01[c] | 7.09E+04[c] | 5.16E+00[c] | 9.22E-06[c] |
| Hexanone[2-] | 1.75E+04 | 1.30E+01 | 1.38E+00 | 1.16E+01 |
| Isopropylbenzene | 6.13E+01 | 6.98E+02 | 3.66E+00 | 4.50E+00 |
| Isopropyltoluene[4-] | 2.34E+01[b] | na[d] | 4.10E+00[b] | 1.64E+00[b] |
| Naphthalene | 3.10E+01 | 1.84E+03 | 3.30E+00 | 8.50E-02 |
| Phenanthrene | 1.15E+00[b] | 2.08E+04 | 4.46E+00[b] | 1.12E-04[b] |
| Propylbenzene[1-] | 5.22E+01 | 9.55E+02 | 3.69E+00 | 3.42E+00 |
| Pyrene | 1.35E-01[b] | 6.94E+04 | 4.88E+00[b] | 4.50E-06[b] |
| Tetrachloroethene | 2.06E+02 | 9.49E+01 | 3.40E+00 | 1.85E+01 |
| Toluene | 5.26E+02 | 2.68E+02 | 2.73E+00 | 2.84E+01 |
| TPH-DRO | na | na | na | na |
| TPH-GRO | na | na | na | na |
| Trimethylbenzene[1,2,4-] | 5.70E+01 | 7.18E+02 | 3.63E+00 | 2.10E+00 |
| Trimethylbenzene[1,3,5-] | 4.82E+01 | 6.02E+02 | 3.42E+00 | 2.10E+00 |
| Xylene (Total) | 1.78E+02 | 3.83E+02 | 3.12E+00 | 7.99E+00 |

[a] Information from http://rais.ornl.gov/cgi-bin/tools/TOX_search, unless noted otherwise.

[b] Information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] Information from NMED (2009, 108070).

[d] na = Not available.

**Table I-4.1-1**
**Exposure Parameter Values Used to Calculate**
**Chemical SSLs for the Industrial, Construction Worker, and Residential Scenarios**

| Parameters | Residential Values | Industrial Values | Construction Worker Values |
|---|---|---|---|
| Target HQ | 1 | 1 | 1 |
| Target cancer risk | $10^{-5}$ | $10^{-5}$ | $10^{-5}$ |
| Averaging time (carcinogen) | 70 yr × 5 d | 70 yr × 365 d | 70 yr × 365 d |
| Averaging time (noncarcinogen) | Exposure duration × 365 d | Exposure duration × 365 d | Exposure duration × 365 d |
| Skin absorption factor | SVOC = 0.1 | SVOC = 0.1 | SVOC = 0.1 |
| | Chemical-specific | Chemical-specific | Chemical-specific |
| Adherence factor–child | 0.2 mg/cm$^2$ | n/a[a] | n/a |
| Body weight–child | 15 kg (0–6 yr of age) | n/a | n/a |
| Cancer slope factor–oral (chemical-specific) | (mg/kg-d)$^{-1}$ | (mg/kg-d)$^{-1}$ | (mg/kg-d)$^{-1}$ |
| Inhalation unit risk (chemical-specific) | (µg/m$^3$) | (µg/m$^3$) | (µg/m$^3$) |
| Exposure frequency | 350 d/yr | 225 d/yr | 250 d/yr |
| Exposure time | 24 hr/d | 8 hr/day | 8 hr/d |
| Exposure duration–child | 6 yr | n/a | n/a |
| Age-adjusted ingestion factor | 114 mg-yr/kg-d | n/a | n/a |
| Age-adjusted inhalation factor | 11 m$^3$-yr/kg-d | n/a | n/a |
| Inhalation rate–child | 10 m$^3$/day | n/a | n/a |
| Soil ingestion rate–child | 200 mg/d | n/a | n/a |
| Particulate emission factor | 6.61 × 10$^9$ m$^3$/kg | 6.61 × 10$^9$ m$^3$/kg | 2.1 ×10$^6$ m$^3$/kg |
| Reference dose–oral (chemical-specific) | (mg/kg-d) | (mg/kg-d) | (mg/kg-d) |
| Reference dose–inhalation (chemical-specific) | (mg/kg-d) | (mg/kg-d) | (mg/kg-d) |
| Exposed surface area–child | 2800 cm$^2$/d | n/a | n/a |
| Age-adjusted skin contact factor for carcinogens | 361 mg-yr/kg-d | n/a | n/a |
| Volatilization factor for soil (chemical-specific) | (m$^3$/kg) | (m$^3$/kg) | (m$^3$/kg) |
| Body weight–adult | 70 kg | 70 kg | 70 kg |
| Exposure duration[b] | 30 yr | 25 yr | 1 yr |
| Adherence factor–adult | 0.07 mg/cm$^2$ | 0.2 mg/cm$^2$ | 0.3 mg/cm$^2$ |
| Soil ingestion rate–adult | 100 mg/d | 100 mg/d | 330 mg/d |
| Exposed surface area–adult | 5700 cm$^2$/d | 3300 cm$^2$/d | 3300 cm$^2$/d |
| Inhalation rate–adult | 20 m$^3$/d | 20 m$^3$/d | 20 m$^3$/d |

Note: Parameter values from NMED (2009, 108070).

[a] n/a = Not applicable.

[b] Exposure duration for lifetime resident is 30 yr. For carcinogens, the exposures are combined for child (6 yr) and adult (24 yr).

**Table I-4.2-1**
**Industrial Carcinogenic**
**Screening Evaluation for AOC 03-003(n)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | Excess Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 0.0063 | 8.26E+00 | 8E-09 |
| Aroclor-1260 | 0.0095 | 8.26E+00 | 1E-08 |
| **Total Excess Cancer Risk** | | | **2E-08** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-2**
**Construction Worker Carcinogenic**
**Screening Evaluation for AOC 03-003(n)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Excess Cancer Risk |
|---|---|---|---|
| Aroclor-1260 | 0.00852 | 7.58E+01 | 1E-09 |
| **Total Excess Cancer Risk** | | | **1E-09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-3**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC 03-003(n)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aroclor-1254 | 0.0063 | 4.36E+00 | 1E-03 |
| **HI** | | | **0.001** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-4**
**Residential Carcinogenic**
**Screening Evaluation for AOC 03-003(n)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Excess Cancer Risk |
|---|---|---|---|
| Aroclor-1260 | 0.00852 | 7.58E+01 | 4E-08 |
| **Total Excess Cancer Risk** | | | **4E-08** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-5**
**Residential Noncarcinogenic**
**Screening Evaluation for AOC 03-003(n)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aroclor-1254 | 0.0063 | 4.36E+00 | 6E-03 |
| | | **HI** | **0.006** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-6**
**Industrial Carcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Aroclor-1254 | 0.0256 | 8.26E+00 | 3E-08 |
| Aroclor-1260 | 0.123 | 8.26E+00 | 1E-07 |
| | | **Total Excess Cancer Risk** | **1E-07** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-7**
**Industrial Noncarcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.02 | 4.54E+02 | 2E-03 |
| Lead | 69.4 | 8.00E+02 | 9E-02 |
| | | **HI** | **0.09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-8**
**Construction Worker Carcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Aroclor-1260 | 0.123 | 7.58E+01 | 8E-09 |
| | | **Total Excess Cancer Risk** | **8E-09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-9**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aroclor-1254 | 0.0146 | 4.36E+00 | 3E-03 |
| Antimony | 1.02 | 1.24E+02 | 8E-03 |
| Lead | 64.1 | 8.00E+02 | 8E-02 |
| Selenium | 1.06 | 1.55E+03 | 7E-04 |
| | | **HI** | **0.09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-10**
**Residential Carcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Aroclor-1260 | 0.0631 | 2.22E+00 | 3E-07 |
| | | **Total Excess Cancer Risk** | **3E-07** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-11**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-014(q)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aroclor-1254 | 0.0146 | 1.12E+00 | 1E-02 |
| Antimony | 1.02 | 3.13E+01 | 3E-02 |
| Lead | 64.1 | 4.00E+02 | 2E-01 |
| Selenium | 1.06 | 3.91E+02 | 3E-03 |
| | | **HI** | **0.2** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-12**
**Construction Worker TPH Screening Evaluation for AOC 03-014(v)**

| COPC | EPC (mg/kg) | Construction Worker* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 31 | 1120 | 3E-02 |
| | | **HI** | **3E-02** |

*Screening guideline for industrial diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-13**
**Residential TPH Screening Evaluation for AOC 03-014(v)**

| COPC | EPC (mg/kg) | Residential* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 31 | 5.20E+02 | 6E-02 |
| | | **HI** | **6E-02** |

*Screening guideline for diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-14**
**Construction Worker Carcinogenic**
**Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00057 | 3.38E+02 | 2E-11 |
| | | **Total Excess Cancer Risk** | **2E-11** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-15**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Construction Worker SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.864 | 1.24E+02 | 7E-03 |
| Butanone[2-] | 0.0027 | 1.48E+05 | 2E-08 |
| Butylbenzene[n-] | 0.00117 | 2.01E+04[b] | 6E-08 |
| Butylbenzene[sec-] | 0.000847 | 1.80E+04[b] | 5E-08 |
| Isopropylbenzene | 0.00021 | 1.03E+04 | 2E-08 |
| Isopropyltoluene[4-] | 0.000927 | 1.03E+04[c] | 9E-08 |
| Propylbenzene[1-] | 0.000987 | 2.01E+04[b] | 5E-08 |
| Trimethylbenzene[1,2,4-] | 0.00411 | 6.88E+02[b] | 6E-06 |
| Trimethylbenzene[1,3,5-] | 0.0052 | 3.10E+03[b] | 2E-06 |
| Xylene (Total) | 0.001 | 3.20E+03[b] | 3E-07 |
| | | **HI** | **0.007** |

[a] SSLs from NMED (2009, 108070).

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] Isopropylbenzene SSL used.

**Table I-4.2-16**
**Residential Carcinogenic**
**Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00057 | 6.99E+00 | 8E-10 |
| **Total Excess Cancer Risk** | | | **8E-10** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-17**
**Residential Noncarcinogenic**
**Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Residential SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.864 | 3.13E+01 | 3E-02 |
| Butanone[2-] | 0.0027 | 3.96E+04 | 7E-08 |
| Butylbenzene[n-] | 0.00117 | 1.40E+02[b] | 8E-06 |
| Butylbenzene[sec-] | 0.000847 | 1.10E+02[b] | 8E-06 |
| Isopropylbenzene | 0.00021 | 3.21E+03 | 7E-08 |
| Propylbenzene[1-] | 0.000987 | 3.40E+03[c] | 3E-07 |
| Isopropyltoluene[4-] | 0.000927 | 3.21E+03[d] | 3E-07 |
| Trimethylbenzene[1,2,4-] | 0.00411 | 6.20E+01 | 7E-05 |
| Trimethylbenzene[1,3,5-] | 0.0052 | 7.80E+02 | 7E-06 |
| Xylene (Total) | 0.001 | 1.09E+03 | 9E-07 |
| **HI** | | | **0.03** |

[a] SSLs from NMED (2009, 108070).

[b] EPA Region 6 SSL (EPA 2007, 099314).

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[d] Isopropylbenzene SSL used.

**Table I-4.2-18**
**Construction Worker TPH Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Construction Worker* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 178.6 | 1120 | 2E-01 |
| **HI** | | | **0.2** |

*Screening guidelines for industrial diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-19**
**Residential TPH Screening Evaluation for AOC 03-027**

| COPC | EPC (mg/kg) | Residential* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 178.6 | 5.20E+02 | 3E-01 |
| | | **HI** | **0.3** |

*Screening guidelines for diesel No. 2 from NMED (NMED 2006, 094614).

**Table I-4.2-20**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-028**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aluminum | 10500 | 4.07E+04 | 3E-01 |
| Barium | 148 | 4.35E+03 | 3E-02 |
| Nickel | 7.7 | 6.19E+03 | 1E-03 |
| Selenium | 0.68 | 1.55E+03 | 4E-04 |
| Benzoic acid | 0.28 | 9.52E+05 | 3E-07 |
| Bis(2-ethylhexyl)phthalate | 0.079 | 4.76E+03 | 2E-05 |
| Methylene chloride | 0.0036 | 1.06E+04 | 3E-07 |
| | | **HI** | **0.3** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-21**
**Residential Carcinogenic**
**Screening Evaluation for SWMU 03-028**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Bis(2-ethylhexyl)phthalate | 0.079 | 3.47E+02 | 2E-09 |
| Methylene chloride | 0.0036 | 1.99E+02 | 2E-10 |
| | | **Total Excess Cancer Risk** | **2E-9** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-22**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-028**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Aluminum | 10500 | 7.81E+04 | 1E-01 |
| Barium | 148 | 1.56E+04 | 9E-03 |
| Nickel | 7.7 | 1.56E+03 | 5E-03 |
| Selenium | 0.68 | 3.91E+02 | 2E-03 |
| Benzoic acid | 0.28 | 2.40E+05 | 1E-06 |
| | | **HI** | **0.2** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-23**
**Construction Worker Carcinogenic**
**Screening Evaluation for SWMU 03-036(a)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00053 | 3.38E+02 | 2E-11 |
| | | **Total Excess Cancer Risk** | **2E-11** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-24**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(a)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Selenium | 0.67 | 1.55E+03 | 4E-04 |
| Acetone | 0.0062 | 2.63E+05 | 2E-08 |
| | | **HI** | **0.0004** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-25**
**Residential Carcinogenic**
**Screening Evaluation for SWMU 03-036(a)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00053 | 6.99E+00 | 8E-10 |
| | | **Total Excess Cancer Risk** | **8E-10** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-26**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(a)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Selenium | 0.67 | 3.91E+02 | 2E-03 |
| Acetone | 0.0062 | 6.75E+04 | 9E-08 |
| | | **HI** | **0.002** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-27**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(c)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Arsenic | 5.7 | 6.54E+01 | 9E-02 |
| Selenium | 0.43 | 1.55E+03 | 3E-04 |
| | | **HI** | **0.09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-28**
**Residential Carcinogenic**
**Screening Evaluation for SWMU 03-036(c)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Arsenic | 5.7 | 3.90E+00 | 1E-05 |
| | | **Total Excess Cancer Risk** | **1E-5** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-29**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(c)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Selenium | 0.43 | 3.91E+02 | 1E-03 |
| | | **HI** | **0.001** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-30**
**Construction Worker Carcinogenic**
**Screening Evaluation for SWMU 03-036(d)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00025 | 3.38E+02 | 7E-12 |
| **Total Excess Cancer Risk** | | | **7E-12** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-31**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(d)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Selenium | 0.51 | 1.55E+03 | 3E-04 |
| **HI** | | | **0.0003** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-32**
**Residential Carcinogenic**
**Screening Evaluation for SWMU 03-036(d)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00025 | 6.99E+00 | 4E-10 |
| **Total Excess Cancer Risk** | | | **4E-10** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-33**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-036(d)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Selenium | 0.51 | 3.91E+02 | 1E-03 |
| **HI** | | | **0.001** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-34**
**Industrial Noncarcinogenic**
**Screening Evaluation for AOC 03-038(c)**

| COPC | EPC (mg/kg) | Industrial SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.12(U) | 4.54E+02[b] | 2E-03 |
| Cobalt | 37.8 | 3.00E+02 | 1E-01 |
| Lead | 83.7 | 8.00E+02 | 1E-01 |
| Manganese | 3280 | 1.45E+05 | 2E-02 |
| Silver | 1.17 | 5.68E+03 | 2E-04 |
| | | **HI** | **0.3** |

[a] SSLs from NMED (2009, 108070).

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

**Table I-4.2-35**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC 03-038(c)**

| COPC | EPC (mg/kg) | Construction Worker SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.16(U) | 1.24E+02 | 9E-03 |
| Cobalt | 27.95 | 3.46E+01[b] | 8E-01 |
| Lead | 62.45 | 8.00E+02 | 8E-02 |
| Manganese | 2633 | 4.63E+02 | 6E+00 |
| Silver | 0.911 | 1.55E+03 | 6E-04 |
| | | **HI** | **7** |

[a] SSLs from NMED (2009, 108070).

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table I-4.2-36**
**Residential Noncarcinogenic**
**Screening Evaluation for AOC 03-038(c)**

| COPC | EPC (mg/kg) | Residential SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.16(U) | 3.13E+01 | 4E-02 |
| Cobalt | 27.95 | 2.30E+01[b] | 1E+00 |
| Lead | 62.45 | 4.00E+02 | 2E-01 |
| Manganese | 2633 | 1.07E+04 | 2E-01 |
| Silver | 0.911 | 3.91E+02 | 2E-03 |
| | | **HI** | **2** |

[a] SSLs from NMED (2009, 108070).

[b] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

**Table I-4.2-37**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC 03-043(b)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Barium | 67.5 | 4.35E+03 | 2E-02 |
| Lead | 31.7 | 8.00E+02 | 4E-02 |
| Selenium | 0.66 | 1.55E+03 | 4E-04 |
| Zinc | 115 | 9.29E+04 | 1E-03 |
| | | **HI** | **0.06** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-38**
**Residential Noncarcinogenic**
**Screening Evaluation for AOC 03-043(b)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Barium | 67.5 | 1.56E+04 | 4E-03 |
| Lead | 31.7 | 4.00E+02 | 8E-02 |
| Selenium | 0.66 | 3.91E+02 | 2E-03 |
| Zinc | 115 | 2.35E+04 | 5E-03 |
| | | **HI** | **0.09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-39**
**Industrial Noncarcinogenic**
**Screening Evaluation for SWMU 03-056(l)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | HQ |
|---|---|---|---|
| Copper | 29.4 | 4.54E+04 | 6E-04 |
| Manganese | 1530 | 1.45E+05 | 1E-02 |
| | | **HI** | **0.01** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-40**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for SWMU 03-056(l)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.27(U) | 1.24E+02 | 1E-02 |
| Copper | 26.77 | 1.24E+04 | 2E-03 |
| Manganese | 1112 | 4.63E+02 | 2E+00 |
| Aroclor-1254 | 0.0019 | 4.36E+00 | 4E-04 |
| | | **HI** | **2** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-41**
**Residential Noncarcinogenic**
**Screening Evaluation for SWMU 03-056(l)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.27(U) | 3.13E+01 | 4E-02 |
| Copper | 26.77 | 3.13E+03 | 9E-03 |
| Manganese | 1112 | 1.07E+04 | 1E-01 |
| Aroclor-1254 | 0.0019 | 1.12E+00 | 2E-03 |
| | | **HI** | **0.2** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-42**
**Industrial Carcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Industrial SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Benzo(a)anthracene | 0.0187 | 2.34E+01 | 8E-09 |
| Benzo(b)fluoranthene | 0.122 | 2.34E+01 | 5E-08 |
| Chrysene | 0.018 | 2.34E+03 | 8E-11 |
| Naphthalene | 0.0168 | 2.52E+02 | 7E-10 |
| **Total Excess Cancer Risk** | | | **6E-08** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-43**
**Industrial Noncarcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Industrial SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 1.33 | 4.54E+02 | 3E-03 |
| Barium | 316.6 | 2.24E+05 | 1E-03 |
| Benzo(g,h,i)perylene | 0.0133 | 1.83E+04[b] | 7E-07 |
| Fluoranthene | 0.0398 | 2.44E+04 | 2E-06 |
| Phenanthrene | 0.0464 | 2.05E+04 | 2E-06 |
| Pyrene | 0.0323 | 1.83E+04 | 2E-06 |
| **HI** | | | **0.004** |

[a] SSLs from NMED (2009, 108070).

[b] Pyrene SSL used as surrogate based on structural similarity.

**Table I-4.2-44**
**Construction Worker Carcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Benzo(a)anthracene | 0.0187 | 2.13E+02 | 9E-10 |
| Benzo(b)fluoranthene | 0.122 | 2.13E+02 | 6E-09 |
| Chrysene | 0.018 | 2.06E+04 | 9E-07 |
| **Total Excess Cancer Risk** | | | **7E-09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-45**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Construction Worker SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Aluminum | 10757 | 4.07E+04 | 3E-01 |
| Antimony | 1.236 | 1.24E+02 | 1E-02 |
| Barium | 167.7 | 4.35E+03 | 4E-02 |
| Beryllium | 0.832 | 1.44E+02 | 6E-03 |
| Chromium | 7.885 | 4.49E+02[b] | 2E-02 |
| Cobalt | 4.751 | 3.49E+01[c] | 1E-01 |
| Copper | 5.945 | 1.24E+04 | 5E-04 |
| Iron | 12616 | 2.17E+05 | 6E-02 |
| Lead | 13.23 | 8.00E+02 | 2E-02 |
| Manganese | 355.7 | 4.63E+02 | 8E-01 |
| Nickel | 6.79 | 6.19E+03 | 1E-03 |
| Selenium | 0.63 | 1.55E+03 | 4E-04 |
| Vanadium | 19.72 | 1.55E+03 | 1E-02 |
| Acetone | 0.00561 | 2.63E+05 | 2E-08 |
| Benzo(g,h,i)perylene | 0.0133 | 6.68E+03[d] | 2E-11 |
| Butanone[2-] | 0.00387 | 1.48E+05 | 3E-08 |
| Fluoranthene | 0.0398 | 8.91E+03 | 4E-06 |
| Hexanone[2-] | 0.00202 | 1.48E+05[e] | 1E-08 |
| Naphthalene | 0.0168 | 7.02E+02 | 2E-05 |
| Phenanthrene | 0.0464 | 7.15E+03 | 6E-06 |
| Pyrene | 0.0323 | 6.68E+03 | 5E-06 |
| | | **HI** | **1** |

[a] SSLs from NMED (2009, 108070).

[b] SSL for chromium(VI) (NMED 2009, 108070).

[c] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[d] Pyrene SSL used as surrogate based on structural similarity.

[e] Butanone[2-] used as a surrogate based on structural similarity.

**Table I-4.2-46**
**Residential Carcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Benzo(a)anthracene | 0.0187 | 6.21E+00 | 3E-08 |
| Benzo(b)fluoranthene | 0.122 | 6.21E+00 | 2E-07 |
| Chrysene | 0.018 | 6.21E+02 | 3E-10 |
| Naphthalene | 0.0168 | 4.50E+01 | 4E-09 |
| **Total Excess Cancer Risk** | | | **2E-07** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-47**
**Residential Noncarcinogenic**
**Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Residential SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Aluminum | 10757 | 7.81E+04 | 1E-01 |
| Antimony | 1.236 | 3.13E+01 | 4E-02 |
| Barium | 167.7 | 1.56E+04 | 1E-02 |
| Beryllium | 0.832 | 1.56E+02 | 5E-03 |
| Chromium | 7.885 | 2.19E+02[b] | 4E-02 |
| Cobalt | 4.751 | 2.30E+01[c] | 2E-01 |
| Copper | 5.945 | 3.13E+03 | 2E-03 |
| Iron | 12616 | 5.48E+04 | 2E-01 |
| Lead | 13.23 | 4.00E+02 | 3E-02 |
| Manganese | 355.7 | 1.07E+04 | 3E-02 |
| Nickel | 6.79 | 1.56E+03 | 4E-03 |
| Selenium | 0.63 | 3.91E+02 | 2E-03 |
| Vanadium | 19.72 | 3.91E+02 | 5E-02 |
| Acetone | 0.00561 | 6.75E+04 | 8E-08 |
| Benzo(g,h,i)perylene | 0.0133 | 1.72E+03 | 8E-06 |
| Butanone[2-] | 0.00387 | 3.96E+04 | 1E-07 |
| Fluoranthene | 0.0398 | 2.29E+03 | 2E-05 |
| Hexanone[2-] | 0.00202 | 2.10E+02[c] | 1E-05 |
| Phenanthrene | 0.0464 | 1.83E+03 | 3E-05 |
| Pyrene | 0.0323 | 1.72E+03 | 2E-05 |
| **HI** | | | **0.7** |

[a] SSLs from NMED (2009, 108070).

[b] SSL for Chromium VI (NMED 2009, 108070).

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

**Table I-4.2-48**
**Industrial TPH Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Industrial* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 19.87 | 1.12E+03 | 2E-02 |
| | | **HI** | **2E-02** |

*Screening guideline for diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-49**
**Construction Worker**
**TPH Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Construction Worker* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 8.398 | 1.12E+03 | 7E-03 |
| | | **HI** | **0.007** |

*Screening guideline for industrial diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-50**
**Residential TPH Screening Evaluation for AOCs 60-004(b,d)**

| COPC | EPC (mg/kg) | Residential* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 8.398 | 5.2E+03 | 2E-02 |
| | | **HI** | **0.02** |

*Screening guideline for diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-51**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC C-03-016**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.2 | 1.24E+02 | 2E-03 |
| Copper | 9.5 | 1.24E+04 | 8E-04 |
| Lead | 31.5 | 8.00E+02 | 4E-02 |
| Manganese | 1490 | 4.63E+02 | 3E+00 |
| Selenium | 0.48 | 1.55E+03 | 3E-04 |
| Bis(2-ethylhexyl)phthalate | 0.15 | 4.76E+03 | 3E-05 |
| | | **HI** | **3** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-52**
**Residential Carcinogenic**
**Screening Evaluation for AOC C-03-016**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Bis(2-ethylhexyl)phthalate | 0.15 | 3.47E+02 | 4E-09 |
| **Total Excess Cancer Risk** | | | **4E-09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-53**
**Residential Noncarcinogenic Screening Evaluation for AOC C-03-016**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.2 | 3.13E+01 | 6E-03 |
| Copper | 9.5 | 3.13E+03 | 3E-03 |
| Lead | 31.5 | 4.00E+02 | 8E-02 |
| Manganese | 1490 | 1.07E+04 | 1E-01 |
| Selenium | 0.48 | 3.91E+02 | 1E-03 |
| **HI** | | | **0.2** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-54**
**Construction Worker TPH**
**Screening Evaluation for AOC C-03-016**

| COPC | EPC (mg/kg) | Construction Worker* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 7100 | 1120 | 6E+00 |
| **HI** | | | **6** |

* Screening guideline for industrial diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-55**
**Residential TPH Screening Evaluation for AOC C-03-016**

| COPC | EPC (mg/kg) | Residential* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 7100 | 5.20E+02 | 1.4E+01 |
| **HI** | | | **14** |

*Screening guideline for diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-56**
**Construction Worker Carcinogenic**
**Screening Evaluation for AOC 03-036(b)**

| COPC | EPC (mg/kg) | Construction Worker SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Tetrachloroethene | 0.00075 | 3.38E+02 | 2E-11 |
| **Total Excess Cancer Risk** | | | **2E-11** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-57**
**Construction Worker Noncarcinogenic**
**Screening Evaluation for AOC 03-036(b)**

| COPC | EPC (mg/kg) | Construction Worker SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.388 | 1.24E+02 | 3E-03 |
| Copper | 4.175 | 1.24E+04 | 3E-04 |
| Lead | 15 | 8.00E+02 | 2E-02 |
| Manganese | 400.7 | 4.63E+02 | 9E-01 |
| Selenium | 0.689 | 1.55E+03 | 4E-04 |
| Zinc | 56.04 | 9.29E+04 | 6E-04 |
| Acetone | 0.00432 | 2.63E+05 | 2E-08 |
| Isopropyltoluene[4-] | 0.00527 | 1.03E+04[b] | 5E-07 |
| Methylene chloride | 0.0027 | 1.06E+04 | 3E-07 |
| Methylnaphthalene[2-] | 0.61 | 1.24E+03[c] | 5E-04 |
| Phenanthrene | 0.092 | 7.15E+03 | 1E-05 |
| Trimethylbenzene[1,2,4-] | 8.69E-04 | 6.88E+02[c] | 1E-06 |
| | | **HI** | **0.9** |

[a] SSLs from NMED (2009, 108070).

[b] Isopropylbenzene SSL used as a surrogate based on structural similarity.

[c] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

**Table I-4.2-58**
**Residential Carcinogenic**
**Screening Evaluation for AOC 03-036(b)**

| COPC | EPC (mg/kg) | Residential SSL* (mg/kg) | Cancer Risk |
|---|---|---|---|
| Methylene chloride | 0.0027 | 1.99E+02 | 1E-10 |
| Tetrachloroethene | 0.00075 | 6.99E+00 | 1E-09 |
| | | **Total Excess Cancer Risk** | **1E-09** |

*SSLs from NMED (2009, 108070).

**Table I-4.2-59**
**Residential Noncarcinogenic**
**Screening Evaluation for AOC 03-036(b)**

| COPC | EPC (mg/kg) | Residential SSL[a] (mg/kg) | HQ |
|---|---|---|---|
| Antimony | 0.388 | 3.13E+01 | 1E-02 |
| Copper | 4.175 | 3.13E+03 | 1E-03 |
| Lead | 15 | 4.00E+02 | 4E-02 |
| Manganese | 400.7 | 1.07E+04 | 4E-02 |
| Selenium | 0.689 | 3.91E+02 | 2E-03 |
| Zinc | 56.04 | 2.35E+04 | 2E-03 |
| Acetone | 0.00432 | 6.75E+04 | 6E-08 |
| Isopropyltoluene[4-] | 0.00527 | 3.21E+03[b] | 2E-06 |
| Methylnaphthalene[2-] | 0.61 | 4.10E+03[c] | 1E-04 |
| Phenanthrene | 0.092 | 1.83E+03 | 5E-05 |
| Trimethylbenzene[1,2,4-] | 8.69E-04 | 6.20E+01[c] | 1E-05 |
| | | **HI** | **0.09** |

[a] SSLs from NMED (2009, 108070).

[b] Isopropylbenzene SSL used as a surrogate based on structural similarity.

[c] EPA regional screening level (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

**Table I-4.2-60**
**Construction Worker TPH Screening Evaluation for SWMU 03-036(b)**

| COPC | EPC (mg/kg) | Construction Worker* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 21.18 | 1120 | 2E-02 |
| | | **HI** | **0.02** |

*Screening guideline for industrial diesel No. 2 from NMED (2006, 094614).

**Table I-4.2-61**
**Residential TPH Screening Evaluation for AOC 03-036(b)**

| COPC | EPC (mg/kg) | Residential* (mg/kg) | HQ |
|---|---|---|---|
| TPH-DRO | 21.18 | 5.20E+02 | 4E-02 |
| | | **HI** | **0.04** |

*Screening guideline for diesel No. 2 from NMED (2006, 094614).

**Table I-5.3-1**
**Ecological Screening Levels for Terrestrial Receptors**

| COPC | American Kestrel (avian intermediate carnivore) | American Kestrel (avian top carnivore) | American Robin (avian herbivore) | American Robin (avian insectivore) | American Robin (avian omnivore) | Deer Mouse (mammalian omnivore) | Desert Cottontail (mammalian herbivore) | Earthworm (soil-dwelling invertebrate) | Plant (terrestrial autotroph - producer) | Montane Shrew (mammalian insectivore) | Red Fox (mammalian top carnivore) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | | | | | |
| Antimony | na* | na | na | na | na | 0.48 | 2.9 | 78 | 0.05 | 0.26 | 45 |
| Barium | 11000 | 37000 | 820 | 1000 | 930 | 1800 | 3300 | 330 | 110 | 1300 | 41000 |
| Chromium | 2200 | 5400 | 280 | 190 | 220 | 860 | 3200 | 0.34 | 0.35 | 280 | 7200 |
| Cobalt | 930 | 3500 | 170 | 96 | 120 | 400 | 1800 | na | 13 | 160 | 5400 |
| Copper | 110 | 1600 | 38 | 15 | 22 | 64 | 270 | 80 | 70 | 38 | 3800 |
| Lead | 120 | 810 | 21 | 14 | 16 | 120 | 370 | 1700 | 120 | 72 | 3700 |
| Manganese | 35000 | 90000 | 1400 | 3100 | 1900 | 1400 | 2000 | 450 | 220 | 1500 | 41000 |
| Nickel | 160 | 2900 | 160 | 21 | 38 | 20 | 500 | 280 | 38 | 9.7 | 1200 |
| Selenium | 5.6 | 97 | 1 | 0.75 | 0.87 | 0.83 | 2.1 | 4.1 | 0.52 | 0.66 | 84 |
| Vanadium | 84 | 170 | 8.9 | 6.7 | 7.6 | 480 | 1500 | na | 0.025 | 140 | 3300 |
| **Organic Chemicals (mg/kg)** | | | | | | | | | | | |
| Acetone | 1200 | 30000 | 7.5 | 170 | 14 | 1.2 | 1.4 | na | na | 15 | 2900 |
| Aroclor-1254 | 0.17 | 0.22 | 1.3 | 0.041 | 0.08 | 0.88 | 52 | na | 160 | 0.44 | 0.15 |
| Aroclor-1260 | 3.7 | 4.6 | 46 | 0.88 | 1.7 | 20 | 3000 | na | na | 10 | 0.14 |
| Benzo(a)anthracene | na | na | na | na | na | 3.4 | 6.2 | na | 18 | 3 | 32 |
| Benzo(b)fluoranthene | na | na | na | na | na | 52 | 130 | na | 18 | 38 | 250 |
| Benzo(g,h,i)perylene | na | na | na | na | na | 47 | 540 | na | na | 24 | 94 |
| Butanone[2-] | na | na | na | na | na | 360 | 420 | na | na | 2600 | 420000 |
| Chrysene | na | na | na | na | na | 3.1 | 6.5 | na | na | 2.4 | 25 |
| Fluoranthene | na | na | na | na | na | 38 | 260 | 10 | na | 22 | 360 |

**Table I-5.3-1 (continued)**

| COPC | American Kestrel (avian intermediate carnivore) | American Kestrel (avian top carnivore) | American Robin (avian herbivore) | American Robin (avian insectivore) | American Robin (avian omnivore) | Deer Mouse (mammalian omnivore) | Desert Cottontail (mammalian herbivore) | Earthworm (soil-dwelling invertebrate) | Plant (terrestrial autotroph - producer) | Montane Shrew (mammalian insectivore) | Red Fox (mammalian top carnivore) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Naphthalene | 100 | 590 | 3.4 | 16 | 5.7 | 9.7 | 12 | na | 1 | 27 | 1200 |
| Phenanthrene | na | na | na | na | na | 15 | 59 | 5.5 | na | 10 | 290 |
| Pyrene | na | na | na | na | na | 32 | 110 | 10 | na | 22 | 360 |

*na = Not available.

**Table I-5.3-2**
**Minimum ESL Comparison for AOC 03-003(n)**

| COPC | EPC | ESL | Receptor | HQ |
|---|---|---|---|---|
| **Organic Chemicals (mg/kg)** | | | | |
| Aroclor-1254 | 0.0063 | 0.041 | American robin (insectivore) | 0.15 |
| Aroclor-1260 | 0.00852 | 0.14 | Red fox | 0.06 |

**Table I-5.3-3**
**Minimum ESL Comparison for SWMU 03-014(q)**

| COPC | EPC | ESL | Receptor | HQ |
|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | |
| Antimony | 1.02 | 0.05 | Plant | **20** |
| Lead | 64.1 | 14 | American robin (insectivore) | **4.6** |
| Selenium | 1.06 | 0.52 | Plant | **2.0** |
| **Organic Chemicals (mg/kg)** | | | | |
| Aroclor-1254 | 0.015 | 0.041 | American robin (insectivore) | **0.37** |
| Aroclor-1260 | 0.0631 | 0.14 | Red Fox | **0.45** |

Note: Bolded values indicate HQ greater than 0.3.

**Table I-5.3-4**
**HI Analysis for SWMU 03-014(q)**

| COPEC | EPC (mg/kg) | American Kestrel (avian intermediate carnivore) | American Kestrel (avian top carnivore) | American Robin (avian herbivore) | American Robin (avian insectivore) | American Robin (avian omnivore) | Deer Mouse (mammalian omnivore) | Desert Cottontail (mammalian herbivore) | Earthworm (soil dwelling invertebrate | Plant (terrestrial autotroph-producer) | Montane Shrew (mammalian insectivore) | Red Fox (mammalian top carnivore) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | | | | | | |
| Antimony | 1.02 | na* | na | na | na | na | **2.1** | **0.35** | 0.013 | **20** | **3.9** | 0.023 |
| Lead | 64.1 | **0.53** | 0.079 | **3.1** | **4.6** | **4** | **0.53** | 0.17 | 0.038 | **0.53** | **0.89** | 0.017 |
| Selenium | 1.06 | 0.19 | 0.011 | **1.1** | **1.4** | **1.2** | **1.3** | **0.5** | 0.26 | **2** | **1.6** | 0.013 |
| **Organic Chemicals (mg/kg)** | | | | | | | | | | | | |
| Aroclor-1254 | 0.015 | 0.09 | 0.07 | 0.01 | **0.37** | **0.2** | 0.02 | 0.00029 | na* | 0.00009 | 0.034 | 0.1 |
| Aroclor-1260 | 0.45 | 0.017 | 0.014 | 0.0014 | 0.072 | 0.037 | 0.0032 | 2.1E-05 | na | na | 0.0063 | **0.45** |
| **HI** | | 0.8 | 0.2 | **4** | **6** | **5** | **4** | 1 | 0.3 | **23** | **6** | 0.6 |

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
*na = Not available.

**Table I-5.3-5**
**Minimum ESL Comparison for AOCs 60-004(b,d)**

| COPC | EPC | ESL | Receptor | HQ |
|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | |
| Antimony | 1.451 | 0.05 | Plant | **29** |
| Barium | 200.4 | 110 | Plant | **1.8** |
| Chromium | 8.892 | 2.3 | Earthworm | **3.9** |
| Cobalt | 5.51 | 13 | Plant | **0.42** |
| Copper | 6.827 | 15 | American robin (insectivore) | **0.46** |
| Lead | 14.19 | 14 | American robin (insectivore) | **1** |
| Manganese | 381.7 | 220 | Plant | **1.7** |
| Nickel | 7.493 | 9.7 | Montane shrew | **0.77** |
| Selenium | 1.13(U) | 0.52 | Plant | **2.2** |
| Vanadium | 23.03 | 0.025 | Plant | **920** |
| **Organic Chemicals (mg/kg)** | | | | |
| Acetone | 0.0063 | 1.2 | Deer mouse | 0.0053 |
| Benzo(a)anthracene | 0.0187 | 3.0 | Montane shrew | 0.0062 |
| Benzo(b)fluoranthene | 0.122 | 18 | Plant | 0.0068 |
| Benzo(g,h,i)perylene | 0.0133 | 24 | Montane shrew | 0.00055 |
| Butanone[2-] | 0.00411 | 360 | Deer Mouse | 0.000011 |
| Chrysene | 0.018 | 2.4 | Montane shrew | 0.0075 |
| Fluoranthene | 0.0398 | 10 | Earthworm | 0.004 |
| Naphthalene | 0.0168 | 1 | Plant | 0.017 |
| Phenanthrene | 0.0464 | 5.5 | Earthworm | 0.0084 |
| Pyrene | 0.0323 | 10 | Earthworm | 0.0032 |

Note: Bolded values indicate HQ greater than 0.3.

**Table I-5.3-6**
**HI Analysis for AOCs 60-004(b,d)**

| COPEC | EPC (mg/kg) | American Kestrel (avian intermediate carnivore) | American Kestrel (avian top carnivore) | American Robin (avian herbivore) | American Robin (avian insectivore) | American Robin (avian omnivore) | Deer Mouse (mammalian omnivore) | Desert Cottontail (mammalian herbivore) | Earthworm (soil dwelling invertebrate | Plant (terrestrial autotroph-producer) | Montane Shrew (mammalian insectivore) | Red Fox (mammalian top carnivore) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | | | | | | |
| Antimony | 1.451 | na* | na | na | na | na | **3** | **0.5** | 0.019 | **29** | **5.6** | 0.032 |
| Barium | 200.4 | 0.018 | 0.0054 | 0.24 | 0.2 | 0.22 | 0.11 | 0.061 | **0.61** | **1.8** | 0.15 | 0.0049 |
| Chromium | 8.892 | 0.0012 | 0.00024 | 0.0047 | 0.011 | 0.0081 | 0.0047 | 0.00068 | **3.9** | **3.7** | 0.012 | 0.0003 |
| Cobalt | 5.51 | 0.0059 | 0.0016 | 0.032 | 0.057 | 0.046 | 0.014 | 0.0031 | na | **0.42** | 0.034 | 0.001 |
| Copper | 6.827 | 0.062 | 0.0043 | 0.18 | **0.46** | **0.31** | 0.11 | 0.025 | 0.085 | 0.098 | 0.18 | 0.0018 |
| Lead | 14.19 | 0.12 | 0.018 | **0.68** | **1** | **0.89** | 0.12 | 0.038 | 0.0083 | 0.12 | 0.2 | 0.0038 |
| Manganese | 381.7 | 0.011 | 0.0042 | 0.27 | 0.12 | 0.2 | 0.27 | 0.19 | **0.85** | **1.7** | 0.25 | 0.0093 |
| Nickel | 7.493 | 0.047 | 0.0026 | 0.047 | **0.36** | 0.2 | **0.37** | 0.015 | 0.027 | 0.2 | **0.77** | 0.0062 |
| Selenium | 1.13(U) | 0.2 | 0.012 | **1.1** | **1.5** | **1.3** | **1.4** | **0.54** | 0.28 | **2.2** | **1.7** | 0.013 |
| Vanadium | 23.03 | 0.27 | 0.14 | **2.6** | **3.4** | **3** | 0.048 | 0.015 | na | **920** | 0.16 | 0.007 |
| **HI** | | 0.7 | 0.2 | **5** | **7** | **6** | **5** | 1 | **6** | **960** | **9** | 0.08 |

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
*na = Not available.

**Table I-5.4-1**
**Comparison of EPCs with**
**Background Concentrations for SWMU 03-014(q)**

| COPEC | EPC (mg/kg) | Soil Background Concentrations (mg/kg) | Tuff Background Concentrations (mg/kg) |
|---|---|---|---|
| Antimony | 1.02 | 0.1–1 | 0.05–0.4 |
| Lead | 64.1 | 2–28 | 1.6–15.5 |
| Selenium | 1.06 | 0.1–1.7 | 0.1–0.105 |

Note: Background concentrations from LANL (1998, 059730).

**Table I-5.4-2**
**Comparison of EPCs with**
**Background Concentrations for AOCs 60-004(b,d)**

| COPEC | EPC (mg/kg) | Soil Background Concentrations (mg/kg) | Tuff Background Concentrations (mg/kg) |
|---|---|---|---|
| Antimony | 1.451 | 0.1–1 | 0.05–0.4 |
| Barium | 200.4 | 21–410 | 1.4–51.6 |
| Calcium | 7810 | 500–14000 | 200–2230 |
| Chromium | 8.892 | 1.9–36.5 | 0.25–13 |
| Cobalt | 5.51 | 1–9.5 | 3.14* |
| Copper | 6.827 | 0.25–16 | 0.25–6.2 |
| Iron | 13745 | 3300–36000 | 190–19500 |
| Lead | 14.19 | 2–28 | 1.6–15.5 |
| Manganese | 381.7 | 76–1100 | 22–752 |
| Nickel | 7.493 | 1–29 | 0.5–7 |
| Selenium | 1.13(U) | 0.1–1.7 | 0.3* |
| Vanadium | 23.03 | 4–56.5 | 0.25–21 |

Note: Background concentrations from LANL (1998, 059730).
*No summary statistics available; the BV was used.

**Table I-5.4-3**
**PAUFs for Ecological Receptors for SWMU 03-014(q)**

| Receptor | Home Range (ha)[a] | Population Area (ha) | PAUF[b] |
|---|---|---|---|
| American Kestrel | 106 | 4240 | 0.0000073 |
| American Robin | 0.42 | 16.8 | 0.0018 |
| Deer Mouse | 0.077 | 3 | 0.01 |
| Desert Cottontail | 3.1 | 124 | 0.00025 |
| Montane Shrew | 0.39 | 15.6 | 0.002 |
| Red Fox | 1038 | 41,520 | 0.00000073 |

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.031 ha) divided by the population area. If a PAUF is greater than 1, no adjustment is made.

**Table I-5.4-4**
**Adjusted HIs at SWMU 03-014(q)**

| COPECs | EPC (mg/kg) | American Kestrel (avian intermediate carnivore) | American Kestrel (avian top carnivore) | American Robin (avian herbivore) | American Robin (avian insectivore) | American Robin (avian omnivore) | Deer Mouse (mammalian omnivore) | Desert Cottontail (mammalian herbivore) | Earthworm (soil dwelling invertebrate | Plant (terrestrial autotroph-producer) | Montane Shrew (mammalian insectivore) | Red Fox (mammalian top carnivore) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Inorganic Chemicals (mg/kg)** | | | | | | | | | | | | |
| Lead | 64.1 | 4E-06 | 6E-07 | 6E-03 | 8E-03 | 7E-03 | 5E-03 | 4E-05 | 4E-02 | **5E-01** | 2E-03 | 1E-08 |
| **Organic Chemicals (mg/kg)** | | | | | | | | | | | | |
| Aroclor-1254 | 0.015 | 7E-07 | 5E-07 | 2E-05 | 7E-04 | 4E-04 | 2E-04 | 7E-08 | na* | 9E-05 | 7E-05 | 7E-08 |
| Aroclor-1260 | 0.45 | 1E-07 | 1E-07 | 3E-06 | 1E-04 | 7E-05 | 3E-05 | 5E-09 | na | na | 1E-05 | 3E-07 |
| **HI** | | 5E-06 | 1E-06 | 6E-03 | 9E-03 | 7E-03 | 5E-03 | 4E-05 | 4E-02 | 5E-01 | 2E-03 | 4E-07 |

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
*na = Not available.

# Attachment I-1

*ProUCL Files*
*(on CD included with this document)*

# Attachment I-2

*Ecological Scoping Checklists*

## I2-1.0 ECOLOGICAL SCOPING CHECKLIST FOR DEVELOPED, NO PATHWAY SITES

### Part A—Scoping Meeting Documentation

| | |
|---|---|
| **Site ID** | AOC 03-014(v), AOC 03-027, SWMU 03-028, SWMU 03-036(a), AOC 03-036(b), SWMU 03-036(c), SWMU 03-036(d), AOC 03-038(c), AOC 03-043(b), SWMU 03-056(l), AOC C-03-016 |
| **Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.** | AOC 03-014(v), AOC 03-027, SWMU 03-028, SWMU 03-036(a), AOC 03-036(b), SWMU 03-036(c), SWMU 03-036(d), AOC 03-038(c), AOC 03-043 (b), SWMU 03-056(l) are developed and have no complete pathways to ecological receptors.<br><br>The following sections describe each SWMU and AOC along with known or suspected mechanisms of release.<br><br>*AOC 03-014(v)* was a floor drain within a former garage (former building 03-0036) installed in 1953. The drain was connected to the sanitary sewer line, which flowed to the wastewater treatment plant. Former building 03-0036 was removed in 1999 in preparation for construction of building 03-2327, the Nicholas C. Metropolis Computing Center. In preparation for this construction, approximately 60 $yd^3$ of contaminated soil was removed, including AOCs 03-014(v) and 03-027. Additional soil was also excavated from the area to accommodate the foundation of building 03-2327. The area was excavated to a depth of approximately 15 ft below grade. Consequently, the site was remediated during the construction of building 03-2327.<br><br>*AOC 03-027* consisted of two former concrete-block-lined lift wells located in the floor below the hydraulic lifts at a former garage, former building 03-0036. The lift wells collected wash water and residual oil from the floor of vehicle maintenance bays. Lift well contents were manually pumped to 55-gal. containers emptied into the station's oil/water separator before being discharged to the sanitary sewer. AOC 03-027 was excavated to a depth of approximately 15 ft below grade to accommodate construction of building 03-2327. Consequently, the site was remediated during the construction of building 03-2327.<br><br>*SWMU 03-028* is a former 12-ft × 15-ft × 6-ft-deep concrete holding pond at the northeast corner of the former asphalt batch plant. The site was used as a settling pond for mineral dust and particulates from gravel captured by scrubber water from the asphalt batch plant (former structure 03-0073). The Roads and Grounds Group removed all sediment and water from the pond in early August 2003 during decommissioning of the asphalt batch plant. The empty pond was photographed and surveyed on August 19, 2003, and the pond was filled with clean soil and gravel on August 20, 2003, to allow a crane to be placed on the site to dismantle the batch plant (former structure 03-0073). The surface of the site was paved with asphalt for use as a parking lot.<br><br>*SWMU 03-036(a)* is the location of two former asphalt emulsion product tanks (former structures 03-0075 and 03-0076), located at the former asphalt batch plant. The tanks were approximately 25 to 30 ft in diameter and 8 to 12 ft high, with a capacity of 30,000 to 50,000 gal. The tanks were located within a soil-bermed secondary containment area approximately 225 ft southwest of building 03-0070. Between October 1988 and April 1989, both tanks were removed, cut up, and disposed of in the Los Alamos County landfill. All soil around and beneath the tanks was also removed, mixed with sand, hardened, and deposited at the Los Alamos County landfill. The area was then used to store and prepare crack-sealing machines until batch plant operations ceased in 2002. The surface of the site was paved with asphalt for use as a parking lot in 2003. |

| | |
|---|---|
| | AOC 03-036(b) is the location of two former 25- to 50-gal aboveground storage tanks that contained No. 2 diesel fuel; operations began in 1960. Before 1989, kerosene was stored in the tanks and used for the same purpose as the No. 2 diesel fuel. Periodic drips and splashes from the tanks stained the gravel. In 2002, the two tanks and stained soil were removed during the demolition and decommissioning (D&D) of the former asphalt batch plant. Investigation sampling did not occur until deeper than 11 ft below grade, therefore, no complete exposure pathways exist.<br><br>SWMU 03-036(c) is the location of two former asphalt emulsion storage tanks. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked. The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot.<br><br>SWMU 03-036(d) is the location of two former asphalt emulsion storage tanks. While in use, the tanks were partially buried with sand and gravel-packed around the base. The tanks were removed, cut apart, and disposed of at the Los Alamos County landfill. An inspection determined the tanks had not leaked. The former tanks were used to store aggregate and to mix feed for the asphalt batch plant until the plant was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot.<br><br>AOC 03-038(c) is a 2-in. cast-iron drainline that formerly carried rinse solution from a copper electroplating bath in building to the industrial waste line. The electroplating bath initially operated in the 1960s and was used to plate very small parts of printed circuit boards. The electroplating bath met EPA point-source category standards until it ceased operation in the early 1970s. The drainpipe was cut and capped inside the wall to make it inaccessible. The area has since been covered with asphalt pavement.<br><br>AOC 03-043(b) is the location of a former 10,000-gal. asphalt emulsion storage tank (former structure 03-0077) installed in 1948. In 1980, the tank was cleaned out, removed, cut up, and disposed of at the Los Alamos County landfill. Stained soil beneath and around the tank was excavated and taken to the landfill. The former tank location was used to store aggregate and to mix feed for the asphalt batch plant until it was decommissioned in 2002. In 2003, the surface of the site was paved with asphalt for use as a parking lot<br><br>SWMU 03-056(l) was an outdoor storage facility on the east side of building 03-0141. Containers of disposable clothing contaminated with beryllium powder are staged in this area before disposal. Carboys used to store beryllium powder in water were also staged in this area. The carboys were usually in a tray that served as secondary containment. No known releases from the drums or carboys to the environment have occurred. This site has since been paved with asphalt for use as a parking lot.<br><br>AOC C-03-016 is a former oil cleanout bin located within the former asphalt batch plant. The bin was installed in the mid-1970s and contained used asphalt emulsion oil, which was applied to roads before laying asphalt. Photographs from the 1970s and 1980s show extensive stains in the immediate vicinity of the bin. The bin and stained soil around the bin were removed in the late 1990s. The surface of the site was paved with asphalt for use as a parking lot in 2003. |
| **List of Primary Impacted Media (Indicate all that apply.)** | **Surface soil** – X<br>**Surface water/sediment** – NA<br>**Subsurface** – X<br>**Groundwater** – NA<br>**Other, explain** – None |

| | |
|---|---|
| **Vegetation class based on GIS vegetation coverage**<br>**(Indicate all that apply.)** | **Water** – NA<br>**Bare Ground/Unvegetated** – X<br>**Spruce/fir/aspen/mixed conifer** – NA<br>**Ponderosa pine** – A few immature pine trees can be found at the edge of parking areas<br>**Piñon juniper/juniper savannah** – NA<br>**Grassland/shrubland** – NA<br>**Developed** – Paved lots, buildings, construction areas and fences.<br>**Burned** – NA |
| **Is T&E Habitat Present?**<br>**If applicable, list species known or suspected of using the site for breeding or foraging.** | The only threatened or endangered (T&E) species that could frequent the LANL area is the Mexican spotted owl. The owl's primary habitat is densely forested canyons and it may use Sandia Canyon and surrounding area as foraging habitat [personnel communication, WES-EDA-GIS Team, Areas of Environmental Interest Metadata]. |
| **Provide list, of Neighboring/ Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate.**<br>**(Use this information to evaluate the need to aggregate sites for screening.)** | AOCs 03-043(g), 03-043(f), 03-016(c), 03-001(i), and C-03-022; SWMUs 03-002(c) and 03-002(b)<br>Releases from these sites include hazardous constituents associated with the former asphalt batch plant in liquid and solid forms through the mechanisms of spills, drainages, outfalls, and material disposal/storage. The chemicals of potential concern (COPCs) for the up-gradient sites include but are not limited to petroleum hydrocarbons, polycyclic aromatic hydrocarbons, SVOCs, and inorganic chemicals. |
| **Surface Water Erosion Potential Information**<br>**Summarize information from SOP 2.01, including the total score and the runoff subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.** | The terminal point of surface water transport is Sandia Canyon. The mesa ground surface of the Upper Sandia Canyon Aggregate Area is typically flat (<10% slope) with some areas gradually sloping (10-30%) toward the canyon. Surface water run-on sources are not present. |

## Part B—Site Visit Documentation

| | |
|---|---|
| **Site ID** | Developed, no pathways: AOC 03-014(v), AOC 03-027, SWMU 03-028, SWMU 03-036(a), AOC 03-036(b), SWMU 03-036(c), SWMU 03-036(d), AOC 03-038(c), AOC 03-043 (b), SWMU 03-056(l). |
| **Date of Site Visit** | April 7, 2010 |
| **Site Visit Conducted by** | Micah Nauck, Terranear PMC<br>Maurice Shendo, Terranear PMC<br>Jayson Romero, Terranear PMC<br>Jim Markwiese, Neptune and Company, Inc. |

### *Receptor Information:*

| | |
|---|---|
| **Estimate cover** | **Relative vegetative cover (high, medium, low, none)** = none<br>**Relative wetland cover (high, medium, low, none)** = none<br>**Relative structures/asphalt, etc., cover (high, medium, low, none)** = high |
| **Field notes on the GIS vegetation class to assist in verifying the Arcview information** | The mesa top sites comprise an active parking lot and structures covering the entire area. A few isolated, immature Ponderosa pines can be found at the edge of the paved areas. |
| **Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.** | See previous page. |
| **Are ecological receptors present at the site?**<br>**(yes/no/uncertain)**<br>**Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.** | Yes.<br>The TA-03 mesa top contains terrestrial biota such as reptiles, small mammals, insects, birds, and plants. The habitat quality at the developed sites associated with the Upper Sandia Canyon Aggregate Area is such that it would not support native plant and animal populations. No aquatic community exists in the Upper Sandia Canyon Aggregate Area. |

### *Contaminant Transport Information:*

| | |
|---|---|
| **Surface water transport**<br>**Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).** | The Upper Sandia Canyon Aggregate Area has a low potential for surface water transport. The ground surface is typically flat (<10% slope) and the area is highly developed and the asphalt or structural cover contributes to stabilization of the surface media, resulting in a low potential for erosion and surface water infiltration. Runoff will likely move as sheet flow off the parking lots and down into the canyon. The terminal point of surface water transport is Sandia Canyon. |
| **Are there any off-site transport pathways (surface water, air, or groundwater)?**<br>**(yes/no/uncertain)**<br>**Provide explanation** | No. There is low potential for surface water transport of site soils considering the sites are capped with asphalt or structures. Precipitation falling on the lots will move off-site as sheet flow. It is also unlikely that soil contaminants will reach receptors as fugitive dust because sites are paved or covered with structures. There is no potential for groundwater contamination as the depth to groundwater at TA-03 is ~1,100 ft below ground surface. |

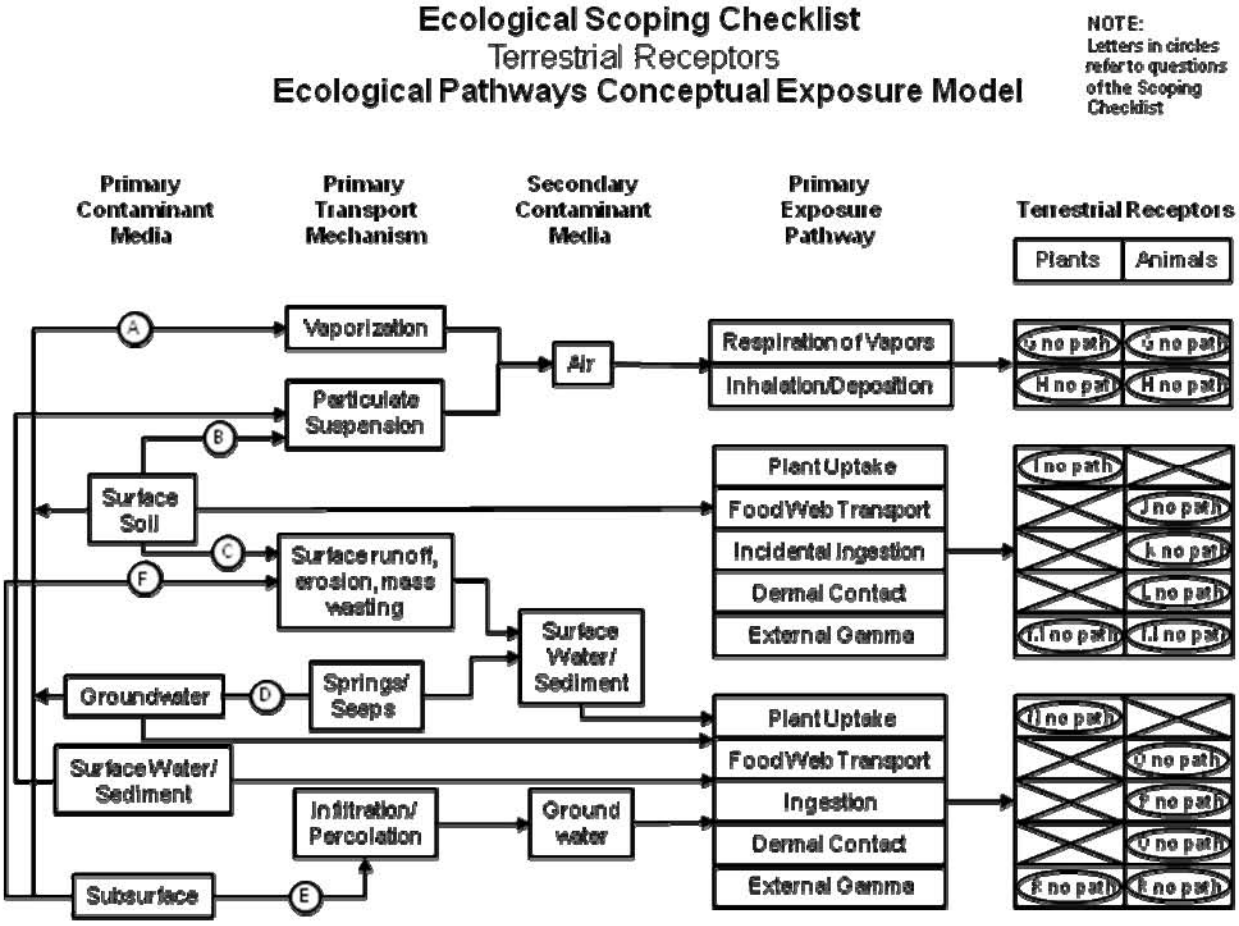
### *Ecological Effects Information:*

| | |
|---|---|
| **Physical Disturbance**<br>**(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)** | The sites are highly disturbed from an ecological perspective in that they are all developed and covered with asphalt or structures. One site [AOC 03-036(b)] that is not asphalt paved but is covered with fill is present at depths deeper than is accessible by biota (begins at 11 ft below grade). |
| **Are there obvious ecological effects?**<br>**(yes/no/uncertain)**<br>**Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).** | Yes. Effects are the result of the physical disturbances from development. |
| **Interim action needed to limit apparent ecological effects?**<br>**(yes/no/uncertain)**<br>**Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.** | No. Effects are not based on contamination; they are the result of site use as a parking lot and building location. |

### *No Exposure/Transport Pathways:*

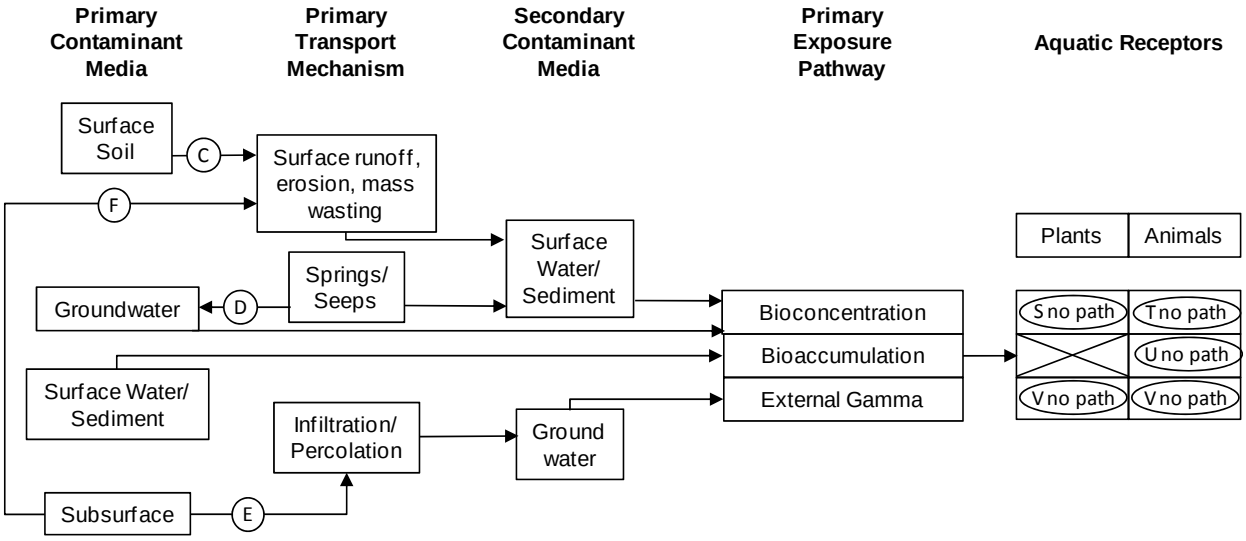
**If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.**

Current and future transport is negligible. The paved or otherwise biologically-inaccessible sites comprising the Upper Sandia Canyon Aggregate Area are expected to remain covered for the foreseeable future because the area is in active use as a parking lot and as a building site and will continue to be used for parking and as the computing center indefinitely.


Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model
NOTE:
Letters in circles refer to questions of the Scoping Checklist
Primary Contaminant Media
Primary Transport Mechanism
Secondary Contaminant Media
Primary Exposure Pathway
Terrestrial Receptors
Plants
Animals
A
Vaporization
Particulate Suspension
Air
Respiration of Vapors
Inhalation/Deposition
B
Surface Soil
C
F
Surface runoff, erosion, mass wasting
Plant Uptake
Food Web Transport
Incidental Ingestion
Dermal Contact
External Gamma
Surface Water/ Sediment
Groundwater
D
Springs/ Seeps
Surface Water/ Sediment
Infiltration/ Percolation
Ground water
Plant Uptake
Food Web Transport
Ingestion
Dermal Contact
External Gamma
Subsurface
E

## Ecological Scoping Checklist
Aquatic Receptors
## Ecological Pathways Conceptual Exposure Model

**NOTE:**
Letters in circles refer to questions of the Scoping Checklist



**Signatures and certifications:**

**Checklist completed by (provide name, organization and phone number):**

**Name (printed):** James Markwiese
**Name (signature):**
**Organization:** Neptune and Company, Inc.
**Phone number:** 505-662-0707, ext. 24

**Verification by another party (provide name, organization and phone number):**

**Name (printed):** Richard J. Mirenda
**Name (signature):**
**Organization:** Los Alamos National Laboratory, ET-DO
**Phone number:** 505-665-6953

## I2-2.0 ECOLOGICAL SCOPING CHECKLIST FOR POTENTIAL HABITAT SITES

### Part A—Scoping Meeting Documentation

| | |
|---|---|
| **Site ID** | AOC 03-003(n), SWMU 03-014(q), and AOCs 60-004(b,d). |
| **Form of site releases (solid, liquid, vapor). Describe all relevant known or suspected mechanisms of release (spills, dumping, material disposal, outfall, explosive testing, etc.) and describe potential areas of release. Reference locations on a map as appropriate.** | The following sections describe each SWMU and AOC along with known or suspected mechanisms of release.<br><br>*AOC 03-003(n)* is the location of a one-time polychlorinated biphenyl (PCB) spill in the salvage yard (SWMU 03-059) located on the south side of building 03-0271. The perimeter is fenced, except for the part that abuts building 03-0271. With the exception of two small (10 x 20 ft area), grass-covered portions of the area, most of the area is asphalt-paved and/or covered by permanent buildings or temporary sheds. The salvage yard was used to store transformers, electrical equipment, batteries, and scrap metal pending sale or reuse. The spill area identified as AOC 03-003(n) is approximately 20 ft south of the northwest corner of building 03-0271. At that location, a transformer ruptured in 1977 and leaked an estimated 10 gal of PCB-contaminated oil into the soil. The drainage pattern west of building 03-0271 was altered in 1991 when the parking lot was regraded and base course was applied. The entire area received additional base course at least once since 1991. The former salvage-yard area is used as a parking lot and storage area for empty containers.<br><br>*SWMU 03-014(q)* is a steeply sloping site characterized by pine needle litter, gamble oak and ponderosa pine trees. It is the former effluent sewage storage tank (former structure 03-0336) for the power plant (building 03-0022). Between 1951 and 1985, the tank received and stored effluent from the former wastewater treatment plant for use as cooling water for the power plant cooling towers (structures 03-0025 and 03-0058). The effluent was pumped to the holding tank and treated to hinder bacteria growth. In the past, chromates were used to treat the effluent. A one-time release of sulfuric acid to the SWMU 03-012(b) outfall from the power plant holding tank, structure 03-0336 [SWMU 03-014(q)], occurred in 1990. Low pH values were reported in a 2.5-mi section of the watercourse below the outfall. Soda ash was added along the watercourse to raise the pH. A subsequent survey detected no measurements below pH 6.9 .<br><br>*AOCs 60-004(b,d)*<br><br>AOC 60-004(b) is an area characterized by grassland and shrub (primarily chamisa) with patches of bare earth resulting from vehicular disturbance. It is a former staging area for 12 containers of diesel sludge removed from underground storage tanks at the power plant. The containers were stored at AOC 60-004(b) in 1988. The storage site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa and is contained within the boundaries of AOC 60-004(d). Because 60-004(b) is contained within 60-004(d) and the data for the sites are identical, the sites are considered duplicates of one another and will be treated as one site. |

| | |
|---|---|
| | AOC 60-004(d) is an area characterized by grassland and shrub (primarily chamisa) with patches of bare earth resulting from vehicular disturbance. It was formerly used to dismantle decommissioned underground storage tanks and to temporarily stage drums containing fluids removed from underground storage tanks. The site is located northeast of the geothermal well mud pit at the east end of Sigma Mesa. The area was first developed in 1979 during a drilling project for a geothermal well. The northern edge of the area was used to stage building rubble, concrete, and rebar. |
| **List of Primary Impacted Media**<br>**(Indicate all that apply.)** | **Surface soil** – X<br>**Surface water/sediment** – NA<br>**Subsurface** – X<br>**Groundwater** – NA<br>**Other, explain** – None |
| **Vegetation class based on GIS vegetation coverage**<br>**(Indicate all that apply.)** | **Water** – NA<br>**Bare Ground/Unvegetated** – X<br>**Spruce/fir/aspen/mixed conifer** – NA<br>**Ponderosa pine** – X<br>**Piñon juniper/juniper savannah** – X<br>**Grassland/shrubland** – X<br>**Developed** – X<br>**Burned** – NA |
| **Is T&E Habitat Present?**<br>**If applicable, list species known or suspected of using the site for breeding or foraging.** | The only threatened or endangered (T&E) species that may frequent the LANL area is the Mexican spotted owl. The owl's primary habitat is densely forested canyons it may use the canyon and surrounding area as foraging habitat [personal communication, WES-EDA-GIS Team, Areas of Environmental Interest Metadata]. |
| **Provide list, of Neighboring/Contiguous/ Upgradient sites, includes a brief summary of COPCs and the form of releases for relevant sites and reference a map as appropriate.**<br>**(Use this information to evaluate the need to aggregate sites for screening.)** | AOC 03-003(n): AOC C-61-002, SWMUs 03-056(a), 03-029, 03-014(r), 61-006, and 61-005.<br>SWMU 03-014(q): AOC 03-047(d); SWMUs 03-045(a), (b), (c), (f), (p), (q), 03-012(b)-00, and 03-056(c ).<br>AOC 60-004(b,d): SWMUs 60-002 and 60-007(a)<br>Releases from these sites include hazardous constituents and radionuclides in liquid, vapor, and solid forms through the mechanisms of spills, dumping, drainages, outfalls, and material disposal/storage. The COPCs for the up-gradient sites include, but are not limited to, VOCs, SVOCs, and inorganic chemicals. |
| **Surface Water Erosion Potential Information**<br>**Summarize information from SOP 2.01, including the total score and the runoff subscore (maximum of 46); terminal point of surface water transport; slope; and surface water run-on sources.** | The terminal point of surface water transport is Sandia Canyon. AOC 03-003(n) is flat and several hundred yards from the canyon edge, limiting the potential for runoff. SWMU 03-014(q) the canyon is steep (>30% slope) with some areas extending into the canyon very steeply (>75% slope). Runoff is evident in some locations for SWMU 03-014(q). AOCs 60-004(b,d) are flat and several hundred yards from the canyon edge, limiting the potential for runoff. |

## Part B—Site Visit Documentation

| | |
|---|---|
| **Site ID** | Upper Sandia Canyon Aggregate Area |
| **Date of Site Visit** | April 7, 2010 |
| **Site Visit Conducted by** | Micah Nauck, Terranear PMC<br>Maurice Shendo, Terranear PMC<br>Jayson Romero, Terranear PMC<br>Jim Markwiese, Neptune and Company, Inc. |

### *Receptor Information:*

| | |
|---|---|
| **Estimate cover** | **Relative vegetative cover (high, medium, low, none)** = medium to high<br>**Relative wetland cover (high, medium, low, none)** = none<br>**Relative structures/asphalt, etc., cover (high, medium, low, none)** = none to low |
| **Field notes on the GIS vegetation class to assist in verifying the Arcview information** | The canyon sites are somewhat undisturbed and the vegetation is typical of the native vegetation and habitats of the canyons. Native vegetation includes grasses [AOC 03-003(n)], chamisa and grasses (AOCs 60-004(b,d)], ponderosa pine woodlands and stands of Gambel's oak [SWMU 03-014(q)]. |
| **Field notes on T&E Habitat, if applicable. Consider the need for a site visit by a T&E subject matter expert to support the use of the site by T&E receptors.** | See previous page. |
| **Are ecological receptors present at the site?**<br>**(yes/no/uncertain)**<br>**Describe the general types of receptors present at the site (terrestrial and aquatic), and make notes on the quality of habitat present at the site.** | Yes.<br>Sandia Canyon contains terrestrial biota such as reptiles, small mammals, insects, birds, and plants. Large vertebrates such as deer may use the area as well. Various songbirds were observed in the trees and circling raptors were observed. Other large mammals, such as elk and coyotes may be in the area. Plant life is abundant and healthy. No aquatic community exists in the SWMUs and consolidated units affected by the canyon sites. |

### *Contaminant Transport Information:*

| | |
|---|---|
| **Surface water transport**<br>**Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).** | The sites have a potential for surface water transport. The canyons are typically steep (>30% slope) with some areas extending into the canyons very steeply (>75% slope). Runoff is evident at SWMU 03-014(q). Runoff may infiltrate in grassland and bare earth areas. The terminal point of surface water transport is Sandia Canyon. |
| **Are there any off-site transport pathways (surface water, air, or groundwater)?**<br>**(yes/no/uncertain)**<br>**Provide explanation** | Yes. There is potential for surface water transport off-site, especially at SWMU 03-014(q). There is little potential for air transport of contamination present in surface soil as fugitive dust due to vegetation and forest/grassland litter cover. There is no potential for groundwater contamination as the depth to groundwater at TA-03 is ~1,100 ft below ground surface. |

### *Ecological Effects Information:*

| | |
|---|---|
| **Physical Disturbance**<br>**(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)** | There is disturbance at AOC 03-003(n) represented by asphalt-paved borders and sheds and buildings, little disturbance at SWMU 03-014(q) because the extreme slope precludes accessibility. There is some erosion evident here that is contained by best management practices in various locations on site. There is moderate disturbance to AOCs 60-004(b,d) resulting from vehicular traffic. |
| **Are there obvious ecological effects?**<br>**(yes/no/uncertain)**<br>**Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).** | Yes. The site AOCs 60-004(b,d) shows crushed plants and patches of upturned earth resulting from vehicular traffic. |
| **Interim action needed to limit apparent ecological effects?**<br>**(yes/no/uncertain)**<br>**Provide explanation and recommendations to mitigate apparent exposure pathways to project lead for IA SMDP.** | No. |

### *No Exposure/Transport Pathways:*

| |
|---|
| **If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to off-site receptors, the remainder of the checklist should not be completed. Stop here and provide additional explanation/justification for proposing an ecological No Further Action recommendation (if needed). At a minimum, the potential for future transport should include the likelihood that future construction activities could make contamination more available for exposure or transport.**<br>Not applicable. |

### *Adequacy of Site Characterization:*

| | |
|---|---|
| **Do existing or proposed data provide information on the nature and extent of contamination?**<br>**(yes/no/uncertain)**<br>**Provide explanation**<br>**(Consider if the maximum value was captured by existing sample data.)** | Yes. Ongoing and completed investigations have defined the nature and extent of contamination. |
| **Do existing or proposed data for the site address potential transport pathways of site contamination?**<br>**(yes/no/uncertain)**<br>**Provide explanation**<br>**(Consider if other sites should be aggregated to characterize potential ecological risk.)** | Yes. Ongoing and completed investigations have defined the nature and extent of contamination. |

**Part C—Ecological Pathways Conceptual Exposure Model**

**Provide answers to Questions A to V to develop the Ecological Pathways Conceptual Exposure Model**

**Question A:**

**Could soil contaminants reach receptors through vapors?**

- **Volatility of the hazardous substance (volatile chemicals generally have Henry's Law constant >$10^{-5}$ atm-m^3/mol and molecular weight <200 g/mol).**

**Answer (likely/unlikely/uncertain):** Unlikely

**Provide explanation:** Volatile contaminants were not detected in the surface and subsurface soils.

**Question B:**

**Could the soil contaminants reach receptors through fugitive dust carried in air?**

- **Soil contamination would have to be on the actual surface of the soil to become available for dust.**
- **In the case of dust exposures to burrowing animals, the contamination would have to occur in the depth interval where these burrows occur.**

**Answer (likely/unlikely/uncertain):** Unlikely

**Provide explanation:** There was little evidence of burrowing at the sites visited.

**Question C:**

**Can contaminated soil be transported to aquatic ecological communities (use SOP 2.01 run-off score and terminal point of surface water runoff to help answer this question)?**

- **If the SOP 2.01 run-off score* for each SWMU and/or AOC included in the site is equal to zero, this suggests that erosion at the site is not a transport pathway. (* note that the runoff score is not the entire erosion potential score, rather it is a subtotal of this score with a maximum value of 46 points).**
- **If erosion is a transport pathway, evaluate the terminal point to see if aquatic receptors could be affected by contamination from this site.**

**Answer (likely/unlikely/uncertain):** Likely

**Provide explanation:** There are no aquatic ecological communities on the sites but runoff from SWMU 03-014(q) could flow into Sandia Canyon where free-flowing water was evident.

**Question D:**

**Is contaminated groundwater potentially available to biological receptors through seeps or springs or shallow groundwater?**

- **Known or suspected presence of contaminants in groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

**Answer (likely/unlikely/uncertain):** Unlikely

**Provide explanation:** There are no seeps, springs or perched groundwater present on or near the sites. The depth of groundwater is greater than 1000 ft below ground surface.

**Question E:**

**Is infiltration/percolation from contaminated subsurface material a viable transport and exposure pathway?**

- **The potential for contaminants to migrate to groundwater.**
- **The potential for contaminants to migrate through groundwater and discharge into habitats and/or surface waters.**
- **Contaminants may be taken up by terrestrial and rooted aquatic plants whose roots are in contact with groundwater present within the root zone.**
- **Terrestrial wildlife receptors generally will not contact groundwater unless it is discharged to the surface.**

**Answer (likely/unlikely/uncertain):** Unlikely

**Provide explanation:** Contaminants are unlikely to migrate to the regional aquifer given the depth to groundwater. The lack of a significant hydraulic driver (e.g., no standing surface water) facilitating infiltration also mitigates the potential for contaminants reaching groundwater.

**Question F:**

**Might erosion or mass wasting events be a potential release mechanism for contaminants from subsurface materials or perched aquifers to the surface?**

- **This question is only applicable to release sites located on or near the mesa edge.**
- **Consider the erodability of surficial material and the geologic processes of canyon/mesa edges.**

**Answer (likely/unlikely/uncertain):** Unlikely

**Provide explanation:** There are no perched aquifers on or near these sites. While erosion potential is moderate at SWMU 03-014(q), there is no evidence of mass wasting events in these areas.

**Question G:**

**Could airborne contaminants interact with receptors through the respiration of vapors?**

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of the inhalation of vapors for burrowing animals.**
- **Foliar uptake of vapors is typically not a significant exposure pathway.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 1

**Terrestrial Animals:** 1

**Provide explanation:** Little evidence of burrowing observed at the sites visited.

**Question H:**

**Could airborne contaminants interact with plants through the deposition of particulates or with animals through the inhalation of fugitive dust?**

- **Contaminants must be present as particulates in the air or as dust for this exposure pathway to be complete.**
- **Exposure through the inhalation of fugitive dust is particularly applicable to ground-dwelling species that would be exposed to dust disturbed by their foraging or burrowing activities or by wind movement.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 1

**Terrestrial Animals:** 1

**Provide explanation:** There was little evidence of burrowing and the ground was fairly well covered with vegetation and leaf/grass litter.

**Question I:**

**Could contaminants interact with plants through root uptake or rain splash from surficial soils?**

- **Contaminants in bulk soil may partition into soil solution, making them available to roots.**
- **Exposure of terrestrial plants to contaminants present in particulates deposited on leaf and stem surfaces by rain striking contaminated soils (i.e., rain splash).**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 2

**Provide explanation:** Low concentrations of COPCs were detected in surface soil.

**Question J:**

**Could contaminants interact with receptors through food-web transport from surficial soils?**

- **The chemicals may bioaccumulate in animals.**
- **Animals may ingest contaminated food items.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 2

**Provide explanation:** COPCs known to bioaccumulate were found in low concentrations in surface soil, indicating that food web transport is a minor pathway

**Question K:**

**Could contaminants interact with receptors through the incidental ingestion of surficial soils?**

- **Incidental ingestion of contaminated soil could occur while animals grub for food resident in the soil, feed on plant matter covered with contaminated soil, or while grooming themselves clean of soil.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 2

**Provide explanation:** COPCs were found in surface soil.

**Question L:**

**Could contaminants interact with receptors through dermal contact with surficial soils?**

- **Significant exposure through dermal contact would generally be limited to organic contaminants that are lipophilic and can cross epidermal barriers.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 2

**Provide explanation:** Lipophilic chemicals were detected at low concentrations at these sites.

**Question M:**

**Could contaminants interact with plants or animals through external irradiation?**

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 0

**Terrestrial Animals:** 0

**Provide explanation:** No radionuclide COPCs were identified at these sites.

**Question N:**

**Could contaminants interact with plants through direct uptake from water and sediment or sediment rain splash?**

- **Contaminants may be taken up by terrestrial plants whose roots are in contact with surface waters.**
- **Terrestrial plants may be exposed to particulates deposited on leaf and stem surfaces by rain striking contaminated sediments (i.e., rain splash) in an area that is only periodically inundated with water.**
- **Contaminants in sediment may partition into soil solution, making them available to roots.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question O:**

**Could contaminants interact with receptors through food-web transport from water and sediment?**

- **The chemicals may bioconcentrate in food items.**
- **Animals may ingest contaminated food items.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question P:**

**Could contaminants interact with receptors through the ingestion of water and suspended sediments?**

- **If sediments are present in an area that is only periodically inundated with water, terrestrial receptors may incidentally ingest sediments.**
- **Terrestrial receptors may ingest water-borne contaminants if contaminated surface waters are used as a drinking water source.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question Q:**

**Could contaminants interact with receptors through dermal contact with water and sediment?**

- **If sediments are present in an area that is only periodically inundated with water, terrestrial species may be dermally exposed during dry periods.**
- **Terrestrial organisms may be dermally exposed to water-borne contaminants as a result of wading or swimming in contaminated waters.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question R:**

**Could suspended or sediment-based contaminants interact with plants or animals through external irradiation?**

- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **Burial of contamination attenuates radiological exposure.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Terrestrial Plants:** 0

**Terrestrial Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question S:**

**Could contaminants bioconcentrate in free-floating aquatic, attached aquatic plants, or emergent vegetation?**

- **Aquatic plants are in direct contact with water.**
- **Contaminants in sediment may partition into pore water, making them available to submerged roots.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Aquatic Plants/Emergent Vegetation:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question T:**

**Could contaminants bioconcentrate in sedimentary or water-column organisms?**

- **Aquatic receptors may actively or incidentally ingest sediment while foraging.**
- **Aquatic receptors may be directly exposed to contaminated sediments or may be exposed to contaminants through osmotic exchange, respiration, or ventilation of sediment pore waters.**
- **Aquatic receptors may be exposed through osmotic exchange, respiration, or ventilation of surface waters.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Aquatic Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question U:**

**Could contaminants bioaccumulate in sedimentary or water column organisms?**

- **Lipophilic organic contaminants and some metals may concentrate in an organism's tissues.**
- **Ingestion of contaminated food items may result in contaminant bioaccumulation through the food web.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Aquatic Animals:** 0

**Provide explanation:** There are no aquatic environments on-site

**Question V:**

**Could contaminants interact with aquatic plants or animals through external irradiation?**

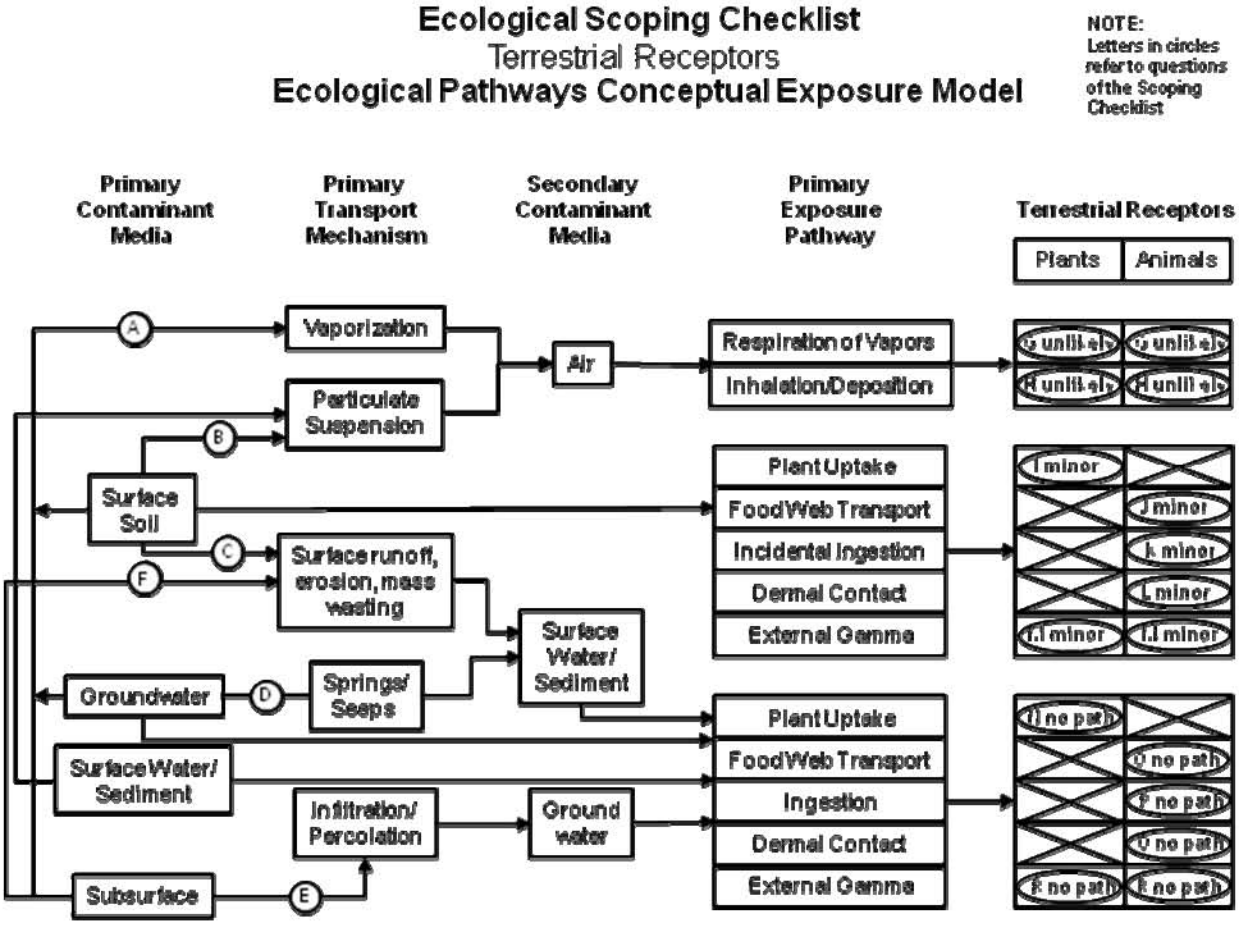
- **External irradiation effects are most relevant for gamma-emitting radionuclides.**
- **The water column acts to absorb radiation; therefore, external irradiation is typically more important for sediment dwelling organisms.**

**Provide quantification of exposure pathway (0=no pathway, 1=unlikely pathway, 2=minor pathway, 3=major pathway):**

**Aquatic Plants:** 0

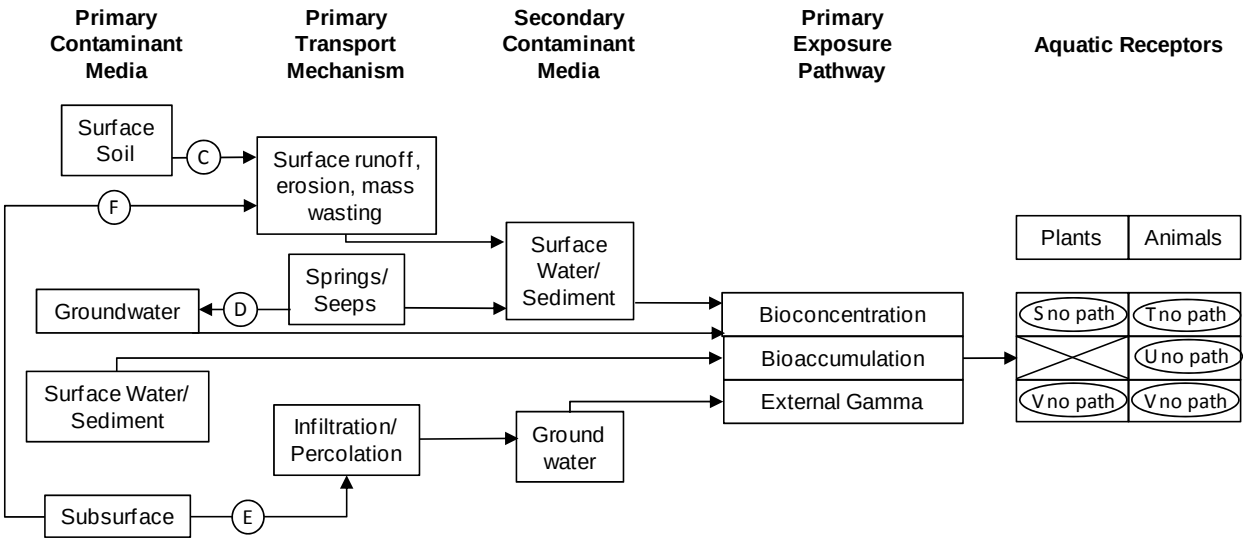
**Aquatic Animals:** 0

**Provide explanation:** There are no aquatic environments on-site


Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model
NOTE:
Letters in circles refer to questions of the Scoping Checklist
Primary Contaminant Media
Primary Transport Mechanism
Secondary Contaminant Media
Primary Exposure Pathway
Terrestrial Receptors
Plants
Animals
A
Vaporization
Particulate Suspension
Air
Respiration of Vapors
Inhalation/Deposition
B
Surface Soil
C
F
Surface runoff, erosion, mass wasting
Plant Uptake
Food Web Transport
Incidental Ingestion
Dermal Contact
External Gamma
I minor
J minor
k minor
L minor
I,l minor
Surface Water/ Sediment
Groundwater
D
Springs/ Seeps
Surface Water/ Sediment
Infiltration/ Percolation
Ground water
Ingestion
Subsurface
E
no path

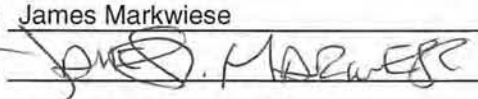
## Ecological Scoping Checklist
Aquatic Receptors
## Ecological Pathways Conceptual Exposure Model

**NOTE:**
Letters in circles refer to questions of the Scoping Checklist

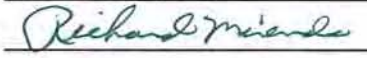


**Signatures and certifications:**

**Checklist completed by (provide name, organization and phone number):**

**Name (printed):** James Markwiese
**Name (signature):** 
**Organization:** Neptune and Company, Inc.
**Phone number:** 505-662-0707, ext. 24

**Verification by another party (provide name, organization and phone number):**

**Name (printed):** Richard J. Mirenda
**Name (signature):** 
**Organization:** Los Alamos National Laboratory, ET-DO
**Phone number:** 505-665-6953