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Investigation Report for Upper Cañada del Buey Aggregate Area

Prepared by the Environmental Programs Directorate

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EXECUTIVE SUMMARY

This investigation report presents the investigation activities at 56 solid waste management units (SWMUs) and areas of concern (AOCs) in the Upper Cañada del Buey Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). The SWMUs and AOCs are located in Technical Area 46 (TA-46) and TA-52 (which includes two sites associated with former TA-04 but now lie within the boundary of TA-52). Of the 56 sites, SWMU 46-003(a) is proposed for delayed characterization and investigation pending excavation and removal of a septic tank.

The objectives of this investigation are 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 as well as to assess whether additional sampling is required. This report presents the results of site characterization activities conducted during the 2010 investigation, as directed by the approved investigation work plan for the Upper Cañada del Buey Aggregate Area.

The 2010 investigation activities included collecting soil, sediment, and rock samples from the surface to a maximum depth of 26 ft below ground surface. Data from samples collected during the 2010 investigation were evaluated with data collected during previous investigations that meet current Laboratory data-quality requirements.

The sampling data presented in this report indicate the extent of contamination has been defined at six sites. Human health and ecological risk assessments were performed for four of these six sites. No COPCs were detected above BVs at one of the remaining two sites, and no COPCs were detected at depth intervals relevant to human health risk assessments at the other site.

The human health risk-screening assessment results indicate no potential unacceptable risks from COPCs for the industrial worker, construction worker, and residential scenarios at the four sites evaluated. The total excess cancer risks were below the New Mexico Environment Department (NMED) target risk level of 1×10^{-5}, and the hazard indexes (HIs) were equivalent to or below the NMED target HI of 1.0. The ecological risk-screening assessment results indicate no potential unacceptable risks to any receptor at the evaluated sites.

The Laboratory recommends corrective actions complete without controls for the six sites within the Upper Cañada del Buey Aggregate Area for which nature and extent have been defined. In addition, one site previously recommended for no further action is recommend for corrective actions complete with controls.

The extent of contamination has not been defined at 49 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 is participating in a national effort by DOE to clean up sites and facilities formerly involved in weapons research and development. The goal of the Laboratory's effort is to ensure past operations do not threaten human or environmental health and safety in and around Los Alamos County, New Mexico. To achieve this goal, the Laboratory is currently investigating sites potentially contaminated by past Laboratory operations. These sites are designated as either solid waste management units (SWMUs) or areas of concern (AOCs).

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

1.1 General Site Information

The Upper Cañada del Buey Aggregate Area, located in Technical Area 46 (TA-46) and TA-52 at the Laboratory (Figures 1.1-1 and 1.1-2), consists of 83 SWMUs and AOCs, 26 of which have been previously investigated and/or remediated and have been approved for no further action (NFA), and 1 site is pending NMED review. The remaining 56 SWMUs or AOCs were addressed in the approved investigation work plan (LANL 2008, 105038.17, pp. 2–8; NMED 2008, 103429). Historical details of previous investigations and data for all 83 sites are provided in the historical investigation report (HIR) for the Upper Cañada del Buey Aggregate Area (LANL 2008, 101803). This investigation report describes the investigation status and results from sampling activities conducted to date for the 56 sites. An additional site [SWMU 52-001(d)] was not discussed in the work plan or sampled during the 2010 investigation because NMED is reviewing supplemental information submitted to support a previous NFA recommendation (Nonno 2008, 101365). Table 1.1-1 lists the 57 sites and provides a brief description, summary of previous investigations, and investigation activities conducted in 2010 for each site.

1.2 Purpose of Investigation

Fifty-six SWMUs and AOCs within the Upper Cañada del Buey Canyon Aggregate Area were addressed during the 2010 investigation because these sites are potentially contaminated with hazardous chemicals and/or radionuclides, and final assessments of site contamination, associated risks, and recommendations for additional corrective actions are incomplete. For each site, the objectives of the 2010 investigation were to (1) 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 2010 investigation at 52 of the 57 SWMUs and AOCs not previously approved for NFA in accordance with the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429). Four sites within the Upper Cañada del Buey Aggregate Area were not sampled in 2010 because data obtained from samples collected from associated or collocated SWMUs were used to evaluate these sites. One site was not sampled because information supporting NFA was previously submitted to NMED and is being reviewed. No additional investigation requirements for this site were identified in the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429).

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

1.3 Document Organization

This report is organized into 11 sections, including this introduction, with multiple supporting appendixes. Section 2 provides details of the site conditions (surface and subsurface) of the aggregate area. Section 3 provides an overview of the scope of the activities performed during the implementation of the work plan. Section 4 describes the regulatory criteria used to evaluate potential risk to ecological and human receptors. Section 5 describes the data review methods. Sections 6, 7, and 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 2010 investigation, site contamination, evaluation of the nature and extent of contamination, and summaries of human health risk-screening and ecological risk-screening assessments for former TA-04 (now part of TA-52), TA-46, and TA-52, 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); risk-screening assessments (Appendix I); and supplemental information on SWMU 52-001(d) (Appendix J).

2.0 AGGREGATE AREA SITE CONDITIONS

2.1 Surface Conditions

2.1.1 Soil

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

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

The soil on the mesa top in the Upper Cañada del Buey Aggregate Area belongs generally to the Hackroy 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 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.

No springs are present in Cañada del Buey. A possible seep may be present north of TA-46 near the location of temporary flume, located downgradient of National Pollutant Discharge Elimination System (NPDES) outfalls on the north side of TA-46, or the damp soil conditions may result from effluent discharges at TA-46. There is no flow from the possible seep (LANL 1999, 064617, p. 3-106).

Effluent from the Sanitary Wastewater Systems Consolidation (SWSC) plant, located at TA-46, is pumped to TA-03 and discharged into upper Sandia Canyon. No treated effluent has been discharged from the SWSC plant into Cañada del Buey (LANL 1997, 056684, p. 28).

Cañada del Buey receives runoff from surrounding mesa tops and effluent from numerous active and inactive outfalls at TA-46. The runoff and effluent do not support continuous flow in any part of the canyon; the stream is entirely ephemeral on Laboratory property (LANL 1999, 064617, p. 3-103). Local runoff from seasonal rainstorms occasionally extends from the Laboratory boundary downstream as far as the Rio Grande, but flow in the upper and middle canyon is rarely continuous (LANL 1999, 064617, p. 3-5).

No perennial reaches occur in Cañada del Buey on Laboratory property. A continuous reach extends a short distance downstream from the White Rock sewage treatment plant discharge point. Surface water flow in the stream channel and across the eastern Laboratory boundary at NM 4 is ephemeral. Flow reaches the Rio Grande occasionally as the result of high snowmelt runoff or periodic storm events (LANL 1999, 064617, p. 3-113).

2.1.3 Land Use

Currently, the mesa-top portion of the Upper Cañada del Buey Aggregate Area is an industrially developed area. It is anticipated that the mesa tops will remain industrial through continued use by the Laboratory and will not change in the foreseeable future. Public access is controlled at TA-46 through physical and administrative controls such as fencing and access control. Cañada del Buey is used as a

recreational area by Laboratory workers; however, no recreational use of the land occurs within the sites under investigation.

2.2 Subsurface Conditions

2.2.1 Stratigraphic Units of the Bandelier Tuff

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

The bedrock at or near the surface of the mesa top is the Bandelier Tuff (Qbt). There are approximately 1250 ft of volcanic and sedimentary materials between any potential contaminant-bearing units at the mesa-top surface and the regional aquifer. The stratigraphic units encountered during investigation of the Upper Cañada del Buey Aggregate Area are described briefly in the following sections. The descriptions begin with the oldest (deepest) and proceed to the youngest (topmost). The only stratigraphic unit encountered during the Upper Cañada del Buey Aggregate Area investigation was Qbt 3 of the Tshirege Member of the Bandelier Tuff (LANL 1999, 064617; LANL 2006, 093196, p. 13). Stratigraphic units comprising the Bandelier Tuff are shown in Figure 2.2-1.

2.2.1.1 Guaje Pumice Bed

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

2.2.1.2 Otowi Member

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

2.2.1.3 Tephra and Volcaniclastic Sediment of the Cerro Toledo Interval

The Cerro Toledo interval is an informal name given to a sequence of volcaniclastic sediment and tephra of mixed provenance that separates the Otowi and Tshirege Members of the Bandelier Tuff (Broxton et al. 1995, 050121; Broxton and Reneau 1995, 049726; Goff 1995, 049682). Although it is located between the two members of the Bandelier Tuff, it is not considered part of that formation (Bailey et al. 1969, 021498). The unit contains primary volcanic deposits described by Smith et al. (1970, 009752) as well as reworked volcaniclastic sediment. The occurrence of the Cerro Toledo interval is widespread; however, its thickness is variable, ranging between several feet 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 equivalent of Cerro Toledo rhyolite tephra. Oxidation and clay-rich horizons indicate at least two periods of soil development occurred within the Cerro Toledo deposits. Because the soil is rich in clay, it may act as a barrier to the movement of vadose zone moisture. Some of the deposits contain both crystal-poor and crystal-rich varieties of pumice. The pumice deposits tend to form porous and permeable horizons within the Cerro Toledo interval, and locally may provide important pathways for moisture transport in the vadose zone. A subordinate lithology within the Cerro Toledo interval includes clast-supported gravel, cobble, and boulder deposits derived from the Tschicoma Formation (Broxton et al. 1995, 050121; Goff 1995, 049682; Broxton and Reneau 1996, 055429).

2.2.1.4 Tshirege Member

The Tshirege Member of the Bandelier Tuff 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 years ago (Izett and Obradovich 1994, 048817; Spell et al. 1996, 055542). The Tshirege Member is a multiple-flow, ash-and-pumice sheet that forms the prominent cliffs in most of the canyons on the Pajarito Plateau. It is a cooling unit whose physical properties vary vertically and laterally. The consolidation in this member is largely from compaction and welding at high temperatures after the tuff was emplaced. Its light brown, orange-brown, purplish, and white cliffs have numerous, mostly vertical fractures that may extend from several feet up to several tens of feet. The Tshirege Member includes thin but distinctive layers of bedded, sand-sized particles called surge deposits that demark separate flow units within the tuff. The Tshirege Member is generally over 200 ft thick.

The Tshirege Member differs from the Otowi Member most notably in its generally greater degree of welding and compaction. Time breaks between the successive emplacement of flow units caused the tuff to cool as several distinct cooling units. For this reason, the Tshirege Member consists of at least four cooling subunits that 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 present at the Upper Cañada del Buey Aggregate Area.

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

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

Subunit Qbt 1v forms alternating clifflike and sloping outcrops composed of porous, nonwelded, crystallized tuff. The base of this unit is a thin horizontal zone of preferential weathering that marks the

abrupt transition from glassy tuff below (in Unit Qbt 1g) to the crystallized tuff above. This feature forms a widespread marker horizon (locally termed the vapor-phase notch) throughout the Pajarito Plateau. The lower part of Qbt 1v is orange-brown, resistant to weathering, and has distinctive columnar (vertical) joints; hence, the term “colonnade tuff” is appropriate for its description. A distinctive white band of alternating cliff- and slope-forming tuffs overlies the colonnade tuff. The tuff of Qbt 1v is commonly nonwelded (pumices and shards retain their initial equant shapes) and 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. Its base consists of a purple-gray, unconsolidated, porous, and crystal-rich nonwelded tuff that forms a broad, gently sloping bench developed on top of Qbt 2. Abundant fractures extend through the upper units of the Bandelier Tuff, including the ignimbrite of Qbt 3 of the Tshirege. The origin of the fractures has not been fully determined, but the most probable cause is brittle failure of the tuff caused by cooling contraction soon after initial emplacement (Vaniman 1991, 009995.1; Wohletz 1995, 054404).

2.2.2 Hydrogeology

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

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

2.2.2.1 Groundwater

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

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

Alluvial Groundwater

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

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

Regional Aquifer

The regional aquifer for the Los Alamos area is the only aquifer capable of large-scale municipal water supply (Purtymun 1984, 006513). The surface of the regional aquifer rises westward from the Rio Grande within the Santa Fe Group into the lower part of the Puye Formation beneath the central and western part of the Pajarito Plateau. The depths to groundwater below the mesa tops range between about 1200 ft along the western margin of the plateau and about 600 ft at the eastern margin. The locations of wells and the generalized water-level contours on top of the regional aquifer are described in the Interim Facility-Wide Groundwater Monitoring Plan (LANL 2010, 109830). The regional aquifer is typically separated from the alluvial groundwater and intermediate-perched 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 Cañada del Buey Aggregate Area approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429); the field investigation results are presented in detail in sections 6 and 7, and in the appendixes. The scope of activities for the 2010 Upper Cañada del Buey Aggregate Area investigation included site access and premobilization activities; geodetic, geophysical, and radiological surveys; surface and shallow subsurface sampling; borehole drilling, sampling, and borehole abandonment; septic tank excavation and removal; health and safety monitoring; and waste management activities.

All activities were conducted in accordance with the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429). The applicable field methods are summarized below and are detailed in Appendix B. Any deviations from the approved investigation work plan are noted in sections 6 and 7 and are described in detail in Appendix B.

3.1 Site Access and Premobilization Activities

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

3.2 Field Activities

The following sections describe the field activities conducted during the 2010 investigation, including surface surveys, field screening, surface and shallow subsurface sampling, 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 Cañada del Buey Aggregate Area investigation to locate surface and subsurface sampling locations. Initial geodetic surveys were performed to establish and mark the planned sampling locations in the field. Geodetic surveys were conducted in accordance with Standard Operating Procedure (SOP) 5028, Coordinating and Evaluating Geodetic Surveys, using a Trimble 5700 differential global positioning system. 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 the site of two abandoned septic tanks [SWMUs 46-003(b) and 46-003(c)] to locate anomalies that could confirm the presence of these tanks. Multiple geophysical methods were used to optimize the survey, including a Schonstedt magnetic locator, radiodetection line tracer, Geonics EM-61 metal detector and Sensors & Software 250 MHz ground-penetrating radar (GPR). Formal surveying was conducted over spatial control and data acquisition grids, which were established utilizing a transit and tape. Survey results showed no evidence of either septic tank. Appendix E presents the geophysics report with individual profile results.

3.2.3 Field Screening

Environmental samples were field screened for headspace organic vapors 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 for approximately five minutes. Screening measurements were recorded on the field sample collection logs (SCLs) and in the field logbook. During some field-screening events, weather-related interference (i.e., high moisture content of the collected samples) caused PID instrumentation reporting errors. Instrumentation function errors were recorded as either "NC" or ">2000" in the SCLs, chain-of-custody (COC) forms, and field logbook. The SCLs are provided on DVD in Appendix G. The organic vapor-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 alpha and beta/gamma 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, 105038.17; NMED 2008, 103429). 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 analytical laboratory for the analyses specified by the approved investigation 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 placed in sample collection bottles.

Samples were collected from depth intervals specified in the approved work plan (LANL 2008, 105038.17; NMED 2008, 103429). 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 TD to 2.0 ft below ground surface (bgs). The top 2.0 ft of each borehole was then capped with Portland type I/II cement to surface grade.

3.2.7 Septic Tank Removal

During the 2010 investigation, four inactive septic tanks were excavated and removed in accordance with the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429). An excavator was used to remove two 500-gal. steel septic tanks, a 1000-gal. concrete septic tank, and a 500-gal. fiberglass septic tank from SWMUs 46-003(d), 46-003(e), 46-003(f), and 46-003(g), respectively. The inlet and outlet drainlines associated with each septic tank were plugged with concrete, except for the SWMU 46-003(d) septic tank, whose inlet drainline had been previously rerouted. Following the backfilling of each septic tank excavation, confirmation samples were collected from three locations in accordance with the approved investigation work plan: below the former septic tank inlet, from the center of the tank footprint, and below the former septic tank outlet (LANL 2008, 105038.17; NMED 2008, 103429). Management of waste generated from the excavation and removal of these septic tanks, drainlines, and associated IDW is described in Appendix D.

3.2.8 Equipment Decontamination

All field equipment that had the potential to contact sample material (e.g., hand augers, sampling scoops, bowls, core-barrel sections) was decontaminated between sample collection and between sampling locations to prevent cross-contamination of samples and sampling equipment. Decontamination was performed in accordance with SOP-5061, Field Decontamination of Equipment. Rinsate blanks were collected on sampling equipment to check the effectiveness of decontamination. The dry decontamination methods used are described in Appendix B.

3.2.9 Chemical and Radiological Sample Analyses

All samples were shipped by the SMO to contract analytical laboratories for the requested analyses. The analyses requested were as specified by the approved work plan (LANL 2008, 105038.17; NMED 2008, 103429). The samples were analyzed for all or a subset of the following: target analyte list (TAL) metals, total cyanide, nitrate, perchlorate, polychlorinated biphenyls (PCBs), semivolatile organic compounds (SVOCs), volatile organic compounds (VOCs), total petroleum hydrocarbons (TPH) diesel range organics

(DRO), pesticides, americium-241, gamma-emitting radionuclides, isotopic plutonium, isotopic uranium, isotopic thorium, cesium, lithium and asbestos.

3.2.10 Health and Safety Measures

All 2010 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 radioactivity was expected and field monitoring for VOCs, gross-alpha and gross-beta/gamma radiation, and dust-particulate matter using both portable and personnel air-monitoring systems.

3.2.11 IDW Storage and Disposal

All IDW generated during the Upper Cañada del Buey Aggregate Area 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 NMED regulations, DOE orders, and Laboratory implementation requirements, policies, and/or procedures. IDW was also managed in accordance with the approved waste characterization strategy form (WCSF) and amendments to the WCSF. Details of IDW management for the Upper Cañada del Buey Aggregate Area investigation are presented in Appendix D.

The waste streams associated with the investigation included drill cuttings, contact waste, returned samples, concrete, steel, fiberglass, and asphalt debris, solid waste, and low-level waste (LLW) from the SWMU 46-003(e) septic tank. Each waste stream was containerized and placed in an accumulation area appropriate for the regulatory classification of the waste, in accordance with the approved WCSF.

3.3 Deviations

Deviations occurred while conducting field activities as defined in the approved work plan (LANL 2008, 103058.17; NMED 2008, 103429). The deviations did not adversely affect the completion or results of the investigation. Specific deviations are summarized in sections 6 and 7, and are 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 Cañada del Buey Aggregate Area sites using NMED guidance (NMED 2009, 108070). 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 Cañada del Buey Aggregate Area is currently industrial and is expected to remain industrial for the reasonably foreseeable future. The 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. Cañada del Buey is used as a recreational area by Laboratory workers; however, no recreational use occurs within the sites under investigation in this aggregate area. The residential scenario is evaluated per the Consent Order.

4.2 Screening Levels

Human health risk-screening evaluations were conducted for the solid media at sites within the Upper Cañada del Buey Aggregate Area. The human health screening assessments (Appendix I) were performed for inorganic and organic chemicals of potential concern (COPCs) using NMED soil screening levels (SSLs) for the industrial, construction worker, and residential scenarios (NMED 2009, 108070). Radionuclides were assessed using the Laboratory screening action levels (SALs) (LANL 2009, 107655). When an NMED SSL was not available for a COPC, SSLs were obtained from EPA regional tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) (adjusted to a risk level of 10^{-5} for carcinogens). A surrogate SSL was used for some COPCs based on structural similarity or breakdown products.

4.3 Ecological Screening Levels

The ecological risk-screening assessments (Appendix I) were conducted using ecological screening levels (ESLs) obtained from the ECORISK Database, Version 2.5 (LANL 2010, 110846). The ESLs are based on similar species and are derived from experimentally determined no observed adverse effect levels, 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 2.5 (LANL 2010, 110846).

4.4 Cleanup Standards

As specified in the Consent Order, screening levels are used as soil cleanup levels unless they are determined to be impracticable or values do not exist for current and reasonably foreseeable future land use. Screening assessments compare COPC concentrations for each site with industrial, residential, and construction worker SSLs/SALs.

The cleanup goals specified in Section VIII of the Consent Order are a target risk of 10^{-5} for carcinogens or a hazard index (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 in 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 and AOC in the Upper Cañada del Buey 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 for organic chemicals. For inorganic chemicals and radionuclides, statistical comparisons are performed, as described in section 5.2, to determine if concentrations are comparable with background and to aid in defining extent. Across a site, extent is defined for inorganic chemicals whose concentrations are below BVs and radionuclides whose concentrations are below BVs/FVs or are not different from background. In addition, concentrations of certain naturally occurring inorganic chemicals (e.g., nitrate) that do not have an established BVs likely reflect naturally occurring concentrations and not a contaminant release.

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

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

5.1 Identification of COPCs

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

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

To identify inorganic COPCs, the first step is to compare the sample result with the BV, if available. If sample results are above BVs and sufficient data are available (10 or more sample results), statistical tests are used to compare the site sample data with the background data set for the appropriate media. If statistical tests cannot be performed because of insufficient data (less than 10 samples) or a high percentage of nondetects, the sample results are compared with the BV and/or the maximum background concentration of the chemical in the appropriate media. If sample results are above the BV and/or maximum background concentration, the chemical is identified as a COPC. The same evaluation is performed using sample DLs when a constituent is not detected but has DLs above the BV. If no BV is available, detected inorganic chemicals are identified as COPCs.

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

Sample media encountered during investigations at Upper Cañada del Buey 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), and Bandelier Tuff (media code QBT3—the only unit of Bandelier Tuff

encountered during this investigation). Because no separate BVs are available for fill material, fill samples are evaluated by comparison with soil BVs (LANL 1998, 059730). The discussions of site contamination in soil include fill samples with soil samples in sample counts and comparisons with background.

5.2 Overview of Statistical Methods

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

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

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

Observed significance levels (p-values) are obtained from the Gehan, quantile, or slippage tests. If a p-value is less than a specified probability (e.g., 0.05, a nominal significance level), then there is some reason to suspect that a difference exists between the distributions. If the p-value is greater than 0.05, no difference is indicated. The standard set of tests is run whenever the detection rate for both the site data set and the Laboratory background data set is greater than 50%; if there are fewer than 50% detections in either set, then the Gehan test is not applicable. If all sample data are nondetects, statistical tests are not performed.

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

from the first test is <0.05, indicating the site data are different from background, the second test does not need to be performed, and the inorganic chemical is identified as a COPC. Results of statistical tests are presented in Appendix H.

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

6.0 FORMER TA-04 BACKGROUND AND FIELD-INVESTIGATION RESULTS

The Upper Cañada del Buey Aggregate Area contains two sites (one AOC and one SWMU) associated with former TA-04 that are addressed in this investigation report (Table 1.1-1). Each site is described separately in sections 6.2 and 6.3, including site description and operational history, relationship to other SWMUs and AOCs, historical and 2010 investigation activities, 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 assessments.

6.1 Background of Former TA-04

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

Former TA-04, called Alpha Site, was used as a firing site until the late 1940s. The former TA underwent decontamination and decommissioning (D&D) in 1985 and now lies within the current boundaries of TA-52 and TA-63. The SWMU and AOC within former TA-04 addressed in this investigation report are located within the boundaries of TA-52.

6.1.1 Operational History

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

6.1.2 Summary of Releases

Potential contaminants at former TA-04 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

Former TA-04 is almost completely developed. Roads and paved parking areas surround the buildings. Former TA-04 is located within the Pajarito Road security corridor and access is controlled/restricted to Laboratory badge holders.

6.2 SWMU 04-003(a), Outfall

6.2.1 Site Description and Operational History

SWMU 04-003(a) is an outfall located approximately 15 ft southeast of former building 04-7 at former TA-04 (now TA-52) (Figure 6.2-1). Former building 04-7 operated from 1948 to 1955 and housed a darkroom and photoprocessing laboratory that discharged to the outfall. Discharges to the outfall flowed to a trench southeast of former building 04-7 that eventually discharged into Cañada del Buey. Portions of the trench have since been covered by buildings 52-114 and 52-115 and an asphalt parking lot. Beta activity was detected in the darkroom in 1955, and portions of the floor were removed in an attempt to remediate the contamination (Lopez Escobedo 1998, 058840, p. 1-2). It is not known whether the drainlines were removed when former building 04-7 was dismantled in 1956 (LANL 1992, 007666, p. 3-7).

6.2.2 Relationship to Other SWMUs and AOCs

AOC 04-004, an area of potential soil contamination associated with the footprint of former building 04-7, is located approximately 15 ft northwest of SWMU 04-003(a). No other SWMUs or AOCs are associated with SWMU 04-003(a).

6.2.3 Summary of Previous Investigations

Resource Conservation and Recovery Act facility investigation (RFI) activities were conducted at SWMU 04-003(a) in 1994, 1995, and 1998 (Lopez Escobedo 1998, 058840). Results of radiation surveys performed in 1994 and 1995 were within instrument background levels. During the 1995 Phase I RFI, 18 samples were collected from six locations. All samples were submitted for analysis of isotopic plutonium and isotopic uranium. One sample was also submitted for analysis of TAL metals, VOCs, SVOCs, and gross-alpha and gross-beta radiation and by gamma spectroscopy (Lopez Escobedo 1998, 058840, pp. 2–8). Cadmium was detected above BV in one soil sample. Pentachlorophenol and gross-alpha and gross-beta radiation were detected in one soil sample. Plutonium-239/240 was detected in two soil samples at depths greater than the applicable FV. Radionuclides analyzed by gamma spectroscopy were not detected or detected above FVs. VOCs were not detected.

During the 1998 RFI, 10 samples were collected from three locations sampled during the 1995 Phase I RFI and from two new sampling locations. Samples were submitted for analysis of TAL metals, SVOCs, and high explosives (HE) (Lopez Escobedo 1998, 058840, pp. 3–4). 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 sediment sample. The DL for

mercury was above BVs in one soil and one sediment sample; the DL for selenium was above the sediment BV in six samples. HE was not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.2.4. Table 6.2-1 presents the samples collected and analyses requested at SWMU 04-003(a).

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 04-003(a). As a result, the following activities were completed as part of the 2010 investigation.

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from four locations to confirm the results of the previous investigation. Two surface samples were collected from 0.0–0.5 ft bgs and 0.0–1.0 ft bgs, two samples were collected from 1.0–2.0 ft bgs, four samples were collected from 2.0–3.0 ft bgs, and two samples were collected from 3.0–4.0 ft bgs. All samples were analyzed at off-site fixed laboratories for TAL metals, SVOCs, cyanide, isotopic uranium, isotopic plutonium, and americium-241. Four of the 10 samples were also analyzed for PCBs.

The 2010 and historical sampling locations at SWMU 04-003(a) are shown in Figure 6.2-1. Table 6.2-1 presents the samples collected and analyses requested for SWMU 04-003(a). 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 04-003(a), a maximum concentration of 535 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (52-10-9510) 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. No changes to sampling or other activities occurred because of the field-screening results.

6.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 04-003(a) were consisted of results from 38 samples (19 soil, 7 sediment, and 12 tuff) collected from 12 locations.

Inorganic Chemicals

Twenty-one samples (9 soil, 6 sediment, and 6 tuff) were analyzed for TAL metals and 10 samples (4 soil and 6 tuff) were analyzed for cyanide. Table 6.2-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.2-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-one samples (nine soil, six sediment, and six tuff) were analyzed for SVOCs, one soil sample was analyzed for VOCs, and four soil samples were analyzed for PCBs. Ten samples (four soil and six sediment) were analyzed for HE. Table 6.2-3 presents the detected organic chemicals. Figure 6.2-3 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-eight samples (15 soil, 1 sediment, and 12 tuff) were analyzed for isotopic plutonium and isotopic uranium, 10 samples (4 soil and 6 tuff) were analyzed for americium-241, and 1 sample was analyzed for gamma-emitting radionuclides and gross alpha/beta radioactivity. Table 6.2-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.2-4 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.2.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above BV but had DLs (1.14 to 1.32 mg/kg) above the soil BV (0. 83 mg/kg) and DLs (1.0 to 1.12 mg/kg) above the tuff BV (0.5 mg/kg) in nine samples. Because antimony was not detected above BVs, the lateral and vertical extent of antimony are defined.

Barium was detected above BV (46 mg/kg) in one tuff sample at a concentration of 47 mg/kg at location 52-610950 from 2.0–3.0 ft bgs. Barium concentrations of barium decreased with depth and decreased downgradient. The lateral and vertical extent of barium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 1.0 mg/kg at location 04-02007 from 0.0–1.0 ft bgs. Cadmium concentrations decreased with depth and decreased downgradient. Cadmium also had DLs above the soil BV in four samples. The lateral and vertical extent of cadmium are defined.

Chromium was detected above tuff BV (7.14 mg/kg) in two samples and had a DL above the tuff BV in one sample at two locations. The maximum concentration of 8.98 mg/kg was detected at location 52-610951 from 2.0–3.0 ft bgs. Chromium concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of chromium are defined.

Mercury was not detected above BV but had a DL (0.11 mg/kg) above the soil BV (0.1 mg/kg) and above the sediment BV (0.1 mg/kg) in one sample each. Because mercury was not detected above BV, the lateral and vertical extent of mercury are defined.

Selenium was not detected above BV but had DLs (1.0 to 1.1 mg/kg) above the sediment BV (0.3 mg/kg) and DLs (0.973 to 1.11 mg/kg) above the tuff BV (0.3 mg/kg). Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 57.2 mg/kg at location 52-610952 from 2.0–3.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-1 and Table H-1). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, acenaphthylene, benzo(a)anthracene, fluorene, 2-methylnaphthalene, and naphthalene were detected in one soil sample at location 52-610953 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acenaphthene, acenaphthylene, benzo(a)anthracene, fluorene, 2-methylnaphthalene, and naphthalene are defined.

Anthracene was detected in two samples at one location. The maximum concentration of 0.201 mg/kg was detected at location 52-610953 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of anthracene are defined.

Benzo(a)pyrene, benzo(b)fluoranthene, and phenanthrene were detected in four samples at three locations. The maximum concentrations were detected at location 52-610953 from 0.0–1.0 ft bgs. The concentrations decreased with depth at location 52-610953 and were below EQLs at location 52-610952. The concentrations increased with depth at location 04-02009 and decreased downgradient. The lateral extent of benzo(a)pyrene, benzo(b)fluoranthene, and phenanthrene is defined, but vertical extent is not defined at one location.

Benzo(g,h,i)perylene, benzo(k)fluoranthene, and chrysene were detected in three samples at two locations. The maximum concentrations were detected at location 52-610953 from 0.0–1.0 ft bgs. The concentrations decreased with depth at location 52-610953. The concentrations increased with depth at location 04-02009 and decreased downgradient. The lateral extent of benzo(g,h,i)perylene, benzo(k)fluoranthene, and chrysene is defined, but the vertical extent is not defined at one location.

Fluoranthene and pyrene were detected in five samples at three locations. The maximum concentrations were detected at location 52-610953 from 0.0–1.0 ft bgs. Fluoranthene and pyrene concentrations decreased with depth at location 52-610953 and were below EQLs at location 52-610952. The concentrations increased with depth at location 04-02009 and decreased downgradient. The lateral extent of fluoranthene and pyrene is defined, but the vertical extent is not defined at one location.

Indeno(1,2,3-cd)pyrene was detected in four samples at three locations. The maximum concentration of 1.02 mg/kg was detected at location 52-610953 from 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth at location 52-610953 and increased with depth at locations 04-02009 and 52-610952. The concentrations decreased downgradient. The lateral extent of indeno(1,2,3-cd)pyrene is defined, but the vertical extent is not defined at two locations.

Pentachlorophenol was detected in one soil sample at a concentration of 0.07 mg/kg at location 04-02010 from 1.0–2.0 ft bgs and was below the EQL at this location. The lateral and vertical extent of pentachlorophenol are defined.

Radionuclides

Plutonium-239/240 was detected or detected above the soil FV (0.054 pCi/g) in four samples at four locations. The maximum activity of 0.631pCi/g was detected at location 04-02006 from 0.0–1.0 ft bgs. Plutonium-239/240 was detected below the FV at an activity of 0.0363 pCi/g at location 52-610953 from 0.0–1.0 ft bgs. Plutonium-239/240 activities decreased with depth at all locations and decreased downgradient. The vertical and lateral extent of plutonium-239/240 are defined.

Summary of Nature and Extent

The vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at SWMU 04-003(a). The extent of inorganic chemicals and radionuclides is defined at SWMU 04-003(a).

6.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 04-003(a) 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 04-003(a) because extent is not defined for the site.

6.3 AOC 04-004, Area of Potential Soil Contamination

6.3.1 Site Description and Operational History

AOC 04-004 is an area of potential soil contamination associated with the footprint of former building 04-7 at former TA-04 (now TA-52) (Figure 6.2-1). The former building, which measured approximately 16 ft × 43 ft, housed a darkroom and photoprocessing laboratory. The building was used to develop film from 1948 to 1955 and was dismantled in 1956 (Lopez Escobedo 1998, 058840, pp. 1–3).

6.3.2 Relationship to Other SWMUs and AOCs

SWMU 04-003(a) is an outfall located approximately 15 ft southeast of former building 04-7 that received photoprocessing waste from former building 04-7. No other SWMUs or AOCs are associated with AOC 04-004.

6.3.3 Summary of Previous Investigations

RFI activities were conducted at AOC 04-004 in 1994, 1995, and 1998 (Lopez Escobedo 1998, 058840). Results of radiation surveys performed in 1994 and in 1995 were within instrument background levels. During 1995 Phase I RFI activities conducted at AOC 04-004, 12 samples were collected from four locations. All samples were submitted for analysis of isotopic plutonium and isotopic uranium. One soil sample was also submitted for analysis of TAL metals, one sample was submitted for analysis of SVOCs, and one sample was submitted for analysis of gamma-emitting radionuclides and gross alpha/beta radioactivity (Lopez Escobedo 1998, 058840, pp. 2–8). Arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, nickel, selenium, silver, thallium, vanadium, and zinc were detected above BVs in one soil sample. Gross alpha/beta radioactivity was detected in one soil sample. Plutonium-239/240 was detected in four soil samples. Isotopic uranium was not detected above BVs. Radionuclides analyzed by gamma spectroscopy were not detected or detected above FVs. SVOCs were not detected.

During the 1998 RFI, 17 samples were collected from four locations sampled during the 1995 Phase I RFI and from one new sampling location. Samples were submitted for analysis of TAL metals, SVOCs, and HE (Lopez Escobedo 1998, 058840, pp. 3–4). Three samples from one location were also submitted for analysis of VOCs. Lead was detected above BV in three soil samples; zinc was detected above BV in two

soil samples and one fill sample. The DLs for mercury were above BV in nine soil and two fill samples. VOCs, SVOCs, and HE were not detected.

All decision-level analytical data collected during previous investigations are presented and evaluated in section 6.3.4. Table 6.3-1 presents the samples collected and analyses requested at AOC 04-004.

6.3.4 Site Contamination

6.3.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization efforts were completed at AOC 04-004

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eighteen surface and subsurface samples were collected from six locations within and bounding the footprint of the former building to supplement data from previous. Samples were collected from three depths (1.0–2.0 ft, 2.0–3.0 ft, and 3.0–4.0 ft) and analyzed for TAL metals, SVOCs, PCBs, cyanide, isotopic uranium, isotopic plutonium, and americium-241.

The 2010 and historical sampling locations at AOC 04-004 are shown in Figure 6.2-1. Table 6.3-1 presents the samples collected and analyses requested for AOC 04-004. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

6.3.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 04-004, a maximum concentration of 165 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (52-10-9527) 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. No changes to sampling or other activities occurred because of the field-screening results.

6.3.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC 04-004 consisted of results from 47 samples (38 soil and 9 tuff) collected from 11 locations.

Inorganic Chemicals

Thirty-six samples (28 soil and 8 tuff) were analyzed for TAL metals and 18 samples (10 soil and 8 tuff) were analyzed for cyanide. Table 6.3-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Figure 6.2-2 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Thirty-six samples (28 soil and 8 tuff) were analyzed for SVOCs, 3 soil samples were analyzed for VOCs, 18 samples (10 soil and 8 tuff) were analyzed for PCBs, and 17 soil samples were analyzed for HE. Table 6.3-3 presents the detected organic chemicals. Figure 6.2-3 shows the spatial distribution of

detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Thirty samples (21 soil and 9 tuff) were analyzed for isotopic plutonium and isotopic uranium, 18 samples (10 soil and 8 tuff) were analyzed for americium-241, and 1 sample was analyzed for gamma-emitting radionuclides and gross alpha/beta radioactivity. Table 6.3-4 presents the radionuclides detected or detected above BVs/FVs. Figure 6.2-4 shows the spatial distribution of radionuclides. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

6.3.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in one sample at a concentration of 7630 mg/kg at location 52-610958 from 2.0–3.0 ft bgs. Aluminum concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of aluminum are defined.

Antimony was not detected above the BVs but had DLs (1.03 to 1.15 mg/kg) above the soil BV (0.83 mg/kg) and DLs (1.02 to 1.11 mg/kg) above the tuff BV (0.5 mg/kg) in 15 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Arsenic was detected above the soil BV (8.17 mg/kg) in one sample at a concentration of 210 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Arsenic concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of arsenic are defined.

Barium was detected above the soil BV (295 mg/kg) in two samples at two locations and was detected above the tuff BV (46 mg/kg) in four samples at three locations. The maximum concentration of 355 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. Barium concentrations decreased with depth at locations 04-02002 and 52-610598 and increased with depth at locations 52-610954 and 52-610956. The concentrations decreased downgradient. The lateral extent of barium is defined, but vertical extent is not defined.

Beryllium was detected above BV (1.83 mg/kg) in one soil sample at a concentration of 6 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Beryllium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of beryllium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 5.4 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Cadmium also had DLs above the soil BV in 10 samples. Cadmium concentrations decreased with depth at location 04-02002 and decreased downgradient. The DLs were below the maximum soil background concentration (2.6 mg/kg). The lateral and vertical extent of cadmium are defined.

Calcium was detected above tuff BV (2200 mg/kg) in two samples at two locations. The maximum concentration of 2270 mg/kg was detected at location 52-610958 from 2.0–3.0 ft bgs. Calcium concentrations decreased with depth at location 52-610958 and decreased downgradient. The calcium concentration at location 52-610956 (2240 mg/kg) was equivalent to the maximum tuff background concentration (2230 mg/kg) at 3.0–4.0 ft bgs. The lateral and vertical extent of calcium 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 five samples at four locations. The maximum concentration of 34.8 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from soil background (Figure H-2 and Table H-2). Chromium concentrations decreased with depth at location 52-610598 and were below the maximum tuff background concentration (13 mg/kg) at the other locations (Figure H-2). The lateral and vertical extent of chromium are defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in one sample and above the tuff BV (3.14 mg/kg) in one sample at two locations. The maximum concentration of 60.2 mg/kg was at location 04-02002 from 0.0–1.0 ft bgs. Cobalt concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of cobalt are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in two samples at three locations. The maximum concentration of 35.6 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at locations 04-02002 and 52-610598, increased with depth at location 52-610956, and decreased downgradient. The lateral extent of copper is defined, but vertical extent is not defined.

Lead was detected above the soil BV (22.3 mg/kg) in four samples at four locations and above the tuff BV (11.2 mg/kg) in two samples at two locations. The maximum concentration of 63.7 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from soil background (Figure H-3 and Table H-2). Lead concentration decreased with depth at location 52-610598, and the concentration was below the maximum tuff background concentration (15.5 mg/kg) at location 52-610956 (Figure H-3). The concentrations decreased downgradient. The lateral and vertical extent of lead are defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample and above the tuff BV (482 mg/kg) in one sample from the same location. The maximum concentration of 753 mg/kg was detected at location 52-610958 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from soil background (Figure H-4 and Table H-2) and decreased with depth and downgradient. The lateral and vertical extent of manganese are defined.

Mercury was not detected above BV but had DLs (0.11 mg/kg) above the soil BV (0.1 mg/kg) in 11 samples. Because mercury was not detected above BV, the lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample at a concentration of 63 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Nickel concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of nickel are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in one sample at a concentration of 361 mg/kg at location 04-02002 from 0.0–1.0 ft bgs and had DLs (1.03 to 1.12 mg/kg) above the tuff BV in eight samples. Selenium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of selenium are defined.

Silver was detected above BV (1 mg/kg) in one soil sample at a concentration of 5.2 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Silver concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of silver are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in one sample at a concentration of 225 mg/kg at location 04-02002 from 0.0–1.0 ft bgs. Thallium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of thallium are defined.

Vanadium was detected above the soil BV (39.6 mg/kg) in one sample and above the tuff BV (17 mg/kg) in one sample at two locations. The maximum concentration of 75.7 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. Vanadium concentrations decreased with depth at location 04-02002, and the concentration was below the maximum tuff background concentration (21 mg/kg) at location 52-610958 (Figure H-4). The concentrations decreased downgradient. The lateral and vertical extent of vanadium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples at four locations. The maximum concentration of 87.9 mg/kg was detected at location 04-02002 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations of zinc are not different from soil background (Figure H-5 and Table H-2). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Aroclor-1260 was detected on one sample at location 52-610955 from 1.0–2.0 ft bgs. Aroclor-1260 concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected in one sample at location 52-610959 from 3.0–4.0 ft bgs. The concentrations were below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Fluoranthene, phenanthrene, and pyrene were detected in one sample at location 52-610959 from 3.0–4.0 ft bgs. The concentrations increased with depth at this location, which is next to a paved road (Puye Road) (Figure 6.2-3) and decreased downgradient. The lateral extent of fluoranthene, phenanthrene, and pyrene is defined. The vertical extent of fluoranthene, phenanthrene, and pyrene is not defined at one location but is probably related to the paved road rather than to the AOC because organic chemicals were not detected within the footprint of former building 04-7. In addition, former building 04-7 housed a darkroom and photoprocessing laboratory used to develop film and would not have used or released polycyclic aromatic hydrocarbons. Therefore, the lateral and vertical extent of fluoranthene, phenanthrene, and pyrene are defined.

Radionuclides

Plutonium-239/240 was detected in four soil samples at four locations. The maximum activity of 0.0363 pCi/g was detected at location 52-610954 from 1.0–2.0 ft bgs. Plutonium-239/240 activities decreased with depth at locations 04-02003, 52-610954, and 52-610956, increased with depth at location 52-610959, and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above tuff BV (0.09 pCi/g) in one sample at an activity of 0.0999 pCi/g at location 52-610954 from 3.0–4.0 ft bgs. Uranium-235/236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of barium, copper, plutonium-239/240, and uranium-235/236 are not defined at AOC 04-004. The extent of organic chemicals is defined at AOC 04-004.

7.0 TA-46 BACKGROUND AND FIELD-INVESTIGATION RESULTS

The Upper Cañada del Buey Aggregate Area contains 71 sites located at TA-46. Of these, 17 sites have been approved for NFA or are pending NFA approval. The remaining 54 sites are described below. All data previously collected from the 54 sites under investigation at TA-46 are screening-level data.

7.1 Background of TA-46

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

7.1.1 Operational History

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

7.1.2 Summary of Releases

Potential contaminants at TA-46 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-46 is almost completely developed. Roads and paved parking areas surround the buildings. TA-46 is located within the Pajarito Road security corridor and access is controlled and restricted to Laboratory badge holders.

7.2 SWMU 46-002, Surface Impoundment

7.2.1 Site Description and Operational History

SWMU 46-002 is a surface impoundment system located at the eastern end of TA-46, southeast of the prototype fabrication building (46-77) on the north-facing slope of SWSC Canyon (Figure 7.2-1). The SWMU consists of a lagoon (structure 46-149) measuring approximately 62 ft × 102 ft × 11 ft deep, associated drainlines, a siphon box, and three sand filters measuring approximately 22 ft × 38 ft × 3 ft deep (LANL 1990, 007513, p. 208). The lagoon and sand filters are lined with butyl rubber. The impoundment system was constructed in the early 1970s to receive sanitary wastewater from buildings within the fenced area of TA-46 (LANL 1993, 020952, p. 5-54). Before the early 1970s, sanitary wastewater from TA-46 buildings was discharged to individual sanitary septic systems associated with SWMUs 46-003(a–f) (LANL 1990, 007513, p. 208). Effluent received in the lagoon flowed through an outlet box to a siphon box and through pipes that discharged to daylight just above the sand filters. Effluent from the pipes was discharged onto concrete pads located in the middle of the sand filters where it was distributed evenly throughout the filters. Effluent from the sand filters was discharged to the canyon from a former EPA NPDES-permitted outfall (SSS07S). The lagoon also had an overflow outfall that discharged into the canyon. The top 6 in. of sand and sludge from the filters was removed every 2 to 3 mo and disposed of at Material Disposal Area (MDA) G at TA-54. The sand beneath this top layer was pushed over the side of the canyon, and the filters were replenished with clean sand. SWMU 46-009(b) comprises the material pushed over the side of the canyon. In 1990, the siphon box and the sand filters were taken offline, and the effluent in the lagoon was pumped to another wastewater treatment facility (LANL 1993, 020952, p. 5-56). The lagoon was removed from service in the early 1990s when the SWSC plant, located to the south of SWMU 46-002, came online. The outfall from the surface impoundment system was removed from the NPDES permit by 1993 (LANL 1993, 020952, p. 129).

7.2.2 Relationship to Other SWMUs and AOCs

Sanitary wastewater that formerly discharged to the septic systems designated as SWMUs 46-003(a–f) was rerouted to the SWMU 46-002 surface impoundment system after the septic systems were taken offline in the 1970s. Sand removed from the SWMU 46-002 filter beds was disposed of at a surface disposal area designated as SWMU 46-009(b).

7.2.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-002.

7.2.4 Site Contamination

7.2.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-002:

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Nine samples were collected from three locations within and beneath the impoundment from the impoundment contents (0.0–1.0 ft or 0.0–1.5 ft bgs), the soil-tuff interface (1.0–2.0 ft bgs or 1.5–2.5 ft bgs), and 5.0 ft below the soil-tuff interface (6.0–7.0 ft or 6.5–7.5 ft bgs). No liner was encountered during the investigation activities.

- Twelve samples were collected from four locations bounding the impoundment and inlet pipe from 0.0–1.0 ft bgs, at the base of the unit (sample depths ranged from 12.0–15.0 ft bgs), and 5 ft below the base of the unit (sampling depths ranged from 17.0–20.0 ft bgs).
- Twelve samples were collected from four locations beneath the drainlines and siphon box from 0.0–0.5 ft or 0.0–1.0 ft bgs, at the soil-tuff interface (sampling depths ranged from 1.0–4.0 ft bgs), and 5 ft below the soil-tuff interface (sampling depths ranged from 5.5–9.0 ft bgs).
- Nine samples were collected from three locations within and beneath the sand filters from the filter bed contents (0.0–1.0 ft bgs), from beneath the bed (3.0–4.0 ft bgs), and from 5 ft beneath the bed (8.0–9.0 ft bgs).
- Six samples were collected from three locations bounding the sand filters from the soil-tuff interface (0.0–1.0 ft bgs), and 5 ft below the soil-tuff interface (sample depths ranged from 6.0–7.0 ft or 8.0–9.0 ft bgs). At all three locations, only six of the nine proposed samples were collected because the soil-tuff interface corresponded to the interval of 0.0–1.0 ft bgs (see deviations in Appendix B).
- Two samples were collected from one location below the impoundment overflow outlet from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-002 are shown in Figure 7.2-1. Table 7.2-1 presents the samples collected and analyses requested for SWMU 46-002. 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 46-002, a maximum concentration of 131 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-11916) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-002. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.2.4.3 Soil, Rock, and Sediment Sampling Analytical Results.

Decision-level data at SWMU 46-002 consisted of results from 50 samples (22 soil and 28 tuff) from 18 locations.

Inorganic Chemicals

Fifty samples (22 soil and 28 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.2-2 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 nature and extent of contamination are defined at SWMU 46-002; inorganic COPCs are identified below.

Antimony was not detected above the soil or tuff BV but had DLs (0.916 to 1.66 mg/kg) above the soil BV (0.83 mg/kg) in 16 samples and DLs (0.6 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in 23 samples. Antimony is identified as a COPC in soil and tuff.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.458 to 1.71 mg/kg) above the soil BV in 18 samples. The maximum DL was less than the maximum soil background concentration (2.6 mg/kg) (Figure H-6). Cadmium is not identified as a COPC in soil.

Chromium was detected above the soil BV (19.3 mg/kg) in three samples at three locations and above the tuff BV (7.14 mg/kg) in one sample with a maximum concentration of 64.4 mg/kg. The results of the Gehan and quantile tests indicated site concentrations are not different from soil background (Figure H-6 and Table H-3) or tuff background (Figure H-7 and Table H-4). Chromium is not identified as a COPC in soil or tuff.

Copper was detected above the soil BV (14.7 mg/kg) in five samples at five locations and above the tuff BV (4.66 mg/kg) in three samples at three locations, with a maximum concentration of 417 mg/kg. Results of the Gehan and quantile tests indicated soil concentrations are different from background (Figure H-7 and Table H-3). Results of the Gehan and quantile tests indicated site concentrations are not different from tuff background (Figure H-8 and Table H-4). Copper is identified as a COPC in soil but is not a COPC in tuff.

Cyanide was detected above the soil BV (0.5 mg/kg) in one sample at a concentration of 0.755 mg/kg. Cyanide is identified as a COPC in soil.

Lead was detected above the soil BV (22.3 mg/kg) in three samples at three locations, with a maximum concentration of 46.8 mg/kg. The results of the Gehan and quantile tests indicated site concentrations are not different from background (Figure H-8 and Table H-3). Lead is not identified as a COPC in soil.

Mercury was detected above the soil BV (0.1 mg/kg) in five samples from three locations and above the tuff BV (0.1 mg/kg) in two samples at two locations, with a maximum concentration of 3.83 mg/kg. Mercury is identified as a COPC in soil and tuff.

Nitrate was detected in 12 soil samples at nine locations and 11 tuff samples at eight locations, with a maximum concentration of 4.64 mg/kg in soil. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. Nitrate is not identified as a COPC.

Perchlorate was detected in one soil sample and two tuff samples at two locations, with a maximum concentration of 0.000761 mg/kg in soil. Perchlorate is identified as a COPC in soil and tuff.

Selenium was detected above the soil BV (1.52 mg/kg) in one sample at a concentration of 2.71 mg/kg. Because the site or background data set had more than 50% nondetects, the Gehan test could not be performed. Because the site or background data set in the top chosen quantile had nondetects, the quantile test could not be performed. The maximum detected concentration (2.71 mg/kg) was above the maximum soil background concentration (1.7 mg/kg) (Figure H-9). Selenium was not detected above the tuff BV but had DLs (0.542 to 1.09 mg/kg) above the tuff BV (0.3 mg/kg) in 28 samples. Selenium is identified as a COPC in soil and tuff.

Silver was detected above the soil BV (1 mg/kg) in five samples at three locations and above the tuff BV (1 mg/kg) in two samples at two locations, with a maximum detected concentration of 29.7 mg/kg. Because the site and background data sets, when combined, had more than 80% nondetects, statistics

were not performed. The maximum detected concentration was above the maximum tuff background concentration (1.9 mg/kg) (Figure H-9). Silver is identified as a COPC in soil and tuff.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples from four locations, with a maximum concentration of 259 mg/kg. The results of the Gehan and quantile tests indicated site concentrations of zinc in soil are not different from background (Figure H-10 and Table H-3). Zinc is not identified as a COPC in soil.

In summary, the inorganic chemicals identified as COPCs are antimony, mercury, perchlorate, selenium, and silver in soil and tuff. Copper and cyanide are identified as COPCs in soil.

Organic Chemicals

Fifty samples (22 soil and 28 tuff) were analyzed for VOCs, SVOCs, and PCBs at SWMU 46-002. Table 7.2-3 presents the detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 46-002; organic COPCs are identified below.

Organic chemicals detected in soil and/or tuff at SWMU 46-002 include acetone, Aroclor-1248, Aroclor-1254, Aroclor-1260, benzo(b)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, chrysene, ethylbenzene, fluoranthene, 2-hexanone, iodomethane, 4-isopropyltoluene, phenanthrene, pyrene, toluene, 1,2-xylene, and 1,3-xylene+1,4-xylene. These organic chemicals are identified as COPCs.

Radionuclides

Fifty samples (22 soil and 28 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.2-4 presents the radionuclides detected or detected above BVs/FVs. Plate 3 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. The nature and extent of contamination are defined at SWMU 46-002; radionuclide COPCs are identified below.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 2.73 pCi/g. Uranium-238 is identified as a COPC in soil.

7.2.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.916 to 1.66 mg/kg) above the soil BV (0.83 mg/kg) in 16 samples and had DLs (0.6 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in 23 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.458 to 1.71 mg/kg) above the soil BV in 18 samples. The maximum DL was less than the maximum soil background concentration (2.6 mg/kg) (Figure H-6). The lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in three samples at three locations and above the tuff BV (7.14 mg/kg) in one sample with a maximum concentration of 64.4 mg/kg. The results of the Gehan and quantile tests indicated site concentrations in soil are not different from soil background (Figure H-6 and Table H-3) or tuff background (Figure H-7 and Table H-4). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in five samples at five locations and above the tuff BV (4.66 mg/kg) in three samples at three locations. The maximum concentration of 417 mg/kg was detected at location 46-611374 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was detected above the soil BV (0.5 mg/kg) in one sample at a concentration of 0.755 mg/kg at location 46-611375 from 0.0–1.5 ft bgs. Cyanide concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in three samples at three locations, with a maximum concentration of 46.8 mg/kg. The results of the Gehan and quantile tests indicated site concentrations are not different from background (Figure H-8 and Table H-3). The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in five samples and above the tuff BV (0.1 mg/kg) in two samples at three locations. The maximum concentration of 3.83 mg/kg was detected at location 46-611373 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nitrate was detected in 12 soil samples at nine locations and 11 tuff samples at eight locations, with a maximum concentration of 4.64 mg/kg in soil. No background data are available for nitrate. Nitrate is naturally occurring, and the concentrations detected likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one soil and two tuff samples at two locations. The maximum concentration of 0.000761 mg/kg was detected at location 46-611390 from 0.0–1.0 ft bgs. Perchlorate concentrations remained essentially the same with depth at both locations and were below the EQL. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in one sample at a concentration of 2.71 mg/kg at location 46-611374 from 0.0–1.0 ft bgs. Selenium also had DLs above the tuff BV at 28 locations. Selenium concentrations decreased with depth at location 46-611374 and decreased downgradient. The lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in five samples and above the tuff BV (1 mg/kg) in two samples at three locations. The maximum concentration of 29.7 mg/kg was detected at location 46-611374 from 0.0–1.0 ft bgs. Silver concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of silver are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples from four locations, with a maximum concentration of 259 mg/kg. The results of the Gehan and quantile tests indicated site concentrations of zinc in soil are not different from background (Figure H-10 and Table H-3). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone and 2-hexanone were detected in three samples and one sample, respectively, at concentrations below the EQLs. The lateral and vertical extent of acetone and 2-hexanone are defined.

Aroclor-1248 was detected in one sample at a concentration of 0.261 mg/kg at location 46-611375 from 0.0–1.5 ft bgs. Aroclor-1248 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1248 are defined.

Aroclor-1254 was detected in 10 samples at four locations. The maximum concentration of 0.329 mg/kg was detected at location 46-611373 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in eight samples at three locations. The maximum concentration of 0.185 mg/kg was detected at location 46-611374 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(b)fluoranthene, benzoic acid, bis(2-ethylhexyl)phthalate, chrysene, iodomethane, 4-isopropyltoluene, phenanthrene, and 1,2-xylene were detected in one or two samples. The concentrations decreased with depth at each location and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Ethylbenzene, fluoranthene, and pyrene were detected in four samples at three to four locations. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of ethylbenzene, fluoranthene, and pyrene are defined.

Toluene was detected in five samples at three locations. The maximum concentration of 0.00266 mg/kg was detected at location 46-611373 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

Xylene(1,3-)+xylene(1,4-) was detected in five samples at three locations. The maximum concentration of 0.00281 mg/kg was detected at location 46-611373 from 0.0–1.0 ft bgs. Xylene(1,3-)+xylene(1,4-) concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

Radionuclides

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 2.73 pCi/g at location 46-611374 from 0.0–1.0 ft bgs. Uranium-238 activities decreased with depth and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The extent of inorganic chemicals, organic chemicals, and radionuclides is defined at SWMU 46-002.

7.2.5 Summary of Human Health Risk Screening

Details of the human health risk-screening assessment for SWMU 46-002 are discussed in Appendix I, section I-4.

The total excess cancer risk for the industrial scenario is 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.05 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The total excess cancer risk for the construction worker scenario is 5×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The total excess cancer risk for the residential scenario is approximately 2×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.1, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

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

7.2.6 Summary of Ecological Risk Screening

Details of the ecological risk-screening assessment 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, comparison with background concentrations, potential effects to populations (individuals for threatened and endangered [T&E] species), and LOAEL analyses.

7.3 SWMU 46-003(a), Septic System

7.3.1 Site Description and Operational History

SWMU 46-003(a) is an inactive septic system located approximately 30 ft southeast of building 46-41 at TA-46 (Figure 7.3-1). The septic system consisted of a septic tank (structure 46-8), manhole (structure 46-6), two distribution boxes (structures 46-9 and 46-10), and a drain field located approximately 30 ft south/southwest of building 46-41 at the head of SWSC Canyon at TA-46. This septic system was installed in 1954 and served restroom facilities in buildings 46-1 and 46-2. A janitorial sink in the basement of building 46-1 also drained to the septic system. Building 46-1 housed offices, two assembly bays, a machine shop, laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area, all in support of the Rover Program (LANL 1993, 020952, p. 5-7). Building 46-2 was a guard station that was relocated approximately 150 ft south of its original location in the mid-1960s (LANL 1993, 020952, p. 5-12). In 1959, this septic system was connected to a restroom and a sink along the north wall of building 46-30, which housed a hydraulics laboratory, a high-bay area with a crane, an actuator test area, and a small machine shop (LANL 1993, 020952, p. 5-7). Before 1968, the drain field associated with the SWMU 46-003(a) septic system was removed from service, and septic tank 46-8 was rerouted to the SWMU 46-003(f) septic system (LANL 1993, 020952, p. 5-9). In the 1970s, the sanitary waste drainlines that discharged to the SWMU 46-003(a) septic system were rerouted to the SWMU 46-002 surface impoundment system, and septic tank 46-8 was removed from service, emptied, filled, and left in place (LASL 1975, 101827). In the early 1990s, the sanitary waste drainlines that previously served SWMU 46-003(a) were rerouted to the SWSC plant (LANL 1996, 101813).

7.3.2 Relationship to Other SWMUs and AOCs

Before 1968, the drain field associated with the SWMU 46-003(a) septic system was removed from service, and septic tank 46-8 was rerouted to the SWMU 46-003(f) septic system. In the 1970s, the sanitary waste drainlines that discharged to the SWMU 46-003(a) septic system were rerouted to the SWMU 46-002 surface impoundment system.

7.3.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(a).

7.3.4 Site Contamination

7.3.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(a):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was not removed as proposed in the approved work plan because the site was inaccessible by heavy equipment given the utility infrastructure present around the tank. Confirmation samples could not be collected beneath the inlet, outlet, and tank because the tank was not removed (see deviations in Appendix B).
- Eight samples were collected from four locations associated with the distribution box and drain field from the base of the drainline/distribution box or soil-tuff interface (depth range of 3.5–11.0 ft bgs), and 5.0 ft below the distribution box or soil-tuff interface (depth range 8.5–16.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(a) are shown in Figure 7.3-1. Table 7.3-1 presents the samples collected and analyses requested for SWMU 46-003(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.3.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-003(a), a maximum concentration of 2.9 ppm was detected at a depth of 9.5–10.5 ft bgs. A sample from this depth (46-10-11521) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-003(a). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.3.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-003(a) consisted of results from eight samples (four soil and four tuff) collected from four locations.

Inorganic Chemicals

Eight samples (four soil and four tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.3-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs.

Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eight samples (four soil and four tuff) were analyzed for VOC, SVOCs, and PCBs. Table 7.3-3 presents the detected organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight samples (four soil and four tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. No radionuclides were detected or detected above BVs/FVs at SWMU 46-003(a).

7.3.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.07 to 1.1 mg/kg) above the soil BV (0.83 mg/kg) in three samples and had DLs (0.52 to 1.02 mg/kg) above the tuff BV (0.5 mg/kg) in four samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.545 to 0.589 mg/kg) above soil BV in three samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

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

Manganese was detected above the soil BV (671 mg/kg) in one sample at a concentration of 852 mg/kg at location 46-611268 from 8.5–9.5 ft bgs. Manganese concentrations were below the maximum soil background concentration (1100 mg/kg) (Figure H-11). The lateral and vertical extent of manganese are defined.

Nitrate was detected in four soil samples at four locations and in four tuff samples at three locations. The maximum concentration of 63.4 mg/kg was detected at location 46-611269 from 9.0–10.0 ft bgs. No background data are available for nitrate. Nitrate concentrations at location 46-611269 decreased with depth and are likely naturally occurring at the other three locations. The concentrations decreased downgradient. The lateral and vertical extent of nitrate are defined.

Selenium was detected above tuff BV (0.3 mg/kg) in two samples and had DLs above the tuff BV in two samples. The detected concentrations were 2.3 mg/kg at location 46-611269 from 9.0–10.0 ft and 14.0–15.0 ft bgs. Selenium concentrations increased with depth at this location and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Organic Chemicals

Methylene chloride was detected in two samples at one location. The maximum concentration of 0.0057 mg/kg was detected at the EQL at location 46-611269 from 14.0–15.0 ft bgs. The lateral and vertical extent of methylene chloride are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-003(a).

Summary of Nature and Extent

As discussed in section 7.3.4.1 and Appendix B, section B-10.0, the septic tank was not removed, and confirmation samples beneath the tank were not collected. Data collected near the distribution boxes and within the drain field indicate the lateral and vertical extent of organic chemicals and radionuclides are defined. The vertical extent of selenium is not defined. The nature and extent of contamination at SWMU 46-003(a) cannot be defined until the septic tank is removed and confirmation samples are collected.

7.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(a) because extent is not defined for the site.

7.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-003(a) because extent is not defined for the site.

7.3.7 Delayed Site Investigation Rationale

Delayed investigation is proposed for the remainder of SWMU 46-003(a). Removing the inactive septic tank and collecting confirmation samples are not feasible because the tank is located directly beneath low-hanging power lines and directly adjacent to active sewer and communications lines. Site access for equipment required to remove the septic tank is extremely limited. Available information, including the source of sanitary wastewater discharged to the system and samples collected at associated locations (e.g., beneath distribution box and drain field), indicates a very low likelihood of releases to the environment. It is proposed that site characterization and investigation be delayed until active utilities located around the septic tank are removed or rendered inactive.

7.4 SWMU 46-003(b), Septic System

7.4.1 Site Description and Operational History

SWMU 46-003(b) is an inactive septic system approximately 60 ft southwest of building 46-77 at TA-46 (Figure 7.2-1). The septic system consisted of a septic tank (structure 46-22), a distribution box (structure 46-29), associated drainlines, and drain field located approximately 50 ft south of building 46-77 at TA-46. This septic system was installed in 1956 and served the restroom facilities in building 46-17, which housed a generator that charged batteries for the Rover Program. The septic system was removed from service in 1973, and drainlines that discharged to SWMU 46-003(b) were rerouted to the

SWMU 46-002 surface impoundment system. Septic tank 46-22 was reportedly emptied, backfilled, and left in place (LASL 1975, 101827). The drainlines that previously served this septic system were rerouted to the SWSC plant in the early 1990s and are currently active (LANL 1996, 101813). No evidence of the septic tank was found during the geophysical survey conducted in 2010 investigation (section 7.4.4.1), indicating the tank has been removed.

7.4.2 Relationship to Other SWMUs and AOCs

In the 1970s, sanitary waste drainlines that discharged to the SWMU 46-003(b) septic system were rerouted to the SWMU 46-002 surface impoundment system. No other SWMUs or AOCs are associated with SWMU 46-003(b).

7.4.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(b).

7.4.4 Site Contamination

7.4.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(b):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was not excavated as proposed in the approved work plan because the tank was not located and is assumed to have been removed previously (see deviations in Appendix B).
- Six samples were collected from three locations associated with the distribution box and drain field from soil-tuff interface (depth range 0.0–6.0 ft bgs) and from 5 ft below the soil-tuff interface (depth range 5.0–11.0 ft bgs).
- Four samples were collected from two locations associated with the former septic tank at the assumed location of the inlet pipe and at the assumed location of the tank from the soil-tuff interface (depth range 3.5–6.0 ft bgs) and 5 ft below the soil-tuff interface (depth range 8.5–11.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(b) are shown in Figure 7.2-1. Table 7.4-1 presents the samples collected and analyses requested for SWMU 46-003(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.4.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-003(b), a maximum concentration of 44.6 ppm was detected at a depth of 1.5–2.5 ft bgs. A sample from this depth (46-10-13428) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.4.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-003(b) consisted of results from 10 samples (5 soil and 5 tuff) collected from five locations.

Inorganic Chemicals

Ten samples (five soil and five tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.4-2 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. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten samples (five soil and five tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.4-3 presents the detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten samples (five soil and five tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-003(b).

7.4.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above BV but had DLs (0.994 to 1.08 mg/kg) above the soil BV (0.83 mg/kg) in five samples and DLs (0.984 to 1.04 mg/kg) above the tuff BV (0.5 mg/kg) in five samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs in (0.497 to 0.542 mg/kg) above the BV in five samples from five locations. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 3790 mg/kg at location 46-611590 from 10.0–11.0 ft bgs. Calcium concentrations increased with depth at location 46-611590 and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Nitrate was detected in one soil sample at a concentration of 1.21 mg/kg at location 46-611592 from 3.5–4.5 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations of nitrate likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in four soil samples at four locations and in three tuff samples at three locations. The maximum concentration of 0.00174 mg/kg was detected at location 46-611592 from

3.5–4.5 ft bgs. Perchlorate concentrations decreased with depth at locations 46-611592 and 46-611596. The concentrations at the other locations remained essentially the same with depth and were below the EQL. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.995 to 1.05 mg/kg) above the BV in five samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Benzo(k)fluoranthene was detected in one sample at a concentration of 0.0121 mg/kg at location 46-611595 from 0.0–1.0 ft bgs. Benzo(k)fluoranthene concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of benzo(k)fluoranthene are defined.

Chrysene was detected in two samples at two locations. The concentrations decreased with depth at location 46-611594. The concentrations were below the EQL at location 46-611592 and decreased downgradient. The lateral and vertical extent of chrysene are defined.

Hexanone(2-) was detected in one sample at a concentration of 0.0128 mg/kg at location 46-611594 from 6.5–7.5 ft bgs. Hexanone(2-) concentrations increased with depth at this location and decreased downgradient. The lateral extent of 2-hexanone is defined, but the vertical extent is not defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-003(b).

Summary of Nature and Extent

The vertical extent of calcium and 2-hexanone is not defined at SWMU 46-003(b). The extent of radionuclides is defined at SWMU 46-003(b).

7.4.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(b) because extent is not defined for the site.

7.4.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-003(b) because extent is not defined for the site.

7.5 SWMU 46-003(c), Septic System

7.5.1 Site Description and Operational History

SWMU 46-003(c) is an inactive septic system approximately 80 ft southeast of building 46-76 at TA-46 (Figure 7.5-1). The septic system consisted of a septic tank (structure 46-49), a distribution box (structure 46-50), associated drainline, a drain field, and an outfall located southeast of building 46-76, beneath an asphalt road outside the security fence at TA-46. This septic system was installed in 1956 and served the restroom facilities, floor drains, roof drains, sinks, and acid sinks in building 46-24, which

housed offices, a machine shop, electrical laboratories, and chemical laboratories where fuel rods were handled (LANL 1993, 020952, p. 5-10). In 1958, an acid dry well located in room B22 of building 46-24 was connected into the SWMU 46-003(c) system but drained to the septic tank for less than 1 yr. The drain field associated with this septic system was removed from service sometime before 1968, and septic tank 46-49 was rerouted to the drain field associated with SWMU 46-003(f) (LANL 1993, 020952, p. 5-10). In the 1970s, sanitary waste drainlines that previously discharged to septic tank 46-49 were rerouted to the SWMU 46-002 surface impoundment system, and septic tank 46-49 was reportedly removed from service, emptied, filled, and left in place (LASL 1975, 101827). No evidence of the septic tank was found during the geophysical survey conducted during the 2010 investigation (section 7.5.4.1), indicating the tank has been removed.

7.5.2 Relationship to Other SWMUs and AOCs

The drain field associated with SWMU 46-003(c) was removed from service before 1968, and discharges from septic tank 46-49 were rerouted to the drain field associated with SWMU 46-003(f). In the 1970s, sanitary waste drainlines that discharged to the SWMU 46-003(c) septic system were rerouted to the SWMU 46-002 surface impoundment system.

7.5.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(c).

7.5.4 Site Contamination

7.5.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(c):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was not removed as proposed in the approved work plan because the tank was not located and is assumed to have been removed previously (see deviations in Appendix B).
- Sixteen samples were collected from eight locations associated with the former septic tank (the inlet pipe, the distribution box, and the drain field), from the soil-tuff interface (depth range 0.3–10.0 ft bgs), and from 5.0 ft below the soil-tuff interface (depth range 5.3–12.5 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(c) are shown in Figure 7.5-1. Table 7.5-1 presents the samples collected and analyses requested for SWMU 46-003(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.5.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-003(c), a maximum concentration of 141 ppm was detected at a depth of 10.0–11.0 ft bgs. A sample from this depth (46-10-11490) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.5.4.3 Soil, Rock, and Sediment Sampling Analytical Results.

Decision-level data at SWMU 46-003(c) consists of results from 16 samples (8 soil and 8 tuff) collected from eight locations.

Inorganic Chemicals

Sixteen samples (eight soil and eight tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.5-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Sixteen samples (eight soil and eight tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.5-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Sixteen samples (eight soil and eight tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.5-4 presents the radionuclides detected or detected above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.5.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the tuff BV (0.5 mg/kg) in one sample at a concentration of 5.69 mg/kg at location 46-611262 from 5.3–6.3 ft bgs. Antimony also had DLs (0.949 to 1.13 mg/kg) above the soil BV (0.83 mg/kg) in five samples and DLs (0.594 to 1.11 mg/kg) above the tuff BV (0.5 mg/kg) in five samples. Antimony concentrations increased with depth at location 46-611262 and increased laterally to the south of the drain field. The lateral and vertical extent of antimony are not defined.

Cadmium was detected above the tuff BV (1.63 mg/kg) in one sample at a concentration of 2.03 mg/kg at location 46-611262 from 5.3–6.3 ft bgs. Cadmium also had DLs (0.475 to 0.564 mg/kg) above the soil BV (0.4 mg/kg) in eight samples. Cadmium concentrations increased with depth at location 46-611262 and increased laterally to the south of the drain field. The lateral and vertical extent of cadmium are not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations, with a maximum concentration of 31.5 mg/kg at location 46-611255 from 11.5–12.5 ft bgs. Chromium concentrations

increased with depth at locations 46-611255 and 46-611262 and increased laterally to the south of the drain field. The lateral and vertical extent of chromium are not defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in one sample at a concentration of 3.88 mg/kg at location 46-611262 from 5.3–6.3 ft bgs. Cobalt concentrations increased with depth at this location and increased laterally to the south of the drain field. The lateral and vertical extent of cobalt are not defined.

Copper was detected above the tuff BV (4.66 mg/kg) in one sample at a concentration of 7.06 mg/kg at location 46-611262 from 5.3–6.3 ft bgs. Copper concentrations increased with depth at this location and increased laterally to the south of the drain field. The lateral and vertical extent of copper are not defined.

Lead was detected above the tuff BV (11.2 mg/kg) in three samples at three locations, with a maximum concentration of 12.8 mg/kg at location 46-611263 from 8.0–9.0 ft bgs. The soil concentration at location 46-611263 from 3.0-4.0 ft bgs was 17.5 mg/kg so lead concentrations decreased with depth. Lead concentrations were below the maximum tuff background concentration (15.5 mg/kg) at all locations (Figure H-12). The lateral and vertical extent of lead are defined.

Nitrate was detected in seven soil samples and four tuff samples, with a maximum concentration of 86.4 mg/kg at location 46-611263 from 3.0–4.0 ft bgs. No background data are available for nitrate. Nitrate concentrations decreased with depth at locations 46-611261 and 46-611263 and decreased downgradient. Nitrate is naturally occurring and the concentrations at the other locations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples, with a maximum concentration of 0.00253 mg/kg at location 46-611263 from 3.0–4.0 ft bgs. Perchlorate concentrations decreased with depth at all locations. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected the tuff BV (0.3 mg/kg) but had DLs (0.949 to 1.11 mg/kg) above BV in eight samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Aroclor-1260 was detected in two samples at two locations at concentrations below the EQL. The lateral and vertical extent of Aroclor-1260 are defined.

Fluoranthene was detected in one sample at a concentration below the EQL. The lateral and vertical extent of fluoranthene are defined.

Radionuclides

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample at an activity of 0.151 pCi/g at location 46-611257 from 10.0–11.0 ft bgs. Uranium-235/236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but vertical extent is not defined.

Summary of Nature and Extent

The lateral and vertical extent of antimony, cadmium, chromium, cobalt, and copper are not defined at SWMU 46-003(c). The vertical extent of uranium-235/236 is not defined at SWMU 46-003(c). The extent of organic chemicals is defined at SWMU 46-003(c).

7.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(c) because extent is not defined for the site.

7.5.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-003(c) because extent is not defined for the site.

7.6 SWMU 46-003(d), Septic System

7.6.1 Site Description and Operational History

SWMU 46-003(d) is an inactive septic system approximately 30 ft northwest of building 46-31 at TA-46 (Figure 7.6-1). The septic system consisted of a septic tank (structure 46-53), a distribution box (structure 46-54), associated drainline, a drain field, and associated outfall. The septic system was installed in 1956 and served the restrooms in building 46-31, which housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). The septic system was removed from service in approximately 1972 to 1973, and its drainline was rerouted to the SWMU 46-002 surface impoundment system. Septic tank 46-53 was emptied, filled, and left in place (LASL 1975, 101827). The septic tank was removed during the 2010 investigation (section 7.6.4.1).

7.6.2 Relationship to Other SWMUs and AOCs

In the 1970s, sanitary waste drainlines that discharged to the SWMU 46-003(d) septic system were rerouted to the SWMU 46-002 surface impoundment system. No other SWMUs or AOCs are associated with SWMU 46-003(d).

7.6.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(d).

7.6.4 Site Contamination

7.6.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(d):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was removed in accordance with the approved work plan (LANL 2008, 105038.17; NMED 2008, 103429). Management of waste generated from the excavation of the septic tank, piping, and associated IDW is described in Appendix D.

- Six confirmation samples were collected at three locations beneath the tank inlet and outlet and within the tank excavation, from beneath the tank inlet and outlet at the soil-tuff interface (4.0–5.0 ft bgs) and 5.0 ft below the soil-tuff interface (9.0–10.0 ft bgs), and from below the tank at 7.0–8.0 ft bgs and 12.0–13.0 ft bgs.
- Eight samples were collected from four locations next to the distribution box and in the drain field associated with the septic tank. Samples were collected at the soil-tuff interface (4.0–5.0 ft bgs) and 5.0 ft below the soil-tuff interface (9.0–10.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(d) are shown in Figure 7.6-1. Table 7.6-1 presents the samples collected and analyses requested for SWMU 46-003(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.6.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-003(d) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.6.4.3 Soil, Rock, and Sediment Sampling Analytical Results.

Decision-level data at SWMU 46-003(d) consists of results from 14 samples (3 soil and 11 tuff) collected from seven locations.

Inorganic Chemicals

Fourteen samples (3 soil and 11 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.6-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Fourteen samples (3 soil and 11 tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.6-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Fourteen samples (3 soil and 11 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.6-4 presents the radionuclides detected or detected above BVs/FVs. Plate 12 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.6.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.11 to 1.19 mg/kg) above the soil BV (0.83 mg/kg) in three samples and DLs (0.728 to 1.21 mg/kg) above the tuff BV (0.5 mg/kg) in 11 samples. Because antimony was not detected above BVs, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 52.1 mg/kg at location 46-611597 from 9.0–10.0 ft bgs. Barium concentrations increased with depth at this location and decreased downgradient. The lateral extent of barium is defined, but the vertical extent is not defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.553 to 0.594 mg/kg) above the BV in three samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 2290 mg/kg at location 46-611597 from 9.0–10.0 ft bgs. Calcium concentrations increased with depth at location 46-611597 and decreased downgradient. The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a concentration of 13.6 mg/kg at location 46-611601 from 9.0–10.0 ft bgs. Chromium concentrations increased with depth at location 46-611601 and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Copper was detected above the tuff BV (4.66 mg/kg) in four samples at three locations. The maximum concentration of 26.7 mg/kg was detected at location 46-611598 from 7.0–8.0 ft bgs. Copper concentrations decreased with depth at location 46-611598, increased with depth at locations 46-611597 and 46-611599, and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the tuff BV (11.2 mg/kg) in one sample at a concentration of 17.6 mg/kg at location 46-611598 from 7.0–8.0 ft bgs. Lead concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the tuff BV (0.1 mg/kg) in two samples at two locations. The maximum concentration of 0.171 mg/kg was detected at location 46-611599 from 9.0–10.0 ft bgs. Mercury concentrations decreased with depth at location 46-611598, increased with depth at location 46-611599, and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in one sample at a concentration of 8.13 mg/kg at location 46-611598 from 7.0–8.0 ft bgs. Nickel concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of nickel are defined.

Nitrate was detected in three soil samples and eight tuff samples at six locations. The maximum concentration of 2.87 mg/kg in tuff was detected at location 46-611598 from 7.0–8.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations of nitrate likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one soil sample at a concentration of 0.00105 mg/kg at location 46-611600 collected from 4.0–5.0 ft bgs. Perchlorate concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.05 to 1.21 mg/kg) above the BV in 11 samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the tuff BV (63.5 mg/kg) in three tuff samples at two locations. The maximum concentration of 106 mg/kg was detected at location 46-611598 from 12.0–13.0 ft bgs. Zinc concentrations increased with depth at locations 46-611597 and 46-611598 and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acetone was detected in three samples at three locations. The maximum concentration of 0.125 mg/kg was detected at location 46-611598 from 7.0–8.0 ft bgs. Acetone concentrations decreased with depth at locations 46-611597 and 46-611598, increased with depth at location 46-611599, and decreased downgradient. The lateral extent of acetone is defined, but the vertical extent is not defined.

Anthracene and phenanthrene were detected in four samples at three locations. Anthracene and phenanthrene concentrations decreased with depth at locations 46-611598 and 46-611600 and were below EQLs at location 46-611597. The lateral and vertical extent of anthracene and phenanthrene are defined.

Aroclor-1254 and Aroclor-1260 were detected in eight and seven samples, respectively, at four locations. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at locations 46-611598 and 46-611602, increased with depth at locations 46-611597 and 46-611599, and decreased downgradient. The lateral extent of Aroclor-1254 and Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene was detected in one sample at location 46-611600. Benzo(a)anthracene concentrations decreased with depth at this location and was below the EQL. The lateral and vertical extent of benzo(a)anthracene are defined.

Benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were detected in two samples at locations 46-611597 and 46-611598. Benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene concentrations decreased with depth at location 46-611598 and were below the EQLs at both locations. The lateral and vertical extent of benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene are defined.

Benzo(a)pyrene, chrysene, and 1,4-dichlorobenzene were detected in three samples at three locations. The maximum concentrations were detected at location 46-611597 from 9.0–10.0 ft bgs. Benzo(a)pyrene and chrysene concentrations decreased with depth at locations 46-611598 and 46-611600. The concentrations of 1,4-dichlorobenzene decreased with depth at location 46-61160. Benzo(a)pyrene, chrysene, and 1,4-dichlorobenzene concentrations increased with depth at location 46-611597. Dichlorobenzene(1,4-) concentrations increased with depth at location 46-611598 and decreased downgradient. The lateral extent of benzo(a)pyrene, chrysene, and 1,4-dichlorobenzene is defined, but vertical extent is not defined.

Benzo(b)fluoranthene was detected in four samples at three locations. The maximum concentration of 0.116 mg/kg was detected at location 46-611597 from 9.0–10.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth at locations 46-611598 and 46-611600, increased with depth at

location 46-611597, and decreased downgradient. The lateral extent of benzo(b)fluoranthene is defined, but the vertical extent is not defined.

Benzoic acid was detected in one sample at a concentration of 1.04 mg/kg at location 46-611603 from 4.0–5.0 ft bgs. Benzoic acid concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of benzoic acid are defined.

Bis(2-ethylhexyl)phthalate and tetrachloroethene were detected in one sample at location 46-611598. The bis(2-ethylhexyl)phthalate and tetrachloroethene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate and tetrachloroethene are defined.

Fluoranthene was detected in four samples at three locations. The maximum concentration of 0.0911 mg/kg was detected at location 46-611597 from 9.0–10.0 ft bgs. Fluoranthene concentrations decreased with depth at location 46-611600, increased with depth at locations 46-611597 and 46-611598, and decreased downgradient. The lateral extent of fluoranthene is defined, but the vertical extent is not defined.

Pyrene was detected in four samples at three locations. The maximum concentration of 0.0774 mg/kg was detected at location 46-611597 from 9.0–10.0 ft bgs. Pyrene concentrations decreased with depth at location 46-611600, increased with depth at locations 46-611597 and 46-611598, and decreased downgradient. The lateral extent of pyrene is defined, but the vertical is not defined.

Trichloroethene was detected in two samples at two locations. The maximum concentration of 0.00139 mg/kg was detected at location 46-611598 from 7.0–8.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Americium-241 was detected in two tuff samples at two locations. The maximum activity of 0.0755 pCi/g was detected at location 46-611599 from 9.0–10.0 ft bgs. Americium-241 activities increased with depth at locations 46-611598 and 46-611599 and decreased downgradient. The lateral extent of americium-241 is defined, but vertical extent is not defined.

Thorium-230 was detected above the soil BV (2.29 pCi/g) in one soil sample and above the tuff BV (1.98 pCi/g) in one tuff sample at two locations. Thorium-230 activities decreased with depth and decreased downgradient. The lateral and vertical extent of thorium-230 are defined.

Uranium-234 was detected above the tuff BV (1.98 pCi/g) in one sample at an activity of 3.54 pCi/g at location 46-611598 from 12.0–13.0 ft bgs.Uranium-234 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-234 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in six samples at five locations. The maximum activity of 0.346 pCi/g was detected at location 46-611598 from 7.0–8.0 ft bgs. Uranium-235/236 activities decreased with depth at locations 46-611598 and 46-611602, increased with depth at locations 46-611597, 46-611599, and 46-611600, and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, uranium-234, and uranium-235/236 is not defined at SWMU 46-003(d).

7.6.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(d) 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 46-003(d) because extent is not defined for the site.

7.7 SWMU 46-003(e), Septic System

7.7.1 Site Description and Operational History

SWMU 46-003(e) is an inactive septic system consisting of a septic tank (structure 46-66), a siphon tank (structure 46-67), a distribution box (structure 46-68), and a drain field located approximately 20 ft east of building 46-58 outside the TA-46 perimeter fence (Figure 7.7-1). Septic tank 46-66 was installed in 1960 and served the restroom facility, shower, water cooler, janitorial sink, and mechanical room floor drain in building 46-58, which contained office space, a laboratory, a machine shop, and an equipment room. The septic system was removed from service in approximately 1972 to 1973, and its drainline was rerouted to the SWMU 46-002 surface impoundment system. Septic tank 46-66 was reportedly emptied, filled, and left in place (LASL 1975, 101827). During the 2010 investigation, the SWMU 46-003(e) septic tank was discovered to contain sludge and a water layer (section 7.7.4.1). This waste was probably placed in the septic tank after the system was removed from service because the inlet and outlet lines were plugged. The water layer, sludge, and septic tank were removed and managed as LLW at Area G at TA-54 (Appendix D).

7.7.2 Relationship to Other SWMUs and AOCs

In the 1970s, sanitary waste drainlines that discharged to SWMU 46-003(e) septic system were rerouted to the SWMU 46-002 surface impoundment system. No other SWMUs or AOCs are associated with SWMU 46-003(e).

7.7.3 Summary of Previous Investigations

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

No previous investigations have been conducted at SWMU 46-003(e).

7.7.4 Site Contamination

7.7.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(e):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was found to contain sludge and a water layer. This waste was probably placed in the septic tank after the system was removed from service because the inlet and outlet lines were plugged. The water and sludge were removed before the septic tank was removed and managed as LLW at Area G at TA-54. Management of waste generated from the removal of the septic tank, septic tank contents, and associated IDW is described in Appendix D.
- Six confirmation samples were collected at three locations beneath the tank inlet and outlet, and within the tank excavation: beneath the inlet (3.0–4.0 ft bgs and 6.0–9.0 ft bgs), beneath the outlet at the soil-tuff interface (4.0–5.0 ft bgs) and 5 ft below the soil-tuff interface (9.0–10.0 ft bgs), and below the tank (7.0–8.0 ft bgs and 12.0–13.0 ft bgs).
- Ten samples were collected from five locations next to the location where the drainline exits building 46-58, and beneath and next to the distribution box and in the drain field at the soil-tuff interface (depth range 0.0–7.0 ft bgs) and 5 ft below the soil-tuff interface (depth range 5.0–12.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(e) are shown in Figure 7.7-1. Table 7.7-1 presents the samples collected and analyses requested for SWMU 46-003(e). 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 46-003(e), a maximum concentration of 170.2 ppm was detected at a depth of 6.0–7.0 ft bgs. A sample from this depth (46-10-13472) was submitted for organic chemicals analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-003(e). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.7.4.3 Soil, Rock, and Sediment Sampling Analytical Results.

Decision-level data at SWMU 46-003(e) consists of results from 16 samples (5 soil and 11 tuff) collected from eight locations.

Inorganic Chemicals

Sixteen samples (5 soil and 11 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.7-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 13 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Sixteen samples (5 soil and 11 tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.7-3 presents the detected organic chemicals. Plate 14 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Sixteen samples (5 soil and 11 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.7-4 presents the radionuclides detected or detected above BVs/FVs. Plate 15 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.7.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.02 to 1.13 mg/kg) above the soil BV (0.83 mg/kg) in 5 samples at five locations and DLs (0.99 to 1.26 mg/kg) above the tuff BV (0.5 mg/kg) in 11 samples at eight locations. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.512 to 0.563 mg/kg) above the BV in five samples at five locations. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at two locations and above the tuff BV (11.2 mg/kg) in five samples at four locations. The maximum concentration of 101 mg/kg was detected at location 46-611604 from 3.0–4.0 ft bgs. Lead concentrations decreased with depth at locations 46-611604, 46-611605, and 46-611609, were below the maximum tuff background concentration (15.5 mg/kg) at location 46-611606 (Figure H-13), increased with depth at location 46-611611, and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in two samples at two locations and above the tuff BV (0.1 mg/kg) in two samples at one location. The maximum concentration of 11.2 mg/kg was detected at location 46-611607 from 2.0–3.0 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nitrate was detected in three soil samples at three locations and in three tuff samples at two locations. The maximum concentration of 3.58 mg/kg was detected at location 46-611606 from 3.0–4.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples at three locations and three tuff samples at two locations. The maximum concentration of 0.00358 mg/kg was detected at location 46-611606 from 3.0–4.0 ft bgs. Perchlorate concentrations decreased with depth at locations 46-611605, 46-611606, and 46-611610, increased with depth at locations 46-611604 and 46-611608, and decreased downgradient. The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.911 to 1.16 mg/kg) above the BV in 11 samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Acetone was detected in three samples at two locations. The maximum concentration of 0.0104 mg/kg was detected at location 46-611605 from 13.0–14.0 ft bgs. Acetone concentrations decreased with depth at location 46-611611, increased with depth at location 46-611605, and decreased downgradient. The lateral extent of acetone is defined, but the vertical extent is not defined.

Aroclor-1254 was detected in seven samples at five locations. The maximum concentration of 0.103 mg/kg was detected at location 46-611604 from 3.0–4.0 ft bgs. Aroclor-1254 concentrations decreased with depth at locations 46-611604, 46-611606, and 46-611607, increased with depth at location 46-611608, were below EQLs at location 46-611611, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in five samples at four locations. The maximum concentration of 0.0467 mg/kg was detected at location 46-611604 from 3.0–4.0 ft bgs. Aroclor-1260 concentrations decreased with depth at locations 46-611604 and 46-611606, increased with depth at location 46-611608, were below the EQL at location 46-611611, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Anthracene, fluoranthene, and pyrene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611608 from 11.0–12.0 ft bgs. The concentrations decreased with depth at location 46-611606. Anthracene and fluoranthene concentrations were below the EQL at location 46-611608, but the pyrene concentration increased with depth at this location. The concentrations decreased downgradient. The lateral extent of anthracene, fluoranthene, and pyrene is defined, the vertical extent of anthracene and fluoranthene is defined, but the vertical extent of pyrene is not defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, and phenanthrene were detected in one or two samples at location 46-611606. The concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Benzo(k)fluoranthene was detected in one sample at location 46-611608. Benzo(k)fluoranthene concentrations were below the EQL. The lateral and vertical extent of benzo(k)fluoranthene are defined.

Benzoic acid was detected in one sample at location 46-611604. Benzoic acid concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of benzoic acid are defined.

Bis(2-ethylhexyl)phthalate and di-n-butylphthalate were detected in three and two samples, respectively. The bis(2-ethylhexyl)phthalate concentration decreased with depth at location 46-611604 and decreased downgradient. The bis(2-ethylhexyl)phthalate and di-n-butylphthalate concentrations were below the

EQLs at locations 46-611608 and 46-611611. The lateral and vertical extent of bis(2-ethylhexyl)phthalate and di-n-butylphthalate are defined.

Radionuclides

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample at an activity of 0.105 pCi/g at location 46-611605 from 13.0–14.0 ft bgs. Uranium-235-236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236 is not defined at SWMU 46-003(e).

7.7.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(e) 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 46-003(e) because extent is not defined for the site.

7.8 SWMU 46-003(f), Septic System

7.8.1 Site Description and Operational History

SWMU 46-003(f) is an inactive septic system consisting of a septic tank (structure 46-94), a manhole (structure 46-95), a distribution box (structure 46-97), and a drain field located approximately 300 ft east of building 46-88 at TA-46 (Figure 7.5-1) (LANL 1993, 020952, pp. 5-12, 5-130). Engineering drawings show that a drainpipe outfall, located approximately 30 ft northeast of the drain field, is also associated with this system (LANL 1993, 020952, p. 5-130). This septic system was installed in 1960 and served the restroom facilities, floor drains, and restroom sinks in building 46-88. This building was the core support test facility for the Rover Program and provided a clean-room, temperature- and humidity-controlled environment for the testing and certification of hydrogen vessels. Previously a guard station (building 46-2) had been connected to another septic system, SWMU 46-003(a) but was disconnected from that unit and connected to this septic system when it was relocated in the mid-1960s to its present location west of building 46-24. Beginning in 1968, the drain field received effluent not only from septic tank 46-94 but also from septic tank 46-8 [SWMU 46-003(a)] and septic tank 46-49 [SWMU 46-003(c)]. This septic system was removed from service in approximately 1972 to 1973, when the buildings it served were connected to a sanitary lagoon (SWMU 46-002) (LANL 1993, 020952, p. 5-12). Septic tank 46-94 was emptied, filled, and left in place (LASL 1975, 101827). Visual observations indicate that the distribution box drain field and drainpipe outfall had been removed (LANL 1993, 020952, p. 5-130). Septic tank 46-94 was removed during the 2010 investigation (section 7.8.4.1).

7.8.2 Relationship to Other SWMUs and AOCs

Beginning in 1968, the SWMU 46-003(f) drain field received effluent not only from septic tank 46-94 but also from septic tank 46-8 [SWMU 46-003(a)] and septic tank 46-49 [SWMU 46-003(c)]. In the 1970s, sanitary waste drainlines that discharged to SWMU 46-003(f) septic system were rerouted to the SWMU 46-002 surface impoundment system.

7.8.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(f).

7.8.4 Site Contamination

7.8.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(f):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was removed in accordance with the approved work plan (LANL 2008, 105038.17; NMED 2008, 103429). Management of waste generated from the removal of the septic tank, outlet drainline, and associated IDW is described in Appendix D.
- Six confirmation samples were collected from three locations beneath the tank inlet and outlet and within the tank excavation: from one location beneath the inlet (8.0–9.0 ft bgs and 13.0–14.0 ft bgs), one location beneath the outlet (11.0–12.0 ft bgs and 16.0–17.0 ft bgs), and one location below the tank (12.0–13.0 ft bgs and 17.0–18.0 ft bgs).
- Two samples were collected from one location beneath the inlet drainline from 3.0–4.0 ft bgs and 5.0–6.0 ft bgs.
- Eight samples were collected from four locations associated with the distribution box, drain field, and drain field outfall pipe from the soil-tuff interface and 5 ft below the soil-tuff interface (depth range 8.5–11.0 ft bgs).
- Two samples were collected from one location downgradient of the drain field outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(f) are shown in Figure 7.5-1. Table 7.8-1 presents the samples collected and analyses requested for SWMU 46-003(f). 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 46-003(f), a maximum concentration of 994.7 ppm was detected at a depth of 3.0–4.0 ft bgs. A sample from this depth (46-10-11875) was submitted for VOC analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-003(f). However, all

samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.8.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-003(f) consists of results from 18 samples (8 soil and 10 tuff) collected from nine locations.

Inorganic Chemicals

Eighteen samples (8 soil and 10 tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.8-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eighteen samples (8 soil and 10 tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.8-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eighteen samples (8 soil and 10 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.8-4 presents the radionuclides detected or detected above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.8.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.942 to 1.13 mg/kg) above soil BV (0.83 mg/kg) in seven samples and DLs (0.931 to 1.09 mg/kg) above tuff BV (0.5 mg/kg) in nine samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 49.4 mg/kg at location 46-611361 from 12.0–13.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-14 and Table H-5). The lateral and vertical extent of barium are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.471 to 0.566 mg/kg) above BV in eight samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Lead was detected above the tuff BV (11.2 mg/kg) in two samples at two locations. The maximum concentration of 43.1 mg/kg was detected at location 46-611364 from 8.5–9.5 ft bgs. Lead concentrations

decreased with depth at location 46-611361, increased with depth at location 46-611364, and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample at a concentration of 0.237 mg/kg at location 46-611362 from 11.0–12.0 ft bgs. Mercury concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nitrate was detected in four soil samples and four tuff samples at five locations. The maximum concentration of 4.78 mg/kg was detected at location 46-611360 from 13.0–14.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in two soil samples and one tuff sample at two locations. The maximum concentration of 0.00206 mg/kg was detected at location 46-611359 from 3.0–4.0 ft bgs. Perchlorate concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.942 to 1.09 mg/kg) above BV in ten samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was not detected above the soil BV (1 mg/kg) but had DLs (2.83 mg/kg) above BV in one sample. Because silver was not detected above BV, the lateral and vertical extent of silver are defined.

Zinc was detected above the tuff BV (63.5 mg/kg) in one sample at a concentration of 77.2 mg/kg at location 46-611364 from 8.5–9.5 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-14 and Table H-5). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected in two samples at two locations. The maximum concentration of 0.0236 mg/kg was detected at location 46-611367 from 1.0–2.0 ft bgs. Acetone concentrations increased with depth at locations 46-611364 and 46-611367 and decreased downgradient. The lateral extent of acetone is defined, but the vertical extent is not defined.

Aroclor-1254 was detected in 11 samples at seven locations. The maximum concentration of 0.0349 mg/kg was detected at location 46-611361 from 17.0–18.0 ft bgs. Aroclor-1254 concentrations decreased with depth at locations 46-611362, 46-611365, and 46-611366, increased with depth at locations 46-611360 and 46-611361, were below EQLs at locations 46-611364 and 46-611367, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in seven samples at five locations. The maximum concentration of 0.017 mg/kg was detected at location 46-611362 from 11.0–12.0 ft bgs. Aroclor-1260 concentrations decreased with depth at locations 46-611362, 46-611365, 46-611366, and 46-611367, increased with depth at location 46-611361, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Fluoranthene and pyrene were detected in one sample at location 46-611362. Fluoranthene and pyrene concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of fluoranthene and pyrene are defined.

Isopropyltoluene(4-) and toluene were detected in one sample at location 46-611367. Isopropyltoluene(4-) and toluene concentrations increased with depth at this location and decreased downgradient in SWSC Canyon. The lateral extent of 4-isopropyltoluene and toluene is defined, but the vertical extent is not defined.

Radionuclides

Cesium-137 was detected in one sample at an activity of 0.0951 pCi/g at location 46-611360 from 8.0–9.0 ft bgs. Cesium-137 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of cesium-137 are defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in three samples at three locations. The maximum activity of 0.123 pCi/g was detected at location 46-611362 from 16.0–17.0 ft bgs. Uranium-235/236 activities increased with depth at locations 46-611362, 46-611365, and 46-611366 and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236 is not defined at SWMU 46-003(f).

7.8.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(f) 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 46-003(f) because extent is not defined for the site.

7.9 SWMU 46-003(g), Septic System

7.9.1 Site Description and Operational History

SWMU 46-003(g) is an inactive septic system approximately 50 ft northeast of the northeast corner of building 46-158 at TA-46 (Figure 7.9-1). The septic system consisted of a septic tank (structure 46-230) and a seepage pit. Septic tank 46-230 was installed after 1960 and served the restroom facilities, water cooler, floor drains, service sinks, laboratory sinks, an eyewash sink, and a kitchen sink in building 46-158, which housed laboratories that conducted laser-induced chemistry experiments. The septic tank also received effluent from former office transportables (structures 46-175, 46-226, and 46-251). The septic tank stopped receiving effluent in 1988 when the drainlines from these buildings were rerouted to two surface impoundments, SWMU 46-005 (section 7.33) (LANL 1993, 020952, p. 5-13). However, the septic tank continued to receive effluent from at least one office transportable (structure 46-175) until 1996 when the transportable was removed from TA-46. Septic tank 46-230 was

removed during the 2010 investigation and was not connected to any building or transportable structure when it was removed (section 7.9.4.1).

7.9.2 Relationship to Other SWMUs and AOCs

In the 1988, sanitary waste drainlines that discharged to SWMU 46-003(g) septic system were rerouted to the SWMU 46-005 surface impoundment system. In the early 1990s, the SWMU 46-005 impoundments were taken out of service, and the sanitary waste line to the impoundments was rerouted to the SWSC plant (LANL 1996, 101818). No other SWMUs or AOCs are associated with SWMU 46-003(g).

7.9.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-003(g).

7.9.4 Site Contamination

7.9.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-003(g):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- The septic tank was removed in accordance with the approved work plan (LANL 2008, 105038.17; NMED 2008, 103429). Management of waste generated from the excavation of the septic tank, outlet drainline, and associated IDW is described in Appendix D.
- Six samples were collected from three locations: beneath the tank inlet and outlet, and within the tank excavation. Samples were collected from two depths—the base of the tank inlet/outlet lines (4.0–5.0 ft bgs) and base of the tank (10.0–11.0 ft bgs)—and from 5 ft below the base of the inlet/outlet lines (9.0–10.0 ft bgs) and base of the tank (15.0–16.0 ft bgs).
- Two samples were collected from the one location next to the seepage pit from the base of the pit at 4.0–5.0 ft bgs and below the base of the pit at 17.0–18.0 ft bgs.
- Four samples were collected from two locations beneath the primary and secondary inlet lines from the base of the line (6.0–7.0 ft bgs) and 5 ft below the base of the line (11.0–12.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-003(g) are shown in Figure 7.9-1. Table 7.9-1 presents the samples collected and analyses requested for SWMU 46-003(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.9.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-003(g), a maximum concentration of 1992 ppm was detected at a depth of 4.0–5.0 ft bgs. A sample from this depth (46-10-13507) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.9.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-003(g) consists of results from 12 samples (4 soil and 8 tuff) collected from six locations.

Inorganic Chemicals

Twelve samples (four soil and eight tuff) were analyzed for TAL metals, nitrate, cyanide, and perchlorate. Table 7.9-2 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. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (four soil and eight tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.9-3 presents the detected organic chemicals. Plate 17 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (four soil and eight tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.9-4 presents the radionuclides detected or detected above BVs/FVs. Plate 18 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.9.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1 to 1.09 mg/kg) above the soil BV (0.83 mg/kg) in four samples and had DLs (0.98 to 1.21 mg/kg) above the tuff BV (0.5 mg/kg) in seven samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in two samples at two locations, with a maximum concentration of 61.6 mg/kg at location 46-611614 from 10.0–11.0 ft bgs. Barium concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of barium are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.5 to 0.536 mg/kg) above BV in two samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample and above the tuff BV (2200 mg/kg) in one sample from two locations. The maximum concentration was 13,900 mg/kg at location 46-611616

from 6.0–7.0 ft bgs. Calcium concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a concentration of 9.15 mg/kg at location 46-611617 from 6.0–7.0 ft bgs. Chromium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of chromium are defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in two samples at two locations. The maximum concentration of 9.99 mg/kg was detected at location 46-611612 from 17.0–18.0 ft bgs. Cobalt concentrations decreased with depth at location 46-611614 and increased with depth at location 46-611612. Cobalt concentrations decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral extent of cobalt is defined, but the vertical extent is not defined.

Copper was detected above the tuff BV (4.66 mg/kg) in two samples at two locations. The maximum concentration of 15 mg/kg was detected at location 46-611612 from 17.0–18.0 ft bgs. Copper concentrations decreased with depth at location 46-611614 and increased with depth at location 46-611612. Copper concentrations decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 27.8 mg/kg at location 46-611612 from 4.0–5.0 ft bgs. Lead concentrations decreased with depth at this location and decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral and vertical extent of lead are defined.

Nitrate was detected in three soil samples and three tuff samples at four locations. The maximum concentration of 2.75 mg/kg was detected at location 46-611612 from 17.0–18.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in three soil samples and one tuff sample at four locations, with a maximum concentration of 0.00126 mg/kg at location 46-611615 from 4.0–5.0 ft bgs. Perchlorate concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.964 to 1.21 mg/kg) above BV in eight samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Aroclor-1254 and Aroclor-1260 were detected in one tuff sample each at locations 46-611612. Aroclor-1260 concentrations decreased with depth, and both concentrations were below the EQLs. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Radionuclides

Cesium-137 was detected in three soil samples and one tuff sample at four locations. The maximum activity of 0.219 pCi/g was detected at location 46-611612 from 4.0–5.0 ft bgs. Cesium-137 activities decreased with depth at all locations and decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral and vertical extent of cesium-137 are defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 2.62 pCi/g at location 46-611612 from 4.0–5.0 ft bgs. Uranium-234 activities decreased with depth at this location and decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral and vertical extent of Uranium-234 are defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 2.72 pCi/g at location 46-611612 from 4.0–5.0 ft bgs. Uranium-238 activities decreased with depth and decreased downgradient in drainage samples collected at SWMU 46-006(c). The lateral and vertical extent of Uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of cobalt and copper is not defined at SWMU 46-003(g). The extent of organic chemicals and radionuclides is defined at SWMU 46-003(g).

7.9.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-003(g) because extent is not defined for the site.

7.9.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-003(g) because extent is not defined for the site.

7.10 SWMU 46-004(a), Drainlines

7.10.1 Site Description and Operational History

SWMU 46-004(a) consists of two drainlines from former sinks in building 46-31 at TA-46 (Figure 7.6-1) that discharged to a dry well, SWMU 46-004(c) (section 7.14), located approximately 10 ft north of building 46-31. Engineering drawings show one drainline discharged acid waste from three sinks on the north side of room 151 (LASL 1960, 101819), and a second drainline was connected to a sink on the west side of room 151 (LANL 1993, 101825). Both drainlines extended north approximately 35 ft beneath building 46-31 to the dry well. Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). During the Rover Program, the sinks on the north side of room 151 were removed, but the drainline was left in place (LANL 1993, 020952, pp. 5-13–5-14). Engineering drawings show the western sink was removed in the early 1990s (LANL 1993, 101823).

7.10.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(a) drainlines discharged to the SWMU 46-004(c) dry well until the sinks were removed from building 46-31. No other SWMUs or AOCs are associated with SWMU 46-004(a).

7.10.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-004(a).

7.10.4 Site Contamination

7.10.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(a):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations next to the drainlines from the base of the drainlines (3.0–4.0 ft bgs) and from 5 ft below the base of the drainlines (8.0–9.0 ft bgs).
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(a) are shown in Figure 7.6-1. Table 7.10-1 presents the samples collected and analyses requested for SWMU 46-004(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.10.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(a), a maximum concentration of 25.9 ppm was detected at a depth of 8.0–9.0 ft bgs. A sample from this depth (46-10-13382) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.10.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(a) consist of results from four samples (two soil and two tuff) collected from two locations.

Inorganic Chemicals

Four samples (two soil and two tuff) were analyzed for TAL metals, cesium, nitrate, and cyanide. Table 7.10-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four samples (two soil and two tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.10-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four samples (two soil and two tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(a).

7.10.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.22 mg/kg) above the soil BV (0.83 mg/kg) in two samples and DLs (1.11 to 1.21 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had a DL (0.611 mg/kg) above the BV in one sample. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Cesium was detected in two soil samples and two tuff samples from two locations. The maximum concentration of 9.95 mg/kg was detected at location 46-611589 from 8.0–9.0 ft bgs. Cesium concentrations increased with depth at locations 46-611588 and 46-611589 and increased downgradient in samples collected at SWMU 46-004(c). The lateral and vertical extent of cesium are not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 14.1 mg/kg was detected at location 46-611588 from 8.0–9.0 ft bgs. Chromium concentrations increased with depth at location 46-611588 and were below the maximum tuff background concentration (13 mg/kg) at location 46-611589 (Figure H-15). Chromium concentrations increased downgradient in samples collected at SWMU 46-004(c). The lateral and vertical extent of chromium are not defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in two samples from two locations. The maximum concentration of 75 mg/kg was detected at location 46-611589 from 8.0–9.0 ft bgs. Copper concentrations increased with depth at locations 46-611588 and 46-611589 and increased downgradient in samples collected at SWMU 46-004(c). The lateral and vertical extent of copper are not defined.

Lead was detected above the tuff BV (11.2 mg/kg) in one sample at a concentration of 36.5 mg/kg at location 46-611589 from 8.0–9.0 ft bgs. Lead concentrations increased with depth at location 46-611589 and increased downgradient in samples collected at SWMU 46-004(c). The lateral and vertical extent of lead are not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample and above the tuff BV (0.1 mg/kg) in one sample at one location. The maximum concentration of 13.4 mg/kg was detected at location 46-611589 from 3.0–4.0 ft bgs. Mercury concentrations decreased with depth and increased downgradient in samples collected at SWMU 46-004(c). The lateral extent of mercury is not defined, but the vertical extent is defined.

Nitrate was detected in two soil samples and two tuff samples from two locations with a maximum concentration of 1.44 mg/kg at location 46-611588 from 3.0–4.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in one sample at a concentration of 0.637 mg/kg at location 46-611589 from 8.0–9.0 ft bgs. Selenium also had a DL above the tuff BV in one sample. Selenium concentrations increased with depth at location 46-611589 and decreased downgradient in samples collected at SWMU 46-004(c). The lateral extent of selenium is defined, but the vertical extent is not defined.

Organic Chemicals

Bis(2-ethylhexyl)phthalate and n-butylbenzene were detected in one tuff sample at location 46-611589 from 8.0–9.0 ft bgs. Bis(2-ethylhexyl)phthalate and n-butylbenzene concentrations increased with depth at location 46-611589 and increased downgradient in samples collected at SWMU 46-004(c). The lateral and vertical extent of bis(2-ethylhexyl)phthalate and n-butylbenzene are not defined.

Methylene chloride, 2-methylnaphthalene, and toluene were detected in one sample each. The concentrations were below the EQLs. The lateral and vertical extent of methylene chloride, 2-methylnaphthalene, and toluene are defined.

Trichloroethane(1,1,1-) was detected in two samples at two locations. The maximum concentration of 0.00176 mg/kg was detected at location 46-611588 from 3.0–4.0 ft bgs. Trichloroethane(1,1,1-) concentrations decreased with depth at both locations and increased downgradient in samples collected at SWMU 46-004(c). The lateral extent of 1,1,1-trichloroethane is not defined, but the vertical extent is defined.

Trichloroethene was detected in three samples at two locations. The maximum concentration of 0.00937 mg/kg was detected at location 46-611588 from 3.0–4.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and increased downgradient in samples collected at SWMU 46-004(c). The lateral extent of trichloroethene is not defined, but the vertical extent is defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

Summary of Nature and Extent

The lateral extent of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene is not defined at SWMU 46-004(a). The vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)phthalate, and n-butylbenzene is not defined at SWMU 46-004(a). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(a).

7.10.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(a) because extent is not defined for the site.

7.10.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(a) because extent is not defined for the site.

7.11 SWMU 46-004(a2), Outfall

7.11.1 Site Description and Operational History

SWMU 46-004(a2) is an inactive outfall located on the east side of building 46-31 at TA-46 (Figure 7.11-1). The outfall discharged to a shallow ditch on the east side of building 46-31, which traversed approximately 50 ft north to a storm drain culvert discharging into Cañada del Buey. The SWMU 46-004(a2) outfall received effluent from a 6-in.-diameter industrial drainline that was historically plumbed to the sinks and drains in rooms 101, 103, and 105 of building 46-31 (LANL 1993, 020952, p. 5-128). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1996, 054929, pp. 5-11-5-14). By 1994, the outfall pipe was plugged (LANL 1996, 054929, p. 99), and all drains leading to the outfall either were removed from service or were rerouted to the SWSC plant (Santa Fe Engineering Ltd. 1994, 101839, Figure 2).

7.11.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(a2) outfall discharged to the same hillside as SWMUs 46-004(u) and 46-004(v). No other SWMUs or AOCs are associated with SWMU 46-004(a2).

7.11.3 Summary of Previous Investigations

During the 1994 Phase I RFI, 12 samples were collected from nine locations and submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic thorium, and isotopic uranium and by gamma spectroscopy. A subset of nine samples was also submitted for analysis of isotopic plutonium, and a subset of eight samples was submitted for analysis of VOCs. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 101803).

Chromium, iron, nickel, silver, and thallium were detected above BVs in one sample. Cadmium was detected above BV in two samples, mercury was detected above BV in three samples, copper and lead were detected above BVs in four samples, and zinc was detected above BV in six samples. DLs for cadmium, mercury, silver, and thallium were above BVs in one to three samples. Anthracene, BHC(delta-) (benzene hexachloride[delta-]), 4,4'-DDE (dichlorophenyltrichloroethylene), 4,4'-DDT (dichlorophenyltrichloroethylene), di-n-octylphthalate, dieldrin, 4,4'-methoxychlor, and methylene chloride were detected in one sample. Aroclor-1254, benzo(a)anthracene, BHC(alpha-), bis(2-ethylhexyl)phthalate, 4,4'-dichlorodiphenyldichloroethane, and endrin aldehyde were detected in two samples. Benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, and heptachlor epoxide were detected in three samples. Aroclor-1260, BHC(gamma-), and fluoranthene were detected in four samples. Chrysene, phenanthrene, and pyrene were detected in five samples. Plutonium-238 was detected above FV in two samples. Plutonium-238 was also detected in four samples at depths greater than the FV. Isotopic uranium and isotopic thorium were not detected above BVs. Radionuclides analyzed by gamma spectroscopy were not detected or detected above FVs.

7.11.4 Site Contamination

7.11.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(a2):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from four locations: two locations at the outfall, one at the mouth of the culvert, and one at the culvert outfall. Samples were collected from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(a2) are shown in Figure 7.11-1. Table 7.11-1 presents the samples collected and analyses requested for SWMU 46-004(a2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.11.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(a2), a maximum concentration of 22.2 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13540) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-004(a2). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.11.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(a2) consist of results from 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, cyanide, and perchlorate. Table 7.11-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eight samples (three soil and five tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.11-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight samples (three soil and five tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(a2).

7.11.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.07 to 1.16 mg/kg) above the soil BV (0.83 mg/kg) in two samples and DLs (0.535 to 1.15 mg/kg) above the tuff BV (0.5 mg/kg) in four samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.537 mg/kg) above BV in one sample. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at two locations and above the tuff BV (4.66 mg/kg) in one sample. The maximum concentration of 26.9 mg/kg was detected at location 46-611618 from 0.0–1.0 ft bgs. The copper concentration decreased with depth at locations 46-611618 and 46-611620, increased with depth at location 46-611621, and decreased downgradient within the drainages of SWMUs 46-004(u) and 46-004(x) (Plate 19).The lateral extent of copper is defined, but the vertical extent is not defined.

Perchlorate was detected in two soil samples at one location and two tuff samples at one location. The maximum concentration of 0.0067 mg/kg was detected at location 46-611620 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at location 46-611620 and increased with depth at location 46-611621. The concentrations decreased downgradient within the drainages of SWMUs 46-004(u) and 46-004(x) (Plate 19). The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.05 to 1.14 mg/kg) above BV in five samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at two locations. The maximum concentration of 150 mg/kg was detected at location 46-611618 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at location 46-611618, increased with depth at location 46-611621, and decreased downgradient in the drainages of SWMUs 46-004(u) and 46-004(x) (Plate 19). The lateral extent of zinc is defined, but vertical extent is not defined.

Organic Chemicals

Acenaphthene, anthracene, benzo(g,h,i)perylene, fluorene, and indeno(1,2,3-cd)pyrene were detected in one sample at one location. The maximum concentrations of these organic chemicals were detected at location 46-611618 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Aroclor-1242 was detected in one tuff sample at a concentration of 0.0073 mg/kg at location 46-611620 from 2.0–3.0 ft bgs. Aroclor-1242 concentrations increased with depth at this location and decreased downgradient. The lateral extent of Aroclor-1242 is defined, but vertical extent is not defined.

Aroclor-1254 was detected in four samples at three locations. The maximum concentration of 0.0176 mg/kg was detected below the EQL at location 46-611618 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at location 46-611618, increased with depth at locations 46-611620 and 46-611621, and decreased downgradient in the drainages of SWMUs 46-004(u) and 46-004(x) (Plate 20). The lateral extent of Aroclor-1254 is defined, but vertical extent is not defined.

Aroclor-1260 was detected in four samples at two locations. The maximum concentration of 0.0227 mg/kg was detected at location 46-611621 from 2.0–3.0 ft bgs. Aroclor-1260 increased with depth at locations 46-611620 and 46-611621 and decreased downgradient in the drainages of SWMUs 46-004(u) and 46-004(x) (Plate 20). The lateral extent of Aroclor-1260 is defined, but vertical extent is not defined.

Benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene were detected in three samples at two locations. The maximum concentrations of these organic chemicals were detected at location 46-611618 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these inorganic chemicals are defined.

Benzo(a)pyrene and phenanthrene were detected in two samples at one location. The maximum concentrations of 0.596 mg/kg and 1.3 mg/kg, respectively, were detected at location 46-611618 from 0.0–1.0 ft bgs. Benzo(a)pyrene and phenanthrene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene and phenanthrene are defined.

Isopropyltoluene(4-)and methylene chloride were detected in two samples and one sample, respectively, at location 46-611621. Isopropyltoluene(4-) concentrations decreased with depth. Isopropyltoluene(4-) and methylene chloride concentrations were below the EQLs. The lateral and vertical extent of 4-isopropyltoluene and methylene chloride are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

Summary of Nature and Extent

The vertical extent of copper, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260 is not defined at SWMU 46-004(a2). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(a2).

7.11.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(a2) because extent is not defined for the site.

7.11.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(a2) because extent is not defined for the site.

7.12 SWMU 46-004(b), Former Tank

7.12.1 Site Description and Operational History

SWMU 46-004(b) is a former alkali-metal cleaning tank (structure 46-81) at TA-46 (Figure 7.6-1). The tank measured approximately 4 ft × 8 ft × 6 ft tall and was located on asphalt pavement within 20 ft of the northwest corner of building 46-31, within the boundary of the SWMU 46-006(d) (section 7.37). The tank was of steel construction with an outlet plumbed to the SWMU 46-004(c) dry well (LASL 1963, 101821). The tank was used in the late 1950s and early 1960s to douse laboratory equipment from cesium-plasma diode experiments before the equipment was reused or disposed of. Butanol or kerosene was used on the equipment to dissolve naturally occurring alkali isotopes of cesium and lithium (LANL 1996, 054929, pp. 24, 27). The tank was removed in 1973 (LANL 1993, 020952, p. 6-7). It should be noted that the 1990 SWMU report incorrectly described the tank as being constructed of concrete.

7.12.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(b) was located within SWMU 46-006(d). No other SWMUs or AOCs are associated with SWMU 46-004(b).

7.12.3 Summary of Previous Investigations

During the 1994 Phase I RFI, two samples were collected from two locations representing the paths for surface-water runoff from SWMU 46-004(b) downgradient of the former tank's location and in the drainage of a nearby outfall [SWMU 46-004(z)] (LANL 1996, 054929, pp. 27–29). These two samples were part of larger sample sets collected in association with SWMU 46-004(z) (ICF Kaiser Engineers 1995, 053452, Exhibit 3, p. 4) and SWMU 46-006(d) (LANL 1996, 054929, pp. 28, 159). Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 101803).

7.12.4 Site Contamination

7.12.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(b):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations: one at the northwest corner of the tank pad and one in the drainage approximately 15 ft northwest of the pad from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, cyanide, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(b) are shown in Figure 7.6-1. Table 7.12-1 presents the samples collected and analyses requested for SWMU 46-004(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.12.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(b), a maximum concentration of 6.6 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13172) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.12.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(b) consist of results from four soil samples collected from two locations.

Inorganic Chemicals

Four soil samples were analyzed for TAL metals, cesium, and cyanide. Table 7.12-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four soil samples were analyzed for VOCs, SVOCs, PCBs, and TPH-DRO. Table 7.12-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four soil samples were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.12-4 presents the radionuclides detected or detected above BVs/FVs. Plate 12 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.12.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV (0.83 mg/kg) but had DLs (1.1 to 1.16 mg/kg) above BV in four samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.55 to 0.579 mg/kg) above BV in three samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Cesium was detected in four soil samples at two locations. The maximum concentration of 7.95 mg/kg was detected at location 46-611546 from 2.0–3.0 ft bgs. Cesium concentrations decreased with depth at location 46-611545, increased with depth at location 46-611546, and decreased downgradient within the

drainage of AOC 46-004(f2) (Plate 19). The lateral extent of cesium is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 85.8 mg/kg at location 46-611546 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 19). The lateral and vertical extent of copper are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 62.8 mg/kg at location 46-611546 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 19). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, fluorene, and indeno(1,2,3-cd)pyrene were detected in one soil sample at location 46-611546 from 2.0–3.0 ft bgs. The concentrations increased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 20). The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Aroclor-1254, Aroclor-1260, benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in two soil samples at one location. The maximum concentrations were detected at location 46-611546 from 2.0–3.0 ft bgs. The concentrations increased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 20). The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Methylnaphthalene(2-), naphthalene, and 1,2,4-trimethylbenzene were detected in one soil sample at location 46-611546 from 2.0–3.0 ft bgs. The concentrations were below the EQLs. The lateral and vertical extent of 2-methylnaphthalene, naphthalene, and 1,2,4-trimethylbenzene are defined.

TPH-DRO was detected in three samples at two locations. The maximum concentration of 25.3 mg/kg was detected at location 46-611546 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at location 46-611546. The TPH-DRO concentration at location 46-611545 was below the EQL. The concentrations increased laterally from location 46-611545 to location 46-611546 (Plate 11). The lateral extent of TPH-DRO is not defined, but the vertical extent is defined.

Trichloroethane(1,1,1-) and trichloroethene were detected in one soil sample at location 46-611545 from 0.0–1.0 ft bgs. Trichloroethane(1,1,1-) and trichloroethene concentrations decreased with depth and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 20). The lateral and vertical extent of 1,1,1-trichloroethane and trichloroethene are defined.

Xylene(1,2-) and 1,3-xylene+1,4-xylene were detected in one soil sample at location 46-611546 from 0.0–1.0 ft bgs. Xylene(1,2-) and 1,3-xylene+1,4-xylene concentrations decreased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 20). The lateral and vertical extent of 1,2-xylene and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 2.62 pCi/g at location 46-611546 from 0.0–1.0 ft bgs. Uranium-234 activities decreased with depth at this location and

decreased downgradient within the drainage of AOC 46-004(f2) (Plate 21). The lateral and vertical extent of uranium-234 are defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 3.24 pCi/g at location 46-611546 from 0.0–1.0 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient within the drainage of AOC 46-004(f2) (Plate 21). The lateral and vertical extent of uranium 238 are defined.

Summary of Nature and Extent

The vertical extent of cesium, acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at SWMU 46-004(b). The lateral extent of TPH-DRO is not defined at SWMU 46-004(b). The extent of radionuclides is defined at SWMU 46-004(b).

7.12.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(b) because extent is not defined for the site.

7.12.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(b) because extent is not defined for the site.

7.13 SWMU 46-004(b2), Outfall

7.13.1 Site Description and Operational History

SWMU 46-004(b2) is an inactive outfall located approximately 20 ft east of building 46-1 at TA-46 (Figure 7.13-1). The outfall pipe consists of a 4-in.-diameter vitrified clay pipe (VCP) that discharged to the east side of building 46-1, down a steep embankment and into a storm drainage ditch, which flowed to a storm drain culvert that discharged into Cañada del Buey (LANL 1993, 020952, p. 5-129). The storm drainage ditch also receives runoff from SWMUs 46-004(s), 46-007, and 46-008(b) (sections 7.25, 7.40, and 7.42, respectively). Engineering drawings show that the floor drains along the east wall of the north high bay in building 46-1 were plumbed to this outfall pipe (LANL 1993, 020952, p.5-129). Building 46-1 housed offices, two assembly bays, a machine shop, and several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area in support of the Rover Program (LANL 1993, 020952, p. 5-7). In 1995, the outfall was plugged and the associated floor drains were either taken out of service or were rerouted to the SWSC plant (LANL 1998, 101808, p. 75).

7.13.2 Relationship to Other SWMUs and AOCs

The storm drainage ditch into which SWMU 46-004(b2) discharged also received runoff from SWMUs 46-004(s), 46-007, and 46-008(b).

7.13.3 Summary of Previous Investigations

During the 1994 Phase I RFI, three samples were collected from three locations near the outfall, and one sample was collected from the mouth of the nearby storm drain culvert. All four samples were submitted for analyses of TAL metals, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Three of the four samples were analyzed for VOCs. The sample collected near the culvert was also analyzed for PCBs and pesticides (LANL 1996, 054929, pp. 113–115, 199, 206). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Lead was detected above BV in one sample. Copper, mercury, and zinc were detected above BVs in all four samples. DLs for cadmium and thallium were above BVs in one and four samples, respectively. Acenaphthene, anthracene, dibenz(a,h)anthracene, fluorene, and naphthalene were detected in two samples. Pyrene was detected in three samples. 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, and phenanthrene were detected in all four samples. Cesium-137 was detected in one sample. Uranium-234 was detected above BV in one sample. Isotopic thorium was not detected or was not detected above BV.

7.13.4 Site Contamination

7.13.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(b2):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations in the drainage ditch beneath the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46 004(b2) are shown in Figure 7.13-1. Table 7.13-1 presents the samples collected and analyses requested for SWMU 46-004(b2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.13.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-004(b2) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.13.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(b2) consist of results from four soil samples collected from two locations.

Inorganic Chemicals

Four soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.13-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four soil samples were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.13-3 presents the detected organic chemicals. Plate 23 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four soil samples were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.13-4 presents the radionuclides detected or detected above BVs/FVs. Plate 24 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.13.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV but had a DL (0.89 mg/kg) above BV (0.83 mg/kg) in one sample. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV but had DLs (0.562 and 0.628 mg/kg) above BV (0.4 mg/kg) in two samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples at two locations. The maximum concentration of 66.8 mg/kg was detected at location 46-611124 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at both locations and decreased downgradient at the top of the drain culvert within SWMU 46-008(b) (Plate 22). The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at one location. The maximum concentration of 31.3 mg/kg was detected at location 46-611123 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in three samples at two locations. The maximum concentration of 0.308 mg/kg was detected at location 46-611124 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at both locations and decreased downgradient at the top of the drain

culvert within SWMU 46-008(b). The lateral and vertical extent of mercury are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples at two locations. The maximum concentration of 149 mg/kg was detected at location 46-611124 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at both locations and decreased downgradient at the top of the drain culvert within SWMU 46-008(b). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthylene, benzo(b)fluoranthene, dibenz(a,h)anthracene, dibenzofuran, and 2-methylnaphthalene were detected in two or three samples at two locations. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Aroclor-1254 was detected in three samples at two locations. The maximum concentration of 1.68 mg/kg was detected at location 46-611123 from 1.0–2.0 ft bgs. Aroclor-1254 concentrations decreased with depth at location 46-611124, increased with depth at location 46-611123, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in two samples at one location. The maximum concentration of 0.764 mg/kg was detected at location 46-611123 from 1.0–2.0 ft bgs. Aroclor-1260 concentrations increased with depth at this location and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, and pyrene were detected in four samples at two locations. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Radionuclides

Cesium-137 was detected in one soil sample. Cesium-137 was detected at 0.224 pCi/g at location 46-611123 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of cesium-137 are defined.

Uranium-234 was detected above the soil BV in two samples at location 46-611123. Uranium-234 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the soil BV in two samples at location 46-611123. Uranium 235/236 activities were the same at both depths and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Summary of Nature and Extent

The vertical extent of Aroclor-1254 and Aroclor-1260 is not defined at SWMU 46-004(b2). The extent of inorganic chemicals and radionuclides is defined at SWMU 46-004(b2).

7.13.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(b2) because extent is not defined for the site.

7.13.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(b2) because extent is not defined for the site.

7.14 SWMU 46-004(c), Dry Well

7.14.1 Site Description and Operational History

SWMU 46-004(c) is an inactive dry well (structure 46-61) located approximately 10 ft north of the high bay in building 46-31 at TA-46 (Figure 7.6-1). The 1990 SWMU report incorrectly identified SWMU 46-004(c) as a sump (LANL 1990, 007513). The dry well is constructed of two sections of 2.5-ft-diameter × 4-ft-long concrete pipe installed vertically to a depth of approximately 8 ft bgs. Engineering drawings show the bottom of the dry well is open (LASL 1960, 101820). Industrial sink drains in room 151 discharged to the dry well through drainlines [SWMU 46-004(a)] that run beneath building 46-31. Engineering drawings show one drainline discharged acid waste from three sinks on the north side of room 151(LASL 1960, 101819), and a second drainline was connected to a sink on the west side of room 151 (LANL 1993, 101825). During the Rover Program, the sinks on the north side of room 151 were removed, and the drainline was left in place (LANL 1993, 020952, pp. 5-13–5-14). Engineering drawings show the western sink and associated drainline were removed in the early 1990s (LANL 1993, 101823). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). Engineering drawings also show the alkali-metal cleaning tank [SWMU 46-004(b)] was connected to the dry well from the late 1950s to the early 1960s (LASL 1963, 101821).

7.14.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(a) drainlines discharged to the SWMU 46-004(c) dry well until the sinks were removed from building 46-31. The SWMU 46-004(b) alkali-metal cleaning tank discharged to the dry well until it was removed.

7.14.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-004(c).

7.14.4 Site Contamination

7.14.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(c):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from two locations: one location down the center of the dry well and one location downgradient from the dry well. Samples were collected from 8.0–9.0 ft bgs, 13.0–14.0 ft bgs, 18.0–19.0 ft bgs, and 23.0–24.0 ft bgs, which correspond to the base of the well and 5 ft, 10 ft, and 15 ft below the base of the well.
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, asbestos, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(c) are shown in Figure 7.6-1. Table 7.14-1 presents the samples collected and analyses requested for SWMU 46-004(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.14.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(c), a maximum concentration of 433 ppm was detected at a depth of 18.0–19.0 ft bgs. A sample from this depth (46-10-13548) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.14.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(c) consist of results from eight tuff samples collected from two locations.

Inorganic Chemicals

Eight tuff samples were analyzed for TAL metals, cesium, nitrate, cyanide, perchlorate, and asbestos. Table 7.14-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified. No asbestos was detected at SWMU 46-004(c).

Organic Chemicals

Eight tuff samples were analyzed for VOCs, SVOCs, and PCBs. Table 7.14-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight tuff samples were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(c).

7.14.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the tuff BV (0.5 mg/kg) in one sample at a concentration of 0.784 mg/kg at location 46-611622 from 8.0–9.0 ft bgs. Antimony also had DLs above the tuff BV in seven samples. Antimony concentrations decreased with depth at location 46-611622 and decreased downgradient. The lateral and vertical extent of antimony are defined.

Cesium was detected in eight samples at two locations. The maximum concentration of 29.9 mg/kg was detected at location 46-611623 from 8.0–9.0 ft bgs. Cesium concentrations decreased with depth at location 46-611623, increased with depth at location 46-611622, and decreased downgradient on the slope below SWMU 46-006(d) (Plate 10). The lateral extent of cesium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 16.7 mg/kg was detected at location 46-611623 from 8.0–9.0 ft bgs. Chromium concentrations decreased with depth at location 46-611623, were below the maximum tuff background concentration (13 mg/kg) at location 46-611622 (Figure H-16), and decreased downgradient on the slope below SWMU 46-006(d) (Plate 10). The lateral and vertical of chromium are defined.

Copper was detected above the tuff BV (4.66 mg/kg) in four samples at two locations. The maximum concentration of 420 mg/kg was detected at location 46-611623 from 8.0–9.0 ft bgs. Copper concentrations decreased with depth at location 46-611623, increased with depth at location 46-611622, and decreased downgradient on the slope below SWMU 46-006(d) (Plate 10). The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above BV (11.2 mg/kg) in two samples at one location. The maximum concentration of 77.7 mg/kg was detected at location 46-611623 from 8.0–9.0 ft bgs. Lead concentrations decreased with depth at this location and decreased downgradient on the slope below SWMU 46-006(d) (Plate 10). The lateral and vertical extent of lead are defined.

Mercury was detected above the tuff BV (0.1 mg/kg) in seven samples at two locations. The maximum concentration of 64.3 mg/kg was detected at location 46-611622 from 18.0–19.0 ft bgs. Mercury concentrations decreased with depth at location 46-611623, increased with depth at location 46-611622, and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.17 mg/kg) above BV in eight samples at two locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the tuff BV (1 mg/kg) in six samples at two locations. The maximum concentration of 114 mg/kg was detected at location 46-611622 from 8.0–9.0 ft bgs. Silver concentrations

decreased with depth at locations 46-611622 and 46-611623 and decreased downgradient. The lateral and vertical extent of silver are defined.

Zinc was detected above the tuff BV (63.5 mg/kg) in one sample at a concentration of 100 mg/kg at location 46-611623 from 8.0–9.0 ft bgs. Zinc concentrations decreased with depth and decreased downgradient on the slope below SWMU 46-006(d) (Plate 10). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected in eight samples at two locations. The maximum concentration of 0.114 mg/kg was detected at location 46-611623 from 8.0–9.0 ft bgs. Acetone concentrations decreased with depth at both locations and decreased downgradient on the slope below SWMU 46-006(d) (Plate 11). The lateral and vertical extent of acetone are defined.

Aroclor-1242 was detected in one sample at a concentration of 0.108 mg/kg at location 46-611623 from 23.0–24.0 ft bgs. Aroclor-1242 concentrations increased with depth at location 46-611623 and decreased downgradient on the slope below SWMU 46-006(d) (Plate 11). The lateral extent of Aroclor-1242 is defined, but the vertical extent is not defined.

Aroclor-1254, Aroclor-1260, and trichloroethene were detected in eight samples at two locations. The maximum concentrations were detected at location 46-611622 from 8.0–9.0 ft bgs, decreased with depth at both locations, and decreased downgradient. The lateral and vertical extent of Aroclor-1254, Aroclor-1260, and trichloroethene are defined.

Benzene, carbon tetrachloride, chlorodibromomethane, cis-1,2-dichloroethene, fluoranthene, fluorene, naphthalene, phenanthrene, pyrene, and 1,3-xylene+1,4-xylene were detected in one to three samples. The concentrations decreased with depth and were below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Bis(2-ethylhexyl)phthalate and n-butylbenzene were detected in seven samples at two locations. The maximum concentrations were detected at location 46-611622 from 8.0–9.0 ft bgs. Bis(2-ethylhexyl)phthalate and n-butylbenzene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate and n-butylbenzene are defined.

Butylbenzene(sec-) was detected in five samples at two locations. The maximum concentration of 0.0496 mg/kg was detected at location 46-611622 from 8.0–9.0 ft bgs. Butylbenzene(sec-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of sec-butylbenzene are defined.

Dichloroethene(1,1-), 1,2-dichloropropane, and 1,1,1,2-tetrachloroethane were detected in three samples at two locations. The maximum concentrations were detected at location 46-611622 from 8.0–9.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1,1-dichloroethene, 1,2-dichloropropane, and 1,1,1,2-tetrachloroethane are defined.

Ethylbenzene, isopropylbenzene, and 1,2-xylene were detected in four samples at two locations. The maximum concentrations were detected at location 46-611622 from 8.0–9.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of ethylbenzene, isopropylbenzene, and 1,2-xylene are defined.

Isopropyltoluene(4-), tetrachloroethene, 1,1,1- trichloroethane, and 1,3,5- trimethylbenzene were detected in six samples at two locations. The maximum concentrations were detected at location 46-611622 from 8.0–9.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 4-isopropyltoluene, tetrachloroethene, 1,1,1- trichloroethane, and 1,3,5-trimethylbenzene are defined.

Methylnaphthalene(2-) was detected in four samples at two locations. The maximum concentration of 1.7 mg/kg was detected at location 46-611622 from 13.0–14.0 ft bgs. Methylnaphthalene(2-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 2-methylnaphthalene are defined.

Propylbenzene(1-) was detected in five samples at two locations. The maximum concentration of 0.0239 mg/kg was detected at location 46-611622 from 8.0–9.0 ft bgs. Propylbenzene(1-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1-propylbenzene are defined.

Toluene was detected in three samples at two locations. The maximum concentration of 0.0153 mg/kg was detected at location 46-611622 from 13.0–14.0 ft bgs. Toluene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

Trimethylbenzene(1,2,4-) was detected in six samples at two locations. The maximum concentration of 0.0497 mg/kg was detected at location 46-611623 from 13.0–14.0 ft bgs. Trimethylbenzene(1,2,4-) concentrations decreased with depth at both locations and decreased downgradient on the slope below SWMU 46-006(d) (Plate 11). The lateral and vertical extent of 1,2,4-trimethylbenzene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(c).

Summary of Nature and Extent

The vertical extent of cesium, copper, mercury, and Aroclor-1242 is not defined at SWMU 46-004(c). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(c).

7.14.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(c) because extent is not defined for the site.

7.14.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(c) because extent is not defined for the site.

7.15 SWMU 46-004(c2), Outfall

7.15.1 Site Description and Operational History

SWMU 46-004(c2) is a former NPDES-permitted outfall from an industrial drainline in building 46-1 at TA-46 (Figure 7.11-1). The outfall consists of a 4-in.-diameter cast-iron pipe that discharged effluent from floor drains in the north equipment room of building 46-1 to a ditch approximately 50 ft northwest of

building 46-1. From the ditch, the effluent flowed to a storm drain culvert that discharged into Cañada del Buey. In 1997, the floor drains that discharged to the SWMU 46-004(c2) outfall either were removed from service or were rerouted to the SWSC plant (LANL 1998, 101808, pp. 77–78). The outfall was removed from the NPDES permit effective March 10, 1998. Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area in support of the Rover Program (LANL 1993, 020952, p. 5-7).

7.15.2 Relationship to Other SWMUs and AOCs

Stormwater runoff from the former SWMU 46-006(a) storage area discharged to the same drainage ditch and culvert as the SWMU 46-004(c2) outfall. No other SWMUs or AOCs are associated with SWMU 46-004(c2).

7.15.3 Summary of Previous Investigations

During the 1994 Phase I RFI, 16 samples were collected from 13 locations at SWMU 46-004(c2). Three of the samples were collected from the outfall and were also used to characterize SWMU 46-006(a) (section 7.34). All 16 samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Ten samples were also analyzed for VOCs (LANL 1996, 054929, pp. 121–122, 141). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium was detected above BV in 1 sample, copper and mercury were detected above BVs in 6 samples, lead was detected above BV in 13 samples, and zinc was detected above BV in 15 samples. Cesium and lithium were detected in eight samples. The DLs for antimony, cadmium, mercury, silver, and thallium were detected above BVs in 2 to 11 samples. Acenaphthene, aldrin, anthracene, dibenzofuran, endosulfan sulfate, fluorene, heptachlor, heptachlor epoxide, 4,4'-methoxychlor,2-methylnaphthalene, and naphthalene were detected in one sample. Benzo(a)pyrene, bis(2-ethylhexyl)phthalate, endosulfan II, and endrin were detected in two samples. Benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and DDT were detected in three samples. Phenanthrene and pyrene were detected in four samples, fluoranthene was detected in six samples, and dieldrin was detected in seven samples. Cesium-137 was detected in two soil samples. VOCs and PCBs were not detected. Isotopic uranium and isotopic thorium were not detected above BVs.

7.15.4 Site Contamination

7.15.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(c2):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twenty-two samples were collected from 11 locations in the drainage below the outfall from two depths: 0.0–0.25 ft bgs or 0.0–1.0 ft bgs and 1.0-2.0 ft bgs.

- All samples were analyzed for TAL metals, cesium, lithium, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(c2) are shown in Figure 7.11-1. Table 7.15-1 presents the samples collected and analyses requested for SWMU 46-004(c2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.15.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-004(c2) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.15.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(c2) consists of results from 22 samples (18 soil and 4 tuff) collected from 11 locations.

Inorganic Chemicals

Twenty-two samples (18 soil and 4 tuff) were analyzed for TAL metals, cesium, lithium, nitrate, cyanide, and perchlorate. Table 7.15-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-two samples (18 soil and 4 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.15-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-two samples (18 soil and 4 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.15-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.15.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.851 to 1.44 mg/kg) above the soil BV (0.83 mg/kg) in 10 samples and DLs (0.508 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in three samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.53 mg/kg at location 46-611113 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.529 to 0.622 mg/kg) above the soil BV in seven samples. Cadmium concentrations decreased with depth at location 46-611113 and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Cesium was detected in 14 soil samples and 4 tuff samples at 11 locations. The maximum concentration of 5.68 mg/kg was detected at location 46-611117 from 0.0–1.0 ft bgs. Cesium concentrations increased with depth at locations 46-611111, 46-611112, 46-611115, and 46-611118, decreased with depth at the other locations, and decreased downgradient. The lateral extent of cesium is defined, but the vertical extent of cesium is not defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 29.2 mg/kg at location 46-611112 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-17 and Table H-6). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in five samples at four locations. The maximum concentration of 45.4 mg/kg was detected at location 46-611113 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in nine samples at six locations. The maximum concentration of 65.1 mg/kg was detected at location 46-611116 from 0.0–1.0 ft bgs. Lead concentrations increased with depth at location 46-611113 and were below the maximum soil background concentrations (28 mg/kg) at location 46-611112 (Figure H-17). The concentrations decreased with depth at the other locations and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Lithium was detected in 18 soil samples at 11 locations. The maximum concentration of 16.4 mg/kg was detected at location 46-611111 from 1.0–2.0 ft bgs. Lithium concentrations increased with depth at locations 46-611111, 46-611112, and 46-611115, decreased with depth at the other locations, and decreased downgradient. The lateral extent of lithium is defined, but the vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in two samples at two locations. The maximum concentration of 0.107 mg/kg was detected at location 46-611116 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nitrate was detected in five soil samples and one tuff sample at four locations. The maximum concentration of 5.03 mg/kg was detected at location 46-611120 from 0.0–0.25 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in nine soil samples at five locations. The maximum concentration of 0.00288 mg/kg was detected at location 46-611113 from 1.0–2.0 ft bgs. Perchlorate concentrations increased with depth at all locations but decreased downgradient. The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.03 to 1.11 mg/kg) above BV in four samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in 12 samples at eight locations. The maximum concentration of 286 mg/kg was detected at location 46-611113 from 0.0–1.0 ft bgs. Zinc concentrations increased with depth at location 46-611115. decreased with depth at the other locations, and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acenaphthene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected at five to eight locations. The maximum concentrations of these organic chemicals were detected at location 46-611112 from 0.0–1.0 ft bgs and increased with depth at location 46-611114. The concentrations of acenaphthene and benzo(k)fluoranthene were below the EQLs, decreased with depth at the other locations, and decreased downgradient. The lateral extent of all the organic chemicals is defined, the vertical extent of acenaphthene and benzo(k)fluoranthene is defined, but the vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined.

Anthracene and fluorene were detected in eight and seven soil samples, respectively, at five locations. The maximum concentrations of 0.087 mg/kg and 0.0396 mg/kg were at location 46-611112 from 0.0–1.0 ft bgs. Anthracene and fluorene concentrations at locations 46-611114 and 46-611116 were below EQLs, decreased with depth at the other locations, and decreased downgradient. The lateral and vertical extent of anthracene and fluorene are defined.

Acetone was detected in three soil samples at three locations. The maximum concentration of 0.00897 mg/kg was detected at location 46-611120 from 0.0–0.25 ft bgs. Acetone concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of acetone are defined.

Aroclor-1254 and Aroclor-1260 were detected in 12 and 13 soil samples at seven and eight locations, respectively. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Benzo(g,h,i)perylene was detected in nine soil samples at six locations, with a maximum concentration of 0.139 mg/kg at location 46-611116 from 0.0–1.0 ft bgs. Benzo(g,h,i)perylene concentrations increased with depth at locations 46-611112 and 46-611114 and decreased downgradient. The lateral extent of benzo(g,h,i)perylene is defined, but the vertical extent is not defined.

Bis(2-ethylhexyl)phthalate and 2-methylnaphthalene were detected in one and two samples, respectively. Bis(2-ethylhexyl)phthalate and 2-methylnaphthalene concentrations were below the EQLs and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate and 2-methylnaphthalene are defined.

Dibenz(a,h)anthracene, naphthalene, and 1,3-xylene+1,4-xylene were detected in five, four, and three samples, respectively. The concentrations were below the EQLs in all samples and decreased downgradient. The lateral and vertical extent of dibenz(a,h)anthracene, naphthalene, and 1,3-xylene+1,4-xylene are defined.

Di-n-butylphthalate, di-n-octylphthalate, and 1,1,1-trichloroethane were detected in one sample each. The concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of di-n-butylphthalate, di-n-octylphthalate, and 1,1,1-trichloroethane are defined.

Isopropylbenzene and 4-isopropyltoluene were detected in one soil sample at location 46-611118 from 0.0–0.25 ft bgs. Isopropylbenzene and 4-isopropyltoluene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of isopropylbenzene and 4-isopropyltoluene are defined.

Radionuclides

Americium-241 was detected above the soil FV (0.013 pCi/g) in two samples at two locations. The maximum activity of 0.0574 pCi/g was detected at location 46-611120 from 0.0–0.25 ft bgs. Americium-241 activities decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of americium-241 are defined.

Cesium-137 was detected above the soil FV (1.65 pCi/g) in one sample at an activity of 4.5 pCi/g at location 46-611120 from 0.0–0.025 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-18 and Table H-6). The lateral and vertical extent of cesium-137 are defined.

Plutonium-239/240 was detected above the soil FV (0.054 pCi/g) in four samples at four locations. The maximum activity of 0.237 pCi/g was detected at location 46-611120 from 0.0–0.25 ft bgs. Plutonium-239/240 activities decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of plutonium-239/240 are defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 3.36 pCi/g at location 46-611120 from 0.0–0.25 ft bgs. Uranium-234 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in two samples at two locations. Uranium-235/236 activities (0.1 and 0.107 pCi/g) are comparable with the tuff BV. The lateral and vertical extent of uranium-235/236 are defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 4.7 pCi/g at location 46-611120 from 0.0–0.25 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of cesium, lead, lithium, perchlorate, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at SWMU 46-004(c2). The extent of radionuclides is defined at SWMU 46-004(c2).

7.15.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(c2) because extent is not defined for the site.

7.15.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(c2) because extent is not defined for the site.

7.16 Consolidated Unit 46-004(d)-99

Consolidated Unit 46-004(d)-99 consists of SWMUs 46-004(d) and 46-004(e). Both SWMUs are inactive dry wells that were plumbed in series and received effluent from sink drains in building 46-58 at TA-46 (Figure 7.7-1). Both dry wells are located approximately 20 ft north of building 46-58. The dry wells are constructed of 3-ft-diameter × 4-ft-long concrete cylinders stacked vertically, with a nesting joint and a gravel bottom. Visual inspection of both wells indicates they are approximately 10 ft deep. The dry wells are belowgrade, except for the top 4- to 6-in. concrete lip, and are covered with metal lids. Both dry wells received effluent from an acid drain in building 46-58 (LANL 1993, 020952, p. 5-14) and effluent from a fume hood sink and a hand-washing sink in building 46-58 (Santa Fe Engineering Ltd. 1994, 101838, p. 16). Building 46-58 contains office space, a laboratory, and an equipment room, and historically housed a machine shop (LANL 1993, 020952, p. 5-14). The fume hood sink was removed and the drainline plugged in 1994; the drainline from the hand-washing sink was repiped to the sanitary sewer system in 1995 (LANL 1998, 101808, p. 82).

7.16.1 SWMUs 46-004(d), Dry Well

7.16.1.1 Site Description and Operational History

SWMU 46-004(d) (structure 46-69) is an inactive dry well located within 3 ft west of the SWMU 46-004(e) dry well (structure 46-70) at TA-46 (Figure 7.7-1). Engineering drawings show SWMU 46-004(d) has an inlet pipe to receive overflow from the SWMU 46-004(e) dry well but has no outlet pipe and was not connected to building 46-58 (LANL 1993, 020952, p. 5-14).

7.16.1.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(d) received overflow from the SWMU 46-004(e) dry well. SWMU 46-004(q) is an outfall located directly north of SWMU 46-004(d); the source of discharges to this outfall is not known (LANL 1993, 020952, p. 5-124–5-125).

7.16.1.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-004(d).

7.16.1.4 Site Contamination

Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(d):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four subsurface samples were collected from one location in the center of the dry well from the base of the well (8.0–9.0 ft bgs), 5.0 ft below the base (13.0–14.0 ft bgs), 10.0 ft below the base (18.0–19.0 ft bgs), and 15.0 ft below the base of the dry well (23.0–24.0 ft bgs).
- Six samples were collected from three locations on the slope below the dry well from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(d) are shown in Figure 7.7-1. Table 7.16-1 presents the samples collected and analyses requested for SWMU 46-004(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 46-004(d), a maximum concentration of 210 ppm was detected at a depth of 8.0–9.0 ft bgs. A sample from this depth (46-10-13214) 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. No changes to sampling or other activities occurred because of the field-screening results.

Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(d) consist of results from 10 samples (7 soil and 3 tuff) collected from four locations.

Inorganic Chemicals

Ten samples (seven soil and three tuff) were analyzed for TAL metals, nitrate, and cyanide. Table 7.16-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 13 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten samples (seven soil and three tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.16-3 presents the detected organic chemicals. Plate 14 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten samples (seven soil and three tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.16-4 presents the radionuclides detected or detected above BVs/FVs. Plate 15 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 4.21 mg/kg at location 46-611557 from 8.0–9.0 ft bgs. Antimony also had DLs (1.02 to 1.34 mg/kg) above the soil and tuff BVs in nine samples. Antimony concentrations decreased with depth at location 46-611557 and decreased downgradient. The lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.488 to 0.67 mg/kg) above the BV in six samples at four locations. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in two samples at two locations and above the tuff BV (7.14 mg/kg) in three samples from one location. The maximum concentration of 53.4 mg/kg was detected at location 46-611557 from 8.0–9.0 ft bgs. Chromium concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at two locations and above the tuff BV (4.66 mg/kg) in three samples at one location. The maximum concentration of 540 mg/kg was detected at location 46-611557 from 8.0–9.0 ft bgs. Copper concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at one location and above the tuff BV (11.2 mg/kg) in three samples at one location. The maximum concentration of 488 mg/kg was detected at location 46-611557 from 8.0–9.0 ft bgs. Lead concentrations decreased with depth at location 46-611557, were below the maximum soil background concentration (28 mg/kg) at location 46-611560 (Figure H-19), and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in five samples at four locations. The maximum concentration of 7.78 mg/kg was detected at location 46-611558 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nitrate was detected in four soil samples at three locations and one tuff sample. The maximum concentration of 1.35 mg/kg was detected at location 46-611557 from 13.0–14.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.03 to 1.05 mg/kg) above the BV in three samples from one location. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in one sample at a concentration of 3.14 mg/kg at location 46-611557 from 8.0–9.0 ft bgs. Silver concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of silver are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 58.7 mg/kg at location 46-611558 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in two samples at two locations. The maximum concentration of 1.35 mg/kg was detected at location 46-611559 from 1.0–2.0 ft bgs. Acenaphthene concentrations decreased with depth at location 46-611557, increased at depth at location 46-611559, and decreased downgradient. The lateral extent of acenaphthene is defined, but the vertical extent is not defined.

Aroclor-1242 was detected in two samples at two locations. The maximum concentration of 0.0542 mg/kg was detected at location 46-611559 from 1.0–2.0 ft bgs. Aroclor-1242 concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 and Aroclor-1260 were detected in five samples at four locations. The maximum concentrations were detected at location 46-611557 from 8.0–9.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Anthracene, benzo(a)anthracene, benzo(b)fluoranthene, chrysene, fluoranthene, and pyrene were detected in two samples at two locations. The concentrations decreased with depth at both locations and decreased at downgradient locations. The lateral and vertical extent of these organic chemicals are defined.

Benzo(a)pyrene was detected in one sample at a concentration of 0.0262 mg/kg at location 46-611558 from 0.0–1.0 ft bgs. Benzo(a)pyrene concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene are defined.

Methylene chloride and trichloroethene were detected in three samples and one sample at two locations and one location, respectively, from 0.0–1.0 ft bgs. Methylene chloride and trichloroethene concentrations decreased with depth and were below the EQLs. The lateral and vertical extent of methylene chloride and trichloroethene are defined.

Benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in one sample at location 46-611557. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of benzo(g,h,i)perylene, fluorene, indeno(1,2,3-cd)pyrene, and phenanthrene are defined.

Radionuclides

Uranium-234 was detected above the soil BV (2.59 pCi/g) in three samples at two locations. The maximum activity of 3.96 pCi/g was detected at location 46-611557 from 8.0–9.0 ft bgs. Uranium-234 activities decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in one sample at an activity of 0.264 pCi/g at location 46-611557 from 8.0–9.0 ft bgs. Uranium-235/236 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Summary of Nature and Extent

The vertical extent of acenaphthene is not defined at SWMU 46-004(d). The extent of inorganic chemicals and radionuclides is defined at SWMU 46-004(d).

7.16.1.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(d) because extent is not defined for the site.

7.16.1.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(d) because extent is not defined for the site.

7.16.2 SWMUs 46-004(e), Dry Well

7.16.2.1 Site Description and Operational History

SWMU 46-004(e) (structure 46-70) is a dry well located next to SWMU 46-004(d) and connected to building 46-58 by an inlet drainline (Figure 7.7-1). This dry well is of the same construction and has the same operational history as SWMU 46-004(d) (section 7.16.1).

7.16.2.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(e) discharged overflow to the SWMU 46-004(d) dry well. SWMU 4-004(q) is an outfall located directly north of SWMU 46-004(e); the source of discharges to this outfall is not known.

7.16.2.3 Summary of Previous Investigations

During a 1989 environmental study, two samples were collected from the sludge at the bottom of the SWMU 46-004(e) dry well and analyzed for inorganic chemicals, VOCs, SVOCs, PCBs, and radionuclides. Data for the 1989 sampling event are not presented in this report but are summarized in the Operable Unit (OU) 1140 work plan (LANL 1993, 020952, pp. 5-17–5-18).

7.16.2.4 Site Contamination

Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(e):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four subsurface samples were collected from one location in the center of the dry well from the base of the well (7.5–8.5 ft bgs), 5.0 ft below the base (12.5–13.5 ft bgs), 10.0 ft below the base (17.5–18.5 ft bgs), and 15.0 ft below the base of the dry well (22.5–23.5 ft bgs).
- Two samples were collected from the location closest point to where the inlet drainline exits building 46-58 from 0.0–1.0 ft bgs and 3.0–4.0 ft bgs.
- Six samples were collected from three locations on the slope below the dry well [same locations sampled for SWMU 46-004(d)] from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(e) are shown in Figure 7.7-1. Table 7.16-5 presents the samples collected and analyses requested for SWMU 46-004(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 46-004(e), a maximum concentration of 707 ppm was detected at a depth of 7.5–8.5 ft bgs. A sample from this depth (46-10-13222) 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. No changes to sampling or other activities occurred because of the field-screening results.

Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data collected at SWMU 46-004(e) consist of results from 12 samples (8 soil and 4 tuff) collected from five locations.

Nature and Extent of Contamination

Inorganic Chemicals

Twelve samples (eight soil and four tuff) were analyzed for TAL metals, nitrate, and cyanide. Table 7.16-6 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 13 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (eight soil and four tuff) were analyzed for VOCs, SVOCs, and PCBs. Table 7.16-7 presents the detected organic chemicals. Plate 14 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (eight soil and four tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.16-8 presents the radionuclides detected or detected above BVs/FVs. Plate 15 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 14 mg/kg at location 46-611561 from 7.5–8.5 ft bgs. Antimony also had DLs (1.01 to 1.34 mg/kg) above the soil and tuff BVs in 11 samples. Antimony concentrations decreased with depth at location 46-611561 and decreased downgradient. The lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 2.4 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Cadmium also had DLs (0.505 to 0.67 mg/kg) above the soil BV in five samples. Chromium concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in two samples at two locations and above the tuff BV (7.14 mg/kg) in one sample. The maximum concentration of 177 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. The chromium concentration decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples at three locations and above the tuff BV (4.66 mg/kg) in four samples at two locations. The maximum concentration of 1650 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was detected above the soil BV (0.5 mg/kg) in one sample at a concentration of 0.826 mg/kg at location 46-611561 from 7.5–8.5 ft bgs. Cyanide concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in four samples at three locations. The maximum concentration of 432 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Lead concentrations decreased with depth at locations 46-611561 and 46-611562, were below the maximum soil background concentration (28 mg/kg) at location 46-611560 (Figure H-20), and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in six samples at five locations and above the tuff BV (0.1 mg/kg) in one sample. The maximum concentration of 39.6 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nickel was detected above the soil BV (15.4 mg/kg) in one sample at a concentration of 17.4 mg/kg at location 46-611562 from 0.0–1.0 ft bgs. Nickel concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of nickel are defined.

Nitrate was detected in five soil samples and two tuff samples at four locations. The maximum concentration of 494 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Nitrate concentrations decreased with depth at location 46-611561 and decreased downgradient. Nitrate concentrations at the other locations likely reflect naturally occurring concentrations. The lateral and vertical extent of nitrate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs in (1.05 to 1.08 mg/kg) above the BV in four samples at two locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in one sample. The maximum concentration of 69.5 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Silver concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of silver are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples at three locations. The maximum concentration of 295 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in one sample at a concentration of 1.35 mg/kg at location 46-611559 from 1.0–2.0 ft bgs. Acenaphthene concentrations increased at depth at this location but decreased downgradient. The lateral extent of acenaphthene is defined but the vertical extent is not defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, and pyrene were detected in one or two samples. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Chloroaniline(4-), 2-methylnaphthalene, tetrachloroethene, and toluene were detected in one sample at location 46-611561 from 7.5–8.5 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 4-chloroaniline, 2-methylnaphthalene, tetrachloroethene, and toluene are defined.

Bis(2-ethylhexyl)phthalate was detected in two samples at two locations. The maximum concentration of 0.429 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Bis(2-ethylhexyl)phthalate concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Aroclor-1242 was detected in two samples at two locations. The maximum concentration of 0.0542 mg/kg was detected at location 46-611559 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with

depth at both locations and decreased downgradient. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 and Aroclor-1260 were detected in five samples at five locations. The maximum concentrations were detected at location 46-611561 from 7.5–8.5 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Chrysene was detected in three samples at three locations. The maximum concentration of 1.4 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Chrysene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of chrysene are defined.

Methylene chloride was detected in four samples at three locations. The maximum concentration of 0.00362 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Methylene chloride concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Trichloroethene detected in two samples at two locations. The maximum concentration of 0.00114 mg/kg was detected at location 46-611561 from 7.5–8.5 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Plutonium-239/240 was detected in one soil sample at an activity of 0.0722 pCi/g at location 46-611561 from 7.5–8.5 ft bgs. Plutonium-239/240 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of plutonium-230/240 are defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in three samples at two locations. The maximum activity of 22.3 pCi/g was detected at location 46-611561 from 7.5–8.5 ft bgs. Uranium-234 activities decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in one sample and above the tuff BV (0.09 pCi/g) in one sample. The maximum activity of 1.33 pCi/g was detected at location 46-611561 from 7.5–8.5 ft bgs and decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Summary of Nature and Extent

The vertical extent of acenaphthene is not defined at SWMU 46-004(e) [the same location as described for SWMU 46-004(d)]. The extent of inorganic chemicals and radionuclides is defined at SWMU 46-004(e).

7.16.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(e) because extent is not defined for the site.

7.16.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(e) because extent is not defined for the site.

7.17 Consolidated Unit 46-004(d2)-99

7.17.1 Consolidated Unit 46-004(d2)-99

Consolidated Unit 46-004(d2)-99 consists of SWMUs 46-004(d2), 46-004(g), and 46-004(h) and AOCs C-46-002 and C-46-003 at TA-46 (Figure 7.17-1). SWMU 46-004(d2) and AOCs C-46-002 and C-46-003 are areas of potential soil contamination from exhaust emissions from stacks on buildings 46-24, 46-31, and 46-30, respectively. SWMUs 46-004(g) and 46-004(h) include an exhaust-emissions component and an outfall component and are associated with buildings 46-1 and 46-16, respectively.

7.17.1.1 Summary of Previous Investigations for Stack Emissions at Consolidated Unit 46-004(d2)-99

During the 1994 Phase I RFI, 17 samples were collected from 13 locations at SWMUs 46-004(d2), 46-004(g), and 46-004(h) and AOCs C-46-002 and C-46-003. Sampling locations were selected based upon the historical prevailing wind direction and the locations of building stacks. All samples were submitted for analyses of TAL metals, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Four of the samples were also analyzed for VOCs and SVOCs (LANL 1996, 054929, p. 216). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper was detected above BV in one soil sample; zinc was detected above BV in two soil samples; mercury was detected above BV in three soil samples. The DLs for antimony, cadmium, selenium, silver, and thallium were above BVs in one to four samples. VOCs and SVOCs were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.17.1.2 Site Contamination

Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at Consolidated Unit 46-004(d2)-99:

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Forty samples were collected from 20 locations to define the nature and extent of contamination on the mesa top proximal to stack locations from unpaved areas and undisturbed areas from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, SVOCs, PCBs, cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at Consolidated Unit 46-004(d2)-99 are shown in Figure 7.17-1. Table 7.17-1 presents the samples collected and analyses requested for Consolidated Unit 46-004(d2)-99. 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 Consolidated Unit 46-004(d2)-99, a maximum concentration of 24.3 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-12953) 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. No changes to sampling or other activities occurred because of the field-screening results.

Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at Consolidated Unit 46-004(d2)-99 consist of results from 40 samples (33 soil and 7 tuff) collected from 20 locations.

Inorganic Chemicals

Forty samples (33 soil and 7 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.17-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 25 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Forty samples (33 soil and 7 tuff) were analyzed for SVOCs and PCBs. Table 7.17-3 presents the detected organic chemicals. Plate 26 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Forty samples (33 soil and 7 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.17-4 presents the radionuclides detected or detected above BVs/FVs. Plate 27 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

Nature and Extent of Contamination

The determination of lateral extent for the stack emissions within the boundaries of TA-46 is not feasible because of the diffuse nature of the releases and the numerous other SWMUs and AOCs present on the mesa top.

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.01 to 11.3 mg/kg) above the soil BV (0.83 mg/kg) in 33 samples and had DLs (1.05 to 1.21 mg/kg) above the tuff BV (0.5 mg/kg) in 7 samples. Because antimony was not detected above BV, the vertical extent of antimony is defined.

Barium was detected above the soil BV (295 mg/kg) in one sample at a concentration of 340 mg/kg at location 46-611492 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-21 and Table H-7). The vertical extent of barium is defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.716 mg/kg at location 46-611485 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.503 to 0.608 mg/kg) above the soil BV in 20 samples. Cadmium concentrations decreased with depth at location 46-611485. The vertical extent of cadmium is defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 7320 mg/kg at location 46-611496 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-21 and Table H-7). The vertical extent of calcium is 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 two samples at three locations. The maximum concentration of 61.6 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Chromium concentrations decreased with depth at location 46-611495 and increased with depth at locations 46-611484 and 46-611488. The vertical extent of chromium is not defined.

Cobalt was detected above the soil BV (8.64 mg/kg) in two samples at one location. The maximum surface concentration of 8.99 mg/kg was detected at location 46-611498 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-22 and Table H-7). The vertical extent of cobalt is defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples and above the tuff BV (4.66 mg/kg) in one sample at two locations. The maximum concentration of 73.1 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at both locations. The vertical extent of copper is defined.

Lead was detected above the soil BV (22.3 mg/kg) in four samples and above the tuff BV (11.2 mg/kg) in one sample at three locations. The maximum concentration of 235 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at all locations. The vertical extent of lead is defined.

Mercury was detected above the soil BV (0.1 mg/kg) in five samples and above the tuff BV (0.1 mg/kg) in one sample at three locations. The maximum concentration of 1.43 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at all locations. The vertical extent of mercury is defined.

Perchlorate was detected in five soil samples at four locations. The maximum concentration of 0.00661 mg/kg) was detected at location 46-611492 from 0.0–1.0 ft bgs. Perchlorate concentrations increased with depth at locations 46-611499 and decreased with depth at the other locations. The vertical extent of perchlorate is not defined.

Potassium was detected above the soil BV (3460 mg/kg) in one sample at a concentration of 3480 mg/kg at location 46-611498 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-22 and Table H-7). The vertical extent of potassium is defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in one sample at a concentration of 0.641 mg/kg at location 46-611489 from 1.0–2.0 ft bgs. Selenium also had DLs above the tuff BV in six samples. Selenium concentrations increased with depth at location 46-611489. The vertical extent of selenium is not defined.

Sodium was detected above BV (915 mg/kg) in two soil samples at location. The maximum concentration of 1220 mg/kg was detected at location 46-611498 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-23 and Table H-7). The vertical extent of sodium is defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples at two locations. The maximum concentration of 120 mg/kg was detected at location 46-611485 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at both locations. The vertical extent of zinc is defined.

Organic Chemicals

Acenaphthene and fluorene were detected in six samples at five locations. The maximum concentrations were detected at location 46-611495 from 0.0–1.0 ft bgs. Acenaphthene and fluorene concentrations decreased with depth at all locations. The vertical extent of acenaphthene and fluorene is defined.

Anthracene and indeno(1,2,3-cd)pyrene were detected in 9 and 12 samples, respectively, at seven locations. The maximum concentrations were detected at location 46-611495 from 0.0–1.0 ft bgs. Anthracene and indeno(1,2,3-cd)pyrene concentrations decreased with depth at all locations, except at location 46-611491 where the concentrations were below the EQLs. The vertical extent of anthracene and indeno(1,2,3-cd)pyrene is defined.

Benzo(a)anthracene and phenanthrene were detected at 16 and 18 samples, respectively, at 12 locations. The maximum concentrations were detected at location 46-611495 from 0.0–1.0 ft bgs. Benzo(a)anthracene and phenanthrene concentrations decreased with depth at all locations, except at location 46-611491 for both organic chemicals and location 46-611497 for benzo(a)anthracene. Benzo(a)anthracene concentrations were below the EQL. The vertical extent of benzo(a)anthracene is defined, but the extent of phenanthrene is not defined.

Aroclor-1242 was detected in one soil sample at a concentration of 0.19 mg/kg at location 46-611489 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with depth at this location. The vertical extent of Aroclor-1242 is defined.

Aroclor-1254 was detected in eight samples at six locations. The maximum concentration of 0.352 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations. The vertical extent of Aroclor-1254 is defined.

Aroclor-1260 was detected in 11 samples at eight locations. The maximum concentration of 0.17 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations. The vertical extent of Aroclor-1260 is defined.

Benzo(a)pyrene was detected in 14 samples at nine locations. The maximum concentration of 1.41 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Benzo(a)pyrene concentrations decreased with depth at all locations, except at locations 46-611491 and 46-611497 where the concentrations were below the EQL. The vertical extent of benzo(a)pyrene is defined.

Benzo(b)fluoranthene was detected in 20 samples at 13 locations. The maximum concentration of 2.38 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth at all locations, except at locations 46-611491, 46-611497, and 46-611499 where the concentrations were below the EQL. The vertical extent of benzo(b)fluoranthene is defined.

Benzo(g,h,i)perylene and chrysene were detected in 15 and 14 samples, respectively, at 10 locations. The maximum concentrations were detected at location 46-611495 from 0.0–1.0 ft bgs. Benzo(g,h,i)perylene and chrysene concentrations decreased with depth at all locations, except at locations 46-611491 and 46-611497 where the concentrations were below the EQLs. The vertical extent of benzo(g,h,i)perylene and chrysene is defined.

Benzo(k)fluoranthene was detected in two samples at two locations. The maximum concentration of 0.0229 mg/kg was detected at location 46-611485 from 1.0–2.0 ft bgs. Benzo(k)fluoranthene concentrations decreased with depth at location 46-61490 and were below the EQL at location 46-611485. The vertical extent of benzo(k)fluoranthene is defined.

Bis(2-ethylhexyl)phthalate and dibenz(a,h)anthracene were detected in one and three samples, respectively, at concentrations below the EQLs. The concentrations also decreased with depth. The vertical extent of bis(2-ethylhexyl)phthalate and dibenz(a,h)anthracene is defined.

Fluoranthene was detected in 21 samples at 14 locations. The maximum concentration of 4.02 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations, except at locations 46-611491, 46-611493, and 46-611497, and were below the EQL at locations 46-611493 and 46-611497. The vertical extent of fluoranthene is not defined.

Methylnaphthalene(2-) was detected in three samples at three locations. The maximum concentration of 0.118 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Methylnaphthalene(2-) concentrations decreased with depth at all locations. The vertical extent of 2-methylnaphthalene is defined.

Naphthalene was detected in five samples at four locations. The maximum concentration of 0.358 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Naphthalene concentrations decreased with depth at all locations. The vertical extent of naphthalene is defined.

Pyrene was detected in 22 samples at 15 locations. The maximum concentration of 3.21 mg/kg was detected at location 46-611495 from 0.0–1.0 ft bgs. Pyrene concentrations decreased with depth at all locations, except at locations 46-611491, 46-611493, and 46-611497, and were below the EQL at locations 46-611493 and 46-611497. The vertical extent of pyrene is not defined

Radionuclides

Plutonium-238 was detected above the soil FV (0.023 pCi/g) in one sample at an activity of 0.032 pCi/g. Plutonium-238 activities decreased with depth. The vertical extent of plutonium-238 is defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 2.64 pCi/g at location 46-611486 from 1.0–2.0 ft bgs. Uranium-234 activities increased with depth at this location. The vertical extent of uranium-234 is not defined.

Summary of Nature and Extent

The vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234 is not defined at Consolidated Unit 46-004(d2)-99.

7.17.1.3 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for Consolidated Unit 46-004(d2)-99 because extent is not defined for the site.

7.17.1.4 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for Consolidated Unit 46-004(d2)-99 because extent is not defined for the site.

7.17.2 SWMU 46-004(d2), Stack Emissions

7.17.2.1 Site Description and Operational History

SWMU 46-004(d2) is an area of potential soil contamination associated with exhaust emissions from stacks on building 46-24 at TA-46 (Figure 7.17-1). Building 46-24 housed laboratories and offices. During 1960 and 1961, experiments conducted in building 46-24 used, and may have released, beryllium and beryllium oxide (LANL 1996, 054929, p. 215).

7.17.2.2 Relationship to Other SWMUs and AOCs

Potential soil contamination associated with SWMU 46-004(d2) may overlap potential soil contamination from exhaust emissions from stacks on building 46-1 [SWMU 46-004(g)], building 46-16 [SWMU 46-004(h)], building 46-30 [AOC C-46-003], and building 46-31 [AOC C-46-002]. These sites are components of Consolidated Unit 46-004(d2)-99.

7.17.2.3 Summary of Previous Investigations

Phase I RFI activities were conducted at SWMU 46-004(d2) in 1994. Data from the 1994 RFI are screening-level data and are summarized in section 7.17.1. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

7.17.2.4 Site Contamination

Stack emissions associated with SWMU 46-004(d2) were characterized as part of Consolidated Unit 46-004(d2)-99 (section 7.17.1).

7.17.2.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(d2) because extent is not defined for the site (section 7.17.1.3).

7.17.2.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(d2) because extent is not defined for the site (section 7.17.1.4).

7.17.3 SWMU 46-004(g), Stack Emissions/Outfall

7.17.3.1 Site Description and Operational History

SWMU 46-004(g) consists of an area of potential surface soil contamination associated with exhaust emissions from stacks on building 46-1 and an inactive outfall from an industrial drainline in building 46-1 at TA-46 (Figures 7.11-1 and 7.17-1). Work in building 46-1 that generated exhaust emissions involved the baking and high-temperature testing of fuel rods (LANL 1993, 020952, p. 5-184).

The outfall component of SWMU 46-004(g) consists of an inactive 12-in.-diameter VCP industrial drain that received effluent from floor drains and roof drains within the central portion of building 46-1 and discharged into Cañada del Buey north of building 46-154 (LANL 1993, 020952, pp. 5-123, 5-184) (Figure 7.11-1). Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, p. 5-7). In 1996 and 1997, the floor drains that discharged to this outfall either were removed from service or were rerouted to the SWSC plant. Roof drains from building 46-1 that discharged to this outfall were rerouted to the stormwater drain system in 1996 (LANL 1998, 101808, pp. 74–75).

7.17.3.2 Relationship to Other SWMUs and AOCs

Potential soil contamination associated with SWMU 46-004(g) may overlap potential soil contamination from exhaust emissions from stacks on building 46-16 [SWMU 46-004(h)], building 46-24 [SWMU 46-004(d2)], building 46-30 [AOC C-46-003], and building 46-31 [AOC C-46-002]. These sites are components of Consolidated Unit 46-004(d2)-99.

7.17.3.3 Summary of Previous Investigations

Data from the 1994 RFI for the stack emissions component of SWMU 46-004(g) are screening-level data and are summarized in section 7.17.1.

During the 1994 Phase I RFI conducted at the outfall component of SWMU 46-004(g), 11 samples were collected from nine locations at and downgradient of the outfall and submitted for analyses of TAL metals, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Six samples were also analyzed for VOCs (LANL 1996, 054929, pp. 32–34). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Arsenic was detected above BV in one sample, selenium was detected above BV in two samples, nickel was detected above BV in five samples, cadmium and silver were detected above BVs in six samples, chromium and lead were detected above BVs in seven samples, copper and zinc were detected above BVs in eight samples, and mercury was detected above BV in nine samples. Cesium and lithium were detected in seven and six samples, respectively. The DLs for antimony, cadmium, mercury, silver, and thallium were above BVs in one to six samples. Acenaphthene, acenaphthylene, di-n-butylphthalate, dibenzofuran, fluorene, isopropyltoluene(4-), methylnaphthalene(2-), and naphthalene were detected in one sample; anthracene and dibenz(a,h)anthracene were detected in two samples; butylbenzylphthalate was detected in three samples; benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in four samples; and benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, and fluoranthene were detected in five samples. Uranium-238 was detected above BV in four samples, uranium-235 was detected above BV

in seven samples, and uranium-234 was detected above BV in eight samples. Radionuclides analyzed by gamma spectroscopy and isotopic thorium were not detected or detected above BVs/FVs.

7.17.3.4 Site Contamination

Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(g):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Sixteen samples were collected from eight locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(g) are shown in Figure 7.11-1. Table 7.17-5 presents the samples collected and analyses requested for SWMU 46-004(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 46-004(g), a maximum concentration of 39.7 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-12651) 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. No changes to sampling or other activities occurred because of the field-screening results.

Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(g) consist of results from 16 samples (14 soil and 2 tuff) collected from eight locations.

Inorganic Chemicals

Sixteen samples (14 soil and 2 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.17-6 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Sixteen samples (14 soil and 2 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.17-7 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Sixteen samples (14 soil and 2 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.17-8 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.952 to 1.25 mg/kg) above the soil BV (0.83 mg/kg) in 14 samples and had DLs (1.02 to 1.18 mg/kg) above the tuff BV 90.5 mg/kg) in 2 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in five samples at four locations. The maximum concentration of 3.38 mg/kg was detected at location 46-611445 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.458 to 0.571 mg/kg) above the soil BV in four samples. Cadmium concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449. The concentration at location 46-611447 was below the maximum soil background concentration (2.6 mg/kg) (Figure H-24). The concentrations decreased downgradient. The lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in two samples at two locations. The maximum concentration of 22.3 mg/kg was detected at location 46-611448 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-24 and Table H-8). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in six soil samples and above the tuff BV (4.66 mg/kg) in one tuff sample at four locations. The maximum concentration of 222 mg/kg was detected at location 46-611449 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the soil BV (22.3 mg/kg) in four samples and above the tuff BV (11.2 mg/kg) in one sample at four locations. The maximum concentration of 76 mg/kg was detected at location 46-611445 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449. The concentration at location 46-611447 was below the maximum soil background concentration (28 mg/kg) (Figure H-25) and decreased downgradient. The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in seven samples and above the tuff BV (0.1 mg/kg) in one sample at four locations. The maximum concentration of 4.04 mg/kg was detected at location 46-611447 from 1.0–2.0 ft bgs. Mercury concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Nickel was detected above the soil BV (15.4 mg/kg) in two samples at two locations. The maximum concentration of 36.9 mg/kg was detected at location 46-611447 from 1.0–2.0 ft bgs. The Gehan and

quantile tests indicated site concentrations are not different from background (Figure H-25 and Table H-8). The lateral and vertical extent of nickel are defined.

Perchlorate was detected in two soil samples at two locations. Perchlorate concentrations decreased with depth at location 46-611446. The concentration at location 46-611447 was below the EQL. The concentrations decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.19 mg/kg) above BV in two samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in seven samples and above the tuff BV (1 mg/kg) in one sample at four samples. The maximum concentration of 16.8 mg/kg was detected at location 46-611446 from 0.0–1.0 ft bgs. Silver concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of silver is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in seven samples at six locations. The maximum concentration of 86.4 mg/kg was detected at location 46-611445 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at locations 46-611444, 46-611445, 46-611446, 46-611449, and 46-611451. The zinc concentration at location 46-611447 was below the maximum soil background concentration (75.5 mg/kg) (Figure H-26). The concentrations decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthylene, dibenzofuran, and di-n-butylphthalate were detected in one sample at location 46-611446 from 1.0–2.0 ft bgs. The concentrations were below the EQLs. The lateral and vertical extent of acenaphthylene, dibenzofuran, and di-n-butylphthalate are defined.

Aroclor-1254 was detected in six samples at four locations. The maximum concentration of 0.12 mg/kg was detected at location 46-611447 from 1.0–2.0 ft bgs. Aroclor-1254 concentrations decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in three samples at two locations. The maximum concentration of 0.0213 mg/kg was detected at location 46-611445 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Acenaphthene, fluorene, 2-methylnaphthalene, and naphthalene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611446 from 1.0–2.0 ft bgs. The concentrations decreased with depth at location 46-611445, increased with depth at location 46-611446, and decreased downgradient. The lateral extent of acenaphthene, fluorene, 2-methylnaphthalene, and naphthalene is defined, but the vertical extent is not defined.

Anthracene and benzo(k)fluoranthene were detected in three samples at two locations. The maximum concentrations were detected at location 46-611446 from 1.0–2.0 ft bgs. Anthracene and benzo(k)fluoranthene concentrations decreased with depth at location 46-611445, increased with depth at

location 46-611446, and decreased downgradient. The lateral extent of anthracene and benzo(k)fluoranthene is defined, but the vertical extent is not defined.

Benzo(a)anthracene was detected in six samples at four locations. The maximum concentration of 0.728 mg/kg was detected at location 46-611446 from 1.0–2.0 ft bgs. Benzo(a)anthracene concentrations decreased with depth at locations 46-611445, 46-611447, and 46-611448, increased with depth at location 46-611446, and decreased downgradient. The lateral extent of benzo(a)anthracene is defined, but the vertical extent is not defined.

Benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, and phenanthrene were detected in seven samples at four locations. The maximum concentrations were detected at location 46-611446 from 1.0–2.0 ft bgs. The concentrations decreased with depth or were below EQLs at locations 46-611444, 46-611445, and 46-611447, increased with depth at location 46-611446, and decreased downgradient. The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Benzo(b)fluoranthene was detected in 10 samples at six locations. The maximum concentration of 0.854 mg/was detected at location 46-611446 from 1.0–2.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth at locations 46-611444, 46-611445, 46-611448, and 46-611449, increased with depth at locations 46-611446 and 46-611447, and decreased downgradient. The lateral extent of benzo(b)fluoranthene is defined, but the vertical extent is not defined.

Dibenz(a,h)anthracene was detected in one sample at a concentration of 0.147 mg/kg at location 46-611445 from 1.0–2.0 ft bgs. Dibenz(a,h)anthracene concentrations increased with depth at this location and decreased downgradient. The lateral extent of dibenz(a,h)anthracene is defined, but the vertical extent is not defined.

Ethylbenzene, 4-isopropyltoluene, and 1,1,1-trichloroethane were detected in one sample each at locations 46-611446, 46-611444, and 46-611445, respectively, from 0.0–1.0 ft bgs. The concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of ethylbenzene, 4-isopropyltoluene, and 1,1,1-trichloroethane are defined.

Fluoranthene and pyrene were detected in nine samples at five locations. The maximum concentrations of these organic chemicals were detected at location 46-611446 from 1.0–2.0 ft bgs. Fluoranthene and pyrene concentrations decreased with depth at locations 46-611444, 46-611445, 46-611447, and 46-611448, increased with depth at location 46-611446, and decreased downgradient. The lateral extent of fluoranthene and pyrene is defined, but the vertical extent is not defined.

Indeno(1,2,3-cd)pyrene was detected in five samples at three locations. The maximum concentration of 0.368 mg/kg was detected at location 46-611446 from 1.0–2.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth at location 46-611445, were below the EQL at location 46-611447, increased with depth at location 46-611446, and decreased downgradient. The lateral extent of indeno(1,2,3-cd)pyrene is defined, but the vertical extent is not defined.

Methylene chloride was detected in two samples at two locations. The maximum concentration of 0.00286 mg/kg was detected at location 46-611446 from 1.0–2.0 ft bgs. Methylene chloride concentrations decreased with depth at location 46-611446 and were below the EQL at location 46-611444. The concentrations decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Toluene was detected in five samples at four locations. The maximum concentration of 0.00129 mg/kg was detected at location 46-611451 from 0.0–1.0 ft bgs. Three of the samples were detected below the

EQL. Toluene concentrations decreased with depth at locations 46-611446 and 46-611451, were below EQL at locations 46-611444 and 46-611445, and decreased downgradient. The lateral and vertical extent of toluene are defined.

Trimethylbenzene(1,2,4-), 1,2-xylene, and 1,3-xylene+1,4-xylene were detected in two to three samples at one or two locations. The concentrations were below the EQLs. The lateral and vertical extent of 1,2,4-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Cesium-137 was detected in two samples at two locations. Cesium-137 was detected below the soil FV at 0.232 pCi/g and 0.213 pCi/g, respectively, from 0.0–1.0 ft bgs at locations 46-611447 and 46-611451. Cesium-137 activities decreased with depth at these locations and decreased downgradient. The lateral and vertical extent of cesium-137 are defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in seven samples and above the tuff BV (1.98 pCi/g) in one sample at four locations. The maximum activity of 32.4 pCi/g was detected at location 46-611446 from 0.0–1.0 ft bgs. Uranium-234 activities decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of uranium-234 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in four samples and above the tuff BV (0.09 pCi/g) in one sample at four locations. The maximum activity of 1.71 pCi/g was detected at location 46-611446 from 0.0–1.0 ft bgs. Uranium-235/236 activities decreased with depth at locations 46-611445, 46-611446, and 46-611449, increased with depth at location 46-611447, and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 2.33 pCi/g at location 46-611445 from 0.0–1.0 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of copper, mercury, silver, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236 is not defined at SWMU 46-004(g).

7.17.3.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(g) because extent is not defined for the site.

7.17.3.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(g) because extent is not defined for the site.

7.17.4 SWMU 46-004(h), Stack Emissions/Outfall

7.17.4.1 Site Description and Operational History

SWMU 46-004(h) consists of an area of potential soil contamination associated with exhaust emissions from stacks on building 46-16 and inactive outfall from an industrial drainline in building 46-16 at TA-46 (Figures 7.7-1 and 7.17-1). Work in building 46-16 that generated exhaust emissions involved experiments conducted with uranium-loaded graphite and tests of uranium fuel rods as part of the Rover Program between the late 1950s and early 1970s.

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

7.17.4.2 Relationship to Other SWMUs and AOCs

Potential soil contamination associated with SWMU 46-004(h) may overlap potential soil contamination from exhaust emissions from stacks on building 46-1 [SWMU 46-004(g)], building 46-24 [SWMU 46-004(d2)], building 46-30 [AOC C-46-003], and building 46-31 [AOC C-46-002]. These sites are all components of Consolidated Unit 46-004(d2)-99. The SWMU 46-004(h) outfall discharges to the same hillside area as SWMU 46-004(q).

7.17.4.3 Summary of Previous Investigations

Data from the 1994 RFI for the stack emissions component of SWMU 46-004(h) are screening-level data and are summarized in section 7.17.1. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

During the 1994 Phase I RFI conducted at the outfall component of SWMU 46-004(h), six samples were collected from five locations at the outfall and downgradient of the outfall and drainage. All six samples were submitted for analyses of TAL metals, VOCs, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy (LANL 1996, 054929, p. 44). Four of the five samples collected were used to characterize SWMU 46-004(q) (section 7.23) (LANL 1996, 054929, pp. 44–56). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Nickel was detected above BV in the tuff sample; silver was detected above BV in one soil sample; cadmium was detected above BV in two soil samples; and copper, lead, mercury, and zinc were detected above BVs in the one tuff sample and in two soil samples. The DLs for antimony, selenium, and thallium were above BVs in the tuff sample. Bis(2-ethylhexyl)phthalate was detected in the one tuff sample and in two soil samples. Uranium-234 and uranium-235 were detected above BVs in one soil sample. Radionuclides analyzed by gamma spectroscopy and isotopic thorium were not detected or detected above BVs/FVs. VOCs were not detected.

7.17.4.4 Site Contamination

Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(h):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, SVOCs, PCBs, cyanide, perchlorate, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Analyses for VOCs and pesticides were inadvertently excluded from the sampling paperwork for this site. Four samples will be collected from the same two locations and analyzed for VOCs and pesticides during the Phase II investigation (see deviations in Appendix B).

The 2010 sampling locations at SWMU 46-004(h) are shown in Figure 7.7-1. Table 7.17-9 presents the samples collected and analyses requested for SWMU 46-004(h). 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 46-004(h), a maximum concentration of 9.5 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13966) 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. No changes to sampling or other activities occurred because of the field-screening results.

Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(h) consist of results from four soil samples collected from two locations.

Inorganic Chemicals

Four soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.17-10 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 13 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four soil samples were analyzed for SVOCs and PCBs. Table 7.17-11 presents the detected organic chemicals. Plate 14 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four soil samples were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(h).

Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV (0.83 mg/kg) but had DLs (1.05 to 1.23 mg/kg) above BV in four samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.523 to 0.617 mg/kg) above BV in four samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in four samples at two locations. The maximum concentration of 0.563 mg/kg was detected at location 46-611765 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at location 46-611765, increased with depth at location 46-611766, and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Perchlorate was detected in two soil samples at one location at concentrations (0.000661 and 0.000709 mg/kg) below the EQL. The lateral and vertical extent of perchlorate is defined.

Organic Chemicals

Aroclor-1254 was detected in one soil sample at a concentration of 0.0232 mg/kg at location 46-611766 from 1.0–2.0 ft bgs. Aroclor-1254 concentrations increased with depth at this location and decreased downgradient within the drainage from SWMU 46-004(q). The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

Summary of Nature and Extent

The vertical extent of mercury and Aroclor-1254 is not defined at SWMU 46-004(h). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(h).

7.17.4.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(h) because extent is not defined for the site.

7.17.4.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(h) because extent is not defined for the site.

7.17.5 AOC C-46-002, Stack Emissions

7.17.5.1 Site Description and Operational History

AOC C-46-002 consists of an area of potential surface soil contamination associated with a one-time release of uranium-235 from a stack on building 46-31 at TA-46 (Figure 7.17-1). The release occurred in 1960 when a tube associated with Rover Program activities ruptured in building 46-31 (LANL 1993, 020952, p. 5-186).

7.17.5.2 Relationship to Other SWMUs and AOCs

Potential soil contamination associated with AOC C-46-002 may overlap potential soil contamination from exhaust emissions from stacks on building 46-1 [SWMU 46-004(g)], building 46-16 [SWMU 46-004(h)], building 46-24 [SWMU 46-004(d2)], and building 46-30 [AOC C-46-003]. These sites are components of Consolidated Unit 46-004(d2)-99.

7.17.5.3 Summary of Previous Investigations

Data from the 1994 RFI conducted at AOC C-46-002 are screening-level data and are summarized in section 7.17.1. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

7.17.5.4 Site Contamination

Stack emissions associated with AOC C-46-002 were characterized as part of Consolidated Unit 46-004(d2)-99 (section 7.17.1).

7.17.5.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-46-002 because extent is not defined for the site (section 7.17.1.3).

7.17.5.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-46-002 because extent is not defined for the site (section 7.17.1.4).

7.17.6 AOC C-46-003, Stack Emissions

7.17.6.1 Site Description and Operational History

AOC C-46-003 is an area of potential surface soil contamination associated with a one-time release of depleted uranium hexafluoride containing uranium-237 from a stack on building 46-30 at TA-46

(Figure 7.17-1). The event occurred in March 1978 and was followed by a series of decontamination and monitoring efforts within and downwind of building 46-30. Ambient-air monitoring conducted after the release showed no detected levels of uranium-237 (LANL 1993, 020952, pp. 5-186–5-187).

7.17.6.2 Relationship to Other SWMUs and AOCs

Potential soil contamination associated with AOC C-46-003 may overlap potential soil contamination from exhaust emissions from stacks on building 46-1 [SWMU 46-004(g)], building 46-16 [SWMU 46-004(h)], building 46-24 [SWMU 46-004(d2)], and building 46-31 [AOC C-46-002]. These sites are components of Consolidated Unit 46-004(d2)-99.

7.17.6.3 Summary of Previous Investigations

Data from the 1994 RFI conducted at AOC C-46-003 are screening-level data and are summarized in section 7.17.1. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

7.17.6.4 Site Contamination

Stack emissions associated with AOC C-46-003 were characterized as part of Consolidated Unit 46-004(d2)-99 (section 7.17.1).

7.17.6.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC C-46-003 because extent is not defined for the site (section 7.17.1.3).

7.17.6.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC C-46-003 because extent is not defined for the site (section 7.17.1.4).

7.18 AOC 46-004(e2), Outfall

7.18.1 Site Description and Operational History

AOC 46-004(e2) is the outfall from roof, floor, and sink drains in building 46-42 at TA-46 (Figure 7.13-1). The outfall consists of a 4-in.-diameter pipe located approximately 50 ft northeast of building 46-42 at the head of a drainage ditch associated with SWMU 46-006(a) (section 7.34). The outfall is located approximately 3 ft below the level of the asphalt pavement. Building 46-42 was constructed as an equipment checkout facility and contains electronics and robotics laboratories (LANL 1996, 054929, pp. 128–129). In the mid-1990s, the floor and sink drains that discharged to this outfall either were removed from service or were rerouted to the sanitary sewer system. The outfall currently receives stormwater from building 46-42 roof drains only (LANL 1998, 101808, pp. 81–82).

7.18.2 Relationship to Other SWMUs and AOCs

Discharges from the AOC 46-004(e2) outfall flowed into the drainage ditch associated with SWMU 46-006(a). Stormwater runoff from the former SWMU 46-006(a) storage area discharged to the

same drainage ditch and culvert as the SWMU 46-004(c2) outfall. No other SWMUs or AOCs are associated with AOC 46-004(e2).

7.18.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC 46-004(e2), one sample was collected from the outfall and submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, and isotopic uranium and by gamma spectroscopy (LANL 1996, 054929, pp. 129–130). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium, chromium, copper, lead, and zinc were detected above BVs. The DL for silver was above BV. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, 4,4'-DDE, 4,4'-DDT, endosulfan II, endrin, fluoranthene, 4,4'-methoxychlor, phenanthrene, and pyrene were detected. Radionuclides were not detected or detected above BVs/FVs. PCBs were not detected.

7.18.4 Site Contamination

7.18.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at AOC 46-004(e2):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Six samples were collected from three locations in the drainage below the outfall from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at AOC 46-004(e2) are shown in Figure 7.13-1. Table 7.18-1 presents the samples collected and analyses requested for AOC 46-004(e2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.18.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 46-004(e2), a maximum concentration of 15.7 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-10831) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.18.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC 46-004(e2) consist of results from six samples (three soil and three tuff) collected from three locations.

Inorganic Chemicals

Six samples (three soil and three tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.18-2 presents the inorganic chemicals detected above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Six samples (three soil and three tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.18-3 presents detected organic chemicals. Plate 23 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Six samples (three soil and three tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. No radionuclides were detected or detected above BVs/FVs at AOC 46-004(e2).

7.18.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.911 to 1.8 mg/kg) above the soil BV (0.83 mg/kg) in two samples and had DLs (0.565 to 1.13 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.521 to 0.614 mg/kg) above BV in three samples. Because cadmium was not detected at above BV, 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 one sample at location 46-611022. The maximum concentration of 20.5 mg/kg was detected from 0.0–1.0 ft bgs. Chromium concentrations decreased with depth at location 46-611022 and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples and above the tuff BV (4.66 mg/kg) in two samples at two locations. The maximum concentration of 97.3 mg/kg was detected at location 46-611022 from 2.0–3.0 ft bgs. Copper concentrations decreased with depth at location 46-611023, increased with depth at location 46-611022, and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples and above the tuff BV (11.2 mg/kg) in two samples at two locations. The maximum concentration of 103 mg/kg was detected at location 46-611022 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of lead are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.15 mg/kg) above BV in three samples at three locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples and above the tuff BV (63.5 mg/kg) in one sample at three locations. The maximum concentration of 94.8 mg/kg was detected at location 46-611022 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, benzo(a)anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene were detected in four samples at two locations. The maximum concentrations were detected at location 46-611022 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Acetone was detected in one soil sample and one tuff sample at location 46-611022. The maximum concentration of 0.0818 mg/kg was detected from 0.0–1.0 ft bgs. Acetone concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acetone are defined.

Anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected in five samples at three locations. The maximum concentrations of these organic chemicals were detected at location 46-611022 from 0.0–1.0 ft bgs. The concentrations decreased with depth at locations 46-611022 and 46-611023, were below EQLs at location 46-611024, and decreased downgradient. The lateral and vertical extent of anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene are defined.

Aroclor-1254 and Aroclor-1260 were detected in five samples at three locations. The maximum concentrations were detected at location 46-611022 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Dibenz(a,h)anthracene was detected in two samples at two locations. The maximum concentration of 0.211 mg/kg was detected at location 46-611022 from 0.0–1.0 ft bgs. Dibenz(a,h)anthracene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Dibenzofuran, ethylbenzene, 4-isopropyltoluene, methylene chloride, toluene, and 1,3,5-trimethylbenzene were detected in one sample at location 46-611022 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Fluoranthene, phenanthrene, and pyrene were detected in six samples at three locations. The maximum concentrations were detected at location 46-611022 from 0.0–1.0 ft bgs. The concentrations decreased with depth at locations 46-611022 and 46-611023, increased with depth at location 46-611024, and decreased downgradient. The lateral extent of fluoranthene, phenanthrene, and pyrene is defined, but the vertical extent is not defined.

Methylnaphthalene(2-) was detected in two samples at two locations. The maximum concentration of 0.136 mg/kg was detected at location 46-611022 from 0.0–1.0 ft bgs. Methylnaphthalene(2-)

concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 2-methylnaphthalene are defined.

Methylphenol(2-) and 4-methylphenol were detected in one sample each at locations 46-611024 from 0.0–1.0 ft bgs. Methylphenol(2-) and 4-methylphenol concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 2-methyphenol and 4-methylphenol are defined.

Naphthalene was detected in three samples at two locations. The maximum concentration of 0.451 mg/kg was detected at location 46-611022 from 0.0–1.0 ft bgs. Naphthalene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of naphthalene are defined.

Trichloroethane(1,1,1-) was detected in one sample at location 46-611022 from 2.0–3.0 ft bgs at a concentration below the EQL. The lateral and vertical extent of 1,1,1-trichloroethane are defined.

Xylene(1,2-) and 1,3-xylene+1,4-xylene were detected in two samples at location 46-611022. The concentrations decreased with depth at this location, were below EQLs, and decreased downgradient. The lateral and vertical extent of 1,2-xylene and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

Summary of Nature and Extent

The vertical extent of copper, fluoranthene, phenanthrene, and pyrene is not defined at AOC 46-004(e2). Radionuclides were not detected or detected above BVs/FVs at AOC 46-004(e2).

7.18.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 46-004(e2) because extent is not defined for the site.

7.18.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 46-004(e2) because extent is not defined for the site.

7.19 SWMU 46-004(f), Outfall

7.19.1 Site Description and Operational History

SWMU 46-004(f) is an inactive outfall from an industrial drainline that served rooms 101 through 134 of building 46-24 at TA-46 (Figure 7.5-1). The outfall consists of a 6-in.-diameter VCP that received discharges from a sump, acid sink, several floor and sink drains, and cooling water system (LANL 1993, 020952, p. 5-123). The outfall pipe discharged to a drain approximately 50 ft east of building 46-24. This drain is part of a network of drains that discharge to SWSC Canyon at former NPDES-permitted outfall 04A018 (LANL 1993, 020952, pp. 5-122–5-123). Building 46-24 housed offices, a machine shop, electrical laboratories, and chemical laboratories where fuel rods were handled (LANL 1993, 020952,

p. 5-10). Before the outfall was removed from the NPDES permit, all discharges to the outfall from building 46-24 ceased (LANL 1999, 064617, p. 2-8).

7.19.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(f) discharged to the same hillside as SWMUs 46-004(t). No other SWMUs or AOCs are associated with SWMU 46-004(f).

7.19.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(f), one sample was collected from the outfall and submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper, lead, mercury, and zinc were detected above BVs. The DL for thallium was above the BV. SVOCs, PCBs, pesticides, and radionuclides were not detected or detected above BVs/FVs.

7.19.4 Site Contamination

7.19.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(f):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from four locations: two locations at the outfall and two locations below the drain network discharge point in the drainage to SWSC Canyon from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(f) are shown in Figure 7.5-1. Table 7.19-1 presents the samples collected and analyses requested for SWMU 46-004(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.19.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-004(f) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.19.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(f) consist of results from eight samples (six soil and two tuff) collected from four locations.

Inorganic Chemicals

Eight samples (six soil and two tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.19-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eight samples (six soil and two tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.19-3 presents detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight samples (six soil and two tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(f).

7.19.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.989 to 1.2 mg/kg) above the soil BV (0.83 mg/kg) in six samples and DLs (1.11 to 1.2 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.486 mg/kg at location 46-611275 from 0.0–1.0 ft bgs. Cadmium also had DLs above the soil BV in five samples. Cadmium concentrations decreased with depth at location 46-611275 and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at one location. The maximum concentration of 43.4 mg/kg was detected at location 46-611273 from 2.0–3.0 ft bgs. Lead concentrations were above the maximum soil background concentration (28 mg/kg) (Figure H-27) and did not change with depth at location 46-611273. The concentrations decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.12 to 1.19 mg/kg) above the BV in two samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Sodium was detected above the soil BV (915 mg/kg) in one sample at a concentration of 1990 mg/kg at location 46-611275 from 0.0–1.0 ft bgs. Sodium concentrations decreased with depth at this location and

decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of sodium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 82.5 mg/kg at location 46-611275 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene were detected in one sample at location 46-611275 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of acenaphthene, anthracene, benzo(g,h,i)perylene, benzo(k)fluoranthene, fluorene, and indeno(1,2,3-cd)pyrene are defined.

Bis(2-ethylhexyl)phthalate was detected in one sample at location 46-611272 from 2.0–3.0 ft bgs at a concentration below the EQL. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Aroclor-1254 was detected in three samples at two locations. The maximum concentration of 0.0563 mg/kg was detected at location 46-611272 from 2.0–3.0 ft bgs. Aroclor-1254 concentrations decreased with depth at location 46-611275, increased with depth at location 46-611272, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in four samples at three locations. The maximum concentration of 0.0482 mg/kg was detected at location 46-611272 from 2.0–3.0 ft bgs. Aroclor-1260 concentrations decreased with depth at location 46-611275, were below the EQL at location 46-611273, increased with depth at location 46-611272, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611275 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, and chrysene are defined.

Fluoranthene was detected in three samples at three locations. The maximum concentration of 0.234 mg/kg was detected at location 46-611275 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of fluoranthene are defined.

Methylene chloride and toluene were detected in one or two samples at one location. Methylene chloride and toluene concentrations decreased with depth, were below the EQLs, and decreased downgradient. The lateral and vertical extent of methylene chloride and toluene are defined.

Phenanthrene was detected in three samples at three locations. The maximum concentration of 0.162 mg/kg was detected at location 46-611274 from 0.0–1.0 ft bgs. Phenanthrene concentrations decreased with depth at all locations and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of phenanthrene are defined.

Pyrene was detected in three samples at three locations. The maximum concentration of 0.139 mg/kg was detected at location 46-611274 from 0.0–1.0 ft bgs. Pyrene concentrations decreased with depth at all locations and decreased downgradient within the drainage associated with SWMU 46-004(t). The lateral and vertical extent of pyrene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(f).

Summary of Nature and Extent

The vertical extent of lead, Aroclor-1254, and Aroclor-1260 is not defined at SWMU 46-004(f). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(f).

7.19.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(f) because extent is not defined for the site.

7.19.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(f) because extent is not defined for the site.

7.20 AOC 46-004(f2), Outfall

7.20.1 Site Description and Operational History

AOC 46-004(f2) is an inactive outfall located approximately 10 ft below the TA-46 perimeter fence and 50 ft north of the northwest corner of building 46-31 (Figure 7.11-1). The outfall consists of a 4-in.-diameter cast-iron pipe that discharges onto the steep slope north of building 46-31. This outfall received effluent from a single floor drain in room 151B of building 46-31 and discharged into Cañada del Buey. Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14). The floor drain leading to this outfall was plugged before 1993.

7.20.2 Relationship to Other SWMUs and AOCs

The AOC 46-004(f2) outfall discharged to the same hillside as SWMUs 46-004(y) and 46-004(z). No other SWMUs or AOCs are associated with AOC 46-004(f2).

7.20.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at AOC 46-004(f2), three samples were collected from three locations within the drainage below the outfall. The samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic thorium, and isotopic uranium and by gamma spectroscopy (LANL 1996, 054929, pp. 135–136). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper was detected above the sediment BV in one sample, lead was detected above the soil BV in one sample above the sediment BV in one sample, and mercury and zinc were detected above soil and sediment BVs in all three samples. The DLs for selenium and silver were above BVs in two and one samples, respectively. Acenaphthene and Aroclor-1260 were detected in one sample, and dieldrin was detected in two samples. Radionuclides were not detected or detected above BVs/FVs.

7.20.4 Site Contamination

7.20.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at AOC 46-004(f2):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twelve samples were collected from six locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at AOC 46-004(f2) are shown in Figure 7.11-1. Table 7.20-1 presents the samples collected and analyses requested for AOC 46-004(f2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.20.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 46-004(f2), a maximum concentration of 20.8 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-12753) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.20.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC 46-004(f2) consist of results from 12 samples (9 soil and 3 tuff) collected from six locations.

Inorganic Chemicals

Twelve samples (nine soil and three tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.20-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (nine soil and three tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.20-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (nine soil and three tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.20-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.20.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.86 to 1.17 mg/kg) above the soil BV (0.83 mg/kg) in eight samples and had DLs (1.05 to 1.12 mg/kg) above the tuff BV (0.5 mg/kg) in three samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 88.4 mg/kg at location 46-611480 from 1.0–2.0 ft bgs. Barium was detected below the soil BV (295 mg/kg) at a concentration of 150 mg/kg in the soil sample from 0.0–1.0 ft bgs at this location, decreased with depth at this location, and decreased downgradient in samples collected at SWMU 46-004(q). The lateral and vertical extent of barium are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.527 to 0.584 mg/kg) above BV in three samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in one sample at one location. The maximum concentration of 18.8 mg/kg was detected at location 46-611480 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at this location and decreased downgradient in samples collected at SWMU 46-004(q). The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil BV (0.5 mg/kg) but had DLs (0.54 to 0.59 mg/kg) above BV in two samples. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample and above the tuff BV (0.1 mg/kg) in two samples at two locations. The maximum concentration of 1.57 mg/kg was detected at location 46-611476 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Perchlorate was detected in three soil samples at two locations. The maximum concentration of 0.000798 mg/kg was detected at location 46-611478 from 0.0–1.0 ft bgs. Perchlorate concentrations were

below EQL, decreased with depth, and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.08 to 1.12 mg/kg) above BV in three samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Aroclor-1254 was detected in four samples at three locations. The maximum concentration of 0.03 mg/kg was detected at location 46-611475 from 0.0–1.0 ft bgs. Aroclor-1254 was detected below the EQL at location 46-611478. The concentrations decreased with depth at the other locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in five samples at three locations. The maximum concentration of 0.035 mg/kg was detected at location 46-611475 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in one sample at location 46-611475 from 0.0–1.0 ft bgs. The concentrations decreased with depth, were below the EQLs, and decreased downgradient. The lateral and vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene are defined.

Benzoic acid was detected in one soil sample at a concentration of 0.861 mg/kg at location 46-611479 from 0.0–1.0 ft bgs. Benzoic acid concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of benzoic acid are defined.

Chrysene was detected in two samples at two locations. The maximum concentration of 0.0181 mg/kg was detected at location 46-611478 from 0.0–1.0 ft bgs. Chrysene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of chrysene are defined.

Phenanthrene was detected in two samples at two locations. The maximum concentration of 0.0909 mg/kg was detected at location 46-611479 from 0.0–1.0 ft bgs. Phenanthrene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of phenanthrene are defined.

Trichloroethene was detected in one soil sample at a concentration of 0.000409 mg/kg at location 46-611479 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Cesium-137 was detected in one soil sample at an activity of 0.128 pCi/g at location 46-611478 from 1.0–2.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Plutonium-239/240 was detected in one soil sample at an activity of 0.0221 pCi/g at location 46-611478 from 1.0–2.0 ft bgs. Plutonium-239/240 activities increased with depth at this location and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of cesium-137 and plutonium-239/240 is not defined at AOC 46-004(f2). The extent of inorganic and organic chemicals is defined at AOC 46-004(f2).

7.20.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for AOC 46-004(f2) because extent is not defined for the site.

7.20.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for AOC 46-004(f2) because extent is not defined for the site.

7.21 SWMU 46-004(m), Outfall

7.21.1 Site Description and Operational History

SWMU 46-004(m) is a former NPDES-permitted outfall (04A013) located approximately 60 ft north of building 46-30 at TA-46 (Figure 7.11-1). The outfall protrudes from a 10-ft-deep bank on the hillside north of building 46-30. The outfall discharged effluent from an industrial drainline in building 46-30 to a ditch at the foot of the bank. The ditch channeled wastewater to a storm drain culvert that discharges into Cañada del Buey (LANL 1996, 054929, pp. 48–49). Engineering drawings show this industrial drainline received effluent from the roof drains, laboratory sinks, and floor drains in building 46-30 (LANL 1993, 020952, p. 5-124). Building 46-30 was constructed as a hydraulics laboratory and contained a high-bay area with a crane, an actuator test area, and a small machine shop (LANL 1993, 020952, p. 5-7). In December 1995, the outfall was removed from the NPDES permit (LANL 1999, 064617, p. 2-8). Before the outfall was removed from the NPDES permit, all discharges to the outfall from building 46-30 ceased.

7.21.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(m) outfall discharged to the same hillside as SWMUs 46-004(g) and 46-004(z). No other SWMUs or AOCs are associated with SWMU 46-004(m).

7.21.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(m), six samples were collected from the outfall and the drainage downgradient of the storm drain culvert outfall that discharges into Cañada del Buey. All six samples were submitted for analyses of TAL metals, SVOCs, and isotopic uranium and by gamma spectroscopy. Three samples were analyzed for PCBs, pesticides, isotopic thorium, and asbestos. Two samples were analyzed for VOCs. Two samples collected from the drainage were used to characterize SWMU 46-007 (section 7.40). One sample collected from the drainage was used to characterize SWMU 46-004(g) (section 7.17.3) (ICF Kaiser Engineers 1995, 053452, Exhibit E, p. 3; LANL 1996, 054929, pp. 34, 50, 199). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Arsenic, cadmium, calcium, chromium, iron, nickel, and silver were detected above BVs in one sample; lead was detected above BV in two samples; copper was detected above BV in three samples; and

mercury and zinc were detected above BVs in four samples. Cesium and lithium were detected in three samples. The DLs for antimony, cadmium, cobalt, silver, and thallium were above BVs in one to five samples. Benzo(a)anthracene and dieldrin were detected in one sample. Benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and endosulfan II were detected in two samples. Phenanthrene was detected in three samples; and fluoranthene and pyrene were detected in four samples. VOCs, PCBs, and asbestos were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.21.4 Site Contamination

7.21.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(m):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eighteen samples were collected from nine locations at the outfall and in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- Two samples were collected from one location next to the drainline directly north of building 46-30 from 0.0–1.0 ft bgs and from beneath the drainline (5.0–6.0 ft bgs).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(m) are shown in Figure 7.11-1. Table 7.21-1 presents the samples collected and analyses requested for SWMU 46-004(m). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.21.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(m), a maximum concentration of 15.3 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-12661) 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. No changes to sampling or other activities occurred because of field-screening results.

7.21.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(m) consist of results from 20 samples (14 soil and 6 tuff) collected from 10 locations.

Inorganic Chemicals

Twenty samples (14 soil and 6 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.21-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 46-004(m); inorganic COPCs are identified below.

Antimony was detected above the tuff BV (0.5 mg/kg) in 1 sample and had DLs (0.953 to 1.26 mg/kg) above the soil BV (0.83 mg/kg) or the tuff BV in 19 samples. Antimony is identified as a COPC in soil and tuff.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.44 mg/kg. Cadmium also had DLs (0.476 to 0.608 mg/kg) above the soil BV in five samples. Because the site or background data set had more than 50% nondetects, the Gehan test could not be performed. Because the site or background data set in the top chosen quantile had nondetects, the quantile test could not be performed. The maximum detected concentration (0.44 mg/kg) and the DLs were less than the maximum soil background concentration (2.6 mg/kg) (Figure H-28). Cadmium is not identified as a COPC in soil.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in two samples, with a maximum concentration of 22.5 mg/kg. The Gehan and quantile tests indicated soil concentrations are not different from background (Figure H-28 and Table H-9). Because there were fewer than 10 tuff samples, statistical tests could not be performed. The concentrations were above the maximum tuff background concentration (6.2 mg/kg) (Figure H-29). Copper is not identified as a COPC in soil, but is identified as a COPC in tuff.

Iron was detected above the soil BV (21500 mg/kg) in one sample at a concentration of 34800 mg/kg. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-29 and Table H-9). Iron is not identified as a COPC in soil.

Manganese was detected above the tuff BV (482 mg/kg) in one sample at a concentration of 680 mg/kg. Because there were fewer than 10 tuff samples, statistical tests could not be performed. Manganese concentrations were below the maximum tuff background concentration (752 mg/kg) (Figure H-30). Manganese is not identified as a COPC in tuff.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample at a concentration of 0.199 mg/kg. Mercury is identified as a COPC in soil.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.02 to 1.24 mg/kg) above BV in six samples. Selenium is identified as a COPC in tuff.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples at three locations, with a maximum concentration of 238 mg/kg. The Gehan and quantile tests indicated site concentrations are different from background (Figure H-30 and Table H-9). Zinc is identified as a COPC in soil.

In summary, the inorganic chemicals identified as COPCs in soil are antimony, mercury, and zinc. The COPCs identified in tuff are antimony, copper, and selenium.

Organic Chemicals

Twenty samples (14 soil and 6 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.21-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 46-004(m); organic COPCs are identified below.

Organic chemicals detected in soil and/or tuff at SWMU 46-004(m) included acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, methylene chloride, naphthalene,

phenanthrene, pyrene, tetrachloroethene, toluene, 1,1,1-trichloroethane, trichloroethene, and 1,3-xylene+1,4-xylene.

These organic chemicals are retained as COPCs.

Radionuclides

Twenty samples (14 soil and 6 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.21-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. The nature and extent of contamination are defined at SWMU 46-004(m); radionuclide COPCs are identified below.

Uranium-234 was detected above the tuff BV (1.98 pCi/g) in two samples, with a maximum detected activity of 3.14 pCi/g. Uranium-234 is identified as a COPC in tuff.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in three samples, with a maximum detected activity of 0.247 pCi/g. Uranium-235/236 is identified as a COPC in tuff.

In summary, the radionuclides identified as COPCs in tuff are uranium-234 and uranium-235/236.

7.21.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the tuff BV (0.5 mg/kg) in one sample at a concentration of 0.599 mg/kg at location 46-611452 from 5.0–6.0 ft bgs. Antimony also had DLs above the soil or tuff BV in 19 samples. Antimony concentrations were slightly above BV and decreased downgradient. The lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.44 mg/kg. Cadmium also had DLs (0.476 to 0.608 mg/kg) above the soil BV in five samples. Because the site or background data set had more than 50% nondetects, the Gehan test could not be performed. Because the site or background data set in the top chosen quantile had nondetects, the quantile test could not be performed. The maximum detected concentration (0.44 mg/kg) and the DLs were less than the maximum soil background concentration (2.6 mg/kg) (Figure H-28). The lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in two samples at two locations. The maximum concentration of 22.5 mg/kg was detected at location 46-611454 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Manganese was detected above the tuff BV (482 mg/kg) in one sample at a concentration of 680 mg/kg. Because there were fewer than 10 tuff samples, statistical tests could not be performed. Manganese concentrations were below the maximum tuff background concentration (752 mg/kg) (Figure H-30). The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample at a concentration of 0.199 mg/kg at location 46-611454 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of mercury are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.02 to 1.24 mg/kg) above the BV in six samples. Because selenium was not detected above the BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in four samples at three locations. The maximum concentration of 238 mg/kg was detected at location 46-611454 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, fluorene, 2-methylnaphthalene, and naphthalene were detected in two samples at one location. The maximum concentrations were detected at location 46-611454 from 0.0–1.0 ft bgs. The concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of acenaphthene, fluorene, 2-methylnaphthalene, and naphthalene are defined.

Anthracene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611454 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of anthracene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene are defined.

Aroclor-1254 was detected in seven samples at four locations, and Aroclor-1260 was detected in two samples at two locations. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Benzo(a)anthracene was detected in four samples at three locations. The maximum concentration was detected at location 46-611454 from 0.0–1.0 ft bgs. Benzo(a)anthracene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(a)anthracene are defined.

Benzo(a)pyrene, benzo(b)fluoranthene, and chrysene were detected in five samples at four locations. The maximum concentrations were detected at location 46-611454 from 0.0–1.0 bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, and chrysene are defined.

Benzo(k)fluoranthene and dibenzofuran were detected in one sample each. Benzo(k)fluoranthene and dibenzofuran concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of benzo(k)fluoranthene and dibenzofuran are defined.

Bis(2-ethylhexyl)phthalate was detected in eight samples at six locations. The maximum concentration of 0.608 mg/kg was detected at location 46-611455 from 0.0–1.0 ft bgs. All other detections were below the EQL. Bis(2-ethylhexyl)phthalate concentrations decreased with depth at locations 46-611454, 46-611455, 46-611459, and 46-611461, were below the EQL at locations 46-611457 and 46-611458, and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Fluoranthene was detected in six samples at five locations. The maximum concentration of 2.26 mg/kg was detected at location 46-611454 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of fluoranthene are defined.

Methylene chloride was detected in two samples at one location. The maximum concentration of 0.00308 mg/kg was detected at location 46-611453 from 0.0–1.0 ft bgs. Methylene chloride concentrations decreased with depth at location 46-611453, were below EQL at location 46-611452, and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Phenanthrene and pyrene were detected in six samples at five locations. The maximum concentrations of these organic chemicals were detected at location 46-611454 from 0.0–1.0 ft bgs. Phenanthrene and pyrene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of phenanthrene and pyrene are defined.

Toluene was detected in two samples at two locations. The maximum concentration of 0.00236 mg/kg was detected at location 46-611452 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

Trichloroethane(1,1,1-), tetrachloroethene, and 1,3-xylene+1,4-xylene were detected in one soil sample at location 46-611453 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 1,1,1- trichloroethane, tetrachloroethene, and 1,3-xylene+1,4-xylene are defined.

Trichloroethene was detected in two samples at two locations. The maximum concentration of 0.00378 mg/kg was detected at location 46-611453 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Uranium-234 was detected above the tuff BV (1.98 pCi/g) in two samples at one location. The maximum activity of 3.14 pCi/g was detected at location 46-611461 from 0.0–1.0 ft bgs. Uranium-234 activities decreased with depth at this location. Uranium-234 was detected only at the most downgradient location (46-611461). This location receives runoff from SWMU 46-004(g) whose upgradient sampling locations also had elevated concentrations of uranium-234. Therefore, it appears the uranium-234 detected in these samples is related to SWMU 46-004(g) and not to SWMU 46-004(m) (Plate 21). The lateral and vertical extent of uranium-234 are defined at SWMU 46-004(m).

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in three samples at two locations. The maximum activity of 0.247 pCi/g was detected at location 46-611461 from 0.0–1.0 ft bgs. Uranium-235/236 activities decreased with depth at this location. Uranium-235/236 activity at location 46-611460 was similar to the BV. Uranium-235/236 was detected only at the two most downgradient locations (46-611460 and 46-611461). These locations receive runoff from SWMU 46-004(g) whose upgradient sampling locations also had elevated concentrations of uranium-235/236. Therefore, it appears the uranium-235/236 detected in these samples is related to SWMU 46-004(g) and not to SWMU 46-004(m) (Plate 21). The lateral and vertical extent of uranium-235/236 are defined at SWMU 46-004(m).

Summary of Nature and Extent

The extent of inorganic, organic, and radionuclide COPCs is defined at SWMU 46-004(m).

7.21.5 Summary of Human Health Risk Screening

Details of the human health risk-screening assessment for SWMU 46-004(m) are discussed in Appendix I, section I-4.

The total excess cancer risk for the industrial scenario is 6×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.04 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The total excess cancer risk for the construction worker scenario is 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The total excess cancer risk for the residential scenario is approximately 7×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.04, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

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

7.21.6 Summary of Ecological Risk Screening

Details of the ecological risk-screening assessment 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, comparison with background concentrations, potential effects to populations (individuals for T&E species), and LOAEL analyses.

7.22 SWMU 46-004(p), Dry Well

7.22.1 Site Description and Operational History

SWMU 46-004(p) is an inactive dry well (no structure number) located next to the southwest corner of building 46-1 at TA-46 (Figure 7.13-1). The dry well consists of corrugated metal pipe, approximately 2 ft in diameter × 10 ft in length, placed vertically in the ground, with a square concrete pad around the top 3 ft of the pipe, and covered with a hinged-metal lid. The dry well was originally constructed to dispose of alkali-metal wastes but was also used to dispose of other chemical wastes from building 46-1. During the late 1950s and early 1960s, solid pieces of cesium or other alkali metals from the operation of cesium-plasma diode were discarded in the dry well; no radioactive cesium-137 was used (LANL 1993, 020952, p. 5-15). Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, p. 5-7).

7.22.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(p) is not associated with any other SWMUs or AOCs.

7.22.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-004(p).

7.22.4 Site Contamination

7.22.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(p):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from two locations next to the dry well from the base of the well (10.0–11.0 ft bgs) and 5.0 ft, 10.0 ft, and 15.0 ft below the base of the well (15.0–16.0 ft bgs, 20.0–21.0 ft bgs, and 25.0–26.0 ft bgs, respectively).
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, cyanide, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(p) are shown in Figure 7.13-1. Table 7.22-1 presents the samples collected and analyses requested for SWMU 46-004(p). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.22.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(p), a maximum concentration of 124 ppm was detected at a depth of 20.0–21.0 ft bgs. A sample from this depth (46-10-13659) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.22.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(p) consist of results from eight tuff samples collected from two locations.

Inorganic Chemicals

Eight tuff samples were analyzed for TAL metals, cesium, cyanide, and asbestos. Table 7.22-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 46-004(p); inorganic COPCs are identified below.

Asbestos was not detected in any samples collected at SWMU 46-004(p).

Antimony was not detected above the tuff BV (0.5 mg/kg) but had DLs (1.04 to 1.15 mg/kg) above BV in eight samples. Antimony is identified as a COPC in tuff.

Cesium was detected in eight tuff samples, with a maximum concentration of 0.227 mg/kg. Cesium is identified as a COPC in tuff.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.05 to 1.15 mg/kg) above BV in eight samples. Selenium is identified as a COPC in tuff.

Zinc was detected above the tuff BV (63.5 mg/kg) in one sample at a concentration of 72.7 mg/kg. Because there were fewer than 10 samples, statistical tests could not be performed. The concentration is above the maximum tuff background concentration (65.6 mg/kg) (Figure H-31). Zinc is identified as a COPC in tuff.

In summary, the inorganic chemicals identified as COPCs in tuff are antimony, cesium, selenium, and zinc.

Organic Chemicals

Eight tuff samples were analyzed for VOCs, SVOCs, and PCBs. No organic chemicals were detected at SWMU 46-004(p).

Radionuclides

Eight tuff samples were analyzed for and isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. No radionuclides were detected or detected above BVs/FVs at SWMU 46-004(p).

7.22.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the tuff BV (0.5 mg/kg) but had DLs (1.04 to 1.15 mg/kg) above BV in eight samples at two locations. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cesium was detected in eight samples at two locations. The maximum concentration of 0.227 mg/kg was detected at location 46-611627 from 25.0–26.0 ft bgs. Cesium concentrations were consistent with depth (from 10.0 to 26.0 ft bgs) and laterally. The lateral and vertical extent of cesium are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.05 to 1.15 mg/kg) above BV in eight samples at two locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the tuff BV (63.5 mg/kg) in one sample at a concentration of 72.7 mg/kg at location 46-611626 from 15.0–16.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

No organic chemicals were detected at SWMU 46-004(p).

Radionuclides

No radionuclides were detected or detected above BVs/FVs at SWMU 46-004(p).

Summary of Nature and Extent

The extent of inorganic, organic, and radionuclide COPCs is defined at SWMU 46-004(p).

7.22.5 Summary of Human Health Risk Screening

All COPCs identified for SWMU 46-004(p) were reported in samples collected from depths greater than 10 ft bgs (10.0–26.9 ft bgs). Therefore, no complete pathways to receptors for any of the exposure scenarios exist, and human health risk-screening assessments were not conducted for this site.

7.22.6 Summary of Ecological Risk Screening

All COPCs identified for SWMU 46-004(p) were reported in samples collected from depths greater than 10 ft bgs (10.0–26.9 ft bgs). Therefore, no complete pathways to any ecological receptor exist, and an ecological risk screening assessment was not conducted for this site.

7.23 SWMU 46-004(q), Outfall

7.23.1 Site Description and Operational History

SWMU 46-004(q) is an inactive outfall located approximately 40 ft north of building 46-58 at TA-46 (Figure 7.7-1). The outfall consists of a 6-in.-diameter cast-iron pipe that discharged into Cañada del Buey. The source of the discharge to the outfall is not known (LANL 1993, 020952, pp. 5-124–5-125).

7.23.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(q) outfall discharged to the same hillside as SWMU 46-004(h). SWMU 46-004(q) is not associated with any other SWMUs or AOCs.

7.23.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(q), one sample was collected from the outfall and submitted for analyses of TAL metals, VOCs, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy (LANL 1996, 054929, pp. 55–57). Four samples were also collected near SWMU 46-004(q) to characterize both SWMUs 46-004(q) and 46-004(h) (LANL 1996, 054929, pp. 44, 56). Details of sampling and the results for these four samples are discussed in section 7.17.4, SWMU 46-004(h). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Barium, cadmium, copper, lead, mercury, nickel, silver, and zinc were detected above BVs. The DL for antimony was above BV. Bis(2-ethylhexyl)phthalate was detected. Uranium-234, uranium-235, and uranium-238 were detected above BVs. Isotopic thorium was not detected above BV. Radionuclides analyzed by gamma spectroscopy and isotopic thorium were not detected or detected above BVs/FVs. VOCs were not detected.

7.23.4 Site Contamination

7.23.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(q):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twenty-six samples were collected from 13 locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(q) are shown in Figure 7.7-1. Table 7.23-1 presents the samples collected and analyses requested for SWMU 46-004(q). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.23.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(q), a maximum concentration of 10.7 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-12967) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-004(q). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.22.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(q) consist of the results from 26 samples (15 soil and 11 tuff) collected from 13 locations.

Inorganic Chemicals

Twenty-six samples (15 soil and 11 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.23-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 13 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-six samples (15 soil and 11 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.23-3 presents the detected organic chemicals. Plate 14 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-six samples (15 soil and 11 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.23-4 presents the radionuclides detected or detected above BVs/FVs. Plate 15 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.23.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.922 to 1.26 mg/kg) above the soil BV (0.83 mg/kg) in 15 samples and had DLs (0.89 to 1.07 mg/kg) above the tuff BV (0.5 mg/kg) in 11 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 62.9 mg/kg at location 46-611505 from 1.0–2.0 ft bgs). Barium concentrations increased with depth at this location and decreased downgradient. The lateral extent of barium is defined, but the vertical extent is not defined.

Beryllium was detected above the tuff BV (1.21 mg/kg) in one sample at a concentration of 1.27 mg/kg at location 46-611512 from 0.0–1.0 ft bgs. Beryllium concentrations decreased with depth at this location and were below the maximum tuff background concentration (1.8 mg/kg) downgradient (Figure H-32). The lateral and vertical extent of beryllium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 1.06 mg/kg was detected at location 46-611501 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.461 to 0.591 mg/kg) above the soil BV in six samples. Cadmium concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in four samples at three locations. The maximum concentration of 38.3 mg/kg was detected at location 46-611501 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) six samples and above the tuff BV (11.2 mg/kg) in one sample at six locations. The maximum concentration of 77.6 mg/kg was detected at location 46-611508 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at locations 46-611502, 46-611503, 46-611507, and 46-611508, were below the maximum tuff background concentration (15.5 mg/kg) at location 46-611513 (Figure H-32), increased with depth at location 46-611501, and decreased downgradient. The lateral extent of lead is defined but the vertical extent is not defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample and above the tuff BV (482 mg/kg) in two samples at two locations. The maximum concentration of 1010 mg/kg was detected at location 46-611513 from 0.0–1.0 ft bgs. Manganese concentrations decreased with depth at location 46-611513, and were below the maximum tuff background concentration (752 mg/kg) at location 46-611508 (Figure H-33). Manganese concentrations at 46-611513 were below the maximum soil background concentration (1100 mg/kg) and maximum tuff background concentration. The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in 10 samples at five locations. The maximum concentration of 824 mg/kg was detected at location 46-611501 from 1.0–2.0 ft bgs. Mercury concentrations increased with depth at this location, decreased with depth at the other locations, and decreased downgradient. The lateral extent of mercury is defined, but vertical extent is not defined.

Perchlorate was detected in five soil samples and one tuff sample at four locations. The maximum concentration of 0.00166 mg/kg was detected at location 46-611501 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at locations 46-611501, 46-611504, and 46-611506. All concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected at above the tuff BV (0.3 mg/kg) but had DLs (0.957 to 1.09 mg/kg) above the BV in 11 samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in one sample at a concentration of 2.84 mg/kg at location 46-611503 from 0.0–1.0 ft bgs. Silver concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of silver are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in eight samples and above the tuff BV (63.5 mg/kg) in one sample at seven locations. The maximum concentration of 143 mg/kg was detected at location 46-611503 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at locations 46-611501, 46-611502, 46-611503, 46-611504, 46-611508, and 46-611513. The concentration at location 46-611509 is equivalent to the maximum tuff background concentration (65.6 mg/kg) (Figure H-33). The concentrations decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Anthracene was detected in one soil sample at a concentration of 0.073 mg/kg at location 46-611501 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of anthracene are defined.

Aroclor-1254 and Aroclor-1260 were detected in seven samples at four locations. The maximum concentrations were detected at location 46-611503 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations increased with depth at location 46-611501, decreased with depth at the other locations, and decreased downgradient. The lateral extent of Aroclor-1254 and Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene, chrysene, and phenanthrene were detected in five samples at three locations. The maximum concentrations were detected at location 46-611501 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(a)anthracene, chrysene, and phenanthrene are defined.

Benzo(a)pyrene and benzo(g,h,i)perylene were detected in four samples at three locations. The maximum concentrations of 0.0799 mg/kg and 0.0397 were detected at location 46-611501 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene and benzo(g,h,i)perylene are defined.

Benzo(b)fluoranthene, fluoranthene and pyrene were detected in six samples at four locations. The maximum concentrations were detected at location 46-611501 from 0.0–1.0 ft bgs. The concentrations

decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(b)fluoranthene, fluoranthene and pyrene are defined.

Bis(2-ethylhexyl)phthalate, indeno(1,2,3-cd)pyrene, and trichloroethene were detected in one or two samples at concentrations below the EQLs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate, indeno(1,2,3-cd)pyrene, and trichloroethene are defined.

Radionuclides

Cesium-137 was detected in two soil samples at two locations. The maximum activity of 0.591 pCi/g was detected at location 46-611504 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at both location and decreased downgradient. The lateral and vertical extent of cesium-137 are defined.

Cobalt-60 was detected in one soil sample at an activity of 0.182 pCi/g at location 46-611502 from 1.0–2.0 ft bgs. Cobalt-60 activities increased with depth at this location and decreased downgradient. The lateral extent of cobalt-60 is defined, but the vertical extent is not defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in four samples at three locations. The maximum activity of 86.7 pCi/g was detected at location 46-611501 from 0.0–1.0 ft bgs. Uranium-234 activities decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in two samples at one location. The maximum activity of 4.33 pCi/g was detected at location 46-611501 from 0.0–1.0 ft bgs. Uranium-235/236 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Summary of Nature and Extent

The vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60 is not defined at SWMU 46-004(q).

7.23.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(q) because extent is not defined for the site.

7.23.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(q) because extent is not defined for the site.

7.24 SWMU 46-004(r), Outfall

7.24.1 Site Description and Operational History

SWMU 46-004(r) is a former NPDES-permitted outfall located approximately 70 ft south of building 46-24 at TA-46 (Figure 7.5-1). The outfall consists of a 4-in.-diameter cast-iron pipe that discharges to a drain south of building 46-24, near the northeast corner of a laser laboratory (building 46-76). Discharge from

this outfall flows through a drain network that discharges to SWSC Canyon at former NPDES-permitted outfall 04A018 (LANL 1993, 020952, pp. 5-122–5-123). The drain network also received effluent from SWMUs 46-004(f) and 46-004(w). The SWMU 46-004(r) outfall received effluent from building 46-24 roof drains and sink drains associated with the west wing of building 46-24. Building 46-24 housed offices, a machine shop, electrical laboratories, and chemical laboratories where fuel rods were handled (LANL 1993, 020952, p. 5-10). The outfall was removed from the NPDES permit in December 1995 (LANL 1999, 064617, p. 2-8). Currently, only roof drains from building 46-24 discharge to the SWMU 46-004(r) outfall.

7.24.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(r) outfall overlaps the location of the SWMU 46-004(w) outfall.

7.24.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(r), one sample was collected from the outfall. The sample was also used to characterize SWMU 46-004(w). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium, copper, and zinc were detected above BVs. The DLs for cadmium and silver were greater than BVs. Benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, pyrene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichloroethene were detected. Radionuclides were not detected.

7.24.4 Site Contamination

7.24.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(r):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Two samples were collected from one location at the storm grate associated with the SWMU 46-004(r) outfall from 0.0–0.25 ft bgs and 0.25–0.50 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(r) are shown in Figure 7.5-1. Table 7.24-1 presents the samples collected and analyses requested for SWMU 46-004(r). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.24.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-004(r) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.24.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(r) consist of results from two soil samples collected from one location.

Inorganic Chemicals

Two soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.24-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BV. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Two soil samples were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.24-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Two soil samples were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(r).

7.24.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at one location. The maximum concentration of 1.1 mg/kg was detected at location 46-612231 from 0.25–0.5 ft bgs. Cadmium concentrations were below the maximum soil background concentration (2.6 mg/kg) (Figure H-34). The lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at one location. The maximum concentration of 108 mg/kg was detected at location 46-612231 from 0.25–0.5 ft bgs. Copper concentrations increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral extent of copper is defined, but the vertical extent is not defined.

Cyanide was detected above the soil BV (0.5 mg/kg) in two samples at one location. The maximum concentration of 0.93 mg/kg was detected at location 46-612231 from 0.0–0.25 ft bgs. Cyanide concentrations decreased with depth and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at one location. The maximum concentration of 73.5 mg/kg was detected at location 46-612231 from 0.0–0.25 ft bgs. Lead

concentrations decreased with depth and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral and vertical extent of lead at are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in two samples at one location. The maximum concentration of 0.344 mg/kg was detected at location 46-612231 from 0.25–0.5 ft bgs. Mercury concentrations increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral extent of mercury is defined, but the vertical extent is not defined.

Silver was detected above the soil BV (1 mg/kg) in one sample at a concentration of 1.6 mg/kg at location 46-612231 from 0.25–0.5 ft bgs. Silver concentrations increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral extent of silver is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at one location. The maximum concentration of 414 mg/kg was detected at location 46-612231 from 0.0–0.25 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, butylbenzylphthalate, gamma-chlordane, chrysene, 4,4'-DDD, dibenz(a,h)anthracene, 1,1-dichloroethane, 1,1-dichloroethene, cis/trans-1,2-dichloroethene, dieldrin, di-n-octylphthalate, endosulfan sulfate, indeno(1,2,3-cd)pyrene, phenanthrene, and tetrachloroethene were detected in one or two samples at concentrations below the EQLs. Because of the small incremental depth intervals sampled, the concentrations did not change substantially with depth. The lateral and vertical extent of these organic chemicals are defined.

Benzo(g,h,i)perylene, bis(2-ethylhexyl)phthalate, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichloroethene were detected in two samples at location 46-612231. The concentrations decreased with depth and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral and vertical extent of these organic chemicals are defined.

Fluoranthene, methylene chloride, and pyrene were detected in two samples at location 46-612231. The concentrations increased slightly with depth and decreased downgradient within the drainage associated with SWMU 46-004(f). The lateral extent fluoranthene, methylene chloride, and pyrene are defined, but the vertical extent is not defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(r).

Summary of Nature and Extent

The vertical extent of copper, mercury, silver, fluoranthene, methylene chloride, and pyrene is not defined at SWMU 46-004(r). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(r).

7.24.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(r) because extent is not defined for the site.

7.24.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(r) because extent is not defined for the site.

7.25 SWMU 46-004(s), Outfall

7.25.1 Site Description and Operational History

SWMU 46-004(s) is an outfall located approximately 20 ft south of building 46-1 at TA-46 (Figure 7.13-1). The outfall consists of a 4-in.-diameter cast-iron pipe that discharged to a drainage ditch (SWMU 46-007) on the south side of building 46-1 (LANL 1993, 020952, p. 5-125). The drainage ditch leads to a storm drain culvert that discharges into Cañada del Buey. The outfall received effluent from floor and roof drains of the south high bay in building 46-1. Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, pp. 5–7). In 1995, all floor drains in the south high bay of building 46-1 either were plugged or were rerouted to the SWSC plant. Currently, roof drains from the south high bay discharge to the storm drainage system and/or daylight near building 46-1 (LANL 1998, 101808, pp. 76-77).

7.25.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(s) outfall discharges to the SWMU 46-007 drainage ditch.

7.25.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(s), three samples were collected from three locations within the outfall, from below the outfall, and from the ditch below the outfall (SWMU 46-007). All samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, and isotopic uranium. Two samples were also analyzed for VOCs (LANL 1996, 054929, pp. 62–63). Two additional samples were collected in the ditch below the outfall to characterize SWMUs 46-004(s) and 46-007 (LANL 1996, 054929, pp. 62, 199). Details of sampling and the results for these two additional samples are presented in section 7.40, SWMU 46-007. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium, nickel, and silver were detected above BVs in one sample; zinc was detected above BV in two samples; copper, lead, and mercury were detected above BVs in three samples. Cesium was detected in one sample. The DLs for thallium were above BV in three samples. Acenaphthene and dibenz(a,h)anthracene were detected in one sample. Anthracene and benzo(g,h,i)perylene were detected in two samples. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in all three samples. Isotopic uranium was not detected or was not detected above BVs. VOCs, PCBs, and pesticides were not detected.

7.25.4 Site Contamination

7.25.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(s):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(s) are shown in Figure 7.13-1. Table 7.25-1 presents the samples collected and analyses requested for SWMU 46-004(s). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.25.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-004(s) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.25.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(s) consist of results from four samples (two soil and two tuff) collected from two locations.

Inorganic Chemicals

Four samples (two soil and two tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.25-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four samples (two soil and two tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.25-3 presents the detected organic chemicals. Plate 23 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four samples (two soil and two tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. No radionuclides were detected or detected above BVs/FVs at SWMU 46-004(s).

7.25.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had a DL (1.14 mg/kg) above the soil BV (0.83 mg/kg) in one sample and a DL (1.12 mg/kg) above the tuff BV (0.5 mg/kg) in one sample. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.543 to 0.569 mg/kg) above BV in two samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 18.6 mg/kg was detected at location 46-611199 from 1.0–2.0 ft bgs. Chromium concentrations increased with depth at location 46-611199, were below the maximum tuff background concentration (13 mg/kg) at location 46-611198 (Figure H-35), and decreased downgradient within SWMU 46-007. The lateral extent of chromium is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples and above the tuff BV (4.66 mg/kg) in two samples. The maximum concentration of 484 mg/kg was detected at location 46-611198 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample and above the tuff BV (0.1 mg/kg) in one sample at one location. The maximum concentration of 1.12 mg/kg was detected at location 46-611199 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at this location and decreased downgradient within SWMU 46-007. The lateral and vertical extent of mercury are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.09 to 1.14 mg/kg) above BV in two samples at two locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

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 detected in one or two samples at location 46-611199. The concentrations increased with depth at this location and decreased downgradient within SWMU 46-007. The lateral extent is defined, but the vertical extent is not defined.

Aroclor-1254 was detected in two samples at one location. The maximum concentration of 0.0331 mg/kg was detected at location 46-611199 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at this location and decreased downgradient within SWMU 46-007. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in one sample at a concentration of 0.0331 mg/kg at location 46-611199 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at this location and decreased downgradient within SWMU 46-007. The lateral and vertical extent of Aroclor-1260 are defined.

Tetrachloroethene, toluene, and 1,3-xylene+1,4-xylene in one or two samples at one location. The maximum concentrations were detected at location 46-611198 from 0.0–1.0 ft bgs. The concentrations decreased with depth, were below the EQLs, and decreased downgradient. The lateral and vertical extent of tetrachloroethene, toluene, and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(s).

Summary of Nature and Extent

The vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at SWMU 46-004(s). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(s).

7.25.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(s) because extent is not defined for the site.

7.25.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(s) because extent is not defined for the site.

7.26 SWMU 46-004(t), Outfall

7.26.1 Site Description and Operational History

SWMU 46-004(t) is a former NPDES-permitted outfall (04A014) located approximately 60 ft southeast of building 46-76 at TA-46 (Figure 7.5-1). The outfall is a 4-in.-diameter VCP drainline that received effluent from sink drains in rooms 101 and 102 and all floor drains in room 104 and the high bay of building 46-88 (Santa Fe Engineering Ltd. 1994, 101840, Figures 11 and 12). The drainline discharged at a point approximately 250 ft northeast of building 46-88 on the west side of SWSC Road. Effluent from the outfall flowed to a storm drain culvert under the road and discharged to SWSC Canyon (LANL 1993, 020952, pp. 5-125–5-126). Building 46-88 housed a structural laboratory for testing pressure vessels associated with the Rover Program. Later, the building was used for process chemistry work to isolate nonradioactive isotopes of carbon, oxygen, and nitrogen (LANL 1993, 020952, p. 5-126). Outfall 04A014 was removed from the NPDES permit in July 1995. Before the outfall was removed from the NPDES permit, all discharges from building 46-88 ceased.

7.26.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(t) outfall is located next to the inlet drainline of the SWMU 46-003(c) septic system and discharged to the same hillside as the outfall from SWMU 46-003(f).

7.26.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-004(t).

7.26.4 Site Contamination

7.26.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(t):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Fourteen samples were collected from seven locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs (see deviations in Appendix B).
- Six samples were collected from three locations beneath the drainline where it was assumed to exit the building and at the joints. Samples were collected from at the base of the line (depth range of 2.5–5.5 ft bgs) and 5.0 ft below the base of the line. All three locations were sampled at various depths, depending on the presumed depth to the base of the line (see deviations in Appendix B).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(t) are shown in Figure 7.5-1. Table 7.26-1 presents the samples collected and analyses requested for SWMU 46-004(t). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.26.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(t), a maximum concentration of 850.4 ppm was detected at a depth of 2.5–3.5 ft bgs. A sample from this depth (46-10-11550) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-004(t). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.26.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(t) consist of results from 20 samples (14 soil and 6 tuff) collected from 10 locations.

Inorganic Chemicals

Twenty samples (14 soil and 6 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.26-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7

shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty samples (14 soil and 6 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.26-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty samples (14 soil and 6 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.26-4 presents the radionuclides detected or detected above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.26.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Aluminum was detected above the tuff BV (7340 mg/kg) in one sample at a concentration of 10,200 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Aluminum concentrations increased with depth at this location and decreased downgradient in the drainage (Plate 4). The lateral extent of aluminum is defined but the vertical is not defined.

Antimony was not detected above the soil or tuff BV but had DLs (1.03 to 1.8 mg/kg) above the soil BV (0.83 mg/kg) in nine samples and had DLs (0.54 mg/kg to 1.15 mg/kg) above the tuff BV (0.5 mg/kg) in five samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in two samples at two locations. The maximum concentration of 167 mg/kg was detected at location 46-611285 from 2.0–3.0 ft bgs. Barium concentrations increased with depth at locations 46-611284 and 46-611285 and decreased downgradient in the drainage (Plate 4). The lateral extent of barium is defined, but the vertical extent is not defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 0.564 mg/kg at location 46-611282 from 0.0–1.0 ft bgs. Cadmium concentrations decreased with depth at this location. Cadmium also had DLs (0.516 to 0.632 mg/kg) above the soil BV in eight samples and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 2600 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Calcium concentrations increased with depth at this location and decreased downgradient in the drainage (Plate 4). The lateral extent of calcium is defined but the vertical extent is not defined.

Chromium was detected above the soil BV (19.3 mg/kg) in two samples at two locations. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-36 and Table H-10). Chromium was also detected above the tuff BV (7.14 mg/kg) in one sample at a concentration of 12.2 mg/kg, which is below the maximum tuff background concentration (13 mg/kg)

(Figure H-36). Chromium concentrations decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of chromium are defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in one sample at a concentration of 4.46 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Cobalt concentrations increased with depth at this location and decreased downgradient in the drainage (Plate 4). The lateral extent of cobalt is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in four samples and above the tuff BV (4.66 mg/kg) in two samples at four locations. The maximum concentration of 34.3 mg/kg was detected at location 46-611280 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV but had a DL (0.59 mg/kg) above the soil BV (0.5 mg/kg) in one sample and a DL (0.54 mg/kg) above the tuff BV (0.5 mg/kg) in one sample. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Iron was detected above the soil BV (21,500 mg/kg) in one sample at a concentration of 30,300 mg/kg at location 46-611282 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-37 and Table H-10). The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at a maximum concentration of 58.7 mg/kg at location 46-611282 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-37 and Table H-10). Lead was also detected above the tuff BV (11.2 mg/kg) in three samples, with a maximum concentration of 15.2 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Lead concentrations were below the maximum tuff background concentration (15.5 mg/kg) (Figure H-38) and decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of lead are defined.

Magnesium was detected above the tuff BV (1690 mg/kg) in one sample at a concentration of 2390 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Magnesium concentrations were below the maximum tuff background concentration (2820 mg/kg) (Figure H-38) and decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of magnesium are defined.

Manganese was detected above the tuff BV (482 mg/kg) in one sample at a concentration of 487 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Manganese concentrations were below the maximum tuff background concentration (752 mg/kg) (Figure H-39) and decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in three samples at three locations. The maximum concentration of 0.185 mg/kg was detected at location 46-611282 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in one sample at a concentration of 9.76 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Nickel concentrations increased with depth at this location and decreased downgradient in the drainage (Plate 4). The lateral extent of nickel is defined, but the vertical extent is not defined.

Perchlorate was detected in one soil sample and one tuff sample at one location at a maximum concentration of 0.00143 mg/kg at location 46-611278 from 3.0–4.0 ft bgs. Perchlorate concentrations

decreased with depth and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in one sample at a concentration of 1.3 mg/kg at location 46-611276 from 9.5–10.5 ft bgs. Selenium also had DLs (1.02 to 1.21 mg/kg) above the tuff BV in five samples. Selenium concentrations increased with depth at location 46-611276 and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Vanadium was detected above the tuff BV (17 mg/kg) in one sample at a concentration of 25.6 mg/kg at location 46-611285 from 2.0–3.0 ft bgs. Vanadium concentrations increased with depth at this location and decreased downgradient in the drainage (Plate 4). The lateral extent of vanadium is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in seven samples at six locations. The maximum concentration of 334 mg/kg was detected at location 46-611282 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at locations 46-611279, 46-611281, 46-611282, 46-611283, and 46-611284. The concentration was below the maximum soil background concentration (75.5 mg/kg) at location 46-611280 (Figure H-39) and decreased downgradient in the drainage (Plate 4). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in five samples at four locations. The maximum concentration was detected at location 46-611282 from 0.0–1.0 ft bgs. Acenaphthene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of acenaphthene are defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in 11 samples at seven locations. The maximum concentrations were detected at location 46-611282 from 0.0–1.0 ft bgs. The concentrations increased with depth at location 46-611280, decreased with depth at all other locations, and decreased downgradient. The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Aroclor-1254 and Aroclor-1260 were detected in 12 and 11 samples, respectively, at seven locations. The maximum concentrations were detected at location 46-611282 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Bis(2-ethylhexyl)phthalate was detected in two samples at one location The maximum concentration of 0.569 mg/kg was detected at location 46-611282 from 2.0–3.0 ft bgs. Bis(2-ethylhexyl)phthalate concentrations increased with depth at this location and decreased downgradient. The lateral extent of bis(2-ethylhexyl)phthalate is defined, but the vertical extent is not defined.

DDD(4,4'-), 4,4'-DDE, and toluene were detected in one or two samples at one or two locations. The concentrations were below the EQLs and decreased downgradient in the drainage (Plate 5). The lateral and vertical extent of 4,4'-DDD, 4,4'-DDE, and toluene are defined.

Dibenz(a,h)anthracene was detected in five samples at three locations. The maximum concentration of 0.142 mg/kg was detected at location 46-611282 from 0.0–1.0 ft bgs. Dibenz(a,h)anthracene concentrations decreased with depth at locations 46-611279 and 46-611282, increased with depth at

location 46-611480, and decreased downgradient. The lateral extent of dibenz(a,h)anthracene is defined but the vertical extent is not defined.

Fluorene was detected in five samples at four locations. The maximum concentration of 0.11 mg/kg was detected at location 46-611282 from 0.0–1.0 ft bgs. Fluorene concentrations did not change or decreased with depth at all locations, and decreased downgradient. The lateral and vertical extent of fluorene are defined.

Indeno(1,2,3-cd)pyrene was detected in 10 samples at six locations. The maximum concentration of 0.38 mg/kg was detected at location 46-611282 from 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations increased with depth at location 46-611280, decreased with depth at the other locations, and decreased downgradient. The lateral extent of indeno(1,2,3-cd)pyrene is defined, but the vertical extent is not defined.

Isopropyltoluene(4-) was detected in five samples at four locations. The maximum concentration of 0.021 mg/kg was detected at location 46-611284 from 2.0–3.0 ft bgs. Isopropyltoluene(4-) concentrations decreased with depth at locations 46-611281 and 46-611285, increased with depth at locations 46-611282 and 46-611284, and decreased downgradient. The lateral extent of 4-isopropyltoluene is defined, but the vertical extent is not defined.

Methylnaphthalene(2-) and naphthalene were detected in four samples at three locations. The maximum concentrations of 0.0239 mg/kg and 0.0554 mg/kg were detected at location 46-611283 from 0.0–1.0 ft bgs. Methylnaphthalene(2-) and naphthalene concentrations decreased with depth at locations 46-611282 and 46-611283 and decreased downgradient. The concentrations at location 46-611279 were below the EQLs. The lateral and vertical extent of 2-methylnaphthalene and naphthalene are defined.

Radionuclides

Cesium-137 was detected in two soil samples at two locations. The cesium-137 activity was 0.156 pCi/g at location 46-611279 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g). Cesium-137 was detected at a similar activity (0.154 pCi/g) at 1.0–2.0 ft bgs at this location. Cesium-137 activities increased with depth at location 46-611280 and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in two samples at two locations. The maximum activity of 0.104 pCi/g was detected at location 46-611285 from 2.0–3.0 ft bgs. Uranium-235/236 activities increased with depth at locations 46-611277 and 46-611285 and decreased downgradient in the drainage (Plate 6). The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236 is not defined at SWMU 46-004(t).

7.26.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(t) because extent is not defined for the site.

7.26.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(t) because extent is not defined for the site.

7.27 SWMU 46-004(u), Outfall

7.27.1 Site Description and Operational History

SWMU 46-004(u) is an inactive outfall located approximately 10 ft north of former building 46-87 at TA-46 (Figure 7.11-1). The outfall consisted of an 8-in.-diameter cast-iron pipe that discharged into Cañada del Buey. This pipe was the overflow pipe for a concrete wet well located in former building 46-87. The wet well was designed as a holding pit for deionized water and historically received effluent from a closed-loop cooling water system serving buildings 46-16, 46-25, and 46-31. The wet well also received effluent from sink drains in building 46-25, which was a battery storage facility also used for small-scale painting activities in support of the Rover Program (LANL 1993, 020952, p. 5-126). Building 46-87 was the pump house for an adjacent cooling tower (former building 46-86) that housed two wet well systems and mechanical equipment associated with the cooling tower (LANL 1993, 020952, p. 5-127). Building 46-87 also stored water-treatment chemicals (Santa Fe Engineering Ltd. 1994, 101838, pp. 16-17). Building 46-87 underwent D&D in December 2001 (LANL 2008, 101882). By the early 1990s, the outfall had been plugged, and effluent discharged to the wet well was periodically pumped out and disposed of at the SWSC plant (Santa Fe Engineering Ltd. 1994, 101838, p. 16). By 1998, the building 46-25 drains that discharged to the wet well were removed from service (LANL 1998, 101808, p. 80).

7.27.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(u) is located approximately 20 ft downgradient of the SWMU 46-004(v) outfall, and both SWMUs discharged to the same hillside as SWMUs 46-004(a2) and 46-004(x).

7.27.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(u), one sample was collected from the outfall and submitted for analyses of TAL metals, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy. During the Phase I RFI, nine additional samples were collected from a drainage below the outfall and used to characterize SWMUs 46-004(a2), 46-004(u), 46-004(v), and 46-006(d) (LANL 1996, 054929, pp. 68, 75, 100, 159). The sampling results of these nine samples are discussed in section 7.11 for SWMU 46-004(a2). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper, mercury, and zinc were detected above BVs. The DL for thallium was above BV. SVOCs were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.27.4 Site Contamination

7.27.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(u):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twenty samples were collected from 10 locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(u) are shown in Figure 7.11-1. Table 7.27-1 presents the samples collected and analyses requested for SWMU 46-004(u). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.27.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(u), a maximum concentration of 25.1 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-13059) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.27.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(u) consist of results from 20 samples (15 soil and 5 tuff) collected from 10 locations.

Inorganic Chemicals

Twenty samples (15 soil and 5 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.27-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty samples (15 soil and 5 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.27-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty samples (15 soil and 5 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.27-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.27.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.02 to 1.37 mg/kg) above the soil BV (0.83 mg/kg) in 13 samples and had DLs (1.09 to 1.2 mg/kg) above the tuff BV (0.5 mg/kg) in 3 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 106 mg/kg at location 46-611536 from 1.0–2.0 ft bgs. Barium concentrations increased with depth at this location and decreased in downgradient samples at SWMU 46-004(q) (Plate 13). The lateral extent of barium is defined, but the vertical extent is not defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.511 to 0.684 mg/kg) above BV in nine samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 2240 mg/kg at location 46-611536 from 1.0–2.0 ft bgs. Calcium concentrations were comparable with the maximum tuff background concentration (2230 mg/kg) (Figure H-40). The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 15.8 mg/kg was detected at location 46-611535 from 1.0–2.0 ft bgs. Chromium concentrations increased with depth at location 46-611535, were less than the maximum tuff background concentration (13 mg/kg) at location 46-611534 (Figure H-40), and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Cobalt was detected above the tuff BV (3.14 mg/kg) in one sample at a concentration of 4.26 mg/kg location 46-611536 from 1.0–2.0 ft bgs. Cobalt concentrations increased with depth at this location and decreased in downgradient samples at SWMU 46-004(q) (Plate 13). The lateral extent of cobalt is defined, but the vertical extent is not defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample and above the tuff BV (4.66 mg/kg) in four samples at four locations. The maximum concentration of 17.7 mg/kg was detected at location 46-611533 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at locations 46-611533 and 46-611534, increased with depth at locations 46-611527, 46-611528, and 46-611536, and decreased downgradient. The lateral extent of copper is defined, but the vertical is not defined.

Cyanide was not detected above the soil or tuff BV but had DLs (0.63 to 0.68 mg/kg) above the soil BV (0.5 mg/kg) in two samples and had DLs (0.53 to 0.63 mg/kg) above the tuff BV (0.5 mg/kg) in two

samples. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the tuff BV (11.2 mg/kg) in one sample at a concentration of 58.7 mg/kg at location 46-611527 from 1.0–2.0 ft bgs. Lead concentrations increased with depth at this location and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Perchlorate was detected in one soil sample and one tuff sample at two locations at a maximum concentration of 0.0028 mg/kg at location 46-611527. Perchlorate concentrations decreased with depth at location 46-611532, were below the EQL at location 46-611527, and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in two samples at two locations. The maximum concentration of 2.1 mg/kg was detected at location 46-611527 from 1.0–2.0 ft bgs. Selenium also had DLs (1.07 to 1.17 mg/kg) above the tuff BV in three samples. The concentrations increased with depth at both locations and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Thallium was detected above the tuff BV (1.1 mg/kg) in one sample at a concentration of 6.3 mg/kg at location 46-611527 from 1.0–2.0 ft bgs. Selenium concentrations increased with depth at this location and decreased downgradient. The lateral extent of thallium is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample and above the tuff BV (63.5 mg/kg) in one sample. The maximum concentration of 70.5 mg/kg was detected at location 46-611533 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at location 46-611533, increased with depth at location 46-611527, and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acenaphthene, anthracene, benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were detected in one soil sample with maximum concentrations detected at location 46-611529 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acenaphthene, anthracene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene are defined.

Acetone was detected in one sample at a concentration of 0.0118 mg/kg at location 46-611534 from 0.0–1.0 ft bgs. Acetone concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acetone are defined.

Aroclor-1254 was detected in 10 samples at six locations. The maximum concentration of 0.0463 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations increased with depth at locations 46-611527 and 46-611535, decreased with depth at the other locations, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in five samples at three locations. The maximum concentration of 0.0493 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Aroclor-1260 concentration decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene, benzo(a)pyrene, and chrysene were detected in two or three samples at two locations. The maximum concentrations were detected at location 46-611529 from 0.0–1.0 ft bgs. The

concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of benzo(a)anthracene, benzo(a)pyrene, and chrysene are defined.

Benzo(b)fluoranthene was detected in five samples at four locations. The maximum concentration of 0.174 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(b)fluoranthene are defined.

Endrin aldehyde was detected in one sample at a concentration of 0.00054 mg/kg at location 46-611527 from 0.0–1.0 ft bgs. Endrin aldehyde concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of endrin aldehyde are defined.

Fluoranthene was detected in seven samples at six locations. The maximum concentration of 0.251 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of fluoranthene are defined.

Phenanthrene was detected in four samples at three locations. The maximum concentration of 0.154 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Phenanthrene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of phenanthrene are defined.

Pyrene was detected in six samples at five locations. The maximum concentration of 0.205 mg/kg was detected at location 46-611529 from 0.0–1.0 ft bgs. Pyrene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of pyrene are defined

Toluene was detected in four samples at three locations. The maximum concentration of 0.00126 mg/kg was detected at location 46-611530 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at locations 46-611529 and 46-611530, were below the EQL at location 46-611535, and decreased downgradient. The lateral and vertical extent of toluene are defined.

Trichloroethene was detected in three samples at two locations. The maximum concentration of 0.00254 mg/kg was detected at location 46-611532 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Trimethylbenzene(1,2,4-), 1,2-xylene, and 1,3-xylene+1,4-xylene were detected in one or two samples from 0.0–1.0 ft bgs. The concentrations decreased with depth and were below the EQLs. The lateral and vertical extent of 1,2,4-trimethylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Cesium-137 was detected in one tuff sample at an activity of 0.627 pCi/g at location 46-611534 from 0.0–1.0 ft bgs. Cesium-137 activities decreased with depth and decreased downgradient. Cesium-137 was not detected in downgradient samples at SWMU 46-004(q) (Plate 15). The lateral and vertical extent of cesium-137 are defined.

Plutonium-239/240 was detected above the soil FV (0.054 pCi/g) in one sample and detected in one tuff sample at two locations. The maximum activity of 0.0558 pCi/g was detected at location 46-611536 from 0.0–1.0 ft bgs. Plutonium-239/240 activities decreased with depth at both locations and were not detected

in downgradient samples at SWMU 46-004(q) (Plate 15). The lateral and vertical extent of plutonium-239/240 are defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample at an activity of 0.144 pCi/ at location 46-611534 from 0.0–1.0 ft bgs. Uranium-235/236 activities decreased with depth and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Summary of Nature and Extent

The vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254 is not defined at SWMU 46-004(u).

7.27.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(u) because extent is not defined for the site.

7.27.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(u) because extent is not defined for the site.

7.28 SWMU 46-004(v), Outfall

7.28.1 Site Description and Operational History

SWMU 46-004(v) is an inactive outfall located approximately 20 ft north of former building 46-87 at TA-46 (Figure 7.11-1). The outfall consists of a 6-in.-diameter cast-iron pipe that discharged effluent from the roof and floor drains of former building 46-87 into Cañada del Buey. Building 46-87 was the pump house for an adjacent cooling tower (former building 46-86) that housed two wet well systems and mechanical equipment associated with the cooling tower (LANL 1993, 020952, p. 5-127). This building was also used to store water-treatment chemicals (Santa Fe Engineering Ltd. 1994, 101838, pp. 16-17). By the early 1990s, the floor drains in former building 46-87 had been plugged, and the outfall was receiving only discharges from the roof drains (Santa Fe Engineering Ltd. 1994, 101838, Figure 9). Building 46-87 underwent D&D in December 2001 (LANL 2008, 101882).

7.28.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(v) is located approximately 20 ft upgradient of the SWMU 46-004(u) outfall, and both SWMUs discharged to the same hillside as SWMUs 46-004(a2) and 46-004(x).

7.28.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(v), one sample was collected from the outfall and submitted for analyses of TAL metals, SVOCs, isotopic thorium, and isotopic uranium and by gamma spectroscopy. During the Phase I RFI, nine additional soil samples were collected from a drainage below the outfall and used to characterize SWMUs 46-004(a2), 46-004(u), 46-004(v), and 46-006(d) (LANL 1996, 054929, pp. 68, 75, 100, 159). The sampling results of these nine samples are presented in section 7.11 for SWMU 46-004(a2). Data from the 1994 RFI are screening-level data and are summarized

below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

The DLs for mercury and thallium were above BVs. Benzo(a)anthracene, chrysene, fluoranthene, phenanthrene, and pyrene were detected. Radionuclides were not detected or detected above BVs/FVs.

7.28.4 Site Contamination

7.28.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(v):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(v) are shown in Figure 7.11-1. Table 7.28-1 presents the samples collected and analyses requested for SWMU 46-004(v). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.28.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(v), a maximum concentration of 4.8 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-14231) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.28.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(v) consist of results from four samples (two soil and two tuff) collected from two locations.

Inorganic Chemicals

Four samples (two soil and two tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.28-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Four samples (two soil and two tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.28-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Four samples (two soil and two tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. No radionuclides were detected or detected above BVs/FVs at SWMU 46-004(v).

7.28.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Copper was detected above the tuff BV (4.66 mg/kg) in two samples at one location. The maximum concentration of 6.6 mg/kg was detected at location 46-611822 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV but had DLs (0.56 to 0.67 mg/kg) above the soil BV (0.5 mg/kg) in two samples at one location, and had DLs (0.52 to 0.55 mg/kg) above the tuff BV (0.5 mg/kg) in two samples at one location. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Perchlorate was detected in one soil sample at a concentration of 0.0023 mg/kg at location 46-611821 from 1.0–2.0 ft bgs. Perchlorate concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in two samples at one location. The maximum concentration of 1.1 mg/kg was detected at location 46-611822 from 1.0–2.0 ft bgs. Selenium concentrations did not change with depth at this location and decreased downgradient in the drainage within SWMU 46-004(u). The lateral extent of selenium is defined, but the vertical is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 112 mg/kg at location 46-611821 from 1.0–2.0 ft bgs. Zinc concentrations increased with depth at this location and decreased downgradient. The lateral extent of zinc is defined, but vertical extent is not defined.

Organic Chemicals

Aldrin, 4,4'-DDE, endrin aldehyde, and endrin ketone were detected in one or two samples at location 46-611821. The concentrations were below the EQLs. The lateral and vertical extent of aldrin, 4,4'-DDE, endrin aldehyde, and endrin ketone are defined.

Aroclor-1254 was detected in two samples at one location. The maximum concentration of 0.08 mg/kg was detected at location 46-611821 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, 4-isopropyltoluene, phenanthrene, pyrene, and trichloroethene were detected in one sample at location 46-611822. The concentrations were below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Methylene chloride was detected in two samples at two locations. The maximum concentration of 0.0073 mg/kg was detected at location 46-611821 from 0.0–1.0 ft bgs. Methylene chloride concentrations decreased with depth at location 46-611821, were below the EQL at location 46-611821, and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(v).

Summary of Nature and Extent

The vertical extent of selenium and zinc is not defined at SWMU 46-004(v). The extent of organic chemicals is defined at SWMU 46-004(v). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-004(v).

7.28.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(v) because extent is not defined for the site.

7.28.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(v) because extent is not defined for the site.

7.29 SWMU 46-004(w), Outfall

7.29.1 Site Description and Operational History

SWMU 46-004(w) is a former NPDES-permitted outfall located approximately 70 ft south of building 46-24 at TA-46 (Figure 7.5-1). The outfall is a 2-in.-diameter cast-iron pipe that discharged to a drain south of building 46-24, near the northeast corner of a laser laboratory (building 46-76). The outfall served a sink drain in building 46-59. SWMU 46-004(w) also received effluent from the SWMU 46-004(r) outfall and was part of a network of drains that discharged to SWSC Canyon at former NPDES-permitted outfall 04A018 (LANL 1993, 020952, pp. 5-122–5-123). Building 46-59 was used for hydraulic and structural testing of components in support of the Rover Program. The outfall was removed from the NPDES permit in December 1995 (LANL 1999, 064617, p. 2-8). Before the outfall was removed from the NPDES permit, all discharges to the outfall from building 46-59 ceased.

7.29.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(w) outfall overlaps the location of the SWMU 46-004(r) outfall.

7.29.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(w), one sample was collected from the outfall and submitted for analyses of TAL metals, VOCs, SVOCs, PCBs, and isotopic uranium and by gamma spectroscopy. This sample was also used to characterize SWMU 46-004(r) (section 7.24). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium, copper, and zinc were detected above BVs. The DLs for cadmium and silver were above BVs. Benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, fluoranthene, phenanthrene, pyrene, 1,1,2-trichloro-1,2,2-trifluoroethane, 1,1,1-trichloroethane, and trichloroethene were detected. PCBs were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.29.4 Site Contamination

7.29.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(w):

- SWMUs 46-004(w) and 46-004(r) (section 7.24) are collocated outfalls. Data from the samples collected at SWMU 46-004(r) were used to evaluate both sites. Sampling activities are described in section 7.24.4.1 as part of SWMU 46-004(r).

The 2010 sampling locations at SWMU 46-004(r) are shown in Figure 7.5-1. Table 7.24-1 presents the samples collected and analyses requested for SWMU 46-004(r). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.29.4.2 Soil, Rock, and Sediment Field-Screening Results

Field-screening activities are described in section 7.24.4.2 as part of SWMU 46-004(r).

7.29.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Sampling analytical results are described in section 7.24.4.3 as part of SWMU 46-004(r).

7.29.4.4 Nature and Extent of Contamination

The nature and extent of contamination are discussed in section 7.24.4.4 as part of SWMU 46-004(r).

7.29.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(w) because extent is not defined for the site.

7.29.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(w) because extent is not defined for the site.

7.30 SWMU 46-004(x), Outfall

7.30.1 Site Description and Operational History

SWMU 46-004(x) is an outfall located approximately 30 ft north of building 46-31 at TA-46 (Figure 7.11-1). The outfall consists of a 6-in.-diameter pipe that receives effluent from roof drains in building 46-31 (LANL 1993, 020952, p. 5-127). The outfall pipe extends approximately 1 ft beyond the steep canyon slope and discharges to a 1- to 2-ft-wide drainage that stretches to the toe of the slope of Cañada del Buey (LANL 1996, 054929, p. 81). Building 46-31 housed test cells with electrical furnaces for thermal testing of graphite and uranium-235/uranium-238 fuel rods in support of the Rover Program. Welding experiments involving thorium were also conducted in building 46-31 (LANL 1993, 020952, pp. 5-11–5-14).

7.30.2 Relationship to Other SWMUs and AOCs

The SWMU 46-004(x) outfall discharged to the same hillside as SWMUs 46-004(a2), 46-004(u), and 46-004(v).

7.30.3 Summary of Previous Investigations

During the 1994 Phase I RFI of SWMU 46-004(x), seven samples were collected from seven locations within the outfall, below the outfall, and in the drainage below the outfall. All samples were submitted for analyses of TAL metals, VOCs, SVOCs, PCBs, pesticides, isotopic plutonium, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium, lead, and mercury were detected above BVs in one sample; cadmium was detected above BV in two samples; and copper and zinc were detected above BVs in three samples. DLs for antimony, cadmium, mercury, and thallium were above BVs in one to seven samples. Acenaphthylene, acetone, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, methylnaphthalene(2-), and methylphenol(4-) were detected in one sample. Acenaphthene, 4,4’-DDE, dibenzofuran, fluorene, heptachlor epoxide, and naphthalene were detected in two samples. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, endrin aldehyde, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in three samples. Chrysene was detected in four samples. Fluoranthene and pyrene were detected in five samples. Plutonium-238 was detected above FV in one sample. Radionuclides analyzed by gamma spectroscopy, isotopic thorium, and isotopic uranium were not detected or detected above BVs/FVs. PCBs were not detected.

7.30.4 Site Contamination

7.30.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(x):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(x) are shown in Figure 7.11-1. Table 7.30-1 presents the samples collected and analyses requested for SWMU 46-004(x). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.30.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(x), a maximum concentration of 14.2 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-13009) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-004(x). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.30.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(x) consist of results from 10 soil samples collected from five locations.

Inorganic Chemicals

Ten soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.30-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten soil samples were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.30-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten soil samples were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.30-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.30.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV (0.83 mg/kg) but had DLs (0.991 to 1.38 mg/kg) above BV in 10 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.496 to 0.616 mg/kg) above BV in eight samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at one location. The maximum concentration of 18.2 mg/kg was detected at location 46-611526 from 1.0–2.0 ft bgs. Copper concentrations increased with depth at this location and decreased downgradient in the drainage within SWMU 46-004(u). The lateral extent of copper is defined, but vertical extent is not defined.

Perchlorate was detected in three soil samples at two locations. The maximum concentration of 0.00105 mg/kg was detected at location 46-611515 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at location 46-611515, were below the EQL at location 46-611526, and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of perchlorate are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in three samples at two locations. The maximum concentration of 107 mg/kg was detected at location 46-611526 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at both locations and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, acenaphthylene, anthracene, benzo(a)anthracene, dibenz(a,h)anthracene, fluorene, 2-methylnaphthalene, and naphthalene were detected in one sample. The maximum concentrations were detected at location 46-611514 from 0.0–1.0 ft bgs, decreased with depth at this location, and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Aroclor-1254 was detected in two samples at one location. The maximum concentration of 0.0899 mg/kg was detected at location 46-611526 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at this location and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in three samples at two locations. The maximum concentration of 0.112 mg/kg was detected at location 46-611526 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with

depth at both locations and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene were detected in three samples at two locations. The maximum concentrations were detected at location 46-611514 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene, benzo(g,h,i)perylene, and indeno(1,2,3-cd)pyrene are defined.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in six samples at four locations. The maximum concentrations were detected at location 46-611514 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene are defined.

Benzo(k)fluoranthene was detected in two samples at one location. The maximum concentration of 0.242 mg/kg detected at location 46-611514 from 0.0–1.0 ft bgs. Benzo(k)fluoranthene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of benzo(k)fluoranthene are defined

Chrysene and phenanthrene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611514 from 0.0–1.0 ft bgs. Chrysene and phenanthrene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of chrysene and phenanthrene are defined.

Fluorene was detected in two samples at one location. The maximum concentration of 0.136 mg/kg was detected at location 46-611519 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of fluorene are defined.

Isopropyltoluene(4-), trichloroethene, and 1,3-xylene+1,4-xylene were detected in two to four samples at two or three locations. The concentrations were below the EQLs and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of 4-isopropyltoluene, trichloroethene, and 1,3-xylene+1,4-xylene are defined.

Toluene was detected in four samples at three locations. The maximum concentration of 0.0015 mg/kg was detected at location 46-611526 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at location 46-611526, were below the EQL at locations 46-611516 and 46-611517, and decreased downgradient in the drainage within SWMU 46-004(u). The lateral and vertical extent of toluene are defined.

Radionuclides

Plutonium-239/240 was detected in one soil sample at an activity of 0.0174 pCi/g at location 46-611514 from 1.0–2.0 ft bgs. Plutonium-239/240 activities increased with depth at this location and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of copper and plutonium-239/240 is not defined at SWMU 46-004(x). The extent of organic chemicals is defined at SWMU 46-004(x).

7.30.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(x) because extent is not defined for the site.

7.30.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(x) because extent is not defined for the site.

7.31 SWMU 46-004(y), Outfall

7.31.1 Site Description and Operational History

SWMU 46-004(y) is a former NPDES-permitted outfall (03A043) located approximately 40 ft north of building 46-31 at TA-46 (Figure 7.11-1). This outfall consisted of a 6-in.-diameter cast-iron pipe that received blowdown from a cooling tower in building 46-31 and effluent from the building's floor drains, roof drains, and laboratory sinks. The outfall pipe discharged into Cañada del Buey (LANL 1993, 020952, p. 5-127). The outfall pipe to the canyon was removed before 1996, the roof drains were rerouted to new storm drains that discharge to the north side of building 46-31, and all floor and sink drains discharging to this outfall were rerouted to the SWSC plant (Santa Fe Engineering Ltd. 1994, 101839, Figure 2). In July 1996, the outfall was removed from the NPDES permit (LANL 1999, 064617, p. 2-8).

7.31.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(y) discharged to the same hillside as AOC 46-004(f2).

7.31.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(y), six samples were collected from five locations within the outfall: just below the outfall, in the drainage, and near the bottom of the drainage at the toe of the slope. All six samples were submitted for analyses of TAL metals, SVOCs, PCBs, isotopic plutonium, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Five samples were also analyzed for VOCs.

Nickel was detected above BV in one sample, lead was detected above BV in two samples, copper was detected above BV in four samples, and mercury and zinc were detected above BVs in six samples. The DLs for cadmium, silver, and thallium were above BVs for one to three samples. Anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, and trichlorofluoromethane were detected in one sample. Benzo(a)anthracene was detected in two samples. Fluoranthene, phenanthrene, and pyrene were detected in three samples. Methylene chloride was detected in five samples. Uranium-234 was detected above BV in one sample. Radionuclides analyzed by gamma spectroscopy, isotopic plutonium, and isotopic thorium were not detected or detected above BVs/FVs. PCBs were not detected.

7.31.4 Site Contamination

7.31.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(y):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Sixteen samples were collected from eight locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(y) are shown in Figure 7.11-1. Table 7.31-1 presents the samples collected and analyses requested for SWMU 46-004(y). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.31.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(y), a maximum concentration of 2.1 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13016) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-004(y). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.31.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(y) consist of results from 16 samples (14 soil and 2 tuff) collected from eight locations.

Inorganic Chemicals

Sixteen samples (14 soil and 2 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.31-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Sixteen samples (14 soil and 2 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.31-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Sixteen samples (14 soil and 2 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.31-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.31.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.03 to 5.65 mg/kg) above the soil BV (0.83 mg/kg) in 14 samples and had DLs (1.06 to 1.14 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 76.1 mg/kg at location 46-611525 from 0.0–1.0 ft bgs. Barium concentrations decreased with depth at this location and decreased from the maximum (234 mg/kg) at location 46-611521, which was below the soil BV. The lateral and vertical extent of barium are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in four samples at four locations. The maximum concentration of 1.04 mg/kg was detected at location 46-611520 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.514 to 0.599 mg/kg) above the soil BV in three samples. Cadmium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 7160 mg/kg at location 46-611524 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-41 and Table H-11). The lateral and vertical extent of calcium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 20.3 mg/kg at location 46-611520 from 0.0–1.0 ft bgs. Chromium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples and above the tuff BV (4.66 mg/kg) in one sample. The maximum concentration of 72.8 mg/kg was detected at location 46-611520 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Iron was detected above the soil BV (21500 mg/kg) in one sample at a concentration of 27,100 mg/kg at location 46-611522 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-41 and Table H-11). The lateral and vertical extent of iron are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples at two locations. The maximum concentration of 33.1 mg/kg was detected at location 46-611519 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-42 and Table H-11). The lateral and vertical extent of lead are defined.

Manganese was detected above the tuff BV (482 mg/kg) in one sample at a concentration of 606 mg/kg at location 46-611525 from 0.0–1.0 ft bgs. Manganese concentrations decreased with depth at this location and were detected below the maximum background concentration (752 mg/kg) (Figure H-42). The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in six samples at four locations. The maximum concentration of 4.8 mg/kg was detected at location 46-611519 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Perchlorate was detected in two soil samples. The maximum concentration of 0.00173 mg/kg was detected at location 46-611518 from 1.0–2.0 ft bgs. Perchlorate concentrations increased with depth at this location and decreased downgradient. The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.04 to 1.15 mg/kg) above the BV in two tuff samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in nine samples at five locations. The maximum concentration of 493 mg/kg was detected at location 46-611520 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in four samples at two locations. The maximum concentration of 0.143 mg/kg was detected at location 46-611518 from 1.0–2.0 ft bgs. Acenaphthene concentrations decreased with depth at location 46-611591, increased with depth at location 46-611518, and decreased downgradient. The lateral extent of acenaphthene is defined, but the vertical extent is not defined.

Acetone was detected in four samples at three locations. The maximum concentration of 0.0162 mg/kg was detected at location 46-611524 from 0.0–1.0 ft bgs. Acetone concentrations decreased with depth at locations 46-611524 and 46-611525, increased with depth at location 46-611522, and decreased downgradient. The lateral extent of acetone is defined, but the vertical extent is not defined.

Anthracene, chrysene, and phenanthrene were detected in three samples at two locations. The maximum concentrations were detected at location 46-611519 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of anthracene, chrysene, and phenanthrene are defined.

Aroclor-1242 was detected in one soil sample at a concentration of 0.18 mg/kg at location 46-611522 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 was detected in six samples at four locations. The maximum concentration of 0.216 mg/kg was detected at location 46-611522 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in four samples at three locations. The maximum concentration of

0.0748 mg/kg was detected at location 46-611522 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene was detected in three samples at two locations. The maximum concentration of 0.8 mg/kg was detected at location 46-611519 from 1.0–2.0 ft bgs. Benzo(a)anthracene concentrations decreased with depth at location 46-611520, did not change with depth at location 46-611519, and decreased downgradient. The lateral extent of benzo(a)anthracene is defined, but the vertical extent is not defined.

Benzo(a)pyrene and benzo(b)fluoranthene were detected in six sample at four locations. The maximum concentrations were detected at location 46-611519 from 0.0–1.0 ft bgs. Benzo(a)pyrene and benzo(b)fluoranthene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(a)pyrene and benzo(b)fluoranthene are defined.

Benzo(g,h,i)perylene, fluoranthene, and indeno(1,2,3-cd)pyrene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611519 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of benzo(g,h,i)perylene, fluoranthene, and indeno(1,2,3-cd)pyrene are defined.

Bis(2-ethylhexyl)phthalate was detected in one sample at location 46-611519 from 1.0–2.0 ft bgs below the EQL. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Ethylbenzene was detected in four samples at three locations. The maximum concentration was detected at location 46-611525 from 0.0–1.0 ft bgs. Ethylbenzene concentrations decreased with depth at locations 46-611524 and 46-611525 and were below the EQL. The lateral and vertical extent of ethylbenzene are defined.

Methylene chloride was detected in two samples at two locations. The maximum concentration of 0.00595 mg/kg was detected at location 46-611519 from 0.0–1.0 ft bgs. Methylene chloride concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Methylnaphthalene(2-) and naphthalene were detected in two samples at one location. The maximum concentrations were detected at location 46-611519 from 0.0–1.0 ft bgs. Methylnaphthalene(2-) and naphthalene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 2-methylnaphthalene and naphthalene are defined.

Pyrene was detected in four samples at three locations. The maximum concentration of 1.18 mg/kg was detected at location 46-611519 from 1.0–2.0 ft bgs. Pyrene concentrations decreased with depth at locations 46-611520 and 46-611523, increased with depth at location 46-611519, and decreased downgradient. The lateral extent of pyrene is defined, but the vertical extent is not defined.

Toluene was detected in six samples at five locations. The maximum concentration of 0.00413 mg/kg was detected at location 46-611525 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at all locations and decreased downgradient at location 46-611534 at SWMU 46-004(u). The lateral and vertical extent of toluene are defined.

Trichloroethane(1,1,1-) was detected in two samples at two locations. The maximum concentration of 0.00184 mg/kg was detected at location 46-611520 from 0.0–1.0 ft bgs. Trichloroethane(1,1,1-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1,1,1-trichloroethane are defined.

Trichloroethene was detected in five samples at three locations. The maximum concentration of 0.0206 mg/kg was detected at location 46-611520 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at locations 46-611519 and 46-611520, increased with depth at location 46-611518, and decreased downgradient. The lateral extent of trichloroethene is defined, but the vertical extent is not defined.

Trimethylbenzene(1,2,4-) and 1,3,5-trimethylbenzene were detected in three and one samples, respectively. The maximum concentrations were detected at location 46-611521 from 0.0–1.0 ft bgs. Trimethylbenzene(1,2,4-) and 1,3,5-trimethylbenzene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene are defined.

Xylene(1,2-) and 1,3-xylene+1,4-xylene were detected in six samples at five locations. The maximum concentrations were detected at locations 46-611521 from 0.0–1.0 ft bgs. Xylene(1,2-) and 1,3-xylene+1,4-xylene concentrations decreased with depth at all locations, were below the EQLs, and decreased downgradient. The lateral and vertical extent of 1,2-xylene, and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Plutonium-239/240 was detected in two subsurface soil samples at two locations. The maximum activity of 0.0888 pCi/g was detected at location 46-611518 from 1.0–2.0 ft bgs. Plutonium-239/240 activities increased with depth at locations 46-611518 and 46-611519 and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in two samples at two locations. The maximum activity of 2.95 pCi/g was detected at location 46-611519 from 0.0–1.0 ft bgs. Plutonium-239/240 activities decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Summary of Nature and Extent

The vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240 is not defined at SWMU 46-004(y).

7.31.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(y) because extent is not defined for the site.

7.31.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(y) because extent is not defined for the site.

7.32 SWMU 46-004(z), Outfall

7.32.1 Site Description and Operational History

SWMU 46-004(z) is an inactive outfall located approximately 60 ft northwest of building 46-31 at TA-46 (Figure 7.11-1). This outfall consists of a 6-in.-diameter cast-iron pipe that receives stormwater discharge from two roof drains at building 46-31 and discharges into Cañada del Buey (LANL 1993, 020952, p. 5-128). Previously, the outfall also served the floor drains for rooms 160 through 172 of building 46-31. The floor drains leading to this outfall were rerouted to the SWSC plant some time before 1993 (LANL 1996, 054929, p. 94).

7.32.2 Relationship to Other SWMUs and AOCs

SWMU 46-004(z) discharged to the same hillside as AOC 46-004(f2).

7.32.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-004(z), 11 samples were collected from eight locations at the bottom of the drainage and from locations in the three drainages that diverge at the toe of the slope. Because a concrete pad lies beneath the discharge pipe, samples were not collected directly beneath the outfall. Ten samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic plutonium, isotopic thorium, and isotopic uranium and by gamma spectroscopy. Six samples were also analyzed for VOCs. One sample was analyzed for inorganic chemicals only. One sample was also used to characterize SWMU 46-004(b) (LANL 1996, 054929, p. 28). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Calcium, nickel, and zinc were detected above BVs in one sample. Mercury was detected above BV in 10 samples. Cesium-137 and plutonium-239/240 were detected in one and two samples, respectively. Isotopic thorium and isotopic uranium were not detected above BVs. VOCs, SVOCs, PCBs, and pesticides were not detected.

7.32.4 Site Contamination

7.32.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-004(z):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twelve samples were collected from six locations in the drainage below the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-004(z) are shown in Figure 7.11-1. Table 7.32-1 presents the samples collected and analyses requested for SWMU 46-004(z). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.32.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-004(z), a maximum concentration of 19.0 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-12736) was submitted for analysis of organic chemical. No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.32.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-004(z) consist of results from 12 samples (10 soil and 2 tuff) collected from six locations.

Inorganic Chemicals

Twelve samples (10 soil and 2 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.32-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (10 soil and 2 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.32-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (10 soil and 2 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.32-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.32.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.956 to 1.23 mg/kg) above the soil BV (0.83 mg/kg) in 10 samples and had DLs (1.04 to 1.05 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.539 to 0.56 mg/kg) above BV in two samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 42.9 mg/kg at location 46-611468 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-43 and Table H-12). The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample and above the tuff BV (482 mg/kg) in one sample. The maximum concentration of 50.9 mg/kg was detected at location 46-611468 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from soil background (Figure H-43 and Table H-12). The lead concentration in tuff was below the maximum tuff background concentration (15.5 mg/kg) (Figure H-44) and decreased downgradient. The lateral and vertical extent of lead are defined.

Manganese was detected above the tuff BV (482 mg/kg) in one sample at a concentration of 497 mg/kg at location 46-611473 from 1.0–2.0 ft bgs. Manganese concentrations were below the maximum background concentration (752 mg/kg) (Figure H-44). The lateral and vertical extent of manganese are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in three samples at two locations. The maximum concentration of 1.41 mg/kg was detected at location 46-611468 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of mercury are defined.

Perchlorate was detected in three soil samples at two locations. The maximum concentration of 0.00493 mg/kg was detected at location 46-611471 from 1.0–2.0 ft bgs. Perchlorate concentrations increased with depth at location 46-611471, were below the EQL at location 46-611469, and decreased downgradient. The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.963 to 1.07 mg/kg) above BV in two samples at two locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at one location. The maximum concentration of 189 mg/kg was detected at location 46-611468 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Aroclor-1254, 1,2,4-trimethylbenzene, and 1,3-xylene+1,4-xylene were detected in one sample each from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations, were below the EQLs, and decreased downgradient. The lateral and vertical extent of Aroclor-1254, 1,2,4-trimethylbenzene, and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Plutonium-239/240 was detected in one subsurface soil sample at an activity of 0.0185 pCi/g at location 46-611469 from 1.0–2.0 ft bgs. Plutonium-239/240 activities increased with depth at this location

and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Uranium-234 was detected above the soil BV (2.59 pCi/g) in one sample at an activity of 2.6 pCi/g at location 46-611468 from 1.0–2.0 ft bgs. Uranium-234 activities increased with depth at location 46-611468 and decreased downgradient. The lateral extent of uranium-234 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the soil BV (0.2 pCi/g) in one sample at an activity of 0.239 pCi/g at location 46-611468 from 1.0–2.0 ft bgs. Uranium-235/236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of perchlorate, plutonium-239/240, uranium-234, and uranium-235/236 is not defined at SWMU 46-004(z). The extent of organic chemicals is defined at SWMU 46-004(z).

7.32.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-004(z) because extent is not defined for the site.

7.32.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-004(z) because extent is not defined for the site.

7.33 SWMU 46-005, Surface Impoundments

7.33.1 Site Description and Operational History

SWMU 46-005 consists of two surface impoundments (structures 46-170 and 46-171) at TA-46: the associated drainlines that connected the impoundments to buildings 46-158, 46-226, and 46-251 and a former NPDES-permitted outfall (Figure 7.9-1). The upper impoundment (46-170) has an overflow drain to the lower impoundment (46-171), which in turn has an overflow line to former NPDES-permitted outfall SSS12S that discharged to SWSC Canyon (LANL 1993, 020952, p. 5-56). The impoundment system, lined with a reinforced Hypalon liner (LANL 1987, 110570), was constructed in approximately 1979 and was first used in 1980. From 1980 to 1987, salt brine associated with solar-energy experiments was discharged from buildings 46-158, 46-226, and 46-251 to the impoundments. There is no evidence that anything other than salt brine was discharged into the impoundments at this time. In 1982, one of the impoundments leaked for approximately 30 d, losing approximately 10,000 to 20,000 kg of sodium chloride. In 1987, the solar experiments were discontinued, the brine was drained and disposed of by a salt disposal company (LANL 1990, 007513, p. 212), and the impoundments were converted to accommodate sanitary waste. The sanitary waste line from buildings 46-158, 46-226, and 46-251 was disconnected from the SWMU 46-003(g) septic system and connected to the uppermost surface impoundment (46-170). In the early 1990s, the SWMU 46-005 impoundments were taken out of service altogether, and the sanitary waste line to the impoundments was rerouted to the SWSC plant (LANL 1996, 101818). The outfall was removed from the NPDES permit before 1994 (LANL 1999, 064617, p. 2-8).

7.33.2 Relationship to Other SWMUs and AOCs

Sanitary waste from buildings 46-158, 46-226, and 46-251 that had discharged to the SWMU 46-003(g) septic system was later discharged to the SWMU 46-005 impoundments.

7.33.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-005.

7.33.4 Site Contamination

7.33.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-005:

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from four locations beneath the drainlines, and two samples were collected from one location at the outfall from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- Ten samples were collected from five locations within the surface impoundments from the base of the impoundments (0.0–1.0 ft bgs) and 5 ft below the impoundments (5.0–6.0 ft bgs).
- Four samples were collected from two locations next to the surface impoundments from 0.0–1.0 ft bgs and 3.0–4.0 ft bgs.
- Two samples were collected from one location at the outfall from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- Four samples were collected from two locations in the drainage below the outfall of the surface impoundment from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, nitrate, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-005 are shown in Figure 7.9-1. Table 7.33-1 presents the samples collected and analyses requested for SWMU 46-005. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.33.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-005, a maximum concentration of 64 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-13698) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.33.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-005 consist of results from 28 samples (20 soil and 8 tuff) collected from 14 locations.

Inorganic Chemicals

Twenty-eight samples (20 soil and 8 tuff) were analyzed for TAL metals, cesium, nitrate, cyanide, and perchlorate. Table 7.33-2 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. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twenty-eight samples (20 soil and 8 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.33-3 presents the detected organic chemicals. Plate 17 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twenty-eight samples (20 soil and 8 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.33-4 presents the radionuclides detected or detected above BVs/FVs. Plate 18 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.33.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.0 to 5.03 mg/kg) above the soil BV (0.83 mg/kg) in four samples and had DLs (0.55 to 0.56 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Beryllium was detected above the soil BV (1.83 mg/kg) in one sample at a concentration of 2.7 mg/kg at location 46-611637 from 3.0–4.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-45 and Table H-13). The lateral and vertical extent of beryllium are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.502 to 0.601 mg/kg) above BV in four samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in four samples at three locations. The maximum concentration of 10,200 mg/kg was detected at location 46-611637 from 3.0–4.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-45 and Table H-13). The lateral and vertical extent of calcium are defined.

Cesium was detected in 20 soil samples and 8 tuff samples at 14 locations. The maximum concentration of 3.78 mg/kg was detected at location 46-611628 from 2.0–3.0 ft bgs. Cesium concentrations increased with depth at locations 46-611628, 46-611629, 46-611631, 46-611636, 46-611637, 46-611640, and 46-611641, decreased with depth at the other seven locations, and decreased downgradient. The lateral extent of cesium is defined, but the vertical extent is not defined.

Cyanide was not detected above the soil or tuff BV but had DLs (0.51 to 0.64 mg/kg) above the soil BV (0.5 mg/kg) in 16 samples and had DLs (0.5 to 0.56 mg/kg) above the tuff BV (0.5 mg/kg) in 8 samples. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample at a concentration of 0.152 mg/kg at location 46-611640 from 1.0–2.0 ft bgs. Mercury concentrations increased with depth at this location and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Nitrate was detected in 16 soil samples and 7 tuff samples at 14 locations. The maximum concentration of 4.6 mg/kg was detected at location 46-611640 from 0.0–1.0 ft bgs. No background data are available for nitrate. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. The lateral and vertical extent of nitrate are defined.

Perchlorate was detected in one soil sample and one tuff sample at two locations. The maximum concentration of 0.0056 mg/kg was detected at location 46-611636 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was detected above the soil BV (1.52 mg/kg) in two samples and above the tuff BV (0.3 mg/kg) in eight samples at nine locations. The maximum concentration of 1.9 mg/kg was detected at location 46-611636 from 5.0–6.0 ft bgs. Selenium concentrations decreased with depth at locations 46-611640 and 46-611641, increased with depth at locations 46-611630, 46-611632, 46-611633, 46-611634, 46-611635, 46-611636, and 46-611638, and decreased downgradient. The lateral extent of selenium is defined, but the vertical extent is not defined.

Organic Chemicals

Acetone, Aroclor-1254, Aroclor-1260, n-butylbenzene, 4-isopropyltoluene, 1,1,2-trichloro-1,2,2-trifluoroethane, and 1,1,1-trichloroethane were detected in one or three samples at one or two locations. The concentrations decreased with depth and/or were below the EQLs. The lateral and vertical extent of these organic chemicals are defined.

Bis(2-ethylhexyl)phthalate was detected in 17 samples at 11 locations. The maximum concentration of 5.4 mg/kg was detected at location 46-611635 from 0.0–1.0 ft bgs. Bis(2-ethylhexyl)phthalate concentrations increased with depth at locations 46-611631, 46-611633, 46-611637, 46-611638, 46-611640, and 46-611641, decreased with depth at the other five locations, and decreased downgradient. The lateral extent of bis(2-ethylhexyl)phthalate is defined, but the vertical extent is not defined.

Radionuclides

Cesium-137 was detected in one subsurface soil sample at an activity of 0.227 pCi/g at location 46-611640 from 1.0–2.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137 is not defined at SWMU 46-005.

7.33.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-005 because extent is not defined for the site.

7.33.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-005 because extent is not defined for the site.

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

7.34.1 Site Description and Operational History

SWMU 46-006(a) is a 70-ft × 100-ft area located at the north end of the parking lot between buildings 46-1 and 46-42 at TA-46 (Figure 7.13-1). The area is paved with asphalt and drains to an adjacent ditch on the north side of the area. The ditch is approximately 5 ft deep and 10 to 15 ft wide, and it drains through a storm drain culvert into Cañada del Buey. During a 1986 site visit, fifteen 55-gal. drums containing dielectric oil were observed to be stored on the pavement. Some of the drums were leaking, and oil had migrated into the drainage ditch next to the asphalt pad (LANL 1996, 054929, p. 140).

7.34.2 Relationship to Other SWMUs and AOCs

SWMU 46-006(a) receives discharges from AOC 46-004(e2), and runoff from 46-006(a) flows to SWMU 46-004(c2).

7.34.3 Summary of Previous Investigations

In 1989, three soil samples from three locations were collected: one sample on the side of the adjacent ditch and two samples below it. The samples were submitted for analyses of TAL metals, VOCs, PCBs, pesticides, radionuclides, and HE (LANL 1993, 020952, pp. 5-82–5-83). Data for the 1989 sampling event are not presented in this report but are summarized in the OU 1140 work plan (LANL 1993, 020952, pp. 5-84–5-85).

During the 1994 Phase I RFI conducted at SWMU 46-006(a), two soil samples were collected from two locations in the drainage ditch next to SWMU 46-006(a). Both samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic thorium, and isotopic uranium and by gamma spectroscopy. One sample was also analyzed for VOCs. These two samples were also used to characterize AOC 46-004(e2) (section 7.18) (LANL 1996, 054929, pp. 129, 140–142). Three additional samples were collected in a cluster at the eastern end of the ditch near the storm drain culvert that discharges into Cañada del Buey. These three samples were also used to characterize both SWMUs 46-006(a) and 46-004(c2) (section 7.15). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper, lead, and zinc were detected above BVs in both samples. The DLs for cadmium and silver were above BVs in both samples. DDE(4,4'-), dieldrin, and endrin aldehyde were detected in one sample. Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 4,4'-DDT, endosulfan II, endrin, fluoranthene, 4,4'-methoxychlor, phenanthrene, and pyrene were detected in both samples. VOCs and PCBs were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.34.4 Site Contamination

7.34.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(a):

- SWMU 46-006(a) and AOC 46-004(e2) are located within a common drainage. Data obtained from samples collected at AOC 46-004(e2) (section 7.18) were used to characterize both sites. Sampling activities are described in section 7.18.4.1 as part of AOC 46-004(e2).

The 2010 sampling locations for AOC 46-004(e2) are shown in Figure 7.13-1. Table 7.18-1 presents the samples collected and analyses requested for AOC 46-004(e2). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.34.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at AOC 46-004(e2), a maximum concentration of 15.7 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-10831) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.34.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Sampling results are described in section 7.18.4.3 as part of AOC 46-004(e2).

7.34.4.4 Nature and Extent of Contamination

The nature and extent of contamination are discussed in section 7.18.4.4 as part of AOC 46-004(e2).

7.34.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-006(a) because extent is not defined for the site.

7.34.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-006(a) because extent is not defined for the site.

7.35 SWMU 46-006(b), Former Storage Shed

7.35.1 Site Description and Operational History

SWMU 46-006(b) is a former storage shed (structure 46-197) that was located approximately 40 ft north of the Laser Isotope Support Facility (building 46-41) at TA-46 (Figure 7.3-1). The shed was installed sometime before 1977, measured 40 ft long × 8 ft wide, and was constructed of plywood on three sides (the north side was open) with a sheet-metal roof. The shed was used for short-term storage of oil drums, vacuum pumps, optical tables, other laboratory equipment, and electrical equipment with PCB-containing oil. The site of the shed is paved with asphalt and slopes toward a storm drain to the southeast. During a 1986 site visit of the area, oil was observed to be leaking from under the back of the shed. In addition, an oil spill was observed east of the shed, and discolored soil was observed at the storm drain outfall (LANL 1993, 020952, p. 5-77). The shed was removed in 1990 (LANL 1993, 020952, p. 5-77).

7.35.2 Relationship to Other SWMUs and AOCs

SWMU 46-008(e) is located directly north of SWMU 46-006(b), and runoff from SWMU 46-006(b) flows toward SWMU 46-009(a).

7.35.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-006(b), five samples were collected from five locations within the footprint of the storage shed, in the drainage below the shed, and from the storm drain outfall. All samples were submitted for analyses of TAL metals, SVOCs, PCBs, and isotopic uranium and by gamma spectroscopy. Two samples were also analyzed for isotopic thorium. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Lead was detected above BV in one soil sample, and zinc was detected above BV in two soil samples. The DLs for cadmium and silver were above BVs in all five samples. Benzo(a)anthracene, benzo(b)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, fluoranthene, and phenanthrene were detected in one soil sample. Pyrene was detected in two soil samples. Uranium-235 was detected above BV in one soil sample. Radionuclides analyzed by gamma spectroscopy and isotopic thorium were not detected or detected above BVs/FVs. PCBs were not detected.

7.35.4 Site Contamination

7.35.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(b):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations at the former shed location from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt).

- Six samples were collected from three locations downgradient of the former storage area, two locations near the storage area, and one location at the end of the culvert (approximately 100 ft southeast at the storm drain outfall) from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-006(b) are shown in Figure 7.3-1. Table 7.35-1 presents the samples collected and analyses requested for SWMU 46-006(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.35.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-006(b), a maximum concentration of 12.9 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-11901) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.35.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-006(b) consist of results from 10 samples (8 soil and 2 tuff) collected from five locations.

Inorganic Chemicals

Ten samples (eight soil and two tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.35-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 46-006(b); inorganic COPCs are identified below.

Antimony was not detected above the soil or tuff BV but had DLs (1.11 to 1.15 mg/kg) above the soil BV (0.83 mg/kg) in two samples and had DLs (1.06 to 1.14 mg/kg) above the tuff BV (0.5 mg/kg) two samples. Antimony is identified as a COPC in soil and tuff.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples, with a maximum concentration of 0.854 mg/kg, and had DLs (0.54 to 0.613 mg/kg) above the soil BV in six samples. Cadmium concentrations and DLs were below the maximum soil background concentration (2.6 mg/kg) (Figure H-46). Cadmium is not identified as a COPC in soil.

Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 6840 mg/kg. Calcium concentrations were below the maximum soil background concentration (14,000 mg/kg) (Figure H-46). Calcium is not identified as a COPC in soil.

Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a maximum concentration of 10.7 mg/kg. Chromium concentrations were below the maximum tuff background concentration (13 mg/kg) (Figure H-47). Chromium is not identified as a COPC in tuff.

Selenium was not detected above tuff BV (0.3 mg/kg) but had DLs (1.07 to 1.18 mg/kg) above BV in two samples. Selenium is identified as a COPC in tuff.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 53 mg/kg. Zinc concentrations were below the maximum soil background concentration (75.5 mg/kg) (Figure H-47). Zinc is not identified as a COPC in soil.

In summary, the inorganic chemicals identified as COPCs are antimony in soil and tuff and selenium in tuff.

Organic Chemicals

Ten samples (eight soil and two tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.35-3 presents the detected organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 46-006(b); organic COPCs are identified below.

Organic chemicals detected in soil and/or tuff included acenaphthene, acetone, anthracene, Aroclor-1242, Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, butylbenzene(n-), butylbenzene(sec-), chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, 2-methylnaphthalene, phenanthrene, 1-propylbenzene, pyrene, toluene, TPH-DRO, 1,2,4-trimethylbenzene, trimethylbenzene(1,3,5-), 1,2-xylene, and 1,3-xylene+1,4-xylene.

These organic chemicals were retained as COPCs at SWMU 46-006(b).

Radionuclides

Ten samples (eight soil and two tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(b). The nature and extent of contamination are defined at SWMU 46-006(b); no radionuclide COPCs were identified at SWMU 46-006(b).

7.35.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.11 to 1.15 mg/kg) above the soil BV (0.83 mg/kg) in two samples and had DLs (1.06 to 1.14 mg/kg) above the tuff BV (0.5 mg/kg) in two samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples with a maximum concentration of 0.854 mg/kg and had DLs (0.54 to 0.613 mg/kg) above the soil BV in six samples. Cadmium concentrations and DLs were below the maximum soil background concentration (2.6 mg/kg) (Figure H-46). The lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 6840 mg/kg. Calcium concentrations were below the maximum soil background concentration (14,000 mg/kg) (Figure H-46). The lateral and vertical extent of calcium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a maximum concentration of 10.7 mg/kg. Chromium concentrations were below the maximum tuff background concentration (13 mg/kg) (Figure H-47). The lateral and vertical extent of chromium are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.07 to 1.18 mg/kg) above the BV in two samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 53 mg/kg. Zinc concentrations were below the maximum soil background concentration (75.5 mg/kg) (Figure H-47). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone was detected in one soil sample at a concentration of 0.00241 mg/kg at location 46-611371 from 1.0–2.0 ft bgs. Acetone concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of acetone are defined.

Aroclor-1242 was detected in one sample at one location. The maximum concentration was detected at location 46-611369 from 3.0–4.0 ft bgs and was below the EQL. Aroclor-1242 was not detected in downgradient samples. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 was detected in three samples at two locations. The maximum concentration was detected at location 46-611370 from 0.0–1.0 ft bgs and was below the EQL. Aroclor-1254 concentrations decreased with depth and was not detected in downgradient samples. The lateral and vertical extent of Aroclor-1254 are defined.

Bis(2-ethylhexyl)phthalate, butylbenzene(n-), butylbenzene(sec-), fluorene, 4-isopropyltoluene, 2-methylnaphthalene, phenanthrene, and 1,2-xylene were detected in one sample each from 0.0–1.0 ft bgs. The concentrations decreased with depth at each location, were below the EQLs, and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611370 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Fluoranthene and pyrene were detected in four samples at three locations. The maximum concentrations of 0.203 mg/kg and 0.245 mg/kg were detected at location 46-611370 from 0.0–1.0 ft bgs. Fluoranthene and pyrene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of fluoranthene and pyrene are defined.

Propylbenzene(1-), 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and 1,3-xylene+1,4-xylene were detected in two samples at two locations. The maximum concentrations of 1-propylbenzene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene were detected at location 46-611369 from 0.0–1.0 ft bgs, and the maximum concentration of 1,3-xylene+1,4-xylene was detected at location 46-611368 from 0.0–1.0 ft bgs. The concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

Toluene was detected in two samples at two locations. The maximum concentration of 0.000399 mg/kg was detected at location 46-611368 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in six samples at four locations. The maximum concentration of 380 mg/kg was detected at location 46-611369 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of TPH-DRO are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(b).

Summary of Nature and Extent

The extent of inorganic, organic, and radionuclide COPCs is defined at SWMU 46-006(b).

7.35.5 Summary of Human Health Risk Screening

Details of the human health risk-screening assessment for SWMU 46-006(b) are discussed in Appendix I, section I-4.

The total excess cancer risk for the industrial scenario is 6×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO was identified as a COPC and the HQ is 0.3, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

The total excess cancer risk for the construction worker scenario is approximately 7×10^{-8}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.009, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

The total excess cancer risk for the residential scenario is approximately 3×10^{-6}, which is less than the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.3, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

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

7.35.6 Summary of Ecological Risk Screening

Details of the ecological risk-screening assessment are presented in Appendix I, section I-5. No potential ecological risk exist for any receptor following evaluations based on minimum ESL, HI analyses, comparison with background concentrations, potential effects to populations (individuals for T&E species), and LOAEL analyses

7.36 SWMU 46-006(c), Storage Area

7.36.1 Site Description and Operational History

SWMU 46-006(c) is a paved 15-ft × 30-ft storage area located between the northeast corner of building 46-158 and the southeast side of building 46-208 at TA-46 (Figure 7.9-1). Asphalt curbing directs runoff into a storm drain discharging to SWSC Canyon. During a 1986 site visit, drums were observed to be leaking, and oil was noted to be draining into the storm drain. The drums were removed before 1994

(LANL 1993, 020952, pp. 5-77–5-78, 5-104). The area is currently used to store laboratory equipment and supplies.

7.36.2 Relationship to Other SWMUs and AOCs

SWMU 46-006(c) is not associated with any other SWMUs or AOCs.

7.36.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-006(c), six samples were collected from four locations with a drainage ditch below the paved area, on the canyon hillside, and from one location in the drainage at the toe of the slope. All samples were submitted for analyses of TAL metals. The samples from the drainage below the paved area were also analyzed for SVOCs and PCBs. The four samples collected from the drainage below the outfall were also analyzed for isotopic thorium and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Chromium, magnesium, and vanadium were detected above BVs in one tuff sample; copper was detected above BV in one soil sample; aluminum, barium, and calcium were detected above BVs in two tuff samples; lead was detected above BV in two soil samples; zinc was detected above BVs in two soil and one sediment sample; and mercury was detected above BV in all six samples. The DLs for selenium and thallium were above BVs in four samples. Bis(2-ethylhexyl)phthalate was detected in the two soil samples. PCBs were not detected. Radionuclides were not detected or detected above BVs/FVs. PCBs were not detected.

7.36.4 Site Contamination

7.36.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(c):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations beneath the storage area from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt).
- Fourteen samples were collected from seven locations downgradient of SWMU 46-006(c) from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-006(c) are shown in Figure 7.9-1. Table 7.36-1 presents the samples collected and analyses requested for SWMU 46-006(c). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.36.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-006(c), a maximum concentration of 274 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-11600) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-006(c). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.36.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-006(c) consist of results from 18 samples (15 soil and 3 tuff) collected from nine locations.

Inorganic Chemicals

Eighteen samples (15 soil and 3 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.36-2 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. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eighteen samples (15 soil and 3 tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.36-3 presents the detected organic chemicals. Plate 17 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eighteen samples (15 soil and 3 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.36-4 presents the radionuclides detected or detected above BVs/FVs. Plate 18 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.36.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.843 to 1.32 mg/kg) above the soil BV (0.83 mg/kg) in 11 samples and had DLs (0.881 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in 3 samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above the tuff BV (46 mg/kg) in one sample at a concentration of 53.6 mg/kg at location 46-611302 from 2.0–3.0 ft bgs. Barium concentrations increased with depth at this location and decreased downgradient. The lateral extent of barium is defined, but the vertical extent is not defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.494 to 0.618 mg/kg) above BV in 14 samples. Because cadmium was not detected above BV, the lateral and vertical extent of are defined.

Calcium was detected above the soil BV (6120 mg/kg) in two samples at two locations. The maximum concentration of 9500 mg/kg was detected at location 46-611298 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-48 and Table H-14). The lateral and vertical extent of calcium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 20.2 mg/kg at location 46-611299 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-48 and Table H-14). Chromium was also detected above the tuff BV (7.14 mg/kg) in one sample at a concentration of 9.9 mg/kg at location 46-611302 from 2.0–3.0 ft bgs, below the maximum tuff background concentration (13 mg/kg) (Figure H-49). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 19.5 mg/kg at location 46-611302 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-49 and Table H-14). The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 43 mg/kg at location 46-611302 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-50 and Table H-14). The lateral and vertical extent of lead are defined.

Manganese was detected above the soil BV (671 mg/kg) in one sample at a concentration of 792 mg/kg at location 46-611298 from 3.0–4.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-50 and Table H-14). The lateral and vertical extent of manganese are defined.

Perchlorate was detected in five soil samples and two tuff samples. The maximum concentration of 0.00241 mg/kg was detected at location 46-611300 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at locations 46-611300 and 46-611301, were below the EQL at the other locations, and decreased downgradient. The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.03 to 1.2 mg/kg) above BV in three samples at three locations. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample and above the tuff BV (63.5 mg/kg) in one sample. The maximum concentration of 735 mg/kg was detected at location 46-611302 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in one soil sample at a concentration of 0.055 mg/kg at location 46-611301 from 0.0–1.0 ft bgs. Acenaphthene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acenaphthene are defined.

Acetone and 2-butanone were detected in one soil sample at location 46-611298 from 3.0–4.0 ft bgs. Acetone and 2-butanone concentrations increased with depth at this location and decreased downgradient. The lateral extent of acetone and 2-butanone is defined, but the vertical extent is not defined.

Aroclor-1242 was detected in two samples at two locations. The maximum concentration of 0.0314 mg/kg was detected at location 46-611304 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 was detected in five samples at four locations. The maximum concentration of 0.244 mg/kg was detected at location 46-611298 from 3.0–4.0 ft bgs. Aroclor-1254 concentrations decreased with depth at locations 46-611299, 46-611300, and 46-611304, increased with depth at location 46-611298, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in nine samples at six locations. The maximum concentration of 0.407 mg/kg was detected at location 46-611298 from 3.0–4.0 ft bgs. Aroclor-1260 concentrations decreased with depth at locations 46-611299, 46-611300, 46-611301, 46-611302, and 46-611304, increased with depth at location 46-611298, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene were detected in one soil sample at location 46-611306 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-009(a) (Plate 5). The lateral and vertical extent of these organic chemicals are defined.

Bis(2-ethylhexyl)phthalate was detected in one soil sample at location 46-611302 from 0.0–1.0 ft bgs. Bis(2-ethylhexyl)phthalate concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Toluene was detected in five samples at four locations. The maximum concentration of 0.000699 mg/kg was detected at location 46-611302 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at locations 46-611298, 46-611302, and 46-611306, were below the EQL at location 46-611300, and decreased downgradient. The lateral and vertical extent of toluene are defined.

Xylene(1,3-)+xylene(1,4-) was detected in two samples at two locations. The maximum concentration of 0.000424 mg/kg was detected at location 46-611302 from 0.0–1.0 ft bgs. Xylene(1,3-)+xylene(1,4-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

TPH-DRO was detected in 10 samples at eight locations. The maximum concentration of 64.1 mg/kg was detected at location 46-611302 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at locations 46-611299, 46-611302, 46-611304, and 46-611305; increased with depth at locations 46-611298, 46-611301, 46-611303, and 46-611306; and decreased downgradient within the drainage associated with SWMU 46-009(a) (Plate 5). The lateral extent of TPH-DRO is defined, but the vertical extent is not defined.

Radionuclides

Americium-241 was detected above the soil FV (0.013 pCi/g) in one sample at an activity of 0.0955 pCi/g at location 46-611305 from 0.0–1.0 ft bgs. Americium-241 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of americium-241 are defined.

Cesium-137 was detected in one subsurface soil sample at an activity of 0.0835 pCi/g at location 46-611298 from 3.0–4.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Plutonium-239/240 was detected above soil FV (0.054 pCi/g) in one sample and was detected in two subsurface soil samples at three locations. The maximum activity of 0.0806 pCi/g was detected at location 46-611305 from 0.0–1.0 ft bgs. Plutonium-239/240 activities decreased with depth at location 46-611305, increased with depth at locations 46-611298 and 46-611300, and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Uranium-238 was detected above the soil BV (2.29 pCi/g) in one sample at an activity of 2.31 pCi/g at location 46-611306 from 0.0–1.0 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-009(a) (Plate 6). The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240 is not defined at SWMU 46-006(c).

7.36.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-006(c) because extent is not defined for the site.

7.36.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-006(c) because extent is not defined for the site.

7.37 SWMU 46-006(d), Area of Potential Soil Contamination

7.37.1 Site Description and Operational History

SWMU 46-006(d) is an area of potential soil contamination located on the north side of building 46-31 at TA-46 (Figure 7.6-1). The area is approximately 50 ft × 300 ft and is level near building 46-31 but drops steeply towards the northern perimeter fence of TA-46 and into Cañada del Buey. With the exception of two asphalt-paved delivery and parking areas located at the eastern and western boundaries of the SWMU, most of the area is unpaved. Oils and possibly other materials spilled in the area. Engineering drawings show that a drain from room 111A also discharged to this SWMU. During a 1986 site visit, 55-gal. drums, cans, rusty chemical storage containers, and a thick layer of oil were observed on the northern slope of the site (LANL 1993, 020952, p. 5-78). SWMUs 46-004(a,b,c) are located within the SWMU 46-006(d) boundary. Drainages that flow into Cañada del Buey, north of TA-46 perimeter fence, receive runoff from SWMU 46-006(d).

7.37.2 Relationship to Other SWMUs and AOCs

SWMUs 46-004(a,b,c) are located within SWMU 46-006(d). Drainages associated with SWMUs 46-004(x,y,z) and AOC 46-004(f2) received runoff from SWMU 46-006(d).

7.37.3 Summary of Previous Investigations

In 1989, six samples from six soil-stained locations at SWMU 46-006(d) were collected and submitted for analyses for TAL metals, VOCs, SVOCs, pesticides, and radionuclides. Data for the 1989 sampling event are not presented in this report but are summarized in the OU 1140 work plan (LANL 1993, 020952, pp. 5-85–5-88).

During the 1994 Phase I RFI conducted at 46-006(d), 23 samples were collected from 17 locations. Twelve samples were collected from within the SWMU boundary and from the area extending to building 46-58; seven samples were collected from five drainages behind building 46-31 that slope into Cañada del Buey; and four samples were collected from the drainage behind building 46-58 that slopes into Cañada del Buey. All samples were submitted for analyses of TAL metals, SVOCs, and isotopic uranium and by gamma spectroscopy. Twenty samples were analyzed for VOCs; 19 samples were analyzed for PCBs, pesticides, and isotopic plutonium; and 11 samples were analyzed for isotopic thorium. Two samples collected from one of the five drainages were also used to characterize AOC 46-004(f2) (LANL 1996, 054929, pp. 135, 159). One of the samples collected within the boundary of SWMU 46-006(d) was also used to characterize SWMU 46-004(b) (LANL 1996, 054929, pp. 28, 159). Nine soil and sediment samples collected for SWMU 46-004(a2) were also used to characterize SWMUs 46-004(u), 46-004(v), and 46-006(d) (LANL 1996, 054929, pp. 68, 75, 100, 159). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Aluminum, arsenic, magnesium, and vanadium were detected above BVs in one tuff sample; cobalt and iron were detected above BVs in one soil sample; cadmium and silver were detected above BVs in three soil samples; chromium was detected above BVs in two tuff samples and one soil sample; and nickel was detected above BVs in one soil, one sediment, and one tuff sample. Barium was detected above BV in four tuff samples, and calcium was detected above BVs in one soil, one sediment, and two tuff samples. Copper was detected above BVs in one tuff and four soil samples, and lead was detected above BVs in four soil and two tuff samples. Mercury was detected above BVs in three soil, five sediment, and two tuff samples, and zinc was detected above BV in seven soil samples. The DLs for antimony, cadmium, cobalt, selenium, silver, and thallium were above BVs in 1 to 11 samples. Acenaphthene and bis(2-ethylhexyl)phthalate were detected in one soil samples, and 4,4’-methoxychlor was detected in one tuff sample. Dieldrin was detected in two soil samples, and 1,1,1-trichloroethane and trichloroethene were detected in two tuff samples. Aroclor-1254 was detected in three soil samples. Cesium-137 was detected in two soil samples. Plutonium-238 was detected above FV in one fill and four soil samples and above BV in three sediment samples. Plutonium-238 was also detected in one soil sample at depths greater than the applicable FV and was detected in two tuff samples. Uranium-234 was detected above BV in one soil sample. Isotopic thorium was not detected or was not detected above BVs.

7.37.4 Site Contamination

7.37.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(d):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from four locations within the SWMU boundary along the north wall of building 46-31 from 0.0–1.0 ft and 4.0–5.0 ft (beneath the asphalt).
- Thirty-two samples were collected from 16 locations within and north of the SWMU boundary on the mesa top and slope (outside of the drainages) from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. TPH-DRO was inadvertently excluded from the sampling paperwork for this site. Additional samples will be collected at SWMU 46-006(d) and analyzed for TPH-DRO during the Phase II investigation (see deviations in Appendix B).

The 2010 sampling locations at SWMU 46-006(d) are shown in Figure 7.6-1. Table 7.37-1 presents the samples collected and analyses requested for SWMU 46-006(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.37.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-006(d), a maximum concentration of 1920 ppm was detected at a depth of 1.0–2.0 ft bgs. A sample from this depth (46-10-13354) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-006(d). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.37.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-006(d) consist of results from 40 samples (34 soil and 6 tuff) collected from 20 locations.

Inorganic Chemicals

Forty samples (34 soil and 6 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.37-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Forty samples (34 soil and 6 tuff) were analyzed VOCs, SVOCs, PCBs, and pesticides. Table 7.37-3 presents the detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Forty samples (34 soil and 6 tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.37-4 presents the radionuclides detected or detected above BVs/FVs. Plate 12 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.37.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.919 to 1.25 mg/kg) above the soil BV (0.83 mg/kg) in 29 samples and DLs (1.04 to 1.13 mg/kg) above the tuff BV (0.5 mg/kg) in three samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Barium was detected above BV (46 mg/kg) in one tuff sample at a concentration of 74.7 mg/kg at location 46-611587 from 1.0–2.0 ft bgs. Barium concentrations increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(z) (Plate 19). The lateral extent of barium is defined, but the vertical extent is not defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in two samples at two locations. The maximum concentration of 0.764 mg/kg was detected at location 46-611571 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.497 to 0.627 mg/kg) above the soil BV in 23 samples, and the concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) one sample at a concentration of 2670 mg/kg at location 46-611587 from 1.0–2.0 ft bgs. Calcium concentrations increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(z) (Plate 19). The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 24.5 mg/kg at location 46-611579 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-51 and Table H-15). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in three samples at three locations. The maximum concentration of 403 mg/kg was detected at location 46-611571 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Cyanide was not detected above the soil or tuff BV but had DLs (0.61 to 0.66 mg/kg) above the soil BV (0.5 mg/kg) in three samples and had DLs (0.52 to 0.59 mg/kg) above the tuff BV (0.5 mg/kg) in three

samples. Because cyanide was not detected above BV, the lateral and vertical extent of cyanide are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 24.9 mg/kg at location 46-611579 from 0.0–1.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-51 and Table H-15). The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in six samples at four locations. The maximum concentration of 115 mg/kg was detected at location 46-611570 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at locations 46-611570, 46-611574, and 46-611584; increased with depth at location 46-611576; and decreased downgradient within the drainage associated with SWMU 46-004(y) (Plate 19). The lateral extent of mercury is defined, but the vertical extent is not defined.

Perchlorate was detected in nine samples at seven locations. The maximum concentration of 0.0027 mg/kg was detected at location 46-611587 from 0.0–1.0 ft bgs. Perchlorate concentrations decreased with depth at location 46-611582 and 46-611587; increased with depth at locations 46-611573, 46-611578, 46-611580, 46-611581, and 46-611584; and decreased downgradient within the drainages associated with SWMUs 46-004(z), 46-004(y), and 46-004(x) (Plate 19). The lateral extent of perchlorate is defined, but the vertical extent is not defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in three samples at three locations. Selenium also had DLs (1.11 to 1.12 mg/kg) above the tuff BV in three samples. The maximum concentration of 1.4 mg/kg was detected at location 46-611586 from 0.0–1.0 ft bgs. Selenium concentrations varied with depth by 0.1 mg/kg at each location and were below the soil BV (1.52 mg/kg) in the surface samples. Because selenium concentrations did not change with depth and were below the soil BV at all locations, the vertical extent of selenium is defined. Selenium decreased downgradient within the drainages associated with SWMUs 46-004(z) and 46-004(y) (Plate 19). The lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in one sample at a concentration of 9.12 mg/kg at location 46-611573 from 1.0–2.0 ft bgs. Silver concentrations increased with depth at location 46-611573 and decreased downgradient. The lateral extent of silver is defined, but the vertical extent is not defined.

Zinc was detected above the soil BV (48.8 mg/kg) in seven samples at seven locations. The maximum concentration of 252 mg/kg was detected at location 46-611571 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at locations 46-611570, 46-611571, 46-611572, 46-611577, 46-611579, and 46-611584; were below the maximum soil background concentration (75.5 mg/kg) at location 46-611573 (Figure H-52); and decreased downgradient within the drainage associated with SWMU 46-004(y) (Plate 19). The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acenaphthene was detected in four samples at four locations. The maximum concentration of 0.707 mg/kg was detected at location 46-611573 from 1.0–2.0 ft bgs. Acenaphthene concentrations decreased with depth at location 46-611572, were below the EQL at location 46-611570, increased with depth at locations 46-611573 and 46-611584, and decreased downgradient within the drainage associated with SWMU 46-004(y) (Plate 20). The lateral extent of acenaphthene is defined, but the vertical extent is not defined.

Acetone was detected in six samples at five locations. The maximum concentration of 0.267 mg/kg was detected at location 46-611573 from 1.0–2.0 ft bgs. Acetone concentrations decreased with depth at locations 46-611568 and 46-611571, were below the EQL at location 46-611577, increased with depth at locations 46-611570 and 46-611573, and decreased downgradient within the drainage associated with SWMU 46-004(y) (Plate 20). The lateral extent of acetone is defined, but the vertical extent is not defined.

Anthracene was detected in six samples at five locations. The maximum concentration of 0.0455 mg/kg was detected at location 46-611572 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth or were below the EQL at all locations. The concentrations decreased downgradient, including within the drainage associated with SWMU 46-004(x) (Plate 20). The lateral and vertical extent of anthracene are defined.

Aroclor-1242 was detected in one soil sample with a concentration of 0.0288 mg/kg at location 46-611568 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 was detected in six samples at five locations. The maximum concentration of 1.36 mg/kg was detected at location 46-611579 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in 14 samples at 12 locations. The maximum concentration of 0.496 mg/kg was detected at location 46-611579 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations increased with depth at location 46-611573, decreased with depth at the other locations, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene was detected in eight samples at seven locations. The maximum concentration of 0.109 mg/kg was detected at location 46-611581 from 1.0–2.0 ft bgs. Benzo(a)anthracene concentrations decreased with depth or were below EQL at most locations and increased with depth at location 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of benzo(a)anthracene is defined, but the vertical extent is not defined.

Benzo(a)pyrene was detected in 12 samples at 11 locations. The maximum concentration of 0.0837 mg/kg was detected at location 46-611572 from 0.0–1.0 ft bgs. Benzo(a)pyrene concentrations decreased with depth or were below EQL at most locations and increased with depth at location 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of benzo(a)pyrene is defined, but the vertical extent is not defined.

Benzo(b)fluoranthene was detected in 17 samples at 14 locations. The maximum concentration of 0.214 mg/kg was detected at location 46-611571 from 0.0–1.0 ft bgs. Benzo(b)fluoranthene concentrations decreased with depth or were below EQL at most locations and increased with depth at location 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of benzo(b)fluoranthene is defined, but the vertical extent is not defined.

Benzo(g,h,i)perylene was detected in nine samples at eight locations. The maximum concentration of 0.069 mg/kg was detected at location 46-611572 from 0.0–1.0 ft bgs. Benzo(g,h,i)perylene concentrations decreased with depth or were below EQL at most locations and increased with depth at location 46-611581. The concentrations decreased downgradient, including within the drainage

associated with SWMU 46-004(x) (Plate 20). The lateral extent of benzo(g,h,i)perylene is defined, but the vertical extent is not defined.

Benzo(k)fluoranthene was detected in four samples at four locations. The maximum concentration of 0.0466 mg/kg was detected at location 46-611572 from 0.0–1.0 ft bgs. Benzo(k)fluoranthene concentrations decreased with depth or were below EQL at all locations and decreased downgradient. The lateral and vertical extent of benzo(k)fluoranthene are defined.

Bis(2-ethylhexyl)phthalate, 1,1,1-trichloroethane, and 2,4,6-trinitrotoluene were detected in one sample from 1.0–2.0 ft bgs. The concentrations were below the EQLs. The lateral and vertical extent of bis(2-ethylhexyl)phthalate, 1,1,1-trichloroethane, and 2,4,6-trinitrotoluene are defined.

Butanone(2-) was detected in two samples at two locations. The maximum concentration of 0.0164 mg/kg was detected at location 46-611573 from 1.0–2.0 ft bgs. Butanone(2-) concentrations were below the EQL at location 46-61186 and increased with depth at location 46-611573. The concentrations decreased downgradient, including within the drainage associated with SWMU 46-004(z) (Plate 20). The lateral extent of 2-butanone is defined, but the vertical extent is not defined.

Chrysene was detected in 13 samples at 12 locations. The maximum concentration of 0.158 mg/kg was detected at location 46-611581 from 1.0–2.0 ft bgs. Chrysene concentrations decreased with depth or were below EQL at most locations and increased with depth at locations 46-611573 and 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of chrysene is defined, but the vertical extent is not defined.

Dibenz(a,h)anthracene, methylene chloride, toluene, and trichloroethene were detected in one or two samples at one location. The concentrations decreased with depth and were below EQLs at each location. The lateral and vertical extent of dibenz(a,h)anthracene, methylene chloride, toluene, and trichloroethene are defined.

Fluoranthene was detected in 23 samples at 16 locations. The maximum concentration of 0.446 mg/kg was detected at location 46-611581 from 1.0–2.0 ft bgs. Fluoranthene concentrations decreased with depth or were below EQL at most locations and increased with depth at locations 46-611570, 46-611573, and 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of fluoranthene is defined, but the vertical extent is not defined.

Fluorene was detected in two samples at two locations. The maximum concentration of 0.0268 mg/kg was detected at location 46-611570 from 4.0–5.0 ft bgs. Fluorene concentrations decreased with depth at location 46-611572 and were below the EQL at location 46-611570. The concentrations decreased downgradient. The lateral and vertical extent of fluorene are defined.

Indeno(1,2,3-cd)pyrene was detected in 10 samples at 9 locations. The maximum concentration of 0.0636 mg/kg was detected at location 46-611572 from 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth or were below EQL at most locations and increased with depth at location 46-611581. The concentrations decreased downgradient, including within the drainage associated with SWMU 46-004(x) (Plate 20). The lateral extent of indeno(1,2,3-cd)pyrene is defined, but the vertical extent is not defined.

Isopropyltoluene(4-) was detected in two samples at one location. The maximum concentration of 0.0704 mg/kg was detected at location 46-611573 from 1.0–2.0 ft bgs. Isopropyltoluene(4-)

concentrations increased with depth at this location and decreased downgradient. The lateral extent of 4-isopropyltoluene is defined, but the vertical extent is not defined.

Methylnaphthalene(2-) was detected in one sample from 4.0–5.0 ft bgs, and the concentration was below the EQL. The lateral and vertical extent of 2-methylnaphthalene are defined.

Phenanthrene was detected in 17 samples at 13 locations. The maximum concentration of 0.272 mg/kg was detected at location 46-611581 from 1.0–2.0 ft bgs. Phenanthrene concentrations decreased with depth or were below EQL at most locations and increased with depth at locations 46-611570, 46-611573, and 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of phenanthrene is defined, but the vertical extent is not defined.

Pyrene was detected in 22 samples at 15 locations. The maximum concentration of 0.344 mg/kg was detected at location 46-611581 from 1.0–2.0 ft bgs. Pyrene concentrations decreased with depth or were below EQL at most locations and increased with depth at locations 46-611570, 46-611573, and 46-611581. The concentrations decreased downgradient, including within the drainages associated with SWMUs 46-004(y) and 46-004(x) (Plate 20). The lateral extent of pyrene is defined, but the vertical extent is not defined.

Radionuclides

Cesium-137 was detected in three soil samples and one tuff sample at four locations. The maximum cesium-137 activity was 0.408 pCi/g from 0.0–1.0 ft bgs at location 46-611582, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at locations 46-611582, 46-611580 (from 0.24 pCi/g at 0.0–1.0 ft bgs to 0.16 pCi/g at 1.0–2.0 ft bgs), and 46-611583 (from 0.115 pCi/g at 0.0–1.0 ft bgs to 0.0641 pCi/g at 1.0–2.0 ft bgs). Cesium-137 activities increased with depth at location 46-611573. The activities decreased downgradient, including within the drainage associated with SWMU 46-004(x) (Plate 21). The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Plutonium-239/240 was detected in one soil sample and one tuff sample at two locations. Plutonium-239/240 activities increased with depth at location 46-611583 and decreased with depth at location 46-611582. The activities decreased downgradient within the drainage associated with SWMU 46-004(x) (Plate 21). The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Uranium-234 was detected above the tuff BV (1.98 pCi/g) in one sample. The maximum activity of 2.08 pCi/g was detected at location 46-611582 from 1.0–2.0 ft bgs. Uranium-234 activities increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(x) (Plate 21). The lateral extent of uranium-234 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample. The maximum activity of 0.155 pCi/g was detected at location 46-611582 from 1.0–2.0 ft bgs. Uranium-235/236 activities increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(x) (Plate 21). The lateral extent of uranium-235/236 is defined, but the vertical extent is not defined.

Uranium-238 was detected above the tuff BV (1.93 pCi/g) in one sample. The maximum activity of 2.41 pCi/g was detected at location 46-611582 from 1.0–2.0 ft bgs. Uranium-238 activities increased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(x) (Plate 21). The lateral extent of uranium-238 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of barium, calcium, mercury, perchlorate, silver, zinc, acenaphthene, acetone, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238 is not defined at SWMU 46-006(d).

7.37.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-006(d) because extent is not defined for the site.

7.37.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-006(d) because extent is not defined for the site.

7.38 SWMU 46-006(f), Storage Area

7.38.1 Site Description and Operational History

SWMU 46-006(f) is a storage shed (building 46-36) located approximately 50 ft east of building 46-1 at TA-46 (Figure 7.13-1). The 20-ft × 30-ft metal storage shed was constructed in 1955 (Meeker et al. 1990, 054783.34, p. 39). The floor of the storage shed is paved and sits approximately 6 to 8 in. belowgrade. The area surrounding the storage shed also has been a storage area as well as a staging area for equipment and materials awaiting disposal and an unloading area for new equipment. The areas on the west and south sides of the storage shed are paved; the areas on the north and east are unpaved. Stored materials may have included oils (possibly containing PCBs), alkali metals, asbestos-containing products, beryllium alloys, potassium dichromate, lead bricks, lead shot, and mercury (LANL 1993, 020952, p. 5-79). Because the floor of building 46-36 is belowgrade, frequent flooding of the storage shed occurs during the rainy season (LANL 1996, 054929, pp. 189–190). The surrounding area slopes north to a storm drain culvert that discharges into Cañada del Buey.

7.38.2 Relationship to Other SWMUs and AOCs

SWMU 46-006(f) is not associated with any other SWMUs or AOCs.

7.38.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-006(f), three samples were collected from three locations near the southeast corner of building 46-36, next to the pavement: one in the drainage area north of building 46-36, one northeast of the building, and one near the storm drain culvert. All samples were submitted for analyses of TAL metals, SVOCs, PCBs, pesticides, isotopic uranium, and asbestos and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Lead was detected above BV in one sample, zinc was detected above BV in two samples, and mercury was detected above BV in all three samples. The DL for thallium was above BV in all three samples.

Aroclor-1254, dieldrin, endosulfan II, and fluoranthene were detected in one sample. Radionuclides were not detected or detected above BVs/FVs.

7.38.4 Site Contamination

7.38.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(f):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations next to the storage area from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt).
- Four samples were collected from two locations downgradient of the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-006(f) are shown in Figure 7.13-1. Table 7.38-1 presents the samples collected and analyses requested for SWMU 46-006(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.38.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-006(f), a maximum concentration of 4.9 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13779) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.38.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-006(f) consist of results from eight samples (four soil and four tuff) collected from four locations.

Inorganic Chemicals

Eight samples (four soil and four tuff) were analyzed for TAL metals, cyanide, perchlorate, and asbestos. Table 7.38-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified. Asbestos was not detected at SWMU 46-006(f).

Organic Chemicals

Eight samples (four soil and four tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Plate 23 shows the spatial distribution of detected organic chemicals. Table 7.38-3 summarizes the analytical results for detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight samples (four soil and four tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(f).

7.38.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.08 to 1.24 mg/kg) above the soil BV (0.83 mg/kg) in four samples and had DLs (1.07 to 1.22 mg/kg) above the tuff BV (0.5 mg/kg) in four samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.542 to 0.619 mg/kg) above BV in four samples. Because cadmium was not detected above BV, 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 one sample. The maximum concentration of 114 mg/kg was detected at location 46-611740 from 0.0–1.0 ft bgs. Chromium concentrations decreased with depth at location 46-611740, increased with depth at location 46-611739, and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 19). The lateral extent of chromium is defined, but vertical extent is not defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 23.4 mg/kg at location 46-611740 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 19). The lateral and vertical extent of lead are defined.

Mercury was detected above the soil BV (0.1 mg/kg) in one sample at a concentration of 0.121 mg/kg at location 46-611740 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at this location and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 19). The lateral and vertical extent of mercury are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.09 to 1.22 mg/kg) above BV in four samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 52.6 mg/kg at location 46-611739 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acetone and bis(2-ethylhexyl)phthalate were detected in one sample from 3.0–4.0 ft bgs. Acetone and bis(2-ethylhexyl)phthalate concentrations were below the EQLs. The lateral and vertical extent of acetone and bis(2-ethylhexyl)phthalate are defined.

Aroclor-1254 was in one soil sample at location 46-611739 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in three samples at three locations. The maximum concentrations were detected either at location 46-611740 or location 46-611738 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 20). The lateral and vertical extent of these organic chemicals are defined.

Benzo(b)fluoranthene, fluoranthene, and pyrene were detected in four samples at four locations. The maximum concentrations were detected at location 46-611740 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 20). The lateral and vertical extent of benzo(b)fluoranthene, fluoranthene, and pyrene are defined.

Ethylbenzene, toluene, and 1,3-xylene+1,4-xylene were detected in one soil sample at location 46-611738 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of ethylbenzene, toluene, and 1,3-xylene+1,4-xylene are defined.

TPH-DRO was detected in three samples at three locations. The maximum concentration was detected at location 46-611740 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at location 46-611737 and 46-611740, and were below the EQL at all locations. The lateral and vertical extent of TPH-DRO are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(f).

Summary of Nature and Extent

The vertical extent of chromium is not defined at SWMU 46-006(f). The extent of organic chemicals is defined at SWMU 46-006(f). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(f).

7.38.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-006(f) because extent is not defined for the site.

7.38.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-006(f) because extent is not defined for the site.

7.39 SWMU 46-006(g), Storage Area

7.39.1 Site Description and Operational History

SWMU 46-006(g) is a storage shed located at the west end of building 46-31 at TA-46 (Figure 7.6-1). The shed is of corrugated-steel construction and measures 10 ft × 20 ft. From 1982 to 1984, the shed housed vacuum pumps used in experiments involving plasma vaporization of depleted uranium powder. The area around the shed is level and paved. Pump oil is known to have been spilled on the floor of the shed (LANL 1996, 054929, p. 194).

7.39.2 Relationship to Other SWMUs and AOCs

Any releases from the shed may have flowed to the western end of SWMU 46-006(d), the surface of the SWMU 46-003(d) septic system, and the same hillside as SWMU 46-004(z) and AOC 46-004(f2).

7.39.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-006(g), two samples were collected from two locations beneath the asphalt floor of the shed and submitted for analyses of VOCs, SVOCs, and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Trichloro-1,2,2-trifluoroethane(1,1,2-) and trichloroethene were detected in one sample. Radionuclides were not detected or detected above BVs/FVs.

7.39.4 Site Contamination

7.39.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-006(g):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Six samples were collected from three locations next to the storage area (to the south, southwest, and northwest) from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt).
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-006(g) are shown in Figure 7.6-1. Table 7.39-1 presents the samples collected and analyses requested for SWMU 46-006(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.39.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-006(g), a maximum concentration of 10.2 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13178) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.39.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-006(g) consist of results from six samples (three soil and three tuff) collected from three locations.

Inorganic Chemicals

Six samples (three soil and three tuff) were analyzed for TAL metals and cyanide. Table 7.39-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 10 shows the spatial distribution of inorganic chemicals detected or detected above BVs. The nature and extent of contamination are defined at SWMU 46-006(g); inorganic COPCs are identified below.

Antimony was not detected above the soil or tuff BV but had DLs (0.956 to 1.09 mg/kg) above the soil BV (0.83 mg/kg) in three samples and DLs (1.04 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in three samples. Antimony is identified as a COPC in soil and tuff.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.478 to 0.498 mg/kg) above the BV in two samples. Because there were fewer than 10 samples, statistical tests could not be performed. The DLs were below the maximum soil background concentration (2.6 mg/kg) (Figure H-53). Cadmium is not identified as a COPC in soil.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.1 mg/kg) above the BV in three samples. Selenium is identified as a COPC in tuff.

In summary, the inorganic chemicals identified as COPCs are antimony in soil and tuff and selenium in tuff.

Organic Chemicals

Six samples (three soil and three tuff) were analyzed for VOCs, SVOCs, PCBs, and TPH-DRO. Table 7.39-3 summarizes the analytical results for detected organic chemicals. Plate 11 shows the spatial distribution of detected organic chemicals. The nature and extent of contamination are defined at SWMU 46-006(g); organic COPCs are identified below.

Organic chemicals detected in soil and/or tuff included Aroclor-1242, Aroclor-1254, Aroclor-1260, TPH-DRO, toluene, and trichloroethene and are retained as COPCs.

Radionuclides

Six samples (three soil and three tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(g).

There were no radionuclide COPCs at SWMU 46-006(g).

7.39.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.956 to 1.09 mg/kg) above the soil BV (0.83 mg/kg) in three samples and DLs (1.04 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in three samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.478 to 0.498 mg/kg) above the BV in two samples. Because there were fewer than 10 samples, statistical tests could not be performed. The DLs were below the maximum soil background concentration (2.6 mg/kg) (Figure H-53). The lateral and vertical extent of cadmium are defined.

Selenium was not detected above the tuff BV but had DLs (1.01 to 1.1 mg/kg) above the tuff BV (0.3 mg/kg) in three samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Aroclor-1242 was detected in one sample at location 46-611549 from 3.0–4.0 ft bgs. Aroclor-1242 concentrations were below the EQL. The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 and Aroclor-1260 were detected in one soil sample at location 46-611549 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth and decreased at downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Toluene was detected in four samples at three locations. The maximum concentration of 0.00351 mg/kg was detected at location 46-611547 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at all locations and decreased at downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in two samples at two locations. The maximum concentration of 64 mg/kg was detected at location 46-611547 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at location 46-611547, were below the EQL at location 46-611548, and decreased at downgradient. The lateral and vertical extent of TPH-DRO are defined.

Trichloroethene was detected in two samples at two locations. The maximum concentration of 0.00164 mg/kg was detected at location 46-611549 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased at downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs.

Summary of Nature and Extent

The extent of inorganic and organic COPCs is defined at SWMU 46-006(g). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-006(g).

7.39.5 Summary of Human Health Risk Screening

Details of the human health risk-screening assessment for SWMU 46-006(g) are discussed in Appendix I, section I-4.

The total excess cancer risk for the industrial scenario is 9×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.002, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO was identified as a COPC and the HQ is 0.06, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

The total excess cancer risk for the construction worker scenario is approximately 7×10^{-9}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.02, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.06, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

The total excess cancer risk for the residential scenario is approximately 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.06, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0 (NMED 2006, 094614).

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

7.39.6 Summary of Ecological Risk Screening

Details of the ecological risk-screening assessment 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, comparison with background concentrations, potential effects to populations (individuals for T&E species), and LOAEL analyses.

7.40 SWMU 46-007, Area of Potential Soil Contamination

7.40.1 Site Description and Operational History

SWMU 46-007 is an area of potential soil contamination associated with a partially paved ditch on the south and southeast sides of building 46-1 at TA-46 (Figure 7.13-1). The ditch drains north into a storm drain culvert that discharges into Cañada del Buey. The ditch also received effluent from the SWMU 46-004(s) outfall that previously discharged to the south side of building 46-1. The drainage path has been altered several times to accommodate construction projects at TA-46. During the late 1950s and early 1960s, the ditch was used to clean equipment from a cesium-plasma diode operation using butanol and kerosene. The ditch also received copper-containing material from heat-pipe research, and green staining was noted on outcropping tuff during early site visits. This SWMU may also have received a variety of chlorinated and hydrocarbon solvents. Mercury was known to have spilled in the south bay of building 46-1, and some floor drains from this area discharged to the SWMU 46-004(s) outfall, which emptied into the ditch (LANL 1993, 020952, pp. 5-79–5-80).

7.40.2 Relationship to Other SWMUs and AOCs

SWMU 46-007 previously received effluent from the SWMU 46-004(s) outfall and discharges from SWMU 46-007 could have flowed to the same hillside as SWMUs 46-004(m) and 46-004(z).

7.40.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-007, three samples were collected from three locations within the drainage ditches on the east and west sides of building 46-1. All samples were analyzed for inorganic chemicals, SVOCs, PCBs, pesticides, and isotopic uranium and by gamma spectroscopy. The two soil samples were also analyzed for VOCs. The samples collected within the drainage ditch were used to characterize SWMU 46-004(s). Several samples collected to characterize other SWMUs were also used to characterize SWMU 46-007, including two soil samples collected for SWMU 46-004(m), two soil samples collected for SWMU 46-004(s), and one soil sample collected for SWMU 46-004(b2) (LANL 1996, 054929, pp. 50, 62, 114, 199, 200, 206). Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Silver was detected above BV in the fill sample; zinc was detected above BV in one soil sample; and copper, lead, and mercury were detected above BVs in all three samples. Cesium was detected in one soil sample. The DLs for thallium were above BV in all three samples. Acenaphthene, anthracene, benzo(g,h,i)perylene, dibenzofuran, fluorene, indeno(1,2,3-cd)pyrene, and naphthalene were detected in one soil sample. Benzo(a)anthracene was detected in the fill sample and in one soil sample. Benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in all three samples. VOCs, PCBs, and pesticides were not detected. Radionuclides were not detected or detected above BVs/FVs.

7.40.4 Site Contamination

7.40.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-007:

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations in the ditch south of building 46-1 from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, cesium, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-007 are shown in Figure 7.13-1. Table 7.40-1 presents the samples collected and analyses requested for SWMU 46-007. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.40.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-007, a maximum concentration of 6.6 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13863) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.40.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-007 consist for results from 10 samples (5 soil and 5 tuff) collected from five locations.

Inorganic Chemicals

Ten samples (five soil and five tuff) were analyzed for TAL metals, cesium, cyanide, and perchlorate. Table 7.40-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten samples (five soil and five tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Plate 23 shows the spatial distribution of detected organic chemicals. Table 7.40-3 summarizes the analytical results for detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten samples (five soil and five tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.40-4 summarizes the analytical results for radionuclides. Plate 24 shows the spatial distribution of detected radionuclides. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.40.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.05 to 1.1 mg/kg) above the soil BV (0.83 mg/kg) in five samples and had DLs (1.06 to 1.11 mg/kg) above the tuff BV (0.5 mg/kg) in five samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.524 to 0.551 mg/kg) above BV in four samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Cesium was detected in five soil samples and five tuff samples at five locations. The maximum concentration of 3.11 mg/kg was detected at location 46-611755 from 2.0–3.0 ft bgs. Cesium concentrations decreased with depth at locations 46-611754, 46-611756, 46-611757, and 46-611758, increased with depth at location 46-611755, and decreased downgradient. The lateral extent of cesium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 20.3 mg/kg was detected at location 46-611754 from 2.0–3.0 ft bgs. Chromium concentrations increased with depth at both locations and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Copper was detected above the tuff BV (4.66 mg/kg) in one sample at a concentration of 8.32 mg/kg detected at location 46-611755 from 2.0–3.0 ft bgs. Copper concentrations increased with depth at this location and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the tuff BV (11.2 mg/kg) in one sample at a concentration of 15.9 mg/kg at location 46-611755 from 2.0–3.0 ft bgs. Lead concentrations increased with depth at this location and decreased downgradient. The lateral extent of lead is defined, but the vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in two samples and above the tuff BV (0.1 mg/kg) in two samples at three locations. The maximum concentration of 7.71 mg/kg was detected at location 46-611754 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at locations 46-611754 and 46-611756, increased with depth at location 46-611755, and decreased downgradient. The lateral extent of mercury is defined, but the vertical extent is not defined.

Selenium was not detected above tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.12 mg/kg) above the BV in five samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Acenaphthene, fluorene, and naphthalene were detected in one sample at location 46-611756 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acenaphthene, fluorene, and naphthalene are defined.

Anthracene was detected in two samples at two locations. The maximum concentration of 0.0602 mg/kg was detected at location 46-611756 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth at location 46-611756, were below the EQL at location 46-611755, and decreased downgradient. The lateral and vertical extent of anthracene are defined.

Aroclor-1254 was detected in two samples at two locations. The maximum concentration of 0.0274 mg/kg was detected at location 46-611755 from 2.0–3.0 ft bgs. Aroclor-1254 concentrations decreased with depth at location 46-611754, increased with depth at location 46-611455, and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in one tuff sample at a concentration of 0.0209 mg/kg at location 46-611755 from 2.0–3.0 ft bgs. Aroclor-1260 concentrations increased with depth at this location and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, and phenanthrene were detected in five samples at three locations. The maximum concentrations were detected at location 46-611756 from 0.0–1.0 ft bgs. The concentrations decreased with depth at location 46-611756 for all five chemicals. The concentrations were below the EQLs at locations 46-611755 for benzo(a)anthracene, benzo(g,h,i)perylene, and chrysene and were below EQLs at location 46-611757 for benzo(a)anthracene, benzo(a)pyrene, benzo(g,h,i)perylene, chrysene, and phenanthrene. The concentrations decreased downgradient. The lateral extent is defined, the vertical extent is defined for benzo(a)anthracene, benzo(g,h,i)perylene, and chrysene, but the vertical extent is not defined for benzo(a)pyrene, benzo(b)fluoranthene, and phenanthrene.

Di-n-octylphthalate was detected in one tuff sample at a concentration of 0.0845 mg/kg at location 46-611755 from 2.0–3.0 ft bgs. Di-n-octylphthalate concentrations were below the EQL. The lateral and vertical extent of di-n-octylphthalate are defined.

Fluoranthene and pyrene were detected in six samples at four locations. The maximum concentrations of these organic chemicals were detected at location 46-611756 from 0.0–1.0 ft bgs. Fluoranthene and pyrene concentrations increased with depth at location 46-611756, decreased with depth at the other locations, and decreased downgradient. The lateral extent of fluoranthene and pyrene is defined, but the vertical extent is not defined.

Indeno(1,2,3-cd)pyrene was detected in six samples at three locations. The maximum concentration of 0.14 mg/kg was detected at location 46-611756 from 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth at location 46-611756, were below the EQL at the other locations, and decreased downgradient. The lateral and vertical extent of indeno(1,2,3-cd)pyrene are defined.

Toluene and 1,1,1-trichloroethane were detected in one soil sample at location 46-611754 from 0.0–1.0 ft bgs. Toluene and 1,1,1-trichloroethane concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of toluene and 1,1,1-trichloroethane are defined.

TPH-DRO was detected in four samples at four locations. The maximum concentration of 163 mg/kg was detected at location 46-611754 from 0.0–1.0 ft bgs. Two of the samples from two locations had TPH-DRO at concentrations below the EQL. TPH-DRO concentrations decreased with depth at the other locations and decreased downgradient. The lateral and vertical extent of TPH-DRO are defined.

Trichloroethene was detected in two samples at two locations. The maximum concentration of 0.00388 mg/kg was detected at location 46-611754 from 0.0–1.0 ft bgs. Trichloroethene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Radionuclides

Cesium-137 was detected in one tuff sample at an activity of 0.286 pCi/g at location 46-611755 from 2.0–3.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Plutonium-239/240 was detected in one tuff sample at an activity of 0.0207 pCi/g at location 46-611755 from 2.0–3.0 ft bgs. Plutonium-239/240 activities increased with depth at this location and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of cesium, chromium, copper, lead, mercury, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, cesium-137, and plutonium-239/240 is not defined at SWMU 46-007.

7.40.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-007 because extent is not defined for the site.

7.40.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-007 because extent is not defined for the site.

7.41 SWMU 46-008(a), Storage Area

7.41.1 Site Description and Operational History

SWMU 46-008(a) is a storage area located along the south and east sides of building 46-88 at TA-46 (Figure 7.5-1). During a 1986 site visit, drums containing nitric acid, cyclohexane, pump oil, and methanol were observed in the SWMU 46-008(a) storage area. One of the drums was leaking (LANL 1993, 020952, p. 5-80). The storage area is paved with asphalt and is currently used to store laboratory equipment and supplies. In the late 1960s and early 1970s, building 46-88 housed a structural test laboratory where pressure vessels associated with the Rover Program were tested. Starting in the mid-1970s, the building was used for process chemistry work to isolate nonradioactive isotopes of carbon, oxygen, and nitrogen (LANL 1993, 020952, p. 5-126).

7.41.2 Relationship to Other SWMUs and AOCs

SWMU 46-008(a) is not associated with any other SWMUs or AOCs.

7.41.3 Summary of Previous Investigations

During the 1994 Phase I RFI, three samples were collected from three locations east and southeast of SWMU 46-008(a). All samples were submitted for analyses of TAL metals and SVOCs. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Zinc was detected above BV in one sample. The DLs for antimony and cadmium were above BVs in all three samples. SVOCs were not detected.

7.41.4 Site Contamination

7.41.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(a):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations next to the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-008(a) are shown in Figure 7.5-1. Table 7.41-1 presents the samples collected and analyses requested for SWMU 46-008(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.41.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-008(a), a maximum concentration of 7.3 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-11797) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.41.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(a) consist of results from 10 soil samples collected from five locations.

Inorganic Chemicals

Ten soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.41-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten soil samples were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.41-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten soil samples were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(a).

7.41.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV but had DLs (1.07 to 1.18 mg/kg) above the soil BV (0.83 mg/kg) in five samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.536 to 0.592 mg/kg) above the BV in 10 samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Organic Chemicals

Acetone was detected in one soil sample at a concentration of 0.0451 mg/kg at location 46-611340 from 0.0–1.0 ft bgs. Acetone concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acetone are defined.

Toluene was detected in three soil samples at three locations. The maximum concentration of 0.00155 mg/kg was detected at location 46-611338 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in seven samples at five locations. The maximum concentration of 123 mg/kg was detected below the EQL at location 46-611338 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at locations 46-611338, 46-611341, and 46-611342, increased with depth at locations 46-611339 and 46-611340, and decreased downgradient. The lateral extent of TPH-DRO is defined, but the vertical extent is not defined.

Trichloroethane(1,1,1-) was detected in two samples at one location. The maximum concentration of 0.00201 mg/kg was detected at location 46-611338 from 0.0–1.0 ft bgs. Trichloroethane(1,1,1-) concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 1,1,1-trichloroethane are defined.

Trichloroethene was detected in one soil sample at a concentration of 0.000434 mg/kg at location 46-611339 from 2.0–3.0 ft bgs. Trichloroethene concentrations were below the EQL at this location and decreased downgradient. The lateral and vertical extent of trichloroethene are defined.

Xylene(1,3-)+xylene(1,4-) was detected in two samples at two locations. The maximum concentration of 0.000749 mg/kg was detected at location 46-611342 from 0.0–1.0 ft bgs. Xylene(1,3-)+xylene(1,4-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(a).

Summary of Nature and Extent

The vertical extent of TPH-DRO is not defined at SWMU 46-008(a). The extent of inorganic chemicals is defined. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(a).

7.41.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(a) because extent is not defined for the site.

7.41.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(a) because extent is not defined for the site.

7.42 SWMU 46-008(b), Storage Area

7.42.1 Site Description and Operational History

SWMU 46-008(b) is a former drum storage area located on the east side of building 46-1 at TA-46 (Figure 7.13-1). The storage area was unpaved, measured approximately 20 ft × 20 ft, and sloped east to a storm drainage ditch and culvert that discharge into Cañada del Buey (LANL 1993, 020952, pp. 5-76, 5-80).

7.42.2 Relationship to Other SWMUs and AOCs

Runoff from SWMU 46-008(b) flows to the same storm drainage ditch that receives runoff from SWMU 46-007.

7.42.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-008(b), two samples were collected from two locations within the former storage area. Both samples were submitted for analyses of SVOCs, PCBs, and pesticides and by gamma spectroscopy. One sample was also analyzed for TAL metals, isotopic thorium, and isotopic uranium. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Mercury was detected above BV in one sample. The DL for thallium was above the BV in one sample. Bis(2-ethylhexyl)phthalate, dieldrin, fluoranthene, indeno(1,2,3-cd)pyrene, and phenanthrene were detected in one sample. Aroclor-1254, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and pyrene were detected in both samples. Radionuclides were not detected or detected above BVs/FVs.

7.42.4 Site Contamination

7.42.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(b):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Eight samples were collected from four locations beneath and downgradient of the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-008(b) are shown in Figure 7.13-1. Table 7.42-1 presents the samples collected and analyses requested for SWMU 46-008(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.42.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-008(b) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.42.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(b) consist of results from eight samples (seven soil and one tuff) collected from four locations.

Inorganic Chemicals

Eight samples (seven soil and one tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.42-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 22 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Eight samples (seven soil and one tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.42-3 presents the detected organic chemicals. Plate 23 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Eight samples (seven soil and one tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.42-4 presents the radionuclides detected or detected above BVs/FVs. Plate 24 shows the spatial distribution of detected radionuclides above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.42.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in two samples at two locations. Antimony also had DLs above the soil and tuff BVs in one sample each. The maximum concentration of 1.29 mg/kg was detected at location 46-611203 from 2.0–3.0 ft bgs. Antimony concentrations decreased with depth at location 46-611203, increased with depth at location 46-611202, and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 19). The lateral extent for antimony is defined, but the vertical extent is not defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.531 to 0.58 mg/kg) above the BV in seven samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at one location. The maximum concentration of 81.1 mg/kg was detected at location 46-611202 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in one sample at a concentration of 36.7 mg/kg at location 46-611201 from 2.0–3.0 ft bgs. Lead concentrations increased with depth at this location and decreased downgradient. The lateral extent of lead is defined, but vertical extent is not defined.

Mercury was detected above the soil BV (0.1 mg/kg) in two samples at one location. The maximum concentration of 0.854 mg/kg was detected at location 46-611202 from 0.0–1.0 ft bgs. Mercury concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of mercury are defined.

Selenium was detected above the tuff BV (0.3 mg/kg) in one sample at a concentration of 0.61 mg/kg at location 46-611200 from 2.0–3.0 ft bgs. Selenium was detected at a concentration of 1.09 mg/kg, which is below the soil BV (1.52 mg/kg), from 0.0–1.0 ft bgs at this location and decreased with depth at this location. Selenium concentrations decreased downgradient. The lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at one location. The maximum concentration of 150 mg/kg was detected at location 46-611202 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene were detected in two to seven samples at two to four locations. The maximum concentrations were detected at location 46-611203 from 2.0–3.0 ft bgs. The concentrations increased with depth at location 46-611203 (at the drainline inlet), decreased with depth at all other locations, and decreased downgradient within the drainage associated with SWMU 46-004(m) (Plate 20). The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Acetone was detected in one soil sample at a concentration of 0.000354 mg/kg at location 46-611200 from 2.0–3.0 ft bgs. Acetone concentrations were below the EQL. The lateral and vertical extent of acetone are defined.

Aroclor-1254 was detected in three samples at two locations. The maximum concentration of 0.0905 mg/kg was detected at location 46-611201 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at location 46-611201, were below the EQL at location 46-611202, and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in one soil sample at a concentration of 0.0295 mg/kg at location 46-611201 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Dinitrotoluene(2,4-) was detected in one soil sample at a concentration of 1.05 mg/kg at location 46-611202 from 2.0–3.0 ft bgs. Dinitrotoluene(2,4-) concentrations increased with depth at this

location and decreased downgradient. The lateral extent of 2,4-dinitrotoluene is defined, but the vertical extent is not defined.

Ethylbenzene was in one soil sample at a concentration of 0.000361 mg/kg at location 46-611200 from 0.0–1.0 ft bgs. Ethylbenzene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of ethylbenzene are defined.

Phenanthrene and pyrene were detected in five samples at four locations. The maximum concentrations of these organic chemicals were detected at location 46-611203 from 2.0–3.0 ft bgs. Phenanthrene and pyrene concentrations increased with depth at this location (at the drainline inlet) and at location 46-611202 and decreased downgradient at location 46-611455, at SWMU 46-004(m) (Plate 20). The lateral extent of phenanthrene and pyrene is defined, but the vertical extent is not defined.

Toluene was detected in three samples at two locations. The maximum concentration of 0.00286 mg/kg was detected at location 46-611200 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in five samples at four locations. The maximum concentration of 73.4 mg/kg was detected at location 46-611202 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at locations 46-611200, 46-611202, and 46-611203, were below the EQL at location 46-611201, and decreased downgradient. The lateral and vertical extent of TPH-DRO are defined.

Trichloroethane(1,1,1-) and 1,1,2-trichloro-1,2,2-trifluoroethane were detected in one soil sample at location 46-611202 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 1,1,1-trichloroethane and 1,1,2-trichloro-1,2,2-trifluoroethane are defined.

Xylene(1,2-) and 1,3-xylene+1,4-xylene were detected in one and three samples, respectively, at one and two locations. The maximum concentrations were detected at location 46-611200 from 0.0–1.0 ft bgs. Xylene(1,2-) and 1,3-xylene+1,4-xylene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of 1,2-xylene and 1,3-xylene+1,4-xylene are defined.

Radionuclides

Cesium-137 was detected in one subsurface soil sample at an activity of 0.0989 pCi/g at location 46-611202 from 2.0–3.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample at an activity of 0.112 pCi/g at location 46-611200 from 2.0–3.0 ft bgs. Uranium-235/236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but the vertical is not defined.

Summary of Nature and Extent

The vertical extent of antimony, lead, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236 is not defined at SWMU 46-008(b).

7.42.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(b) because extent is not defined for the site.

7.42.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(b) because extent is not defined for the site.

7.43 SWMU 46-008(d), Storage Area

7.43.1 Site Description and Operational History

SWMU 46-008(d) is a paved storage area located on the south side of building 46-24 at TA-46 (Figure 7.5-1). This area stored laboratory equipment and supplies. A 1986 site visit noted two unlabeled drums of oil on the south side of structure 46-24 (LANL 1990, 007513, p. 125).

7.43.2 Relationship to Other SWMUs and AOCs

SWMU 46-008(d) is not associated with any other SWMUs or AOCs.

7.43.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-008(d), two samples were collected from two unpaved locations southwest and downgradient of the storage area. The samples were submitted for analyses of TAL metals, VOCs, SVOCs, PCBs, and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Chromium, lead, nickel, and silver were detected above BVs in one sample. The DLs for cadmium and silver were above BVs in two and one samples, respectively. Bis(2-ethylhexyl)phthalate, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, fluoranthene, phenanthrene, and pyrene were detected in one sample. Cesium-137 was detected in one sample. Isotopic uranium was not detected or was not detected above BV.

7.43.4 Site Contamination

7.43.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(d):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twelve samples were collected from six locations next to the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-008(d) are shown in Figure 7.5-1. Table 7.43-1 presents the samples collected and analyses requested for SWMU 46-008(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.43.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-008(d), a maximum concentration of 0.1 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. No changes to sampling or other activities occurred because of the field-screening results.

7.43.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(d) consist of results from 12 samples (5 soil and 7 tuff) collected from six locations.

Inorganic Chemicals

Twelve samples (five soil and seven tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.43-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Twelve samples (five soil and seven tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.43-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Twelve samples (five soil and seven tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(d).

7.43.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.957 to 1.08 mg/kg) above the soil BV (0.83 mg/kg) in three samples and had DLs (0.527 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in seven samples. Because antimony was not detected above the BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.478 to 0.558 mg/kg) above the soil BV in five samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in two samples at two locations. The maximum concentration of 8.91 mg/kg was detected at location 46-611347 from 2.0–3.0 ft bgs. Chromium concentrations were below the maximum tuff background concentration (13 mg/kg) (Figure H-54) and decreased downgradient. The lateral and vertical extent of chromium are defined.

Copper was detected above the tuff BV (4.66 mg/kg) in one sample at a concentration of 6.35 mg/kg at location 46-611348 from 2.0–3.0 ft bgs. Copper concentrations increased with depth at this location and decreased downgradient. The lateral extent of copper is defined, but the vertical extent is not defined.

Lead was detected above the tuff BV (11.2 mg/kg) in one sample at a concentration of 14 mg/kg at location 46-611343 from 2.0–3.0 ft bgs. Lead concentrations were below the maximum tuff background concentration (15.5 mg/kg) (Figure H-54) and decreased downgradient. The lateral and vertical extent of lead are defined.

Manganese was detected above the tuff BV (482 mg/kg) in two samples at one location. The maximum concentration of 705 mg/kg was detected at location 46-611345 from 0.0–1.0 ft bgs. Manganese concentrations decreased with depth, were below the maximum tuff background concentration (752 mg/kg) (Figure H-55), and decreased downgradient. The lateral and vertical extent of manganese are defined.

Nickel was detected above the tuff BV (6.58 mg/kg) in one sample at a concentration of 12.6 mg/kg at location 46-611348 from 2.0–3.0 ft bgs. Nickel concentrations increased with depth at this location and decreased downgradient. The lateral extent of nickel is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.02 to 1.15 mg/kg) above the BV in seven samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Organic Chemicals

Acenaphthene was detected in two samples at one location. The maximum concentration of 0.192 mg/kg was detected at location 46-611346 from 2.0–3.0 ft bgs. Acenaphthene concentrations increased with depth at this location and decreased downgradient. The lateral extent of acenaphthene is defined, but the vertical extent is not defined.

Anthracene was detected in three samples at two locations. The maximum concentration of 0.275 mg/kg was detected at location 46-611346 from 2.0–3.0 ft bgs. Anthracene concentrations decreased with depth at location 46-611344, increased with depth at location 46-611346, and decreased downgradient. The lateral extent of anthracene is defined, but the vertical extent is not defined.

Aroclor-1254 was detected in one sample at location 46-611346 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Methylene chloride was detected in two samples at two locations. The maximum concentration of 0.00243 mg/kg was detected at location 46-611346 from 0.0–1.0 ft bgs. Methylene chloride concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of methylene chloride are defined.

Aroclor-1260 was detected in three samples at three locations. The maximum concentration was detected at location 46-611346 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at

locations 46-611346 and 46-611348, were below EQL at location 46-611344, and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and phenanthrene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611346 from 2.0–3.0 ft bgs. The concentrations decreased with depth at location 46-611343, increased with depth at locations 46-611346 and 46-611348, and decreased downgradient. The lateral extent of benzo(a)pyrene, benzo(b)fluoranthene, chrysene, and phenanthrene is defined, but vertical extent is not defined.

Benzo(a)anthracene and benzo(k)fluoranthene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611346 from 2.0–3.0 ft bgs. Benzo(a)anthracene and benzo(k)fluoranthene concentrations decreased with depth at location 46-611343, increased with depth at location 46-611346, were below EQLs at location 46-611348, and decreased downgradient. The lateral extent of benzo(a)anthracene and benzo(k)fluoranthene is defined, but vertical extent is not defined.

Benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene were detected in three samples at two locations. The maximum concentrations were detected at location 46-611346 from 2.0–3.0 ft bgs. Benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene concentrations remained the same with depth at location 46-611346, were below EQLs at location 46-611348, and decreased downgradient. The lateral extent of benzo(g,h,i)perylene and indeno(1,2,3-cd)pyrene is defined, but vertical extent is not defined.

Dibenzofuran was detected in one sample at location 46-611346 from 2.0–3.0 ft bgs. Dibenzofuran concentrations were below the EQL. The lateral and vertical extent of dibenzofuran are defined.

Ethylbenzene, 1,2,4-trimethylbenzene, and 1,2-xylene were detected in one sample at location 46-611347 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of ethylbenzene, 1,2,4-trimethylbenzene, and 1,2-xylene are defined.

Fluoranthene and pyrene were detected in six samples at five locations. The maximum concentrations were detected at location 46-611346 from 2.0–3.0 ft bgs. Fluoranthene and pyrene concentrations decreased with depth at locations 46-611343, 46-611344, and 46-611347, increased with depth at locations 46-611346 and 46-611348, and decreased downgradient. The lateral extent of fluoranthene and pyrene is defined, but vertical extent is not defined.

Fluorene was detected in two samples at one location. The maximum concentration of 0.175 mg/kg was detected at location 46-611346 from 2.0–3.0 ft bgs. Fluorene concentrations increased with depth at this location and decreased downgradient. The lateral extent of fluorene is defined, but vertical extent is not defined.

Methylnaphthalene(2-) and naphthalene were detected in one sample at location 46-611346 from 2.0–3.0 ft bgs. Methylnaphthalene(2-) and naphthalene concentrations increased with depth at this location and decreased downgradient. The lateral extent of 2-methylnaphthalene and naphthalene is defined, but vertical extent is not defined.

Toluene was detected in four samples at four locations. The maximum concentration of 0.00249 mg/kg was detected at location 46-611347 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in four samples at three locations. The maximum concentration of 75.6 mg/kg was detected at location 46-611346 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of TPH-DRO are defined.

Xylene(1,3-)+xylene(1,4-) was detected in seven samples at five locations. The maximum concentration of 0.00117 mg/kg was detected at location 46-611347 from 0.0–1.0 ft bgs. Xylene(1,3-)+xylene(1,4-) concentrations decreased with depth at locations 46-611344, 46-611345, 46-611346, and 46-611347 and below EQL at location 46-611348. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(d).

Summary of Nature and Extent

The vertical extent of copper, nickel, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylnaphthalene(2-), naphthalene, phenanthrene, and pyrene is not defined at SWMU 46-008(d). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-008(d).

7.43.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(d) because extent is not defined for the site.

7.43.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(d) because extent is not defined for the site.

7.44 SWMU 46-008(e), Storage Area

7.44.1 Site Description and Operational History

SWMU 46-008(e) is an unpaved storage area located south of an office transportable (building 46-187) at TA-46 (Figure 7.3-1). The 20-ft × 35-ft area has been used for storage since the 1950s. A storage shed (structure 46-79) formerly occupied the site but was removed sometime before 1988. Four drums of what may have been waste vacuum oil were noted to be stored at the site during a 1986 site visit (LANL 1993, 020952, p. 5-81). Traces of asphalt in the soil indicate the area may have been paved previously. An office transportable (building 46-555) currently occupies the site. Drainage from the area flows east into a storm drainage that discharges to SWSC Canyon outside the TA-46 perimeter fence (LANL 1993, 020952, p. 5-81).

7.44.2 Relationship to Other SWMUs and AOCs

Runoff from SWMU 46-008(e) flows toward SWMUs 46-006(b) and 46-009(a).

7.44.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-008(e), eight samples were collected from eight locations: four within the boundary of the storage area, two from the storm drainage to the east, and two from locations south and downgradient of the two storm drainage samples on the north rim of SWSC Canyon. All samples were submitted for analyses of TAL metals, SVOCs, PCBs, and isotopic uranium and by gamma spectroscopy. The four samples collected within the storage area were also analyzed for pesticides, and one of these samples was analyzed for VOCs. The four samples collected within and downgradient of the storm drainage were also analyzed for isotopic thorium, and one of these samples was analyzed for VOCs. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Zinc was detected above BV in two soil samples, and mercury was detected above BV in four soil samples. The DLs for antimony and cadmium were above BVs in one fill and three soil samples; the DLs for thallium were above BV in four soil samples. Uranium-235 was detected above BV in one soil sample. VOCs, SVOCs, PCBs, and pesticides were not detected. Isotopic thorium was not detected above BV. Radionuclides analyzed by gamma spectroscopy were not detected or detected above FVs.

7.44.4 Site Contamination

7.44.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(e):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Fourteen samples were collected from seven locations beneath, next to, and downgradient of the storage area from 0.0–0.75 ft bgs or 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-008(e) are shown in Figure 7.3-1. Table 7.44-1 presents the samples collected and analyses requested for SWMU 46-008(e). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.44.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-008(e), a maximum concentration of 2.2 ppm was detected at a depth of 0.0–0.5 ft bgs. A sample from this depth (46-10-11819) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-008(e). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.44.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(e) consist of results from 14 samples (6 soil and 8 tuff) collected from seven locations.

Inorganic Chemicals

Fourteen samples (six soil and eight tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.44-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Fourteen samples (six soil and eight tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.44-3 presents the detected organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Fourteen samples (six soil and eight tuff) were analyzed for isotopic uranium, isotopic plutonium, isotopic thorium, americium-241, and gamma-emitting radionuclides. Table 7.44-4 presents the radionuclides detected or detected above BVs/FVs. Plate 6 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.44.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.05 to 1.12 mg/kg) above the soil BV (0.83 mg/kg) in three samples and had DLs (1.02 to 1.1 mg/kg) above the tuff BV (0.5 mg/kg) in six samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.489 to 0.572 mg/kg) above BV in six samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the tuff BV (2200 mg/kg) in one sample at a concentration of 2520 mg/kg at location 46-611353 from 2.0–3.0 ft bgs. Calcium concentrations increased with depth at this location and decreased downgradient at location 46-611372 within SWMU 46-006(b) (Plate 4). The lateral extent of calcium is defined, but the vertical extent is not defined.

Chromium was detected above the tuff BV (7.14 mg/kg) in one sample at a concentration of 13.2 mg/kg at location 46-611349 from 2.0–3.0 ft bgs. Chromium concentrations increased with depth at this location and decreased downgradient. The lateral extent of chromium is defined, but the vertical extent is not defined.

Perchlorate was detected in one soil sample and two tuff samples at three locations. The maximum concentration of 0.000776 mg/kg was detected at location 46-611355 from 2.0–3.0 ft bgs. Perchlorate concentrations decreased with depth at locations 46-611349 and 46-611350, were below EQL at location 46-611355, and decreased downgradient at location 46-611372 within SWMU 46-006(b) (Plate 4). The lateral and vertical extent of perchlorate are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (1.01 to 1.11 mg/kg) above BV in eight samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was not detected in tuff above the tuff BV (1 mg/kg) but had a DL (2.71 mg/kg) above BV in one sample. Because silver was not detected above BV, the lateral and vertical extent of silver are defined.

Thallium was detected above the soil BV (0.73 mg/kg) in one sample at a concentration of 0.926 mg/kg at location 46-611355 from 0.0–1.0 ft bgs. Thallium concentrations decreased with depth and decreased downgradient at location 46-611372 within SWMU 46-006(b) (Plate 4). The lateral and vertical extent of thallium are defined.

Organic Chemicals

Aroclor-1254 and Aroclor-1260 were detected in one sample at location 46-611354 from 0.0–0.75 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Butylbenzene(n-), butylbenzene(sec-), ethylbenzene, 4-isopropyltoluene, naphthalene, 1-propylbenzene, 1,2-xylene, and 1,3-xylene+1,4-xylene were detected in one sample at location 46-611351 from 0.0–0.5 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of these organic chemicals are defined.

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

Methylnaphthalene(2-) was detected in three samples at three locations. The maximum concentration of 0.0493 mg/kg was detected at location 46-611351 from 0.0–0.5 ft bgs. Methylnaphthalene(2-) concentrations decreased with depth at all locations and decreased downgradient. The lateral and vertical extent of 2-methylnaphthalene are defined.

TPH-DRO was detected in eight samples at five locations. The maximum concentration of 158 mg/kg was detected at location 46-611352 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at locations 46-611349, 46-611351, 46-611352, and 46-611353, increased with depth at location 46-611354, and decreased downgradient. The lateral extent of TPH-DRO is defined, but the vertical extent is not defined.

Trichloroethane(1,1,1-) and trichloroethene were detected in one sample at location 46-611352 from 0.0–1.0 ft bgs. Trichloroethane(1,1,1-) and trichloroethene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of 1,1,1-trichloroethane and trichloroethene are defined.

Trimethylbenzene(1,2,4-) and 1,3,5-trimethylbenzene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611351 from 0.0–0.5 ft bgs. Trimethylbenzene(1,2,4-) and 1,3,5-trimethylbenzene concentrations decreased with depth at

location 46-611351, were below the EQLs at location 46-611354, and decreased downgradient. The lateral and vertical extent of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene are defined.

Radionuclides

Americium-241 was detected above the soil FV (0.013 pCi/g) in one sample at location 46-611353 from 0.0–1.0 ft bgs. Americium-241 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of americium-241 are defined.

Summary of Nature and Extent

The vertical extent of calcium, chromium, and TPH-DRO is not defined at SWMU 46-008(e). The extent of radionuclides is defined at SWMU 46-008(e)

7.44.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(e) because extent is not defined for the site.

7.44.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(e) because extent is not defined for the site.

7.45 SWMU 46-008(f), Storage Area

7.45.1 Site Description and Operational History

SWMU 46-008(f) is a paved storage area located next to the southeast corner of building 46-31 at TA-46 (Figure 7.11-1). During a 1986 site visit, four drums of oil, which could have been product or waste oil, were observed at this location (LANL 1993, 020952, p. 5-81).

7.45.2 Relationship to Other SWMUs and AOCs

Runoff from SWMU 46-008(f) flows to the same hillside as discharges from SWMUs 46-004(a2,u,v).

7.45.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-008(f), one sample was collected from the east side of the storage area, and one sample was collected southeast of the storage area. Both samples were submitted for analyses of TAL metals, VOCs, SVOCs, and isotopic uranium and by gamma spectroscopy. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium was detected above BV in one sample, and copper, lead, and zinc were detected above BVs in both samples. The DLs for cadmium and silver were above BVs in one and two samples, respectively. 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, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, naphthalene, phenanthrene, pyrene, and

1,1,1-trichloroethane were detected in one sample. Radionuclides were not detected or detected above BVs/FVs.

7.45.4 Site Contamination

7.45.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(f):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Ten samples were collected from five locations beneath and next to the storage area from 0.0–1.0 ft and 3.0–4.0 ft (beneath the asphalt).
- Four samples were collected from two locations downgradient of the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-008(f) are shown in Figure 7.11-1. Table 7.45-1 presents the samples collected and analyses requested for SWMU 46-008(f). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.45.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-008(f), a maximum concentration of 9.2 ppm was detected at a depth of 2.0–3.0 ft bgs. A sample from this depth (46-10-13195) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-008(f). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.45.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(f) consist of results from 14 samples (8 soil and 6 tuff) collected from seven locations.

Inorganic Chemicals

Fourteen samples (eight soil and six tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.45-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 19 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Fourteen samples (eight soil and six tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.45-3 presents the detected organic chemicals. Plate 20 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Fourteen samples (eight soil and six tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.45-4 presents the radionuclides detected or detected above BVs/FVs. Plate 21 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.45.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (1.08 to 1.27 mg/kg) above the soil BV (0.83 mg/kg) in eight samples and had DLs (1.01 to 1.15 mg/kg) above the tuff BV (0.5 mg/kg) in six samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.538 to 0.635 mg/kg) above BV in six samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Calcium was detected above the soil BV (6120 mg/kg) in one sample at a concentration of 7770 mg/kg at location 46-611555 from 0.0–1.0 ft bgs. Calcium concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of calcium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in two samples at two locations. The maximum concentration of 22.8 mg/kg was detected at location 46-611551 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of copper are defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.986 to 1.18 mg/kg) above BV in six of six samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in one sample at a concentration of 69.3 mg/kg at location 46-611551 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene and fluorene were detected in two samples at two locations. The maximum concentrations were detected at location 46-611552 from 0.0–1.0 ft bgs. Acenaphthene and fluorene concentrations decreased with depth at both locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of acenaphthene and fluorene are defined.

Anthracene was detected in four samples at four locations. The maximum concentration of 0.112 mg/kg was detected at location 46-611552 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of anthracene are defined.

Aroclor-1242 was detected in five samples at five locations. The maximum concentration of 0.0044 mg/kg was detected at location 46-611551 from 2.0–3.0 ft bgs. Aroclor-1242 concentrations decreased with depth at locations 46-611554 and 46-611556, were below EQL at locations 46-611550 and 46-611553, increased with depth at location 46-611551, and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral extent of Aroclor-1242 is defined, but vertical extent is not defined.

Aroclor-1254 was detected in six samples at four locations. The maximum concentration of 0.095 mg/kg was detected at location 46-611555 from 0.0–1.0 ft bgs. Aroclor-1254 concentrations decreased with depth at locations 46-611551, 46-611555, and 46-611556, were below EQL at location 46-611550, and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral extent of and vertical of Aroclor-1254 are defined.

Aroclor-1260 was detected in four samples at two locations. The maximum concentration of 0.0761 mg/kg was detected at location 46-611555 from 0.0–1.0 ft bgs. Aroclor-1260 concentrations decreased with depth at locations 46-611551 and 46-611555 and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene, benzo(b)fluoranthene, chrysene, phenanthrene, and pyrene were detected in six samples at five locations. The maximum concentrations were detected at location 46-611551 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of these organic chemicals are defined.

Benzo(a)pyrene was detected in five samples at four locations. The maximum concentration of 0.334 mg/kg was detected at location 46-611551 from 0.0–1.0 ft bgs. Benzo(a)pyrene concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of benzo(a)pyrene are defined.

Benzo(g,h,i)perylene and benzo(k)fluoranthene were detected in three samples at three locations. The maximum concentrations were detected at location 46-611551 from 0.0–1.0 ft bgs. Benzo(g,h,i)perylene and benzo(k)fluoranthene concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of benzo(g,h,i)perylene and benzo(k)fluoranthene are defined.

Fluoranthene was detected in seven samples at five locations. The maximum concentration of 0.988 mg/kg was detected at location 46-611551 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of fluoranthene are defined.

Indeno(1,2,3-cd)pyrene was detected in four samples at three locations. The maximum concentration of 0.171 mg/kg was detected at location 46-611551 from 0.0–1.0 ft bgs. Indeno(1,2,3-cd)pyrene concentrations decreased with depth at all locations and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of indeno(1,2,3-cd)pyrene are defined.

Methylnaphthalene(2-), methylene chloride, and naphthalene were detected in one sample at location 46-611552 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral and vertical extent of 2-methylnaphthalene, methylene chloride, and naphthalene are defined.

TPH-DRO was detected in five samples at four locations. The maximum concentration of 42.5 mg/kg was detected at location 46-611555 from 3.0–4.0 ft bgs. TPH-DRO concentration decreased with depth at locations 46-611553 and 46-611554, were below the EQL at location 46-611551, increased with depth at location 46-611555, and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 20). The lateral extent of TPH-DRO is defined, but vertical extent is not defined.

Radionuclides

Cesium-137 was detected in one soil sample. The activity at location 46-611551 from 0.0–1.0 ft bgs was 0.106 pCi/g, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at this location and decreased downgradient at location 46-611619 within SWMU 46-004(a2) (Plate 21). The lateral and vertical extent for cesium-137 are defined.

Uranium-235/236 was detected above soil BV (0.2 pCi/g) in one sample at an activity of 0.255 pCi/g at location 46-611555 from 3.0–4.0 ft bgs. Uranium 235/236 activities increased with depth at this location and decreased downgradient. The lateral extent of uranium-235/236 is defined, but vertical is not defined.

Summary of Nature and Extent

The vertical extent of Aroclor-1242, TPH-DRO, and uranium-235/236 is not defined at SWMU 46-008(f). The extent of inorganic chemicals is defined at SWMU 46-008(f).

7.45.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(f) because extent is not defined for the site.

7.45.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(f) because extent is not defined for the site.

7.46 SWMU 46-008(g), Storage Area

7.46.1 Site Description and Operational History

SWMU 46-008(g) is an unpaved storage area located south of a laser laboratory (building 46-76) at TA-46 (Figure 7.5-1). In 1990, 20 drums containing dielectric oil were reported to be stored directly on the ground at this location (LANL 1993, 020952, p. 5-82). The site is a level area bisected by a drainage that flows east into SWSC Canyon through a storm drain culvert.

7.46.2 Relationship to Other SWMUs and AOCs

Runoff from SWMU 46-008(g) flows to the same hillside as the SWMU 46-004(t) outfall.

7.46.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-008(g), five samples were collected from four locations within and next to the storage area. All samples were submitted for analyses of TAL metals, SVOCs, and PCBs. Four samples were also analyzed for VOCs. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Cadmium, lead, manganese, and mercury were detected above BVs in one sample. Zinc was detected above BV in three samples. The DLs for antimony and cadmium were above BVs in five and four samples, respectively. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene were detected in one sample. Fluoranthene and pyrene were detected in three samples. PCBs were not detected.

7.46.4 Site Contamination

7.46.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-008(g):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Tables 3.2-2.
- Fourteen samples were collected from seven locations beneath, next to, and downgradient of the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, pesticides, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. TPH-DRO was inadvertently excluded from the sampling paperwork for this site. Additional samples will be collected at SWMU 46-008(g) and analyzed for TPH-DRO during the Phase II investigation (see deviations in Appendix B).

The 2010 sampling locations at SWMU 46-008(g) are shown in Figure 7.5-1. Table 7.46-1 presents the samples collected and analyses requested for SWMU 46-008(g). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.46.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-008(g), a maximum concentration of 3.5 ppm was detected at a depth of 0.0–1.0 ft bgs. A sample from this depth (46-10-13805) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.46.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-008(g) consist of results from 14 samples (13 soil and 1 tuff) collected from seven locations.

Inorganic Chemicals

Fourteen samples (13 soil and 1 tuff) were analyzed for TAL metals, cyanide, and asbestos. Table 7.46-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 7 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified. Asbestos was not detected at SWMU 46-008(g).

Organic Chemicals

Fourteen samples (13 soil and 1 tuff) were analyzed for VOCs, SVOCs, PCBs, and pesticides. Table 7.46-3 presents the detected organic chemicals. Plate 8 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Fourteen samples (13 soil and 1 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.46-4 presents the radionuclides detected or detected above BVs/FVs. Plate 9 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.46.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was detected above the soil BV (0.83 mg/kg) in one sample at a concentration of 2.05 mg/kg at location 46-611752 from 0.0–1.0 ft bgs. Antimony also had DLs (1.04 to 1.2 mg/kg) above the soil BV in 11 samples and a DL (1.15 mg/kg) above the tuff BV (0.5 mg/kg) in one sample. Antimony concentrations decreased with depth at location 46-611752 and decreased downgradient in the drainage at location 46-611280 within SWMU 46-004(t) (Plate 7). The lateral and vertical extent of antimony are defined.

Cadmium was detected above the soil BV (0.4 mg/kg) in one sample at a concentration of 1.0 mg/kg at location 46-611752 from 0.0–1.0 ft bgs. Cadmium also had DLs (0.55 to 0.61 mg/kg) above the soil BV in eight samples. Cadmium concentrations decreased with depth at location 46-611752 and decreased downgradient in the drainage at location 46-611280 within SWMU 46-004(t) (Plate 7). The lateral and vertical extent of cadmium are defined.

Chromium was detected above the soil BV (19.3 mg/kg) in one sample at a concentration of 494 mg/kg at location 46-611752 from 0.0–1.0 ft bgs. Chromium concentrations decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 7). The lateral and vertical extent of chromium are defined.

Copper was detected above the soil BV (14.7 mg/kg) in one sample at a concentration of 69.4 mg/kg at location 46-611752 from 0.0–1.0 ft bgs. Copper concentrations decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 7). The lateral and vertical extent of copper are defined.

Lead was detected above the soil BV (22.3 mg/kg) in two samples and above the tuff BV (11.2 mg/kg) one sample at two locations. The maximum concentration of 180 mg/kg was detected at location 46-611752 from 0.0–1.0 ft bgs. Lead concentrations decreased with depth at location 46-611752, increased with depth at location 46-611746, and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 7). The lateral extent of lead is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had a DL (1.06 mg/kg) above BV in one sample. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Silver was detected above the soil BV (1 mg/kg) in two samples at two locations. The maximum concentration of 3.01 mg/kg was detected at location 46-611752 from 0.0–1.0 ft bgs. Silver concentrations decreased with depth at both locations and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 7). The lateral and vertical extent of silver are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in five samples at four locations. The maximum concentration of 176 mg/kg was detected at location 46-611747 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 7). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene was detected in five samples at four locations. The maximum concentration of 0.749 mg/kg was detected at location 46-611752 from 0.0–1.0 ft bgs. Acenaphthene concentrations decreased with depth at all locations and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of acenaphthene are defined.

Acenaphthylene was detected in one sample at a concentration of 0.0379 mg/kg at location 46-611752 from 0.0–1.0 ft bgs. Acenaphthylene concentrations decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of acenaphthylene are defined.

Anthracene was detected in seven samples at six locations. The maximum concentration of 1.05 mg/kg was detected at location 46-611752 from 0.0–1.0 ft bgs. Anthracene concentrations decreased with depth at five locations, were below the EQL at location 46-611749, and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of anthracene are defined.

Aroclor-1242 was detected in one sample at a concentration of 0.107 mg/kg at location 46-611751 from 0.0–1.0 ft bgs. Aroclor-1242 concentrations decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of Aroclor-1242 are defined.

Aroclor-1254 and Aroclor-1260 were detected in six samples at four locations. The maximum concentrations were detected at location 46-611752 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with at locations 46-611750, 46-611751, and 46-611752, increased with depth at location 46-611748, and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral extent of Aroclor-1254 and Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and phenanthrene were detected in eight samples at six locations. The maximum concentrations were detected at location 46-611752 from 0.0–1.0 ft bgs. The concentrations decreased with depth at five locations, increased with depth at location 46-611749,

and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral extent of benzo(a)anthracene, benzo(b)fluoranthene, chrysene, and phenanthrene is defined, but the vertical extent is not defined.

Benzo(a)pyrene was detected in seven samples at six locations. The maximum concentration of 3 mg/kg was detected from 0.0–1.0 ft bgs at location 46-611752. Benzo(a)pyrene concentrations decreased with depth at five locations, increased with depth at location 46-611749, and decreased downgradient within of SWMU 46-004(t) (Plate 8). The lateral extent of benzo(a)pyrene is defined, but the vertical extent is not defined.

Benzo(g,h,i)perylene, indeno(1,2,3-cd)pyrene, and pyrene were detected in 9 samples, and fluoranthene in 10 samples at six locations. The maximum concentrations were detected at location 46-611752 from 0.0–1.0 ft bgs. The concentrations decreased with depth at five locations, increased with depth at location 46-611749, and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral extent of benzo(g,h,i)perylene, fluoranthene, indeno(1,2,3-cd)pyrene, and pyrene is defined, but the vertical extent is not defined.

Dibenz(a,h)anthracene was detected in seven samples at five locations. The maximum concentration of 0.573 mg/kg was detected at location 46-611752 from 0.0–1.0 ft bgs. Dibenz(a,h)anthracene concentrations decreased with depth at locations 46-611747, 46-611748, and 460611752, were below the EQL at locations 46-611749 and 46-611751, and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Dibenzofuran was detected in two samples at location 46-611752 from 0.0–1.0 ft bgs. Dibenzofuran concentrations decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of dibenzofuran are defined.

Fluorene, 2-methylnaphthalene, and naphthalene were detected in four samples at three locations. The maximum concentrations were detected at location 46-611752 from 0.0–1.0 ft bgs. The concentrations decreased with depth at all locations and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 8). The lateral and vertical extent of fluorene, 2-methylnaphthalene, and naphthalene are defined.

Radionuclides

Cesium-137 was detected in one soil sample at one location. The maximum activity of 0.594 pCi/g was detected at location 46-611752 from 0.0–1.0 ft bgs, which is below the soil FV (1.65 pCi/g). Cesium-137 activities decreased with depth at this location and decreased downgradient within the drainage of SWMU 46-004(t) (Plate 9). The lateral and vertical extent of cesium-137 are defined.

Summary of Nature and Extent

The vertical extent of lead, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene is not defined at SWMU 46-008(g). The extent of radionuclides is defined at SWMU 46-008(g).

7.46.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-008(g) because extent is not defined for the site.

7.46.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-008(g) because extent is not defined for the site.

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

7.47.1 Site Description and Operational History

SWMU 46-009(a) is a surface disposal area located at the head of SWSC Canyon near the southeastern corner of TA-46 (Figure 7.3-1). The surface disposal area covers approximately 5000 yd^2, extending from the canyon rim to the floor of SWSC Canyon. The disposal area contains a variety of material including asphalt, concrete, plywood, pipe, and other construction materials. The dates material was disposed of at the site are not known. Aerial photographs of TA-46 taken in 1958 show the presence of the surface disposal area (LANL 1993, 020952, pp. 5-164–5-167), confirming that disposal had started by at least 1958.

7.47.2 Relationship to Other SWMUs and AOCs

The SWMU 46-003(a) drain field is located within the northwest corner of SWMU 46-009(a). Stormwater runoff from SWMUs 46-006(b), 46-008(e) and 46-0101(d) flows toward SWMU 46-009(a).

7.47.3 Summary of Previous Investigations

A series of non-RFI-related sampling events were conducted at SWMU 46-009(a). In 1990, samples were collected from three boreholes drilled to depths of 24 ft along the path of the road that bisects the surface disposal area. The samples were field screened for radioactivity and analyzed for toxicity characteristic leaching procedure metals, VOCs, and PCBs. In 1992, 10 composite surface-soil samples collected from SWMU 46-009(a) were field screened for radioactivity and analyzed for asbestos. During a second sampling event conducted in 1992, seven surface samples were collected from various locations within and around SWMU 46-009(a). The samples were field screened for radioactivity and submitted for analyses of TAL metals, VOCs, PCBs, asbestos, and total uranium. Analytical results for these events are not presented in this report but are summarized in the OU 1140 work plan (LANL 1993, 020952, pp. 5-164–5-170). No previous RFI sampling was conducted at SWMU 46-009(a).

7.47.4 Site Contamination

7.47.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-009(a):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Tables 3.2-2.
- Eighteen samples were collected from six locations within the landfill from 4.0–5.0 ft bgs, 9.0–10.0 ft bgs and 14.0–15.0 ft bgs.

- Twenty samples were collected from 10 locations downgradient of the landfill and in SWSC Canyon from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, nitrate, cyanide, pesticides, TPH-DRO, asbestos, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-009(a) are shown in Figure 7.3-1. Table 7.47-1 presents the samples collected and analyses requested for SWMU 46-009(a). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.47.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-009(a), a maximum concentration of 6.1 ppm was detected at a depth of 9.0–10.0 ft bgs. A sample from this depth (46-10-10025) was submitted for organic chemical analysis. Moisture-related instrumentation errors prevented the reporting of organic vapor field-screening concentrations at several sampling locations at SWMU 46-009(a). However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.47.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-009(a) consist of results from 38 samples (33 soil and 5 tuff) collected from 16 locations.

Inorganic Chemicals

Thirty-eight samples (33 soil and 5 tuff) were analyzed for TAL metals, nitrate, cyanide, and asbestos. Table 7.47-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified. Asbestos was not detected at SWMU 46-009(a).

Organic Chemicals

Thirty-eight samples (33 soil and 5 tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.47-3 presents the detected organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Thirty-eight samples (33 soil and 5 tuff) were analyzed isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.47-4 presents the radionuclides detected or detected above BVs/FVs. Plate 6 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.47.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.89 to 1.2 mg/kg) above the soil BV (0.83 mg/kg) in 23 samples and had DLs (1.01 to 1.16 mg/kg) above the tuff BV (0.5 mg/kg) in five samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had DLs (0.495 to 0.598 mg/kg) above BV in 28 samples. Because cadmium was not detected above BV, the lateral and vertical extent of cadmium are defined.

Nitrate was detected in 17 soil samples and 3 tuff samples at SWMU 46-009(a). The maximum concentration of 22.3 mg/kg was detected at location 46-610984 from 14.0–15.0 ft bgs. Nitrate is naturally occurring and the concentrations likely reflect naturally occurring levels. However, nitrate concentrations increased with depth at location 46-610984 to a maximum concentration of 22.3 mg/kg and decreased downgradient. The lateral extent of nitrate is defined, but the vertical extent is not defined.

Selenium was not detected above the tuff BV (0.3 mg/kg) but had DLs (0.929 to 1.1 mg/kg) above the BV in five samples. Because selenium was not detected above BV, the lateral and vertical extent of selenium are defined.

Sodium was detected above the soil BV (915 mg/kg) in one sample at a concentration of 1270 mg/kg at location 46-610998 from 1.0–2.0 ft bgs. The Gehan and quantile tests indicated site concentrations are not different from background (Figure H-56 and Table H-16). The lateral and vertical extent of sodium are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in two samples at one location. The maximum concentration of 220 mg/kg was detected at location 46-610998 from 1.0–2.0 ft bgs. Zinc concentrations increased with depth at this location and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Acenaphthene was detected in five samples at five locations. The maximum concentration of 0.367 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Acenaphthene concentrations decreased with depth at locations 46-610983, 46-610987, and 46-610988, were below EQL at location 46-610991, increased with depth at location 46-610990, and decreased downgradient. The lateral extent of acenaphthene is defined, but the vertical extent is not defined.

Acetone, 1-propylbenzene, 1,2,4-trimethylbenzene, and 1,2-xylene were detected in one sample at location 46-610994 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of acetone, 1-propylbenzene, 1,2,4-trimethylbenzene, and 1,2-xylene are defined.

Anthracene was detected in nine samples at eight locations. The maximum concentration of 0.624 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Anthracene concentrations decreased with depth at six locations, were below EQL at location 46-610991, increased with depth at location 46-610990, and decreased downgradient. The lateral extent of anthracene is defined, but the vertical extent is not defined.

Aroclor-1242 was detected in one sample at a concentration of 0.0536 mg/kg at location 46-610988 from 14–15 ft bgs. Aroclor-1242 concentrations increased with depth at this location and decreased downgradient. The lateral extent of Aroclor-1242 is defined, but the vertical extent is not defined.

Aroclor-1248 was detected in three samples at one location. The maximum concentration of 0.0264 mg/kg was detected at location 46-610987 from 9.0–10.0 ft bgs. Aroclor-1248 concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of Aroclor-1248 are defined.

Aroclor-1254 was detected in nine samples at seven locations. The maximum concentration of 0.039 mg/kg was detected at location 46-610988 from 14–15 ft bgs. Aroclor-1254 concentrations decreased with depth or were below EQLs at locations 46-610987, 46-610991, 46-610993, 46-610994, 46-610997, and 46-610998; increased with depth at location 46-610988; and decreased downgradient. The lateral extent of Aroclor-1254 is defined, but the vertical extent is not defined.

Aroclor-1260 was detected in 14 samples at 10 locations. The maximum concentration of 0.0455 mg/kg was detected at location 46-610987 from 14–15 ft bgs. Aroclor-1260 concentrations decreased with depth at seven locations, were below EQL at location 46-610990, increased with depth at locations 46-610987 and 46-610988, and decreased downgradient. The lateral extent of Aroclor-1260 is defined, but the vertical extent is not defined.

Benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, and pyrene were detected in 17, 18, 19, and 18 samples, respectively, at 13 locations. The maximum concentrations were detected at location 46-610983 from 4.0–5.0 ft bgs. The concentrations decreased with depth at 10 locations, were below EQL at location 46-610989, increased with depth at locations 46-610990 and 46-610991, and decreased downgradient. The lateral extent of benzo(a)anthracene, benzo(b)fluoranthene, fluoranthene, and pyrene is defined, but the vertical extent is not defined.

Benzo(a)pyrene was detected in 14 samples at 10 locations. The maximum concentration of 0.85 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Benzo(a)pyrene concentrations decreased with depth at eight locations, increased with depth at locations 46-610990 and 46-610991, and decreased downgradient. The lateral extent of benzo(a)pyrene is defined, but the vertical extent is not defined.

Benzo(g,h,i)perylene was detected in eight samples at seven locations. The maximum concentration of 0.539 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Benzo(g,h,i)perylene concentrations decreased with depth at six locations, increased with depth at location 46-610990, and decreased downgradient. The lateral extent of benzo(g,h,i)perylene is defined, but the vertical extent is not defined.

Benzo(k)fluoranthene was detected in two samples at two locations. The maximum concentration of 0.401 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Benzo(k)fluoranthene concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of benzo(k)fluoranthene are defined.

Bis(2-ethylhexyl)phthalate, chloromethane, and dibenzofuran were detected in one sample. The concentrations decreased with depth and/or were below the EQLs. The lateral and vertical extent of bis(2-ethylhexyl)phthalate, chloromethane, and dibenzofuran are defined.

Chrysene was detected in 15 samples at 11 locations. The maximum concentration of 0.94 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Chrysene concentrations increased with depth at locations 46-610990 and 46-610991 and decreased downgradient. The lateral extent of chrysene is defined, but the vertical extent is not defined.

Dibenz(a,h)anthracene was detected in one sample at a concentration of 0.13 mg/kg at location 46-610983 from 4.0–5.0 ft bgs. Dibenz(a,h)anthracene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of dibenz(a,h)anthracene are defined.

Fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene were detected in three samples at three locations. The maximum concentrations were detected at location 46-610983 from 4.0–5.0 ft bgs. The concentrations decreased with depth at locations 46-610983, 46-610984 (2-methylnaphthalene), and 46-610988 [indeno(1,2,3-cd)pyrene], were below EQLs (fluorene and naphthalene) at location 46-610991, increased with depth at locations 46-610990, and decreased downgradient. The lateral extent of fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, and naphthalene is defined, but the vertical extent is not defined.

Isopropyltoluene(4-) was detected in two samples at two locations. The maximum concentration of 0.0458 mg/kg was detected at location 46-610994 from 0.0–1.0 ft bgs. Isopropyltoluene(4-) concentrations decreased with depth at both locations and decreased downgradient. The lateral extent and vertical extent of 4-isopropyltoluene are defined.

Phenanthrene was detected in 16 samples at 12 locations. The maximum concentration of 2.64 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. Phenanthrene concentrations decreased with depth at nine locations, were below EQL at location 46-610989, increased with depth at locations 46-610990 and 46-610991, and decreased downgradient. The lateral extent of phenanthrene is defined, but the vertical extent is not defined.

Toluene was detected in five samples at five locations. The maximum concentration of 0.0615 mg/kg was detected at location 46-610994 from 0.0–1.0 ft bgs. Toluene concentrations decreased with depth at four locations, were below the EQL at location 46-610995, and decreased downgradient. The lateral and vertical extent of toluene are defined.

TPH-DRO was detected in 21 samples at 13 locations. The maximum concentration of 78 mg/kg was detected at location 46-610983 from 4.0–5.0 ft bgs. TPH-DRO concentrations decreased with depth at 11 locations, were below EQL at location 46-610997, increased with depth at location 46-610990, and decreased downgradient. The lateral extent of TPH-DRO is defined, but the vertical extent is not defined.

Xylene(1,3-)+xylene(1,4-) were detected in two samples at two locations. The maximum concentration of 0.00155 mg/kg was detected at location 46-610994 from 0.0–1.0 ft bgs. Xylene(1,3-)+xylene(1,4-) concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of 1,3-xylene+1,4-xylene are defined.

Radionuclides

Cesium-137 was detected in two soil samples at two locations. Cesium-137 activities increased with depth at locations 46-610996 and 46-610997 and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Uranium-234 was detected above the tuff BV (1.98 pCi/g) in one sample at an activity of 2.08 pCi/g at location 46-610983 from 9.0–10.0 ft bgs. Uranium-234 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-234 are defined.

Uranium-235/236 was detected above the tuff BV (0.09 pCi/g) in one sample at an activity of 0.151 pCi/g at location 46-610983 from 9.0–10.0 ft bgs. Uranium-235/236 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-235/236 are defined.

Uranium-238 was detected above the tuff BV (1.93 pCi/g) in one sample at an activity of 2.28 pCi/g at location 46-610983 from 9.0–10.0 ft bgs. Uranium-238 activities decreased with depth at this location and decreased downgradient. The lateral and vertical extent of uranium-238 are defined.

Summary of Nature and Extent

The vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137 is not defined at SWMU 46-009(a).

7.47.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-009(a) because extent is not defined for the site.

7.47.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-009(a) because extent is not defined for the site.

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

7.48.1 Site Description and Operational History

SWMU 46-009(b) is a surface disposal area located approximately 325 southeast of building 46-77 at TA-46 (Figure 7.2-1). The surface disposal area received discarded sand from the sand filters associated with the SWMU 46-002 surface impoundment system. The sand filters operated from 1973 to 1990. During operation, the top 6 in. of sand and sludge was removed from the filters every 2 to 3 mo and disposed of at MDA G at TA-54. The sand beneath the top layer was pushed over the side of the canyon, and the filters were replenished with clean sand (LANL 1993, 020952, p. 5-166). In 1990, the sand filters were taken offline (LANL 1993, 020952, p. 5-56).

7.48.2 Relationship to Other SWMUs and AOCs

Sand from the sand filters associated with the SWMU 46-002 surface impoundment system was disposed of at SWMU 46-009(b).

7.48.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 46-009(b).

7.48.4 Site Contamination

7.48.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-009(b):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Twelve samples were collected from six locations within and next to the former surface disposal area from 0.0–1.0 ft bgs, and 2.0–3.0 ft bgs.
- Twenty samples were collected from 10 locations downgradient of the former surface disposal area from 0.0–1.0 ft bgs and 1.0–2.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-009(b) are shown in Figures 7.2-1 and 7.48-1. Table 7.48-1 presents the samples collected and analyses requested for SWMU 46-009(b). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.48.4.2 Soil, Rock, and Sediment Field-Screening Results

No verifiable headspace screening data for organic vapors were collected at SWMU 46-009(b) because of moisture-related instrumentation errors. However, all samples collected 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. No changes to sampling or other activities occurred because of the field-screening results.

7.48.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-009(b) consist of results from 32 samples (31 soil and 1 tuff) collected from 16 locations.

Inorganic Chemicals

Thirty-two samples (31 soil and 1 tuff) were analyzed for TAL metals, cyanide, and perchlorate. Table 7.48-2 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. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Thirty-two samples (31 soil and 1 tuff) were analyzed for VOCs, SVOCs, PCBs, pesticides. Table 7.48-3 presents the detected organic chemicals. Plate 2 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Thirty-two samples (31 soil and 1 tuff) were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Table 7.48-4 presents the radionuclides detected or detected above BVs/FVs. Plate 3 shows the spatial distribution of radionuclides detected or detected above BVs/FVs. Because the extent of contamination is not defined for the site, radionuclide COPCs have not been identified.

7.48.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil or tuff BV but had DLs (0.976 to 1.26 mg/kg) above the soil BV (0.83 mg/kg) in 27 samples and a DL (1.11 mg/kg) above the tuff BV (0.5 mg/kg) in one sample. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above soil BV (0.4 mg/kg) but had DLs (0.488 to 0.63 mg/kg) above the BV in 31 samples. Because cadmium was not detected above BV, the lateral and vertical nature and extent are defined.

Perchlorate was detected in five soil samples at four locations. The maximum concentration of 0.00133 mg/kg was detected at location 46-611003 from 2.0–3.0 ft bgs. Perchlorate concentrations decreased with depth or were below EQLs at all locations. The lateral and vertical extent of perchlorate are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in six samples at four locations. The maximum concentration of 94.7 mg/kg was detected at location 46-611008 from 1.0–2.0 ft bgs. Zinc concentrations decreased with depth at locations 46-611010 and 46-611011, increased with depth at locations 46-611007 and 46-611008, and decreased downgradient. The lateral extent of zinc is defined, but the vertical extent is not defined.

Organic Chemicals

Anthracene, benzo(a)pyrene and chrysene were detected in one sample at location 46-611007 from 0.0–1.0 ft bgs. The concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of anthracene, benzo(a)pyrene and chrysene are defined.

Aroclor-1254 was detected in one sample at a concentration of 0.0029 mg/kg at location 46-611000 from 2.0–3.0 ft bgs. Aroclor-1254 concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of Aroclor-1254 are defined.

Aroclor-1260 was detected in 10 samples at five locations. Aroclor-1260 concentrations were below the EQL at all locations and decreased downgradient. The lateral and vertical extent of Aroclor-1260 are defined.

Benzo(a)anthracene was detected in four samples at three locations. The maximum concentration of 0.0269 mg/kg was detected at location 46-611007 from 0.0–1.0 ft bgs. Benzo(a)anthracene concentrations decreased with depth at locations 46-611007 and 46-611011, were below the EQL at location 46-611008, and decreased downgradient. The lateral and vertical extent of benzo(a)anthracene are defined.

Benzo(b)fluoranthene was detected in two samples at two locations. The maximum concentration of 0.0225 mg/kg was detected at location 46-611008 from 1.0–2.0 ft bgs. Benzo(b)fluoranthene concentrations were below the EQL and decreased downgradient. The lateral and vertical extent of benzo(b)fluoranthene are defined.

Benzoic acid was detected in two samples at two locations. The maximum concentration of 0.628 mg/kg was detected at location 46-611003 from 0.0–1.0 ft bgs. Benzoic acid concentrations decreased with depth at both locations and decreased downgradient. The lateral and vertical extent of benzoic acid are defined.

Chloromethane was detected in one sample at a concentration of 0.00307 mg/kg at location 46-611014 from 0.0–1.0 ft bgs. Chloromethane concentrations decreased with depth at this location and increased downgradient. The lateral extent of chloromethane is not defined, but vertical extent is defined.

Fluoranthene was detected in five samples at four locations. The maximum concentration of 0.0503 mg/kg was detected at location 46-611007 from 0.0–1.0 ft bgs. Fluoranthene concentrations decreased with depth or were below EQLs at all locations and decreased downgradient. The lateral and vertical extent of fluoranthene are defined.

Phenanthrene was detected was detected in two samples at one location. The maximum concentration of 0.034 mg/kg was detected at location 46-611007 from 0.0–1.0 ft bgs. Phenanthrene concentrations decreased with depth at this location and decreased downgradient. The lateral and vertical extent of phenanthrene are defined.

Pyrene was detected in four samples at three locations. The maximum concentration of 0.0448 mg/kg was detected at location 46-611007 from 0.0–1.0 ft bgs. Pyrene concentrations decreased with depth or were below EQLs at all locations and decreased downgradient. The lateral and vertical extent of pyrene are defined.

Radionuclides

Cesium-137 was detected in one sample at an activity of 0.323 pCi/g at location 46-611010 from 1.0–2.0 ft bgs. Cesium-137 activities increased with depth at this location and decreased downgradient. The lateral extent of cesium-137 is defined, but the vertical extent is not defined.

Plutonium-239/240 was detected in one sample at an activity of 0.0439 pCi/g at location 46-611010 from 1.0–2.0 ft bgs. Plutonium-239/240 activities increased with depth at this location and decreased downgradient. The lateral extent of plutonium-239/240 is defined, but the vertical extent is not defined.

Summary of Nature and Extent

The vertical extent of zinc, cesium-137, and plutonium-239/240 is not defined at SWMU 46-009(b). The lateral extent of chloromethane is not defined at SWMU 46-009(b).

7.48.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-009(b) because extent is not defined for the site.

7.48.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-009(b) because extent is not defined for the site.

7.49 SWMU 46-010(d), Storage Area

7.49.1 Site Description and Operational History

SWMU 46-010(d) is a partially paved storage area located on the south side of the Laser Isotope Support Facility (building 46-41) at TA-46 (Figure 7.3-1). During a 1986 site visit, unmarked, rusty drums were observed at this 10-ft × 25-ft area (LANL 1993, 020952, p. 5-82). After 1986, the area was operated as a satellite accumulation area.

7.49.2 Relationship to Other SWMUs and AOCs

Stormwater runoff from SWMU 46-010(d) flows to SWMU 46-009(a).

7.49.3 Summary of Previous Investigations

During the 1994 Phase I RFI conducted at SWMU 46-010(d), two samples were collected from two locations from the unpaved area below the storage shed. Both samples were submitted for analyses of TAL metals, VOCs, SVOCs, PCBs, and asbestos. Data from the 1994 RFI are screening-level data and are summarized below. Section 3.0 of the HIR presents a more detailed discussion of the screening-level results (LANL 2008, 100693).

Copper was detected above BV in one sample, and mercury and zinc were detected above BVs in both samples. The DLs for cadmium and thallium were above BVs in one and two samples, respectively. Fluoranthene was detected in one sample. VOCs, PCBs, and asbestos were not detected.

7.49.4 Site Contamination

7.49.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at SWMU 46-010(d):

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Four samples were collected from two locations beneath the storage area from 0.0–1.0 ft, and 3.0–4.0 ft (beneath the asphalt).
- Six samples will be collected from three locations downgradient of the storage area from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs.
- All samples were analyzed for TAL metals, VOCs, SVOCs, PCBs, cyanide, perchlorate, pesticides, TPH-DRO, isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides.

The 2010 sampling locations at SWMU 46-010(d) are shown in Figure 7.3-1. Table 7.49-1 presents the samples collected and analyses requested for SWMU 46-010(d). The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.49.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-010(d), a maximum concentration of 15.8 ppm was detected at a depth of 3.0–4.0 ft bgs. A sample from this depth (46-10-12717) 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. No changes to sampling or other activities occurred because of the field-screening results.

7.49.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at SWMU 46-010(d) consist of results from 10 soil samples collected from five locations.

Inorganic Chemicals

Ten soil samples were analyzed for TAL metals, cyanide, and perchlorate. Table 7.49-2 presents the inorganic chemicals above BVs and detected inorganic chemicals with no BVs. Plate 4 shows the spatial distribution of inorganic chemicals detected or detected above BVs. Because the extent of contamination is not defined for the site, inorganic COPCs have not been identified.

Organic Chemicals

Ten soil samples were analyzed for VOCs, SVOCs, PCBs, pesticides, and TPH-DRO. Table 7.49-3 presents the detected organic chemicals. Plate 5 shows the spatial distribution of detected organic chemicals. Because the extent of contamination is not defined for the site, organic COPCs have not been identified.

Radionuclides

Ten soil samples were analyzed for isotopic uranium, isotopic plutonium, americium-241, and gamma-emitting radionuclides. Radionuclides were not detected or detected above BVs/FVs.

7.49.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Antimony was not detected above the soil BV (0.83 mg/kg) but had DLs (1.12 to 1.24 mg/kg) above BV in nine samples. Because antimony was not detected above BV, the lateral and vertical extent of antimony are defined.

Cadmium was not detected above the soil BV (0.4 mg/kg) but had a DL (0.618 mg/kg) above BV in one sample. The lateral and vertical extent of cadmium are defined.

Perchlorate was detected in five soil samples at three locations. The maximum concentration of 0.00123 mg/kg was detected at location 46-611466 in a sample collected from 0.0–1.0 ft bgs. Perchlorate

concentrations decreased with depth at all locations and decreased downgradient in SWMU 46-003(a) and within the drainage from SWMU 46-004(t). The lateral and vertical extent of perchlorate are defined.

Zinc was detected above the soil BV (48.8 mg/kg) in six samples at five locations. The maximum concentration of 117 mg/kg was detected at location 46-611464 from 0.0–1.0 ft bgs. Zinc concentrations decreased with depth at all locations and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral and vertical extent of zinc are defined.

Organic Chemicals

Acenaphthene and fluorene were detected in five samples at four locations. The maximum concentrations were detected at location 46-611463 from 3.0–4.0 ft bgs. Acenaphthene and fluorene concentrations decreased with depth at locations 46-611464, 46-611466, and 46-611467, increased with depth at location 46-611463, and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of acenaphthene and fluorene is defined, but the vertical extent is not defined.

Anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, and indeno(1,2,3-cd)pyrene were detected in six samples at five locations. The maximum concentrations were detected at location 46-611463 from 3.0–4.0 ft bgs. The concentrations decreased with depth at locations 46-611464, 46-611465, 46-611466, and 46-611467, increased with depth at location 46-611463, and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of these organic chemicals is defined, but the vertical extent is not defined.

Aroclor-1254 and Aroclor-1260 were detected in five and four samples, respectively, at four locations. The maximum concentrations were detected at location 46-611465 from 0.0–1.0 ft bgs. Aroclor-1254 and Aroclor-1260 concentrations decreased with depth at all locations and decreased downgradient in SWMUs 46-003(a) and 46-009(a). The lateral and vertical extent of Aroclor-1254 and Aroclor-1260 are defined.

Bis(2-ethylhexyl)phthalate was detected in three samples at three locations. The maximum concentration was detected at location 46-611466 from 0.0–1.0 ft bgs. Bis(2-ethylhexyl)phthalate concentrations decreased with depth at all locations and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral and vertical extent of bis(2-ethylhexyl)phthalate are defined.

Dibenzofuran was detected in one sample at a concentration of 0.0974 mg/kg at location 46-611463 from 3.0–4.0 ft bgs. Dibenzofuran concentrations were below the EQL at this location and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral and vertical extent of dibenzofuran are defined.

Dibenz(a,h)anthracene was detected in one sample at a concentration of 0.0788 mg/kg at location 46-611463 from 3.0–4.0 ft bgs. Dibenz(a,h)anthracene concentration increased with depth at this location and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of dibenz(a,h)anthracene is defined, but the vertical extent is not defined.

Fluoranthene, phenanthrene, and pyrene were detected in eight, seven, and seven samples, respectively, at five locations. The maximum concentrations were detected at location 46-611463 from 0.0–1.0 ft bgs. The concentrations decreased with depth at locations 46-611464, 46-611465, 46-611466, and 46-611467, increased with depth at location 46-611463, and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of fluoranthene, phenanthrene, and pyrene is defined, but the vertical extent is not defined.

Methylnaphthalene(2-) was detected in two samples at two locations. The maximum concentration of 0.122 mg/kg was detected at location 46-611463 from 3.0–4.0 ft bgs. Methylnaphthalene(2-) concentrations decreased with depth at location 46-611466, increased with depth at location 46-611463, and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of 2-methylnaphthalene is defined, but the vertical extent is not defined.

Naphthalene was detected in four samples at three locations. The maximum concentration of 0.296 mg/kg was detected at location 46-611463 from 3.0–4.0 ft bgs. Naphthalene concentrations decreased with depth at locations 46-611466 and 46-611467, increased with depth at location 46-611463, and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral extent of naphthalene is defined, but the vertical extent is not defined.

TPH-DRO was detected in seven samples at five locations. The maximum concentration of 13.3 mg/kg was detected at location 46-611463 from 0.0–1.0 ft bgs. TPH-DRO concentrations decreased with depth at all locations and decreased downgradient within SWMUs 46-003(a) and 46-009(a). The lateral and vertical extent of TPH-DRO are defined.

Radionuclides

Radionuclides were not detected or detected above BVs/FVs at SWMU 46-010(d).

Summary of Nature and Extent

The vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene is not defined at SWMU 46-010(d). The extent of inorganic chemicals is defined at SWMU 46-010(d). Radionuclides were not detected or detected above BVs/FVs at SWMU 46-010(d).

7.49.5 Summary of Human Health Risk Screening

A human health risk assessment has not been performed for SWMU 46-010(d) because extent is not defined for the site.

7.49.6 Summary of Ecological Risk Screening

An ecological risk assessment has not been performed for SWMU 46-010(d) because extent is not defined for the site.

7.50 AOC C-46-001, Spill/Release Area

7.50.1 Site Description and Operational History

AOC C-46-001 is the location of a one-time spill of mercury in the vicinity of building 46-75 at TA-46 (Figure 7.5-1). On July 22, 1975, 250–500 g (0.55–1.1 lb) of mercury spilled on the ground near building 46-75 (LASL 1975, 008501). The spill was cleaned up shortly after it occurred. The memorandum documenting the spill does not provide the precise location of where the spill occurred at building 46-75; however, aerial photos show the entire area surrounding building 46-75 was paved at the time of the spill (LANL 1993, 020952, p. 5-131).

7.50.2 Relationship to Other SWMUs and AOCs

Stormwater runoff from the possible location of AOC C-46-001 flows toward SWMU 46-008(g) and 46-004(t).

7.50.3 Summary of Previous Investigations

No previous investigations have been conducted at AOC C-46-001.

7.50.4 Site Contamination

7.50.4.1 Soil, Rock, and Sediment Sampling

As part of the 2010 investigation, the following characterization activities were conducted at AOC C-46-001:

- All samples were field screened for organic vapors and gross-alpha, -beta, and -gamma radioactivity. Field-screening results were recorded on the SCLs (Appendix G) and are presented in Table 3.2-2.
- Two samples were collected from one location approximately 15 ft southwest of the southwest corner of building 46-75 from 0.0–1.0 ft and 1.0–2.0 ft (beneath the asphalt).
- All samples were analyzed for mercury only.

The 2010 sampling locations at AOC C-46-001 are shown in Figure 7.5-1. Table 7.50-1 presents the samples collected and analyses requested for AOC C-46-001. The geodetic coordinates of sampling locations are presented in Table 3.2-1.

7.50.4.2 Soil, Rock, and Sediment Field-Screening Results

During headspace screening for organic vapors at SWMU 46-010(d), a maximum concentration of 42.1 ppm was detected at a depth of 1.0–2.0 ft (beneath the asphalt). No radiological-screening results exceeded twice the daily site background levels. Field-screening results are presented in Table 3.2-2. No changes to sampling or other activities occurred because of the field-screening results.

7.50.4.3 Soil, Rock, and Sediment Sampling Analytical Results

Decision-level data at AOC C-46-001 consist of results from two samples (one soil and one tuff) collected from one location.

Inorganic Chemicals

One soil sample and one tuff sample were analyzed for mercury. Mercury was not detected above BV in either sample. Plate 7 shows the sampling locations associated with this AOC where mercury was not detected above BV. The nature and extent of contamination are defined at AOC C-46-001.

Mercury was detected below the soil and tuff BV (0.1 mg/kg) in two samples with a maximum concentration of 0.00894 mg/kg. Mercury is not identified as a COPC in soil at AOC C-46-001.

7.50.4.4 Nature and Extent of Contamination

Inorganic Chemicals

Mercury was detected below the soil and tuff BV (0.1 mg/kg) in two samples. Because mercury was not detected above BV, the lateral and vertical extent of mercury are defined.

7.50.5 Summary of Human Health Risk Screening

A human health risk assessment was not performed for AOC C-46-001 because no COPCs were identified for the site. Therefore, no potential unacceptable risks from COPCs exist for the industrial, construction worker, and residential scenarios.

7.50.6 Summary of Ecological Risk Screening

An ecological risk assessment was not performed for AOC C-46-001 because no COPCs were identified for the site. Therefore, no potential risks from COPCs to ecological receptors exist.

8.0 TA-52 BACKGROUND AND FIELD-INVESTIGATION RESULTS

One SWMU located in TA-52 is addressed in this investigation report (Table 1.1-1). This site is described in section 8.2, including a site description and operational history, relationship to other SWMUs and AOCs, historical investigation activities conducted, and current site usage and status. This site was not discussed in the work plan or sampled during the 2010 investigation because NMED is reviewing supplemental information submitted to support a previous NFA recommendation (Nonno 2008, 101365).

8.1 Background of TA-52

TA-52 is located on a small fingerlike mesa that extends eastward from the main Pajarito Mesa. The mesa is bounded on the north by Ten Site Canyon, which branches west from Mortandad Canyon and on the south by Cañada del Buey (LANL 1992, 007666, p. 3-2).

TA-52 was established to house the historical UHTREX (Ultra-High-Temperature Reactor Experiment), which involved the use of high-temperature, gas-cooled reactor technology and the research and development of new fuels. Currently, a wide variety of theoretical and computational activities related to nuclear reactor performance and safety occur at TA-52 (LANL 1992, 007666; LANL 1994, 039932).

8.1.1 Operational History

UHTREX was located in building 52-1. Plans to operate UHTREX with uranium-thorium fuel elements and other fuels with a high yield of fission products did not materialize. UHTREX was used for reactor experiments from 1965 to 1968. Criticality was attained in August 1967, and the reactor operated for about 1 yr (LANL 1992, 007666; LANL 1994, 039932). In 1970, the reactor was shut down and the fuel removed. In 1989, the contaminated equipment was removed and the building was decontaminated (Salazar and Elder 1992, 012021). Building 52-2 housed the waste neutralization and pumping facility designed for caustic pretreatment of UHTREX liquid acid wastes to neutralize the wastewater before it was piped to TA-50, the Laboratory's radioactive liquid waste treatment facility. After the reactor was shut down, the nuclear fuel was removed and buildings 52-1 and 52-2 along with associated structures underwent D&D in 1989.

8.1.2 Summary of Releases

Potential contaminants at TA-52 may have been released into the environment through drainages, outfalls, firing sites, liquid spills, leaks, or operational releases.

8.1.3 Current Site Usage and Status

TA-52 is almost completely developed. Roads and paved parking areas surround the buildings. TA-52 is located within the Pajarito Road security corridor, and access is controlled and restricted to Laboratory badge holders.

8.2 SWMU 52-001(d), Former Facility Equipment

8.2.1 Site Description and Operational History

SWMU 52-001(d) consists of former radioactively contaminated equipment that was previously located inside the reactor development facility (building 52-1) at TA-52. This equipment was associated with UHTREX and included the sump pump room, hot cells, filters, and duct work.

UHTREX was intended for the advancement of high-temperature, gas-cooled reactor technology and research and development of new fuels. However, plans to operate UHTREX with uranium-thorium fuel elements and other fuels with high yield of fission products did not materialize. Instead, UHTREX was used for reactor experiments from 1967 to 1968. In 1970, the reactor was shut down and the fuel was removed. The contaminated equipment associated with SWMU 52-001(d) was removed in 1989 and the building interior was decontaminated to levels below DOE guidelines for radioactivity. Building 52-1 currently houses offices and laboratories.

8.2.2 Relationship to Other SWMUs and AOCs

SWMU 52-001(d) is one of four SWMUs associated with the former UHTREX facility. SWMU 52-001(a) consisted of air filter banks located in a subsurface pit. The helium coolant from the UTHREX reactor was circulated through these filters to remove fission-product particulates. The filters were removed and the pit decontaminated and backfilled in 1989. SWMU 52-001(b) was identified as the heat dump building (building 52-15) and SWMU 52-001(c) as the heat dump pad (structure 52-16). These units contained fans and coils used to cool the helium secondary reactor coolant and were also removed in 1989. SWMUs 52-001(a,b,c) were approved for NFA by NMED in 1996 (NMED 1996, 055815).

8.2.3 Summary of Previous Investigations

No previous investigations have been conducted at SWMU 52-001(d).

8.2.4 Current Site Status

In 1992, SWMU 52-001(d) was proposed for NFA RFI work plan for OU 1129 (LANL 1992, 007666). The Laboratory subsequently included SWMU 52-001(d) in a Class III permit modification request submitted to NMED in 1995 in which the site was proposed for NFA (LANL 1995, 045365). In the notice of determination issued on the permit modification request, the NMED comment for SWMU 52-001(d) stated “Information based on sampling should be presented to indicate whether a release of hazardous constituents to the environment has occurred” (NMED 1996, 055815). In the response to the notice of determination, the Laboratory clarified that all equipment associated with SWMU 52-001(d) had been

completely contained within the building; there was no potential for contaminants to have been released to the environment (LANL 1997, 055510).

In 2002, the Laboratory indicated it would provide NMED with supplemental information to support the NFA recommendation for SWMU 52-001(d) (LANL 2002, 071447). In 2008, the Laboratory submitted to NMED supplemental information related to the potential for releases to the environmental from SWMU 52-001(d) demonstrating the site was appropriate for NFA (Nonno 2008, 101365). The supplemental information indicated the facilities and equipment were located within a building designed specifically to prevent uncontrolled releases (e.g., constructed of reinforced concrete walls several feet thick) because it housed a nuclear reactor. Liquid wastes generated in the building were collected by the sanitary and/or radioactive liquid waste sumps before they were discharged to SWMUs 52-002(a), 52-003(a), and/or 52-003(b). Any airborne releases from building 52-1 were captured by the ventilation system and treated by filtration before they were emitted to the atmosphere. The equipment inside building 52-1 associated with SWMU 52-001(d) was decontaminated and/or removed during 1989 D&D activities. Therefore, SWMU 52-001(d) is appropriate for NFA under the current definition of NFA criterion 3 (no release to the environment of hazardous waste has occurred or is likely to occur in the future). Also, any releases from the liquid waste system outside the building would be associated with other SWMUs and investigated as those SWMUs. Therefore, sampling of SWMU 52-001(d) is not necessary to support the NFA determination. A copy of the supplemental information the Laboratory provided NMED regarding SWMU 52-001(d) in 2008 is included in Appendix J.

9.0 CONCLUSIONS

9.1 Nature and Extent of Contamination

The nature and extent of contamination have been defined for six sites investigated during the 2010 investigation at Upper Cañada del Buey Aggregate Area. The nature and extent of contamination have not been defined for 49 sites. One site is proposed for delayed characterization and investigation pending the removal of a septic tank system and collection of confirmation sampling beneath the septic tank. Another site was recommended for NFA during previous investigations and remediation. Summaries of the nature and extent of contamination and remaining characterization requirements for the sites at former TA-04, TA-46, and TA-52 are presented below.

9.1.1 Former TA-04

The nature and extent of contamination have not been defined for two sites at former TA-04. 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 04-003(a)—vertical extent of benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene
- AOC 04-004—vertical extent of barium, copper, plutonium-239/240, and uranium-235/236

9.1.2 TA-46

The nature and extent of contamination have been defined for the following six sites at TA-46:

- SWMU 46-002, Surface impoundment
- SWMU 46-004(m), Inactive outfall
- SWMU 46-004(p), Inactive dry well
- SWMU 46-006(b), Former storage shed
- SWMU 46-006(g), Storage area
- AOC C-46-001, Spill/release area

The nature and extent of contamination have not been defined for 47 sites in TA-46. 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 46-003(b)—vertical extent of calcium and 2-hexanone
- SWMU 46-003(c)—lateral and vertical extent of antimony, cadmium, chromium, cobalt, copper; vertical extent of uranium-235/236
- SWMU 46-003(d)—vertical extent of barium, calcium, chromium, copper, mercury, zinc, acetone, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, chrysene, 1,4-dichlorobenzene, fluoranthene, pyrene, americium-241, uranium-234, and uranium-235/236
- SWMU 46-003(e)—vertical extent of lead, perchlorate, acetone, Aroclor-1254, Aroclor-1260, pyrene, and uranium-235/236
- SWMU 46-003(f)—vertical extent of lead, acetone, Aroclor-1254, Aroclor-1260, 4-isopropyltoluene, toluene, and uranium-235/236
- SWMU 46-003(g)—vertical extent of cobalt and copper
- SWMU 46-004(a)—lateral extent of cesium, chromium, copper, lead, mercury, bis(2-ethylhexyl)phthalate, n-butylbenzene, 1,1,1-trichloroethane, and trichloroethene; vertical extent of cesium, chromium, copper, lead, selenium, bis(2-ethylhexyl)phthalate, and n-butylbenzene
- SWMU 46-004(a2)—vertical extent of copper, zinc, Aroclor-1242, Aroclor-1254, and Aroclor-1260
- SWMU 46-004(b)—lateral extent of TPH-DRO; vertical extent of cesium, acenaphthene, anthracene, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene;
- SWMU 46-004(b2)—vertical extent of Aroclor-1254 and Aroclor-1260
- SWMU 46-004(c)—vertical extent of cesium, copper, mercury, and Aroclor-1242
- SWMU 46-004(c2)—vertical extent of cesium, lead, lithium, perchlorate, zinc, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene
- SWMU 46-004(d)—vertical extent of acenaphthene
- SWMU 46-004(e)—vertical extent of acenaphthene

- Consolidated Unit 46-004(d2)-99, consisting of SWMUs 46-004(d2), 46-004(g), 46-004(h) and AOCs C-46-002 and C-46-003—vertical extent of chromium, perchlorate, selenium, fluoranthene, phenanthrene, pyrene, and uranium-234.
    - ❖ SWMU 46-004(g), outfall—vertical extent of copper, mercury, silver, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, uranium-234, and uranium-235/236.
    - ❖ SWMU 46-004(h), outfall—vertical extent of mercury and Aroclor-1254.
- AOC 46-004(e2)—vertical extent of copper, fluoranthene, phenanthrene, and pyrene
- SWMU 46-004(f)—vertical extent of lead, Aroclor-1254, and Aroclor-1260
- AOC 46-004(f2)—vertical extent of cesium-137 and plutonium-239/240
- SWMU 46-004(q)—vertical extent of barium, lead, mercury, Aroclor-1254, Aroclor-1260, and cobalt-60
- SWMU 46-004(r)—vertical extent of copper, mercury, silver, fluoranthene, methylene chloride, and pyrene
- SWMU 46-004(s)—vertical extent of chromium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene
- SWMU 46-004(t)—vertical extent of aluminum, barium, calcium, cobalt, nickel, selenium, vanadium, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, bis(2-ethylhexyl)phthalate, chrysene, dibenz(a,h)anthracene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltouene, phenanthrene, pyrene, cesium-137, and uranium-235/236
- SWMU 46-004(u)—vertical extent of barium, chromium, cobalt, copper, lead, selenium, thallium, zinc, and Aroclor-1254
- SWMU 46-004(v)—vertical extent of selenium and zinc
- SWMU 46-004(w) [overlaps with SWMU 46-004(r)]—vertical extent of copper, mercury, silver, fluoranthene, methylene chloride, and pyrene
- SWMU 46-004(x)—vertical extent of copper and plutonium-239/240
- SWMU 46-004(y)—vertical extent of perchlorate, acenaphthene, acetone, benzo(a)anthracene, pyrene, trichloroethene, and plutonium-239/240
- SWMU 46-004(z)—vertical extent of perchlorate, plutonium-239/240, uranium-234, and uranium-235/236
- SWMU 46-005—vertical extent of cesium, mercury, selenium, bis(2-ethylhexyl)phthalate, and cesium-137
- SWMU 46-006(a) [overlaps with AOC 46-004(e2)]—vertical extent of copper, fluoranthene, phenanthrene, and pyrene
- SWMU 46-006(c)—vertical extent of acetone, barium, 2-butanone, Aroclor-1254, Aroclor-1260, TPH-DRO, cesium-137, and plutonium-239/240

- SWMU 46-006(d)—vertical extent of barium, calcium, mercury, perchlorate, silver, zinc, acenaphthene, acetone, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, 2-butanone, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, 4-isopropyltoluene, phenanthrene, pyrene, cesium-137, plutonium-239/240, uranium-234, uranium-235/236, and uranium-238
- SWMU 46-006(f)—vertical extent of chromium
- SWMU 46-007—vertical extent of cesium, chromium, copper, lead, mercury, Aroclor-1254, Aroclor-1260, benzo(a)pyrene, benzo(b)fluoranthene, fluoranthene, phenanthrene, pyrene, cesium-137, and plutonium-239/240
- SWMU 46-008(a)—vertical extent of TPH-DRO
- SWMU 46-008(b)—vertical extent of antimony, lead, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenzofuran, 2,4-dinitrotoluene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, cesium-137, and uranium-235/236
- SWMU 46-008(d)—vertical extent of copper, nickel, acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, methylnaphthalene(2-), naphthalene, phenanthrene, and pyrene
- SWMU 46-008(e)—vertical extent of calcium, chromium, and TPH-DRO
- SWMU 46-008(f)—vertical extent of Aroclor-1242, TPH-DRO, and uranium-235/236
- SWMU 46-008(g)—vertical extent of lead, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, indeno(1,2,3-cd)pyrene, phenanthrene, and pyrene
- SWMU 46-009(a)—vertical extent of nitrate, zinc, acenaphthene, anthracene, Aroclor-1242, Aroclor-1254, Aroclor-1260, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, chrysene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, pyrene, TPH-DRO, and cesium-137
- SWMU 46-009(b)—lateral extent of chloromethane; vertical extent of zinc, cesium-137, and plutonium-239/240
- SWMU 46-010(d)—vertical extent of acenaphthene, anthracene, benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(g,h,i)perylene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, fluoranthene, fluorene, indeno(1,2,3-cd)pyrene, 2-methylnaphthalene, naphthalene, phenanthrene, and pyrene

Delayed investigation is proposed for the following site at TA-46:

- SWMU 46-003(a)—Septic system

The following sites require additional analyses that were inadvertently excluded during the 2010 investigation:

- SWMU 46-004(h)—VOCs and pesticides
- SWMU 46-006(d)—TPH-DRO
- SWMU 46-008(g)—TPH-DRO

9.1.3 TA-52

The following site was previously recommended for NFA and remediation during previous investigations:

- SWMU 52-001(d), Former facility equipment

9.2 Summary of Risk-Screening Assessments

Four of the six sites for which the nature and extent of contamination are defined were evaluated for potential human health and ecological risks.

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 or doses from COPCs exist for the industrial, construction worker, or residential scenarios at SWMUs 46-002, 46-004(m), 46-006(b), and 46-006(g), and AOC C-46-001. The total excess cancer risks are below the NMED target risk level of 1×10^{-5}, the HIs are below the NMED target HI of 1.0, and the doses are below the DOE target dose limit of 15 mrem/yr. The equivalent total risks were estimated using EPA's radionuclide preliminary remediation goals for an outdoor worker and a resident (http://epa-orgs.ornl.gov/cgi-bin/radionuclides/rprg_search). The radionuclide total risks ranged from 8×10^{-7} to 4×10^{-7} for the industrial scenario, from 7×10^{-7} to 3×10^{-7} for the construction worker scenario, and from 4×10^{-7} to 2×10^{-6} for the residential scenario. The risk-screening assessments for AOC C-46-001 were not conducted because no COPCs were identified.

A risk-screening assessment for SWMU 46-004(p) was not conducted because no complete pathways for exposure to receptors exist for any scenario. Therefore, no potential unacceptable risks exist for any scenario.

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 LOAEL analyses for SWMUs 46-002, 46-004(m), 46-006(b), and 46-006(g). No potential ecological risk for any receptor was also found for AOC C-46-001 because no COPCs were identified.

Complete exposure pathways to receptors are not present at SWMU 46-004(p) because contamination was deeper than 5 ft bgs. Therefore, an ecological risk-screening assessment was not conducted for this SWMU and there are no potential risks to ecological receptors.

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 action 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 and construction worker) 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 Cañada del Buey Aggregate Area is industrial.

10.1 Additional Field Characterization Activities

The extent of contamination has not been defined for 49 sites investigated in the Upper Cañada del Buey Aggregate Area (Table 9.1-1). Additional sampling is needed to define the extent of contamination for one or more inorganic chemical, organic chemical, or radionuclide at the following sites:

- SWMUs 04-003(a); 46-003(b); 46-003(c); 46-003(d); 46-003(e); 46-003(f); 46-003(g); 46-004(a); 46-004(a2); 46-004(b); 46-004(b2); 46-004(c); 46-004(c2); 46-004(d); 46-004(d2); 46-004(e); 46-004(f); 46-004(g); 46-004(h); 46-004(q); 46-004(r); 46-004(s); 46-004(t); 46-004(u); 46-004(v); 46-004(w); 46-004(x); 46-004(y); 46-004(z); 46-005; 46-006(a); 46-006(c); 46-006(d); 46-006(f); 46-007; 46-008(a); 46-008(b); 46-008(d); 46-008(e); 46-008(f); 46-008(g); 46-009(a); 46-009(b); and 46-010(d); and AOCs 04-004; 46-004(e2); 46-004(f2); C-46-002; C-46-003.

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 Cañada del Buey Aggregate Area.

10.2 Recommendations for Corrective Actions Complete

Five sites for which the nature and extent of contamination are defined do not pose a potential unacceptable risks or doses under the industrial, construction worker, and residential scenarios. No potential ecological risk was also found for any receptor at these sites. These sites are as follows:

- SWMU 46-002, Surface impoundment
- SWMU 46-004(m), Inactive outfall
- SWMU 46-006(b), Former storage shed
- SWMU 46-006(g), Storage area
- AOC C-46-001, Spill/release area

At these sites, the Laboratory recommends that no further investigation or remediation activities are warranted. Because these sites have been found not to pose potential unacceptable risks or doses to human health under the residential scenario, they are appropriate for corrective actions complete without controls.

One site for which the nature and extent of contamination are defined did not have risk-screening assessments conducted because no complete pathways exist for exposure to human or ecological receptors. Therefore, no potential unacceptable risks exist for any scenario or ecological receptor at the following site:

- SWMU 46-004(p), Inactive dry well

The Laboratory recommends that no further investigation or remediation activities are warranted for this site. Because the site has been found not to pose potential unacceptable risks to human health (no complete exposure pathways are present because COPCs were detected at depth intervals to which receptors would not be exposed), it is appropriate for corrective actions complete without controls.

In addition, one site was recommended for NFA during previous investigations and remediation:

- SWMU 52-001(d), Former facility equipment

This site operated from 1967 to 1968 and underwent D&D in 1989. In 2008, the Laboratory provided NMED with supplemental information to support an NFA recommendation (Nonno 2008, 101365). The supplemental information provided in 2008 demonstrated that any releases outside building 52-01 would be associated with the other SWMUs associated with the building and sampling of SWMU 52-001(d) is not necessary to support the NFA determination.

As proposed in the approved investigation work plan, no additional sampling was conducted in 2010 (LANL 2008, 105038.17; NMED 2008, 103429). This site is appropriate for corrective actions complete without controls.

10.3 Recommendations for Delayed Characterization

One site is recommended for delayed characterization and investigation until active utilities located around the septic tank are removed or rendered inactive:

- SWMU 46-003(a), Septic system

10.4 Schedule for Recommended Activities

A Phase II investigation work plan will be developed and submitted to NMED six 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)

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), December 2007. "EPA Region 6 Human Health Medium-Specific Screening Levels," U.S. EPA Region 6, Dallas, Texas. (EPA 2007, 099314)

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)

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)

ICF Kaiser Engineers, August 1995. "Summary of 1994 Field Activities at TA-46, OU 1140, Volume 1," report prepared for Los Alamos National Laboratory, Vol. 1 of 3, Los Alamos, New Mexico. (ICF Kaiser Engineers 1995, 053452)

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), June 26, 1987. "Ponds/Lagoons Conversion, Bldg. WA-158, TA-46," Engineering Drawing ENG-C-45310, sheet number 1 through 6, Los Alamos, New Mexico. (LANL 1987, 110570)

LANL (Los Alamos National Laboratory), November 1990. "Solid Waste Management Units Report," Vol. III of IV (TA-26 through TA-50), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007513)

LANL (Los Alamos National Laboratory), May 1992. "RFI Work Plan for Operable Unit 1129," Los Alamos National Laboratory document LA-UR-92-800, Los Alamos, New Mexico. (LANL 1992, 007666)

LANL (Los Alamos National Laboratory), May 18, 1993. "Drain Modifications, Mech: Removal Plumbing Plan, Bldg. 31, TA-46," Engineering Drawing C46364, sheet number 4 of 11, Los Alamos, New Mexico. (LANL 1993, 101823)

LANL (Los Alamos National Laboratory), May 18, 1993. "Drain Modifications, Mech: Plumbing Plan New Work, Bldg. 31, TA-46," Engineering Drawing C46364, sheet number 6 of 11, Los Alamos, New Mexico. (LANL 1993, 101825)

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

LANL (Los Alamos National Laboratory), June 13, 1994. "Addendum to the Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan for Operable Unit (OU) 1129," Los Alamos National Laboratory letter (EM/ER:94-J242) to T.J. Taylor (DOE ER Program Manager) from J. Jansen (ER Program Manager), Los Alamos, New Mexico. (LANL 1994, 039932)

LANL (Los Alamos National Laboratory), March 1995. "Request for Permit Modification, Units Proposed for NFA," Los Alamos National Laboratory document LA-UR-95-767, Los Alamos, New Mexico. (LANL 1995, 045365)

LANL (Los Alamos National Laboratory), April 23, 1996. "Utility Record Drawings, Sanitary Sewer System, TA-46," Engineering Drawing AB584, sheet number 6 of 6, Los Alamos, New Mexico. (LANL 1996, 101818)

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

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

LANL (Los Alamos National Laboratory), September 1997. "Environmental Surveillance Compliance at Los Alamos During 1996," Los Alamos National Laboratory report LA-13343-ENV, Los Alamos, New Mexico. (LANL 1997, 056684)

LANL (Los Alamos National Laboratory), March 1997. "Response to Notice of Determination for Requests for Permit Modification: Units Proposed for No Further Action, March and September 1995," Los Alamos National Laboratory document LA-UR-97-763, Los Alamos, New Mexico. (LANL 1997, 055510)

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 15, 1998. "SWRC Drains Database," online search results from database at Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1998, 101808)

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), February 11, 2002. "Withdrawal of Solid Waste Management Units (SWMUs) from the March 1995, September 1995, and September 1996 Requests for Permit Modification (LA-UR-95-767, LA-UR-95-3319, and LA-UR-96-3357, Respectively)," Los Alamos National Laboratory letter (ER2002-0110) to J. Young (NMED-HWB) from J.A. Canepa (LANL) and M. Johansen (DOE-LASO), Los Alamos, New Mexico. (LANL 2002, 071447)

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), June 2006. "2006 Hydrogeologic Site Atlas," Los Alamos National Laboratory document LA-UR-06-3058, Los Alamos, New Mexico. (LANL 2006, 093196)

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

LANL (Los Alamos National Laboratory), June 2008. "Historical Investigation Report for Upper Cañada del Buey Aggregate Area," Los Alamos National Laboratory document LA-UR-08-3863, Los Alamos, New Mexico. (LANL 2008, 101803)

LANL (Los Alamos National Laboratory), September 2008. "Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-6122, Los Alamos, New Mexico. (LANL 2008, 105038.17)

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), June 2010. "2010 Interim Facility-Wide Groundwater Monitoring Plan," Los Alamos National Laboratory document LA-UR-10-1777, Los Alamos, New Mexico. (LANL 2010, 109830)

LANL (Los Alamos National Laboratory), October 2010. "Ecorisk Database (Release 2.5)," on CD, LA-UR-10-6898, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2010, 110846)

LASL (Los Alamos Scientific Laboratory), January 27, 1960. "Modifications, Mechanical Piping Plan, Bldg. WA-31, TA-46," Engineering Drawing ENG-C-24148, sheet number 3 of 8, Los Alamos, New Mexico. (LASL 1960, 101819)

LASL (Los Alamos Scientific Laboratory), January 27, 1960. "Modifications, Mech. Elevation, Diagrams, Notes, and Legend, Bldg. WA-31, TA-46," Engineering Drawing ENG-C-24150, sheet number 5 of 8, Los Alamos, New Mexico. (LASL 1960, 101820)

LASL (Los Alamos Scientific Laboratory), November 1, 1963. "Reactive Metal Cleanup Tank, Mech: Tank Plans, Sections, and Details, Structure WA-31, TA-46," Engineering Drawing ENG-C-26077, sheet number 1 of 1, Los Alamos, New Mexico. (LASL 1963, 101821)

LASL (Los Alamos Scientific Laboratory), March 15, 1975. "Tech Area Sewage Systems Improvements, TA-46, WA-Site, Sewer, Plan, and Profile," Engineering Drawing ENG-C-42762, sheet number 2 of 18, Revision 1, Los Alamos, New Mexico. (LASL 1975, 101827)

LASL (Los Alamos Scientific Laboratory), July 23, 1975. "Mercury Spill at TA-46," Los Alamos National Laboratory memorandum H8-75-244 to File from P.A. Ablquist (H8-75), Los Alamos, New Mexico. (LASL 1975, 008501)

Lopez Escobedo, G., June 16, 1998. "SAP Documentation for Additional Sampling Activities at PRSs 04-003(a) and 04-004," Los Alamos National Laboratory memorandum (EM/ER-RAFA:98-111) to the file, OU 1129 from G. Lopez Escobedo (CST-7), Los Alamos, New Mexico. (Lopez Escobedo 1998, 058840)

Meeker, K., F.E. Goff, J.N. Gardner, P.E. Trujillo, Jr., and D. Counce, March 1990. "Environmental Sampling and Mud Sampling Program of CSDP Core Hole VC-2B, Valles Caldera, New Mexico," Los Alamos National Laboratory report LA-11759-OBES, Los Alamos, New Mexico. (Meeker et al. 1990, 054783.34)

NMED (New Mexico Environment Department), December 10, 1996. "Notice of Determination Requests for Permit Modification Units Proposed for No Further Action March and September 1995," New Mexico Environment Department memorandum to T. Taylor (DOE), and H. Jansen (EM/ER) from R.S. Dinwiddie (NMED-HRMB), Santa Fe, New Mexico. (NMED 1996, 055815)

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), October 20, 2008. "Notice of Approval, Revision 1, Investigation Work Plan for Upper Cañada del Buey Aggregate Area," 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, 103429)

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)

Nonno, L., April 15, 2008. Supplemental Information for SWMU 52-001(d) [and attachment]. E-mail message to N. Dhawan (NMED) from L. Nonno (LANL), Los Alamos, New Mexico. (Nonno 2008, 101365)

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)

Salazar, M., and J. Elder, August 1992. "Decommissioning the UHTREX Reactor Facility at Los Alamos, New Mexico," Los Alamos Scientific Laboratory report LA-12356, Los Alamos, New Mexico. (Salazar and Elder 1992, 012021)

Santa Fe Engineering Ltd., February 1994. "Wastewater Stream Characterization for TA-46-16, 17, 20, 25, 37, 58, 77, 86, 87, 105, 191, 254, 264, 265, 266, 267, 268, 269, 270, 296, 320, and 400 at Los Alamos National Laboratory, Environmental Study, Characterization Report #65," report prepared for Los Alamos National Laboratory, Santa Fe, New Mexico. (Santa Fe Engineering, Ltd. 1994, 101838)

Santa Fe Engineering Ltd., March 1994. "Wastewater Stream Characterization for TA-46-30, 31, 36, 74, 128, 154, 165, 182, 183, 184, 187, 188, 189, 240, 241, 242, 255, 263, 274, 276, 277, 278, 279, 282, 283, 285, 293, 294, 303, 306, 311, 321, 322, 323, 324, 325, 358, 359, 393, and 397 at Los Alamos National Laboratory, Environmental Study, Characterization Report #67," report prepared for Los Alamos National Laboratory, Santa Fe, New Mexico. (Santa Fe Engineering, Ltd. 1994, 101839)

Santa Fe Engineering Ltd., March 1994. "Wastewater Stream Characterization for TA-46-1, 2, 24, 41, 59, 75, 76, 88, 111, 119, 120, 121, 134, 181, 185, 186, 217, 218, 252, 257, 258, 259, 260, 261, 262, 271, 272, 286, 297, 298, 301, 302, 309, 314, 318, 319, 341, 342, 343, 357, and 360 at Los Alamos National Laboratory, Environmental Study, Characterization Report #71," report prepared for Los Alamos National Laboratory, Santa Fe, New Mexico. (Santa Fe Engineering, Ltd. 1994, 101840)

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)

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)

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	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.
Drainages	WQH Drainage Arcs; Los Alamos National Laboratory, ENV Water Quality and Hydrology Group; 1:24,000 Scale Data; 03 June 2003.
Inferred Upper Cañada del Buey Aggregate Area drainages	Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1; LANL ERID 105038.17; LA-UR-08-6122; September 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.
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.

Legend Item	Data Source
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 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 Upper Cañada del Buey Aggregate Area	Auxiliary Geospatial Themes for the Upper Cañada del Buey Aggregate Area HIR-IWP; LANL ERID 101881; June 2008.
Former LANL Upper Cañada del Buey Aggregate Area structures	Auxiliary Geospatial Themes for the Upper Cañada del Buey Aggregate Area HIR-IWP; LANL ERID 101881; June 2008.
Upper Cañada del Buey Aggregate Area LANL PRS boundaries	Digitized from: relevant maps appearing in the Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1; LANL ERID 105038.17; LA-UR-08-6122; September 2008. Potential Release Sites; Los Alamos National Laboratory, Waste and Environmental Services Division, Environmental Data and Analysis Group, EP2009-0137; 1:2,500 Scale Data; 25 January 2010.
Upper Cañada del Buey Aggregate Area 2010 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, 4 October 2010.
LANL historical sampling locations	Point Feature Locations of the Environmental Restoration Project Database; Los Alamos National Laboratory, Waste and Environmental Services Division, 5 June 2010.
Contours	Hypsography, 2, 10, 20, and 100 Foot Contour Interval; Los Alamos National Laboratory, ENV Environmental Remediation and Surveillance Program; 1991.

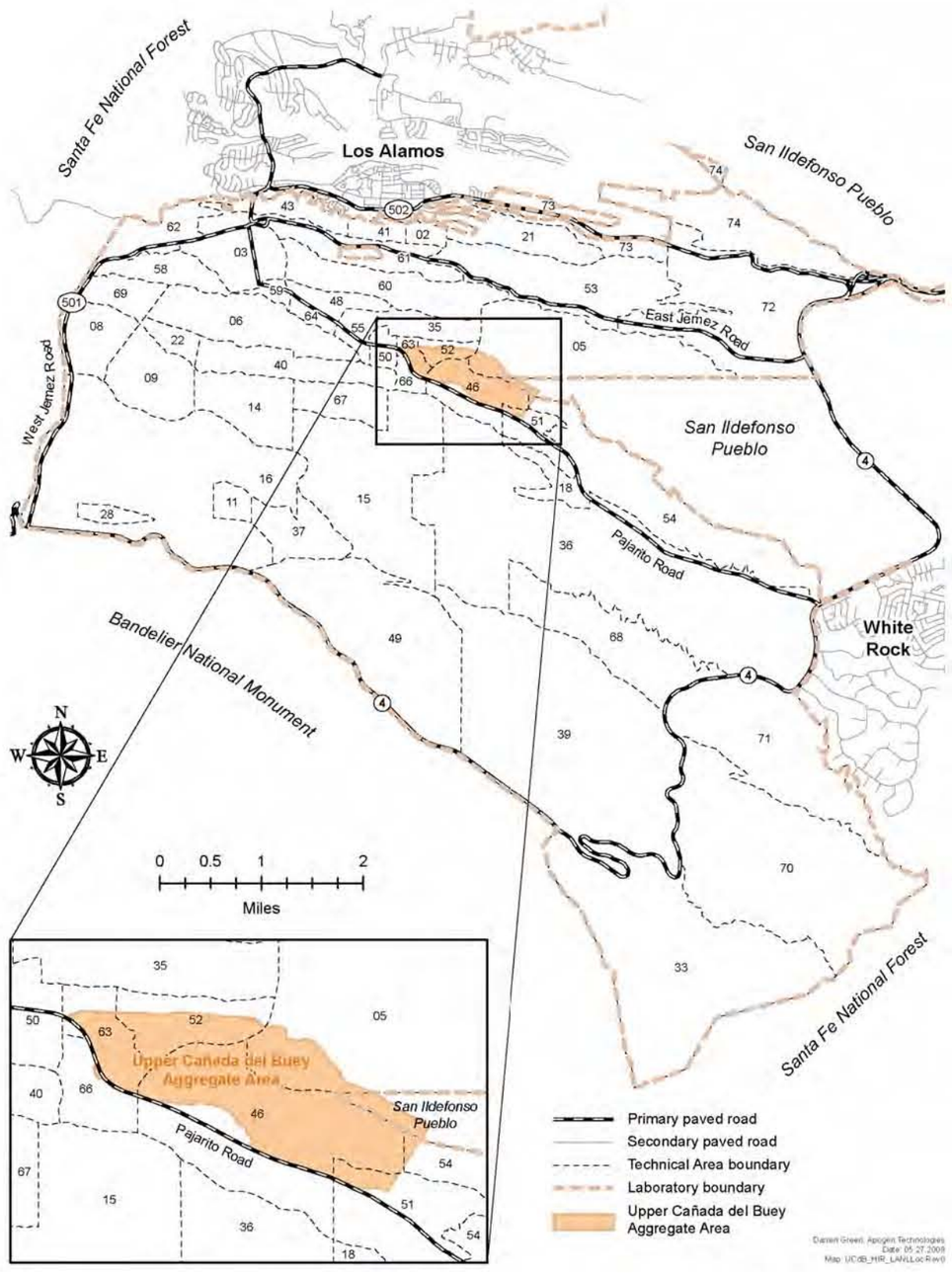

Figure 1.1-1 Location of Upper Cañada del Buey Aggregate Area with respect to Laboratory technical areas

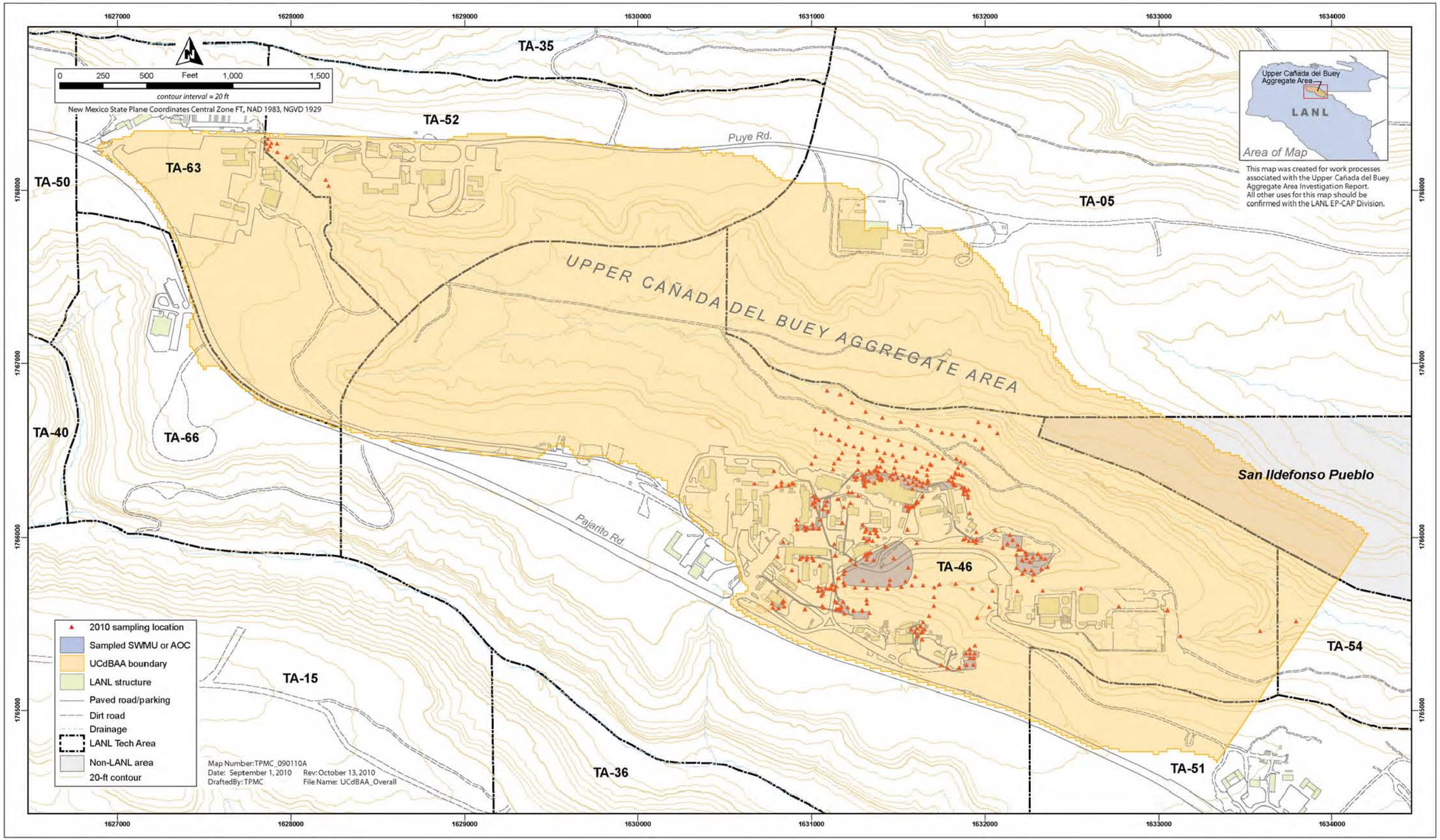

Figure 1.1-2 Location of Upper Cañada del Buey Aggregate Area and its surrounding land holdings

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

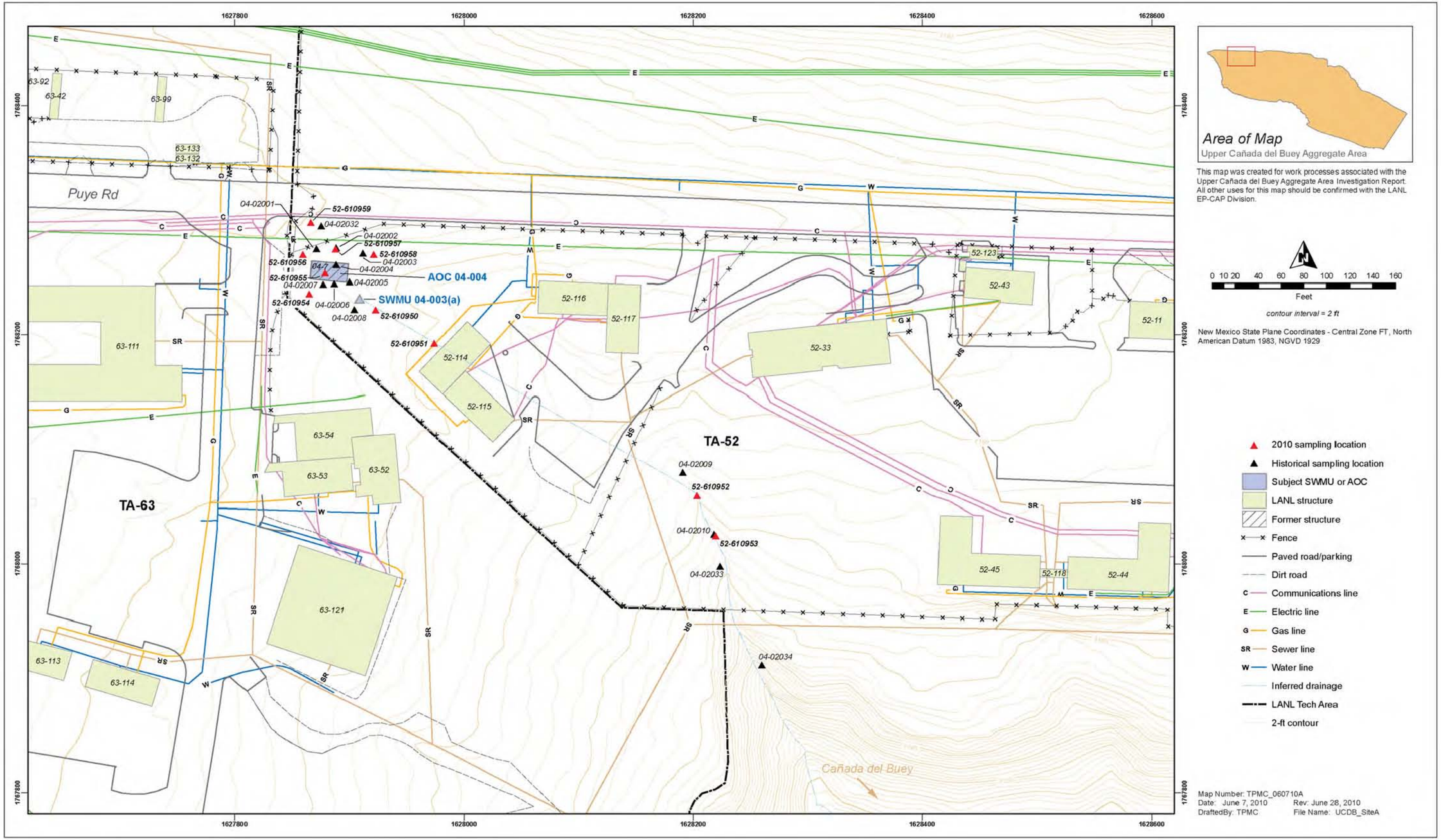

Figure 6.2-1 Site map of SWMU 04-003(a) and AOC 04-004

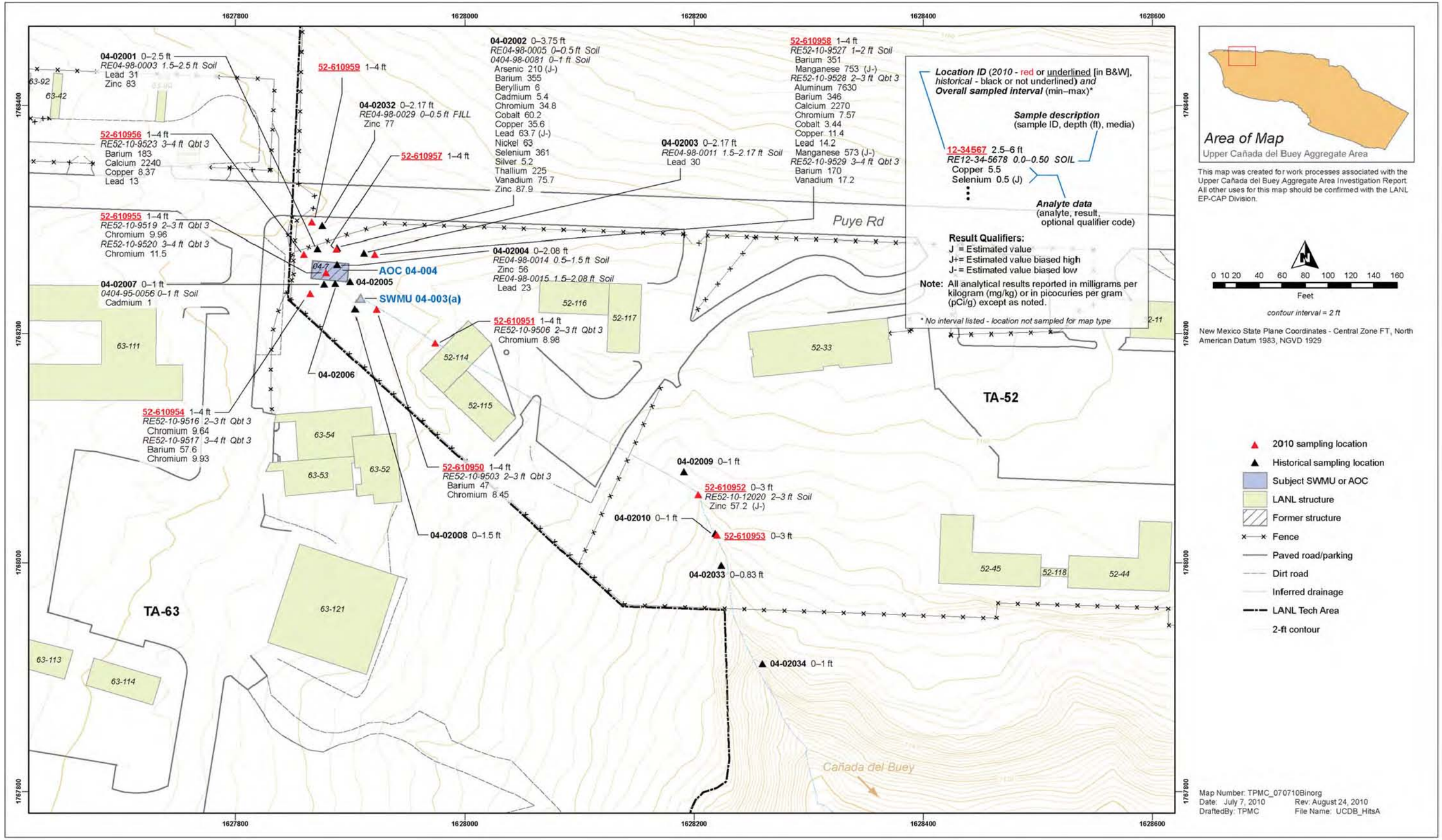

Figure 6.2-2 Inorganic chemicals detected or detected above BVs at SWMU 04-003(a) and AOC 04-004

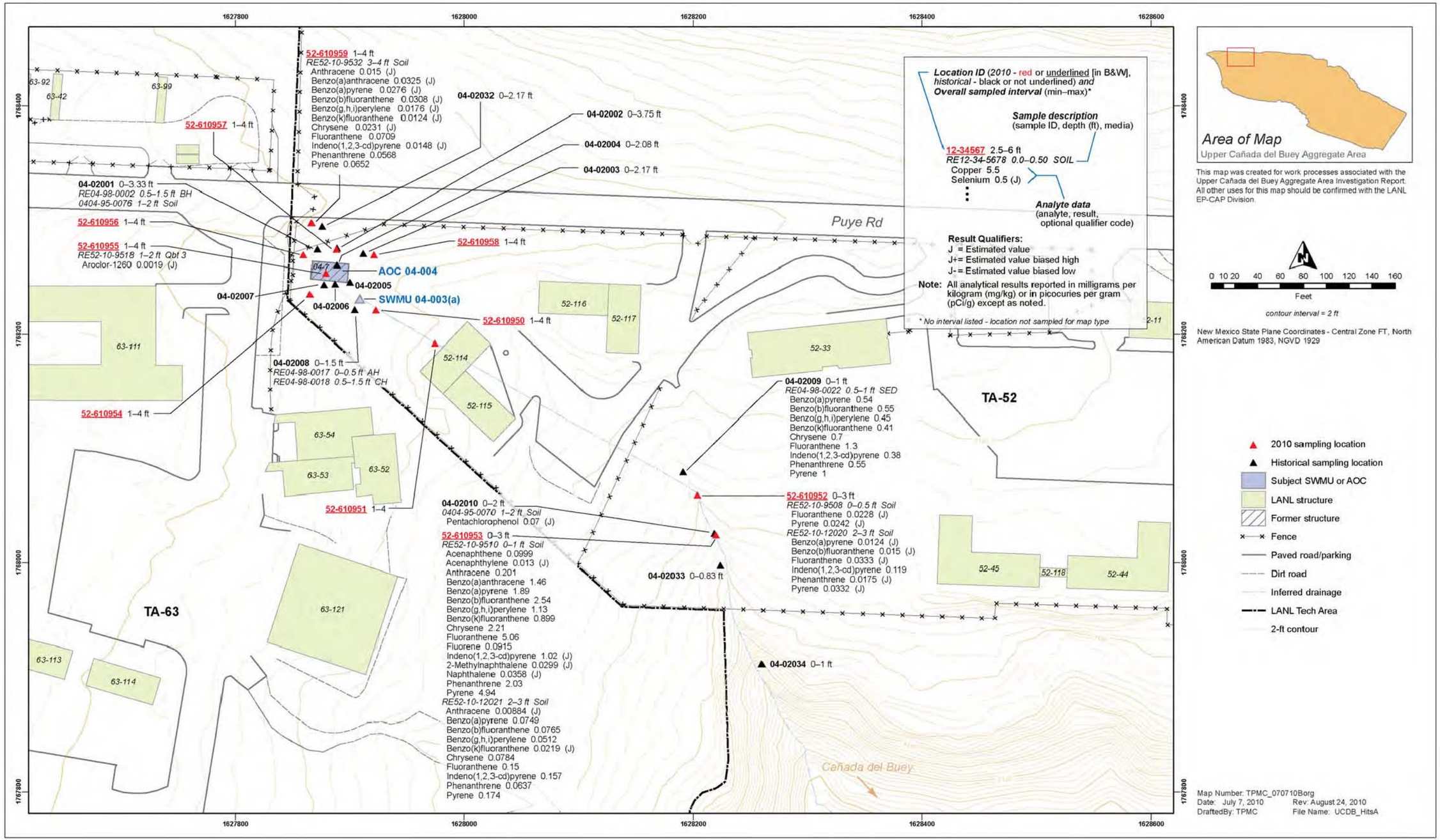

Figure 6.2-3 Organic chemicals detected at SWMU 04-003(a) and AOC 04-004

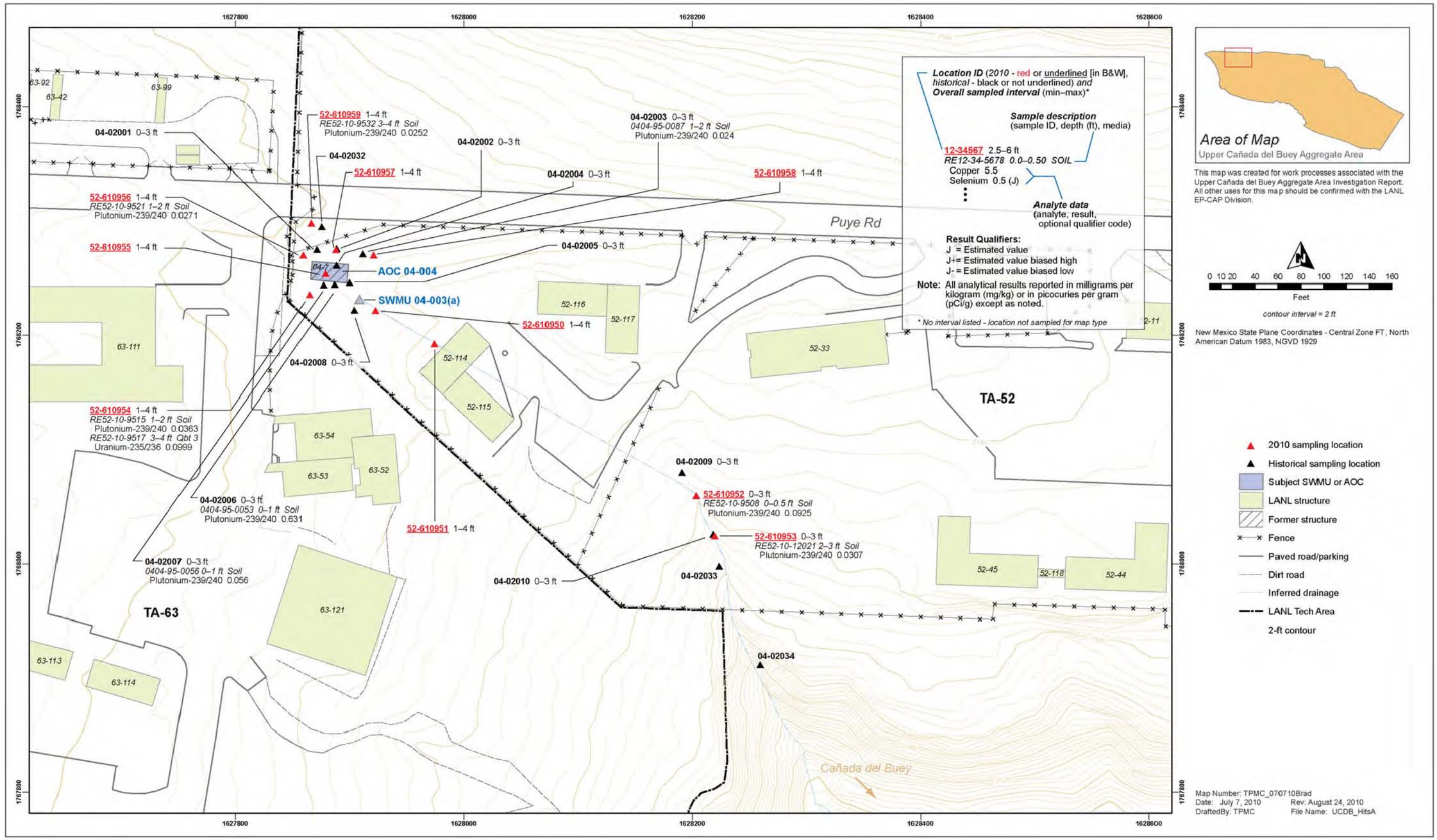

Figure 6.2-4 Radionuclides detected or detected above BVs/FVs at SWMU 04-003(a) and AOC 04-004

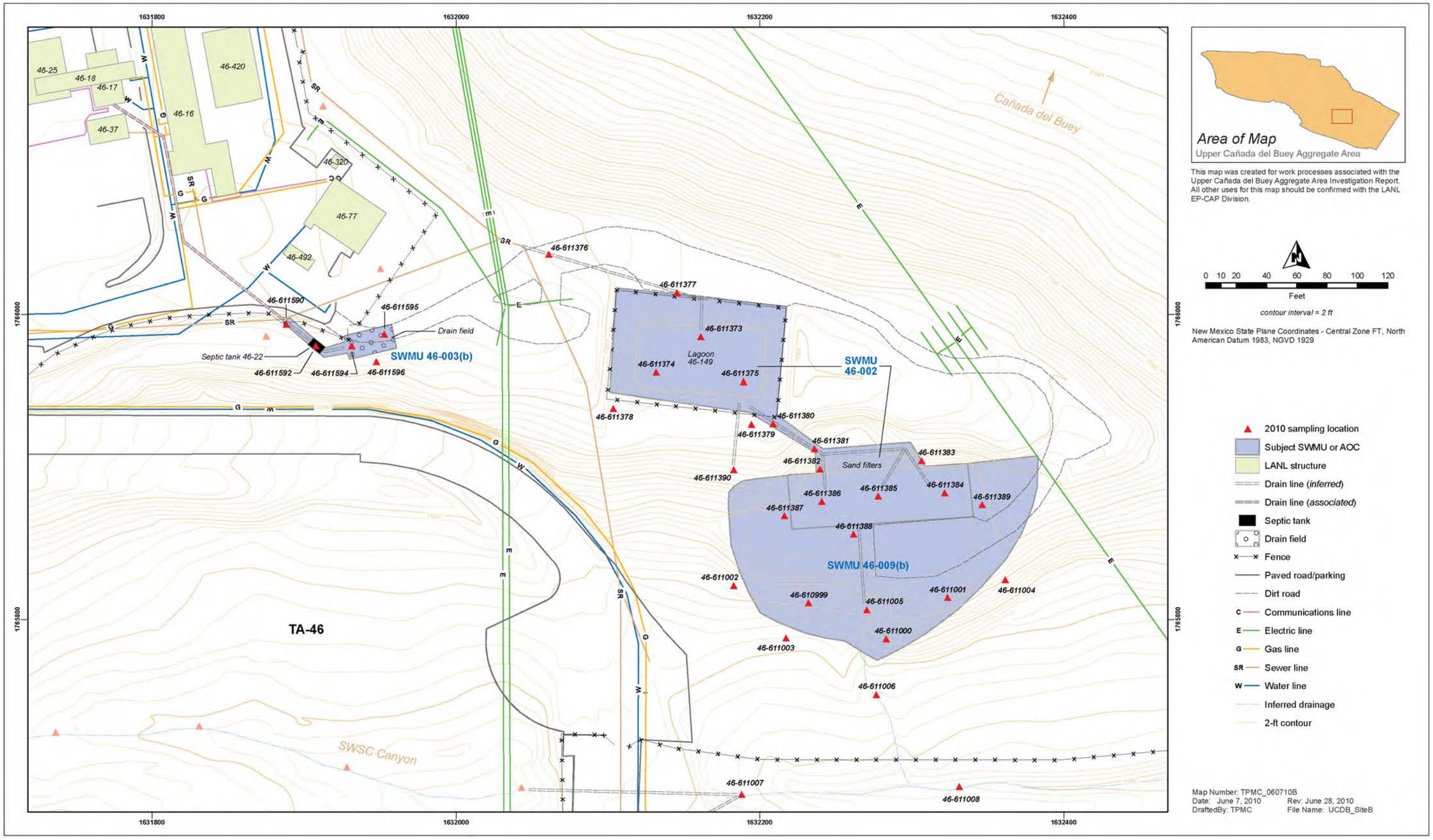

Figure 7.2-1 Site map of SWMUs 46-002, 46-003(b), and 46-009(b)

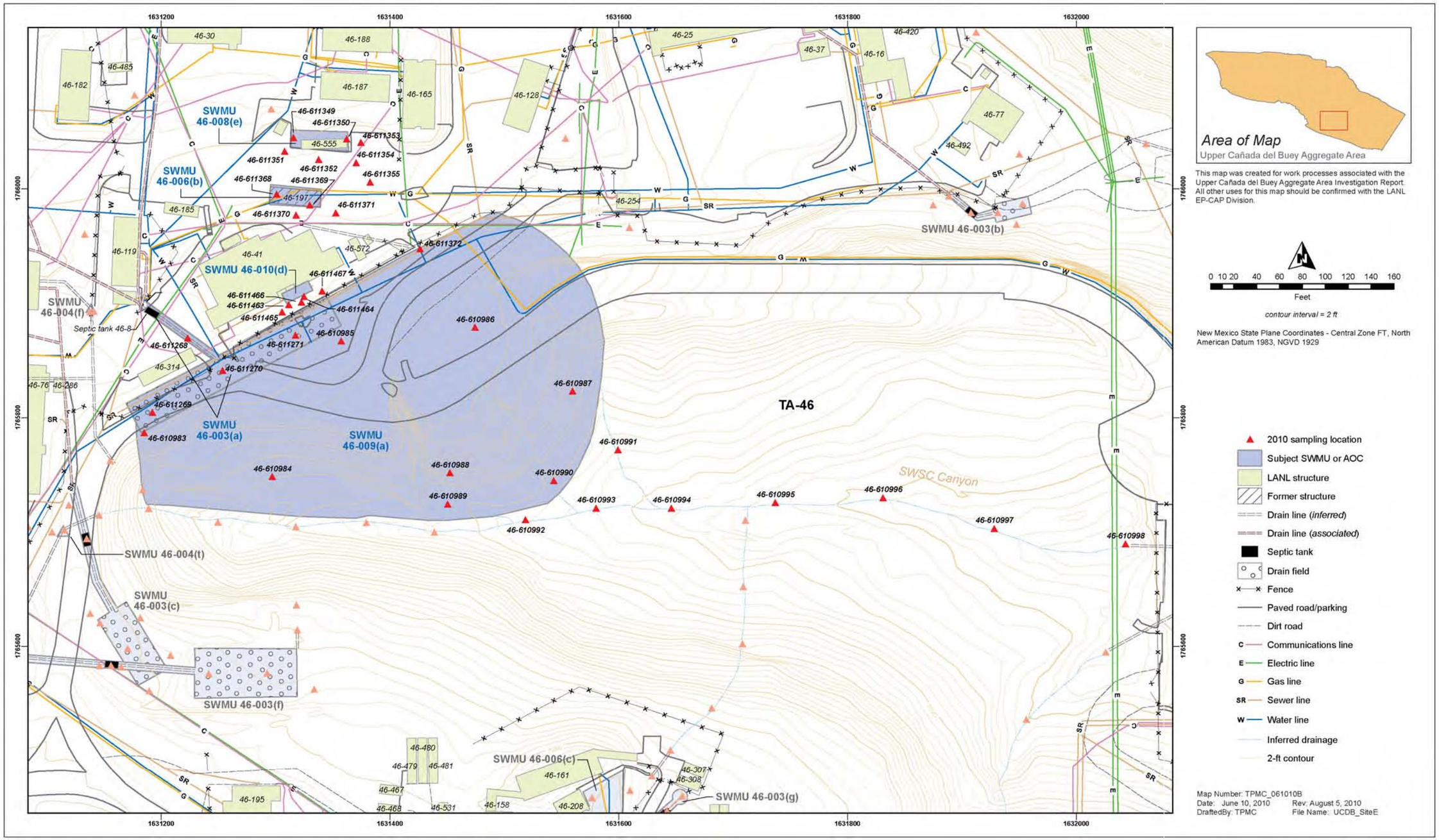

Figure 7.3-1 Site map of SWMUs 46-003(a), 46-006(b), 46-008(e), 46-009(a), and 46-010(d)

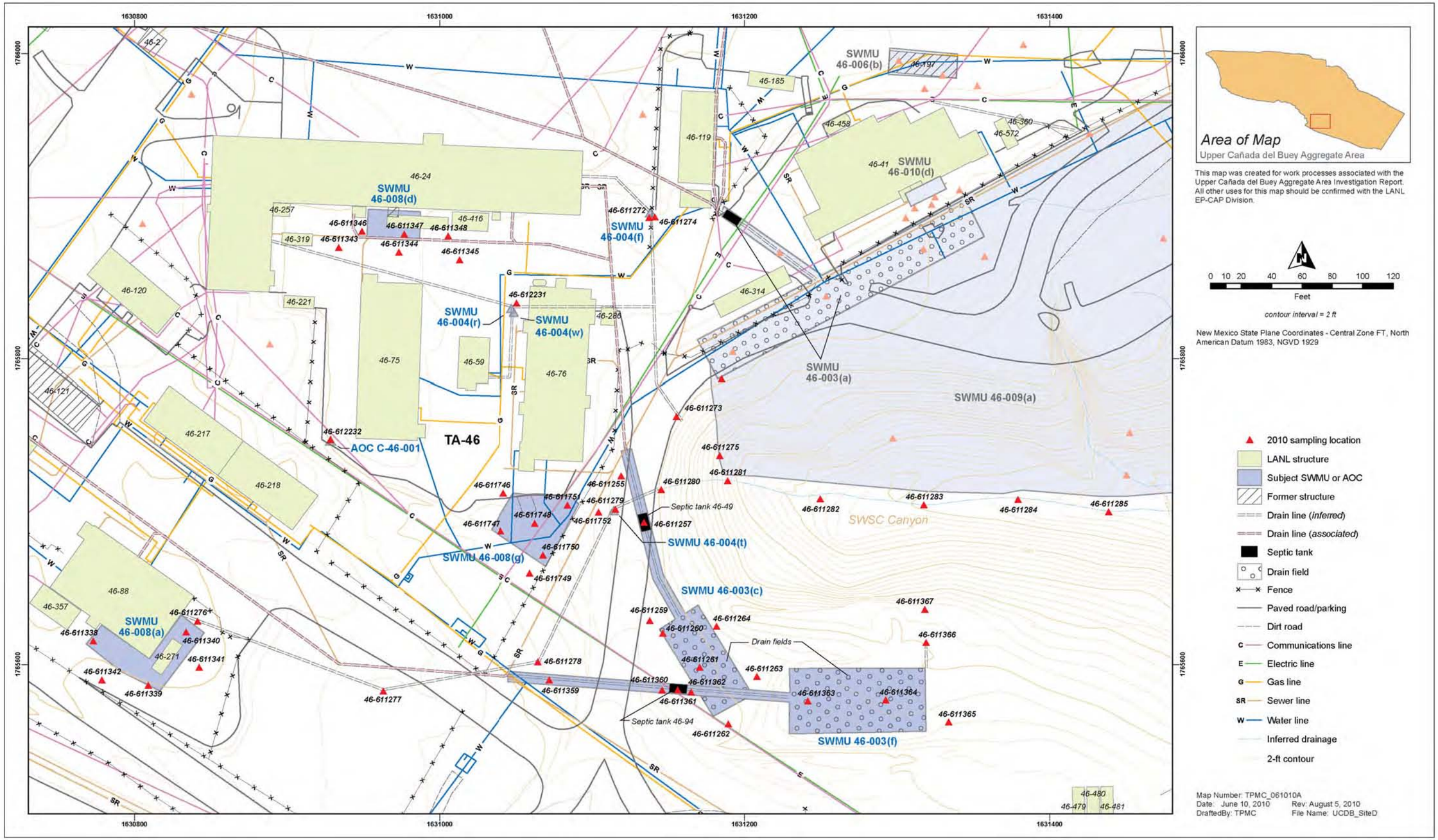

Figure 7.5-1 Site map of SWMUs 46-003(c), 46-003(f), 46-004(f,r,t,w), 46-008(a,d,g), and AOC C-46-001

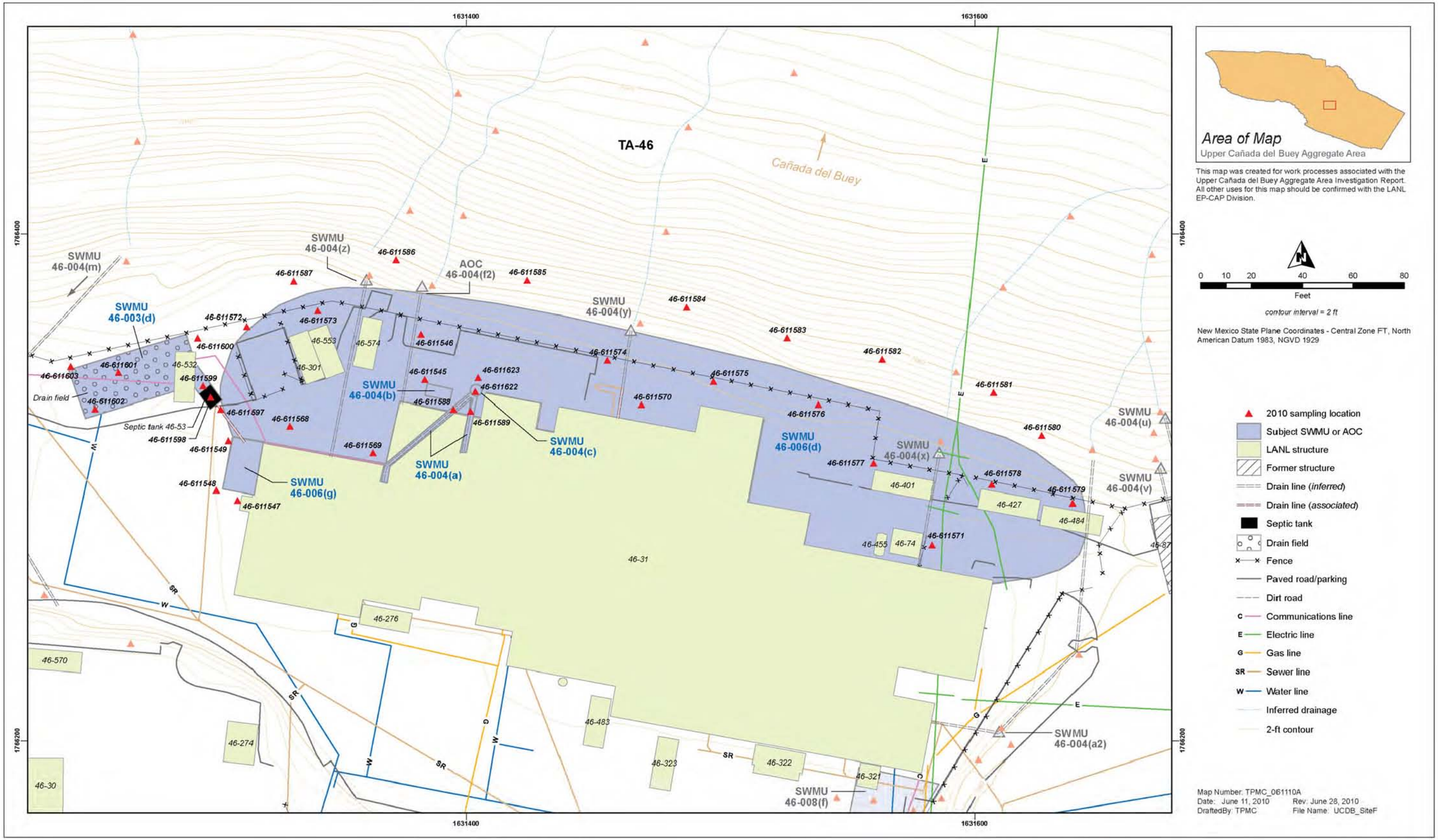

Figure 7.6-1 Site map of SWMUs 46-003(d), 46-004(a,b,c), 46-006(d), and 46-006(g)

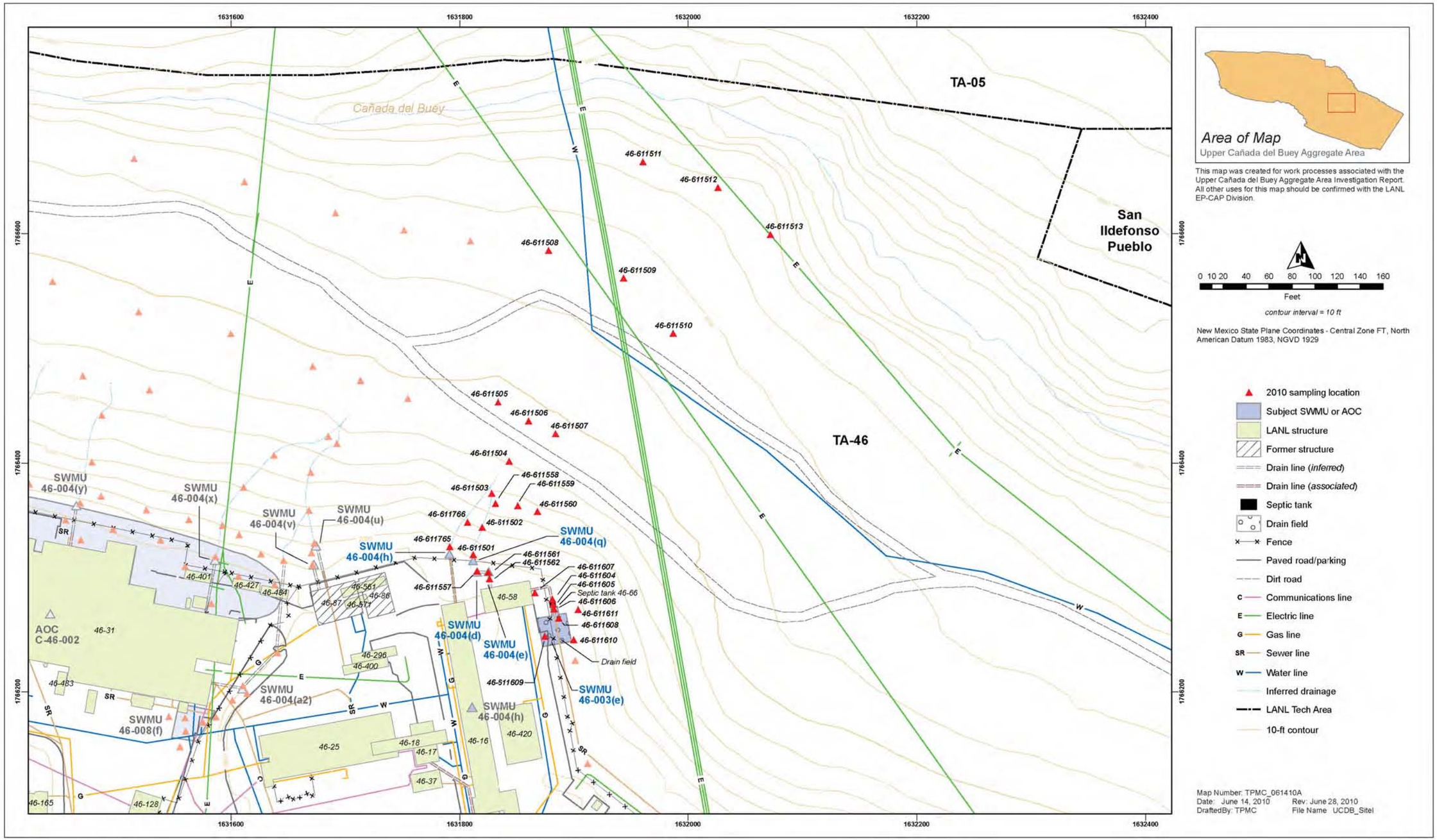

Figure 7.7-1 Site map of SWMUs 46-003(e) and 46-004(d,e,h,q)

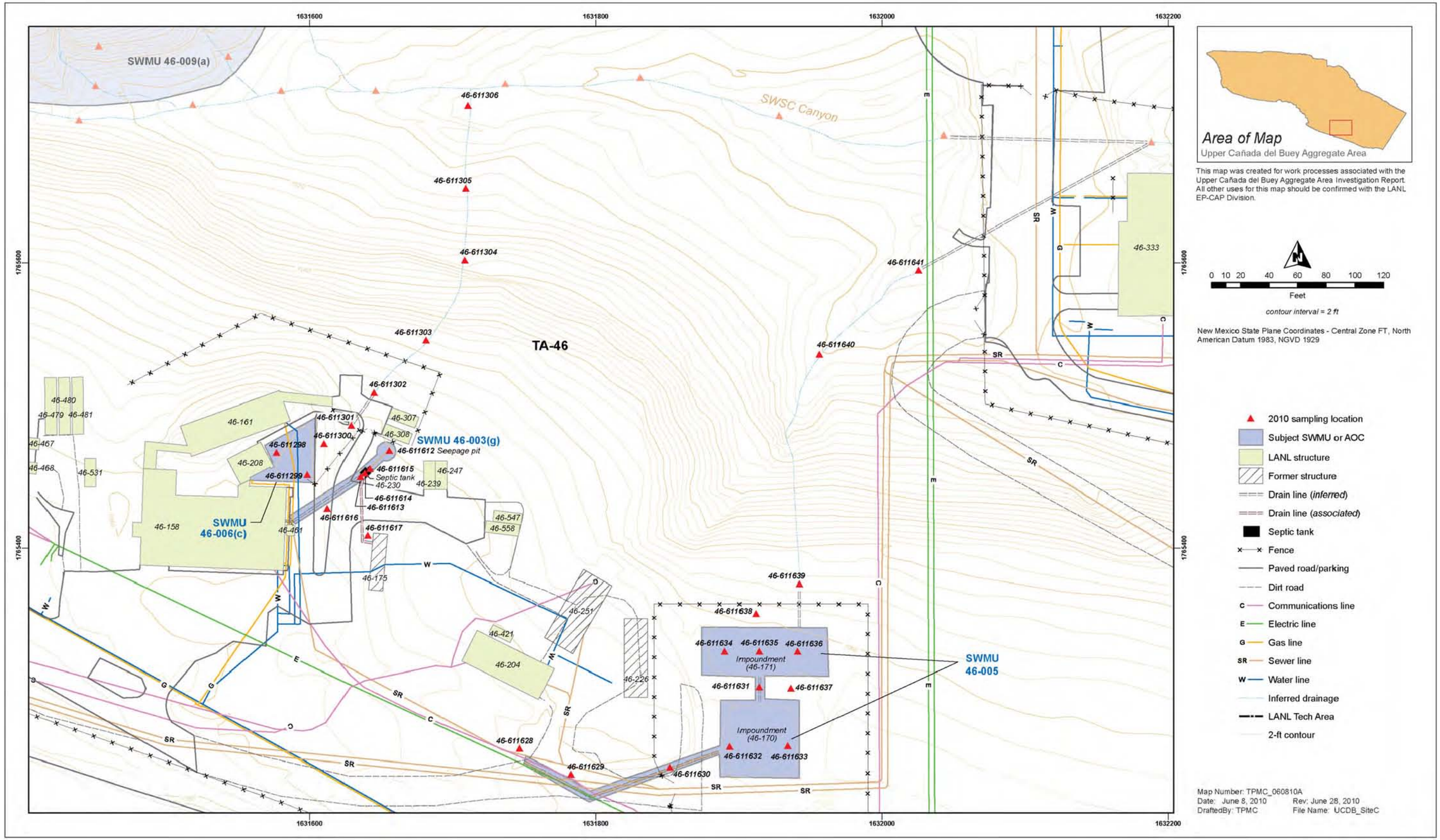

Figure 7.9-1 Site map of SWMUs 46-003(g), 46-005, and 46-006(c)

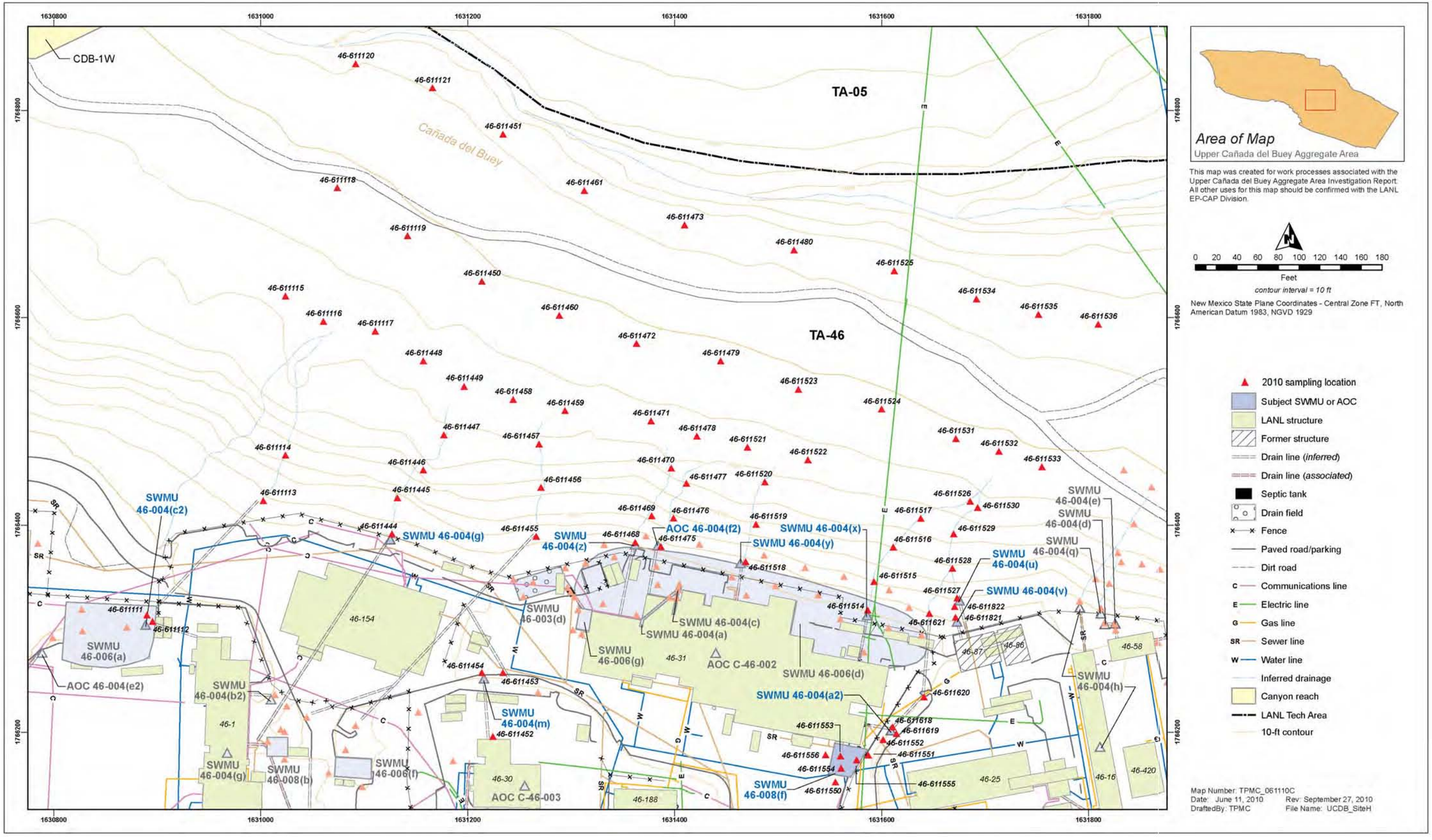

Figure 7.11-1 Site map of SWMUs 46-004(a2,c2,g,m,u,v,x,y,z), 46-008(f), and AOC 46-004(f2)

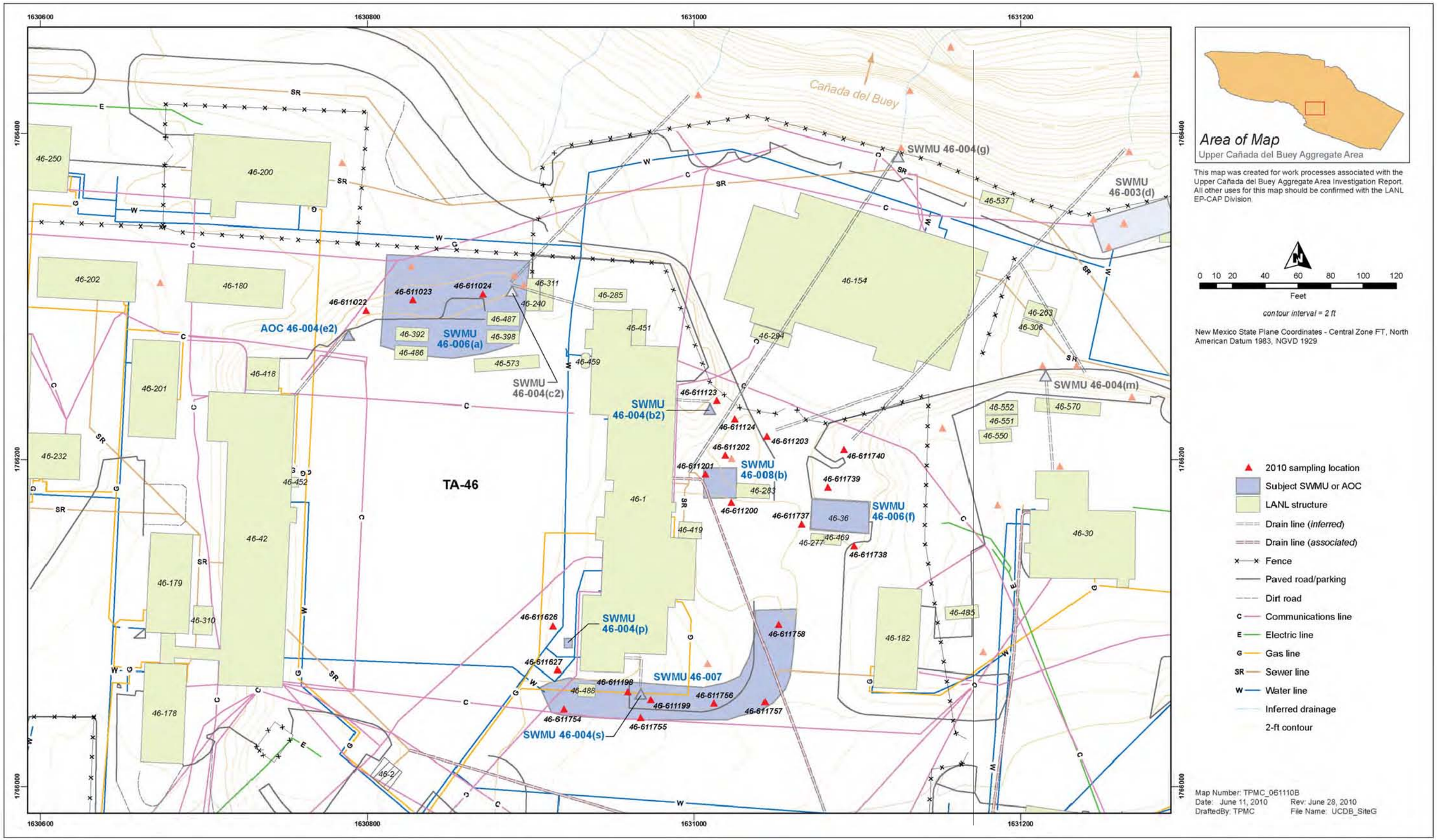

Figure 7.13-1 Site map of SWMUs 46-004(b2,p,s), 46-006(a), 46-006(f), 46-007, 46-008(b), and AOC 46-004(e2)

Figure 7.17-1 Site map of Consolidated Unit 46-004(d2)-99 consisting of SWMUs 46-004(d2,g,h) and AOCs C-46-002 and C-46-003

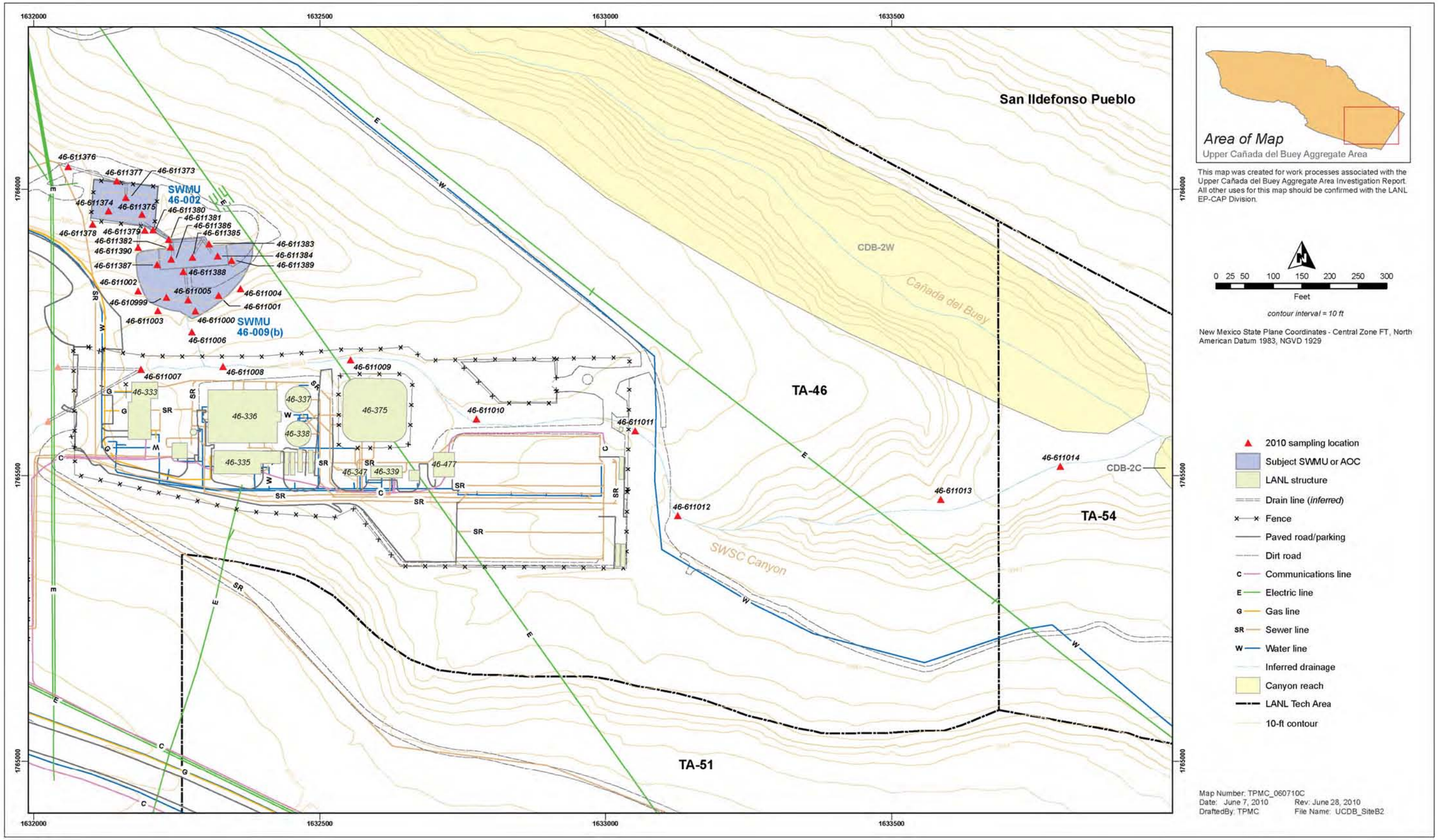

Figure 7.48-1 Site map of SWMU 46-009(b)

Table 1.1-1
Sites under Investigation in Cañada del Buey Aggregate Area

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
Former TA-04				
04-003(a)-00	SWMU 04-003(a)	Inactive outfall and associated drainline from former building 04-7	1994,1995,1998 RFIs	Sampled
	AOC 04-004	Area of potential soil contamination associated with former building 04-7	1994,1995,1998 RFIs	Sampled
TA-46				
	SWMU 46-002	Surface impoundment	No RFI activity	Sampled
	SWMU 46-003(a)	Inactive septic system	No RFI activity	Accessible portions of system sampled
	SWMU 46-003(b)	Inactive septic system	No RFI activity	Geophysical survey; sampled remaining portions of system
	SWUM 46-003(c)	Inactive septic system	No RFI activity	Geophysical survey; sampled remaining portions of system
	SWUM 46-003(d)	Inactive septic system	No RFI activity	Tank removed; sampled remaining portions of system
	SWMU 46-003(e)	Inactive septic system	1993 RFI	Tank removed; sampled remaining portions of system
	SWMU 46-003(f)	Inactive septic system	No RFI activity	Tank removed; sampled remaining portions of system
	SWMU 46-003(g)	Inactive septic system	No RFI activity	Tank removed; sampled remaining portions of system
	SWMU 46-004(a)	Drainlines from former sinks in building 46-31 that discharged to a dry well north of building 46-31	No RFI activity	Sampled
	SWMU 46-004(a2)	Inactive outfall located on the east side of building 46-31	1994 RFI	Sampled
	SWMU 46-004(b)	Former alkali-metal cleaning tank	1994 RFI	Sampled
	SWMU 46-004(b2)	Inactive outfall located east of building 46-1	1994 RFI	Sampled

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
	SWMU 46-004(c)	Inactive dry well located north of building 46-31	No RFI activity	Sampled
	SWMU 46-004(c2)	Inactive outfall located north of building 46-1	1994 RFI	Sampled
46-004(d)-99	SWMU 46-004(d)	Inactive dry well; received overflow from the adjacent SWMU 46-004(e) dry well	No RFI activity	Sampled
	SWMU 46-004(e)	Inactive dry well connected to building 46-58	No RFI activity	Sampled
46-004(d2)-99	SWMU 46-004(d2)	Area of potential soil contamination associated with exhaust emissions from stacks on building 46-24	1994 RFI	Sampled; stack locations
	SWMU 46-004(g)	Area of potential soil contamination associated with exhaust emissions from stacks on building 46-1 and inactive outfall from building 46-1	1994 RFI	Sampled; stack and outfall locations
	SWMU 46-004(h)	Area of potential soil contamination with exhaust emissions from stacks on building 46-16 and an outfall from building 46-16	1994 RFI	Sampled; stack and outfall locations
	AOC C-46-002	Area of potential soil contamination associated with a one-time release of uranium-235 from a stack on building 46-31	1994 RFI	Sampled; stack locations
	AOC C-46-003	Area of potential soil contamination associated with a one-time release of depleted uranium hexafluoride containing uranium-237 from a stack on building 46-30	1994 RFI	Sampled; stack locations
	AOC 46-004(e2)	Outfall located northeast of building 46-42, currently receives stormwater from building 46-42 roof drains	1994 RFI	Sampled

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
	SWMU 46-004(f)	Inactive outfall located east of building 46-24	1994 RFI	Sampled
	AOC 46-004(f2)	Inactive outfall located north of the northwest corner of building 46-31	1994 RFI	Sampled
	SWMU 46-004(m)	Inactive outfall located north of building 46-30	1994 RFI	Sampled
	SWMU 46-004(p)	Inactive dry well located next to the southwest corner of building 46-1; used for disposal of alkali-metal wastes and other chemical wastes	No RFI activity	Sampled
	SWMU 46-004(q)	Inactive outfall located north of building 46-58	1994 RFI	Sampled
	SWMU 46-004(r)	Outfall located south of building 46-24, currently receives stormwater from building 46-24 roof drains	1994 RFI	Sampled
	SWMU 46-004(s)	Outfall, located south of building 46-1, currently receives stormwater from building 46-1 high bay roof drains	1994 RFI	Sampled
	SWMU 46-004(t)	Inactive outfall located southeast of building 46-76	No RFI activity	Sampled
	SWMU 46-004(u)	Inactive outfall located north of former building 46-87	1994 RFI	Sampled
	SWMU 46-004(v)	Inactive outfall located north of former building 46-87	1994 RFI	Sampled
	SWMU 46-004(w)	Inactive outfall located south of building 46-24	1994 RFI	Sampled; overlaps with SWMU 46-004(r)
	SWMU 46-004(x)	Outfall located north of building 46-31, currently receives stormwater from building 46-31 roof drains	1994 RFI	Sampled
	SWMU 46-004(y)	Inactive outfall located north of building 46-31	1994 RFI	Sampled
	SWMU 46-004(z)	Inactive outfall located northwest of building 46-31	1994 RFI	Sampled

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
	SWMU 46-005	Surface impoundments	No RFI activity	Sampled
	SWMU 46-006(a)	Area of potential soil contamination located between buildings 46-1 and 46-42	1994 RFI	Sampled; overlaps with AOC 46-004(e2)
	SWMU 46-006(b)	Former storage shed location north of building 46-41	1994 RFI	Sampled
	SWMU 46-006(c)	Storage area located between the northeast corner of building 46-158 and the southeast side of building 46-208	1994 RFI	Sampled
	SWMU 46-006(d)	Area of potential soil contamination located on the north side of building 46-31	1994 RFI	Sampled
	SWMU 46-006(f)	Storage shed located east of building 46-1	1994 RFI	Sampled
	SWMU 46-006(g)	Storage shed located at the west end of building 46-31	1994 RFI	Sampled
	SWMU 46-007	Area of potential soil contamination located on the south and southeast sides of building 46-1	1994 RFI	Sampled
	SWMU 46-008(a)	Storage area located along the south and east sides of building 46-88	1994 RFI	Sampled
	SWMU 46-008(b)	Former drum storage area located on the east side of building 46-1	1994 RFI	Sampled
	SWMU 46-008(d)	Storage area located on the south side of building 46-24	1994 RFI	Sampled
	SWMU 46-008(e)	Storage area located south of transportable building 46-187	1994 RFI	Sampled
	SWMU 46-008(f)	Storage area located on the southeast side of building 46-31	1994 RFI	Sampled
	SWMU 46-008(g)	Storage area located south building 46-76	1994 RFI	Sampled

Table 1.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Previous Investigation(s)	2010 Investigation
	SWMU 46-009(a)	Surface disposal area located at the head of SWSC Canyon near the southeastern corner of TA-46	No RFI activity	Sampled
	SWMU 46-009(b)	Surface disposal area southeast of building 46-77	No RFI activity	Sampled
	SWMU 46-010(d)	Storage area located on the south side of building 46-41	1994 RFI	Sampled
	AOC C-46-001	One-time mercury spill in the vicinity of building 46-75	No RFI activity	Sampled
TA-52				
	SWMU 52-001(d)	UHTREX sump pump room, duct work, filters and hot cells in building 52-1	No RFI activity	None; site pending NMED review of supplemental information (LANL 2008, 101365)

Note: Shading denotes consolidated unit.

Table 3.2-1
Surveyed Coordinates for Locations Sampled in 2010

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
TA-04			
SWMU 04-003(a)	52-610950	1627923.221	1768221.875
SWMU 04-003(a)	52-610951	1627974.639	1768192.587
SWMU 04-003(a)	52-610952	1628203.738	1768059.813
SWMU 04-003(a)	52-610953	1628220.010	1768024.667
AOC 04-004	52-610954	1627865.336	1768235.604
AOC 04-004	52-610955	1627879.248	1768253.909
AOC 04-004	52-610956	1627859.845	1768270.018
AOC 04-004	52-610957	1627888.401	1768274.777
AOC 04-004	52-610958	1627921.350	1768270.018
AOC 04-004	52-610959	1627866.801	1768298.208
TA-46			
SWMU 46-002	46-611373	1632161.356	1765985.497
SWMU 46-002	46-611374	1632131.515	1765962.143
SWMU 46-002	46-611375	1632189.467	1765956.088
SWMU 46-002	46-611376	1632061.020	1766039.557
SWMU 46-002	46-611377	1632145.787	1766014.473
SWMU 46-002	46-611378	1632103.404	1765938.789
SWMU 46-002	46-611379	1632194.657	1765928.409
SWMU 46-002	46-611380	1632208.929	1765928.842
SWMU 46-002	46-611381	1632236.175	1765912.408
SWMU 46-002	46-611382	1632239.635	1765899.001
SWMU 46-002	46-611383	1632306.669	1765904.623
SWMU 46-002	46-611384	1632321.806	1765883.431
SWMU 46-002	46-611385	1632278.125	1765881.269
SWMU 46-002	46-611386	1632240.932	1765877.809
SWMU 46-002	46-611387	1632216.281	1765868.295
SWMU 46-002	46-611388	1632261.691	1765856.185
SWMU 46-002	46-611389	1632346.457	1765875.647
SWMU 46-002	46-611390	1632182.980	1765898.568
SWMU 46-003(a)	46-611268	1631223.257	1765869.483
SWMU 46-003(a)	46-611269	1631192.442	1765804.771
SWMU 46-003(a)	46-611270	1631253.730	1765841.064
SWMU 46-003(a)	46-611271	1631317.415	1765871.880
SWMU 46-003(b)	46-611590	1631888.461	1765993.584
SWMU 46-003(b)	46-611592	1631907.923	1765979.312
SWMU 46-003(b)	46-611594	1631931.276	1765979.312

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-003(b)	46-611595	1631952.900	1765987.097
SWMU 46-003(b)	46-611596	1631947.711	1765968.933
SWMU 46-003(c)	46-611255	1631119.279	1765723.761
SWMU 46-003(c)	46-611257	1631134.320	1765693.375
SWMU 46-003(c)	46-611259	1631137.996	1765628.804
SWMU 46-003(c)	46-611260	1631146.670	1765620.586
SWMU 46-003(c)	46-611261	1631170.866	1765598.217
SWMU 46-003(c)	46-611262	1631189.583	1765561.238
SWMU 46-003(c)	46-611263	1631208.301	1765592.282
SWMU 46-003(c)	46-611264	1631181.822	1765625.152
SWMU 46-003(d)	46-611597	1631303.546	1766330.752
SWMU 46-003(d)	46-611598	1631299.611	1766335.511
SWMU 46-003(d)	46-611599	1631296.609	1766339.949
SWMU 46-003(d)	46-611600	1631294.413	1766358.893
SWMU 46-003(d)	46-611601	1631263.390	1766345.165
SWMU 46-003(d)	46-611602	1631254.055	1766330.889
SWMU 46-003(d)	46-611603	1631244.446	1766347.636
SWMU 46-003(e)	46-611604	1631881.753	1766281.103
SWMU 46-003(e)	46-611606	1631882.275	1766276.663
SWMU 46-003(e)	46-611607	1631883.059	1766272.484
SWMU 46-003(e)	46-611608	1631866.605	1766286.587
SWMU 46-003(e)	46-611609	1631887.238	1766264.387
SWMU 46-003(e)	46-611610	1631875.223	1766248.456
SWMU 46-003(e)	46-611611	1631900.296	1766245.322
SWMU 46-003(f)	46-611359	1631072.166	1765590.045
SWMU 46-003(f)	46-611360	1631146.179	1765583.197
SWMU 46-003(f)	46-611361	1631156.423	1765583.397
SWMU 46-003(f)	46-611362	1631165.096	1765582.084
SWMU 46-003(f)	46-611363	1631241.536	1765576.150
SWMU 46-003(f)	46-611364	1631292.666	1765576.806
SWMU 46-003(f)	46-611365	1631333.953	1765562.454
SWMU 46-003(f)	46-611366	1631319.144	1765614.498
SWMU 46-003(f)	46-611367	1631318.231	1765636.154
SWMU 46-003(g)	46-611612	1631655.626	1765468.592
SWMU 46-003(g)	46-611613	1631635.410	1765450.053
SWMU 46-003(g)	46-611614	1631638.505	1765452.706
SWMU 46-003(g)	46-611615	1631642.043	1765455.801
SWMU 46-003(g)	46-611616	1631612.309	1765428.107

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-003(g)	46-611617	1631640.496	1765409.263
SWMU 46-004(a)	46-611588	1631395.152	1766330.752
SWMU 46-004(a)	46-611589	1631401.741	1766330.020
SWMU 46-004(a2)	46-611618	1631610.614	1766205.213
SWMU 46-004(a2)	46-611619	1631614.319	1766198.544
SWMU 46-004(a2)	46-611620	1631640.997	1766234.114
SWMU 46-004(a2)	46-611621	1631646.184	1766314.887
SWMU 46-004(b)	46-611545	1631383.804	1766342.466
SWMU 46-004(b)	46-611546	1631382.340	1766360.403
SWMU 46-004(b2)	46-611123	1631014.073	1766236.164
SWMU 46-004(b2)	46-611124	1631025.141	1766225.097
SWMU 46-004(c)	46-611622	1631403.572	1766337.707
SWMU 46-004(c)	46-611623	1631404.670	1766343.198
SWMU 46-004(c2)	46-611111	1630890.321	1766313.132
SWMU 46-004(c2)	46-611112	1630895.855	1766307.095
SWMU 46-004(c2)	46-611113	1631002.592	1766423.954
SWMU 46-004(c2)	46-611114	1631024.056	1766467.775
SWMU 46-004(c2)	46-611115	1631024.056	1766620.705
SWMU 46-004(c2)	46-611116	1631060.723	1766596.298
SWMU 46-004(c2)	46-611117	1631110.806	1766586.721
SWMU 46-004(c2)	46-611118	1631074.138	1766725.341
SWMU 46-004(c2)	46-611119	1631142.107	1766678.942
SWMU 46-004(c2)	46-611120	1631092.025	1766845.343
SWMU 46-004(c2)	46-611121	1631166.254	1766821.928
SWMU 46-004(d)	46-611557	1631815.414	1766305.340
SWMU 46-004(d)	46-611558	1631831.607	1766364.627
SWMU 46-004(d)	46-611559	1631851.456	1766362.537
SWMU 46-004(d)	46-611560	1631868.694	1766357.575
46-004(d2)-99	46-611481	1630888.665	1765809.506
46-004(d2)-99	46-611482	1630805.347	1765888.439
46-004(d2)-99	46-611483	1630837.505	1765973.218
46-004(d2)-99	46-611484	1631950.359	1766030.197
46-004(d2)-99	46-611485	1631912.537	1766137.084
46-004(d2)-99	46-611486	1631901.848	1766227.528
46-004(d2)-99	46-611487	1631875.044	1765985.798
46-004(d2)-99	46-611488	1631553.560	1766044.175
46-004(d2)-99	46-611489	1631133.410	1765960.245
46-004(d2)-99	46-611490	1631152.321	1766219.388

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
46-004(d2)-99	46-611491	1631186.031	1766172.440
46-004(d2)-99	46-611492	1631176.987	1766081.996
46-004(d2)-99	46-611493	1631296.208	1766069.663
46-004(d2)-99	46-611494	1631008.434	1766074.761
46-004(d2)-99	46-611495	1631023.233	1766200.559
46-004(d2)-99	46-611496	1631268.252	1766238.299
46-004(d2)-99	46-611497	1631609.470	1765966.064
46-004(d2)-99	46-611498	1630673.154	1766308.771
46-004(d2)-99	46-611499	1630784.883	1766382.496
46-004(d2)-99	46-611500	1630827.273	1766318.821
SWMU 46-004(e)	46-611561	1631825.078	1766304.556
SWMU 46-004(e)	46-611562	1631826.101	1766298.832
AOC 46-004(e2)	46-611022	1630799.268	1766291.482
AOC 46-004(e2)	46-611023	1630827.942	1766298.022
AOC 46-004(e2)	46-611024	1630870.702	1766301.562
SWMU 46-004(f)	46-611272	1631137.631	1765892.526
SWMU 46-004(f)	46-611273	1631155.526	1765762.669
SWMU 46-004(f)	46-611274	1631141.397	1765892.868
SWMU 46-004(f)	46-611275	1631183.854	1765737.080
AOC 46-004(f2)	46-611475	1631386.735	1766379.573
AOC 46-004(f2)	46-611476	1631398.808	1766407.073
AOC 46-004(f2)	46-611477	1631411.552	1766440.610
AOC 46-004(f2)	46-611478	1631421.613	1766486.221
AOC 46-004(f2)	46-611479	1631444.418	1766557.990
AOC 46-004(f2)	46-611480	1631515.517	1766665.309
SWMU 46-004(g)	46-611444	1631126.903	1766391.758
SWMU 46-004(g)	46-611445	1631132.269	1766426.637
SWMU 46-004(g)	46-611446	1631157.311	1766453.466
SWMU 46-004(g)	46-611447	1631176.986	1766487.451
SWMU 46-004(g)	46-611448	1631157.311	1766558.102
SWMU 46-004(g)	46-611449	1631196.661	1766533.955
SWMU 46-004(g)	46-611450	1631213.653	1766635.014
SWMU 46-004(g)	46-611451	1631234.222	1766777.212
SWMU 46-004(h)	46-611765	1631791.427	1766326.743
SWMU 46-004(h)	46-611766	1631806.989	1766348.233
SWMU 46-004(m)	46-611452	1631224.385	1766196.020
SWMU 46-004(m)	46-611453	1631234.222	1766257.728
SWMU 46-004(m)	46-611454	1631213.653	1766257.728

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-004(m)	46-611455	1631266.418	1766389.194
SWMU 46-004(m)	46-611456	1631270.890	1766436.593
SWMU 46-004(m)	46-611457	1631269.101	1766478.627
SWMU 46-004(m)	46-611458	1631244.060	1766521.554
SWMU 46-004(m)	46-611459	1631294.142	1766510.822
SWMU 46-004(m)	46-611460	1631288.776	1766602.043
SWMU 46-004(m)	46-611461	1631312.923	1766722.777
SWMU 46-004(p)	46-611626	1630914.021	1766098.019
SWMU 46-004(p)	46-611627	1630916.704	1766071.189
SWMU 46-004(q)	46-611501	1631812.108	1766319.980
SWMU 46-004(q)	46-611502	1631819.886	1766343.881
SWMU 46-004(q)	46-611503	1631828.260	1766373.579
SWMU 46-004(q)	46-611504	1631843.971	1766401.681
SWMU 46-004(q)	46-611505	1631834.008	1766453.414
SWMU 46-004(q)	46-611506	1631860.832	1766436.936
SWMU 46-004(q)	46-611507	1631884.463	1766425.696
SWMU 46-004(q)	46-611508	1631878.460	1766585.046
SWMU 46-004(q)	46-611509	1631943.988	1766560.904
SWMU 46-004(q)	46-611510	1631987.291	1766512.620
SWMU 46-004(q)	46-611511	1631960.850	1766662.799
SWMU 46-004(q)	46-611512	1632026.378	1766640.190
SWMU 46-004(q)	46-611513	1632072.363	1766599.186
SWMU 46-004(r)	46-611231	1631050.892	1765836.431
SWMU 46-004(s)	46-611198	1630959.631	1766057.774
SWMU 46-004(s)	46-611199	1630973.940	1766052.774
SWMU 46-004(t)	46-611276	1630841.465	1765628.529
SWMU 46-004(t)	46-611277	1630963.057	1765582.695
SWMU 46-004(t)	46-611278	1631064.861	1765601.869
SWMU 46-004(t)	46-611279	1631115.535	1765701.848
SWMU 46-004(t)	46-611280	1631145.666	1765714.676
SWMU 46-004(t)	46-611281	1631189.035	1765720.611
SWMU 46-004(t)	46-611282	1631249.753	1765708.741
SWMU 46-004(t)	46-611283	1631317.775	1765704.632
SWMU 46-004(t)	46-611284	1631379.405	1765708.285
SWMU 46-004(t)	46-611285	1631438.753	1765700.067
SWMU 46-004(u)	46-611527	1631673.188	1766329.838
SWMU 46-004(u)	46-611528	1631668.420	1766358.451
SWMU 46-004(u)	46-611529	1631669.782	1766391.833

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-004(u)	46-611530	1631692.945	1766417.039
SWMU 46-004(u)	46-611531	1631671.826	1766483.803
SWMU 46-004(u)	46-611532	1631713.383	1766471.540
SWMU 46-004(u)	46-611533	1631754.939	1766456.552
SWMU 46-004(u)	46-611534	1631691.582	1766618.010
SWMU 46-004(u)	46-611535	1631751.533	1766603.023
SWMU 46-004(u)	46-611536	1631809.440	1766593.485
SWMU 46-004(v)	46-611821	1631671.379	1766311.181
SWMU 46-004(v)	46-611822	1631670.638	1766321.556
SWMU 46-004(x)	46-611514	1631586.669	1766318.257
SWMU 46-004(x)	46-611515	1631592.800	1766345.507
SWMU 46-004(x)	46-611516	1631611.194	1766378.889
SWMU 46-004(x)	46-611517	1631637.763	1766406.821
SWMU 46-004(x)	46-611526	1631685.451	1766423.171
SWMU 46-004(y)	46-611518	1631468.565	1766364.816
SWMU 46-004(y)	46-611519	1631478.626	1766401.036
SWMU 46-004(y)	46-611520	1631487.346	1766441.952
SWMU 46-004(y)	46-611521	1631470.577	1766475.489
SWMU 46-004(y)	46-611522	1631528.932	1766463.416
SWMU 46-004(y)	46-611523	1631519.542	1766531.161
SWMU 46-004(y)	46-611524	1631600.031	1766512.380
SWMU 46-004(y)	46-611525	1631612.104	1766645.187
SWMU 46-004(z)	46-611468	1631361.917	1766383.597
SWMU 46-004(z)	46-611469	1631378.015	1766409.085
SWMU 46-004(z)	46-611470	1631396.796	1766455.367
SWMU 46-004(z)	46-611471	1631377.344	1766500.977
SWMU 46-004(z)	46-611472	1631363.258	1766574.759
SWMU 46-004(z)	46-611473	1631409.540	1766689.456
SWMU 46-005	46-611628	1631746.759	1765259.928
SWMU 46-005	46-611629	1631782.599	1765241.781
SWMU 46-005	46-611630	1631851.594	1765246.736
SWMU 46-005	46-611631	1631914.202	1765302.992
SWMU 46-005	46-611632	1631893.787	1765261.254
SWMU 46-005	46-611633	1631934.164	1765261.707
SWMU 46-005	46-611634	1631890.157	1765327.944
SWMU 46-005	46-611635	1631914.202	1765327.944
SWMU 46-005	46-611636	1631940.969	1765327.944
SWMU 46-005	46-611637	1631936.432	1765302.085

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-005	46-611638	1631911.934	1765354.258
SWMU 46-005	46-611639	1631942.330	1765375.127
SWMU 46-005	46-611640	1631956.394	1765536.092
SWMU 46-005	46-611641	1632025.807	1765594.979
SWMU 46-006(b)	46-611368	1631301.117	1765995.335
SWMU 46-006(b)	46-611369	1631329.878	1765985.748
SWMU 46-006(b)	46-611370	1631318.008	1765977.074
SWMU 46-006(b)	46-611371	1631352.704	1765978.900
SWMU 46-006(b)	46-611372	1631426.204	1765947.400
SWMU 46-006(c)	46-611298	1631576.732	1765467.193
SWMU 46-006(c)	46-611299	1631598.480	1765451.569
SWMU 46-006(c)	46-611300	1631610.092	1765473.527
SWMU 46-006(c)	46-611301	1631629.094	1765486.407
SWMU 46-006(c)	46-611302	1631645.141	1765509.209
SWMU 46-006(c)	46-611303	1631681.386	1765546.053
SWMU 46-006(c)	46-611304	1631708.411	1765602.187
SWMU 46-006(c)	46-611305	1631708.974	1765652.296
SWMU 46-006(c)	46-611306	1631710.663	1765710.288
SWMU 46-006(d)	46-611568	1631330.726	1766324.163
SWMU 46-006(d)	46-611569	1631363.305	1766313.547
SWMU 46-006(d)	46-611570	1631469.096	1766332.582
SWMU 46-006(d)	46-611571	1631583.306	1766277.183
SWMU 46-006(d)	46-611572	1631313.887	1766363.331
SWMU 46-006(d)	46-611573	1631341.708	1766369.554
SWMU 46-006(d)	46-611574	1631455.552	1766350.153
SWMU 46-006(d)	46-611575	1631497.282	1766341.734
SWMU 46-006(d)	46-611576	1631538.647	1766332.582
SWMU 46-006(d)	46-611577	1631560.244	1766309.520
SWMU 46-006(d)	46-611578	1631606.734	1766301.101
SWMU 46-006(d)	46-611579	1631638.581	1766293.780
SWMU 46-006(d)	46-611580	1631626.501	1766320.502
SWMU 46-006(d)	46-611581	1631607.466	1766337.341
SWMU 46-006(d)	46-611582	1631563.539	1766350.519
SWMU 46-006(d)	46-611583	1631526.201	1766358.938
SWMU 46-006(d)	46-611584	1631486.667	1766371.018
SWMU 46-006(d)	46-611585	1631424.071	1766381.634
SWMU 46-006(d)	46-611586	1631372.457	1766389.687
SWMU 46-006(d)	46-611587	1631332.190	1766381.268

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-006(f)	46-611737	1631066.056	1766160.622
SWMU 46-006(f)	46-611738	1631098.252	1766147.207
SWMU 46-006(f)	46-611739	1631082.154	1766182.980
SWMU 46-006(f)	46-611740	1631091.991	1766206.232
SWMU 46-006(g)	46-611547	1631310.227	1766294.878
SWMU 46-006(g)	46-611548	1631301.807	1766298.905
SWMU 46-006(g)	46-611549	1631306.566	1766318.306
SWMU 46-007	46-611754	1630920.281	1766047.042
SWMU 46-007	46-611755	1630967.680	1766041.676
SWMU 46-007	46-611756	1631012.396	1766050.620
SWMU 46-007	46-611757	1631043.698	1766051.514
SWMU 46-007	46-611758	1631051.747	1766098.913
SWMU 46-008(a)	46-611338	1630773.143	1765615.565
SWMU 46-008(a)	46-611339	1630809.208	1765586.369
SWMU 46-008(a)	46-611340	1630833.861	1765621.499
SWMU 46-008(a)	46-611341	1630842.534	1765598.217
SWMU 46-008(a)	46-611342	1630778.621	1765589.999
SWMU 46-008(b)	46-611200	1631023.128	1766174.036
SWMU 46-008(b)	46-611201	1631007.030	1766191.029
SWMU 46-008(b)	46-611202	1631019.439	1766202.655
SWMU 46-008(b)	46-611203	1631044.592	1766214.393
SWMU 46-008(d)	46-611343	1630934.022	1765872.952
SWMU 46-008(d)	46-611344	1630973.283	1765869.757
SWMU 46-008(d)	46-611345	1631013.000	1765864.757
SWMU 46-008(d)	46-611346	1630949.087	1765883.452
SWMU 46-008(d)	46-611347	1630976.935	1765881.626
SWMU 46-008(d)	46-611348	1631005.696	1765880.257
SWMU 46-008(e)	46-611349	1631315.726	1766044.639
SWMU 46-008(e)	46-611350	1631362.291	1766043.726
SWMU 46-008(e)	46-611351	1631307.965	1766032.770
SWMU 46-008(e)	46-611352	1631337.639	1766025.465
SWMU 46-008(e)	46-611353	1631374.617	1766040.531
SWMU 46-008(e)	46-611354	1631370.508	1766022.726
SWMU 46-008(e)	46-611355	1631382.834	1766005.835
SWMU 46-008(f)	46-611550	1631555.544	1766151.769
SWMU 46-008(f)	46-611551	1631587.147	1766177.886
SWMU 46-008(f)	46-611552	1631601.511	1766192.773
SWMU 46-008(f)	46-611553	1631560.246	1766177.103

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-008(f)	46-611554	1631560.768	1766165.350
SWMU 46-008(f)	46-611555	1631575.916	1766173.185
SWMU 46-008(f)	46-611556	1631545.881	1766178.147
SWMU 46-008(g)	46-611746	1631042.035	1765712.348
SWMU 46-008(g)	46-611747	1631040.209	1765687.695
SWMU 46-008(g)	46-611748	1631062.579	1765692.717
SWMU 46-008(g)	46-611749	1631059.383	1765659.847
SWMU 46-008(g)	46-611750	1631068.057	1765671.717
SWMU 46-008(g)	46-611751	1631084.035	1765704.587
SWMU 46-008(g)	46-611752	1631104.579	1765700.021
SWMU 46-009(a)	46-611983	1631185.240	1765786.880
SWMU 46-009(a)	46-611984	1631297.260	1765748.520
SWMU 46-009(a)	46-611985	1631357.524	1765866.922
SWMU 46-009(a)	46-611986	1631474.507	1765878.974
SWMU 46-009(a)	46-611987	1631559.586	1765822.964
SWMU 46-009(a)	46-611988	1631452.529	1765752.065
SWMU 46-009(a)	46-611989	1631450.402	1765724.415
SWMU 46-009(a)	46-611990	1631543.279	1765744.976
SWMU 46-009(a)	46-611991	1631599.289	1765771.917
SWMU 46-009(a)	46-611992	1631518.465	1765710.944
SWMU 46-009(a)	46-611993	1631580.147	1765720.870
SWMU 46-009(a)	46-611994	1631646.083	1765720.870
SWMU 46-009(a)	46-611995	1631736.833	1765725.833
SWMU 46-009(a)	46-611996	1631831.129	1765730.087
SWMU 46-009(a)	46-611997	1631928.260	1765703.145
SWMU 46-009(a)	46-611998	1632043.117	1765689.674
SWMU 46-009(b)	46-610999	1632232.246	1765811.045
SWMU 46-009(b)	46-611000	1632283.171	1765787.367
SWMU 46-009(b)	46-611001	1632323.716	1765814.613
SWMU 46-009(b)	46-611002	1632182.944	1765822.398
SWMU 46-009(b)	46-611003	1632217.326	1765788.016
SWMU 46-009(b)	46-611004	1632361.666	1765826.290
SWMU 46-009(b)	46-611005	1632270.521	1765806.504
SWMU 46-009(b)	46-611006	1632276.684	1765750.714
SWMU 46-009(b)	46-611007	1632188.175	1765685.039
SWMU 46-009(b)	46-611008	1632331.343	1765690.227
SWMU 46-009(b)	46-611009	1632554.394	1765701.638
SWMU 46-009(b)	46-611010	1632774.046	1765598.644
SWMU 46-009(b)	46-611011	1633052.369	1765578.182

Table 3.2-1 (continued)

Conolidated Unit/ SWMU/AOC	Location ID	Easting (ft)	Northing (ft)
SWMU 46-009(b)	46-611012	1633127.065	1765430.035
SWMU 46-009(b)	46-611013	1633586.203	1765458.497
SWMU 46-009(b)	46-611014	1633795.181	1765516.143
SWMU 46-010(d)	46-611463	1631311.708	1765898.665
SWMU 46-010(d)	46-611464	1631324.947	1765905.969
SWMU 46-010(d)	46-611465	1631305.773	1765892.252
SWMU 46-010(d)	46-611466	1631322.665	1765900.926
SWMU 46-010(d)	46-611467	1631340.926	1765910.513
AOC C-46-001	46-612232	1630928.543	1765747.409

Table 3.2-2
Field-Screening Results for Samples Collected in 2010

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
TA-04						
SWMU 04-003(a)	52-610950	1.0–2.0	RE52-10-9502	2.8	41	1116
SWMU 04-003(a)	52-610950	2.0–3.0	RE52-10-9503	0.5	41	1116
SWMU 04-003(a)	52-610950	3.0–4.0	RE52-10-9504	0.0	41	1116
SWMU 04-003(a)	52-610951	1.0–2.0	RE52-10-9505	0.0	41	1116
SWMU 04-003(a)	52-610951	2.0–3.0	RE52-10-9506	0.3	41	1116
SWMU 04-003(a)	52-610951	3.0–4.0	RE52-10-9507	0.0	41	1116
SWMU 04-003(a)	52-610952	0.0–0.5	RE52-10-9508	189	14.25	1386
SWMU 04-003(a)	52-610952	2.0–3.0	RE52-10-12020	NC[b]	27	1267
SWMU 04-003(a)	52-610953	0.0–1.0	RE52-10-9510	535	14.25	1386
SWMU 04-003(a)	52-610953	2.0–3.0	RE52-10-12021	NC	27	1267
AOC 04-004	52-610954	1.0–2.0	RE52-10-9515	31.8	41	1116
AOC 04-004	52-610954	2.0–3.0	RE52-10-9516	18.0	41	1116
AOC 04-004	52-610954	3.0–4.0	RE52-10-9517	0.0	41	1116
AOC 04-004	52-610955	1.0–2.0	RE52-10-9518	10.7	41	1116
AOC 04-004	52-610955	2.0–3.0	RE52-10-9519	4.2	41	1116
AOC 04-004	52-610955	3.0–4.0	RE52-10-9520	10.7	41	1116
AOC 04-004	52-610956	1.0–2.0	RE52-10-9521	0.8	14.25	1386
AOC 04-004	52-610956	2.0–3.0	RE52-10-9522	3.2	14.25	1386
AOC 04-004	52-610956	3.0–4.0	RE52-10-9523	0.9	14.25	1386
AOC 04-004	52-610957	1.0–2.0	RE52-10-9524	0.9	41	1116
AOC 04-004	52-610957	2.0–3.0	RE52-10-9525	2.4	41	1116
AOC 04-004	52-610957	3.0–4.0	RE52-10-9526	0.0	41	1116
AOC 04-004	52-610958	1.0–2.0	RE52-10-9527	165	14.25	1386
AOC 04-004	52-610958	2.0–3.0	RE52-10-9528	28.7	14.25	1386
AOC 04-004	52-610958	3.0–4.0	RE52-10-9529	14.0	14.25	1386
AOC 04-004	52-610959	1.0–2.0	RE52-10-9530	0.3	14.25	1386
AOC 04-004	52-610959	2.0–3.0	RE52-10-9531	0.0	14.25	1386
AOC 04-004	52-610959	3.0–4.0	RE52-10-9532	0.0	14.25	1386
TA-46						
SWMU 46-002	46-611373	0.0–1.0	RE46-10-11915	124	9	1159
SWMU 46-002	46-611373	1.0–2.0	RE46-10-11916	131	9	1159
SWMU 46-002	46-611373	6.0–7.0	RE46-10-11917	122	9	1159

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-002	46-611374	0.0–1.0	RE46-10-11918	108	9	1159
SWMU 46-002	46-611374	1.5–2.5	RE46-10-11919	125	9	1159
SWMU 46-002	46-611374	6.5–7.5	RE46-10-11920	90.2	9	1159
SWMU 46-002	46-611375	0.0–1.0	RE46-10-11921	88.3	9	1159
SWMU 46-002	46-611375	1.5–2.5	RE46-10-11922	121	9	1159
SWMU 46-002	46-611375	6.5–7.5	RE46-10-11923	118	9	1159
SWMU 46-002	46-611376	0.0–1.0	RE46-10-11924	NC	6	755
SWMU 46-002	46-611376	14.0–15.0	RE46-10-11925	NC	12	827
SWMU 46-002	46-611376	19.0–20.0	RE46-10-11926	NC	12	827
SWMU 46-002	46-611377	0.0–1.0	RE46-10-11927	NC	10	1269
SWMU 46-002	46-611377	12.0–13.0	RE46-10-11928	NC	10	1269
SWMU 46-002	46-611377	17.0–18.0	RE46-10-11929	NC	10	1269
SWMU 46-002	46-611378	0.0–1.0	RE46-10-11930	NC	10	1269
SWMU 46-002	46-611378	12.0–13.0	RE46-10-11931	NC	10	1269
SWMU 46-002	46-611378	17.0–18.0	RE46-10-11932	NC	10	1269
SWMU 46-002	46-611379	0.0–1.0	RE46-10-11933	NC	10	1269
SWMU 46-002	46-611379	12.0–13.0	RE46-10-11934	NC	10	1269
SWMU 46-002	46-611379	17.0–18.0	RE46-10-11935	NC	10	1269
SWMU 46-002	46-611380	0.0–1.0	RE46-10-11936	NC	10	1269
SWMU 46-002	46-611380	1.0–2.0	RE46-10-11937	NC	10	1269
SWMU 46-002	46-611380	6.0–7.0	RE46-10-11938	NC	10	1269
SWMU 46-002	46-611381	0.0–0.50	RE46-10-11939	3.1	13	768
SWMU 46-002	46-611381	0.5–1.5	RE46-10-11940	0.0	13	768
SWMU 46-002	46-611381	5.5–6.5	RE46-10-11941	0.0	13	768
SWMU 46-002	46-611382	0.0–1.0	RE46-10-11942	NC	10	1269
SWMU 46-002	46-611382	3.0–4.0	RE46-10-11943	NC	10	1269
SWMU 46-002	46-611382	8.0–9.0	RE46-10-11944	NC	10	1269
SWMU 46-002	46-611383	0.0–1.0	RE46-10-11945	NC	10	1269
SWMU 46-002	46-611383	3.0–4.0	RE46-10-11946	NC	10	1269
SWMU 46-002	46-611383	8.0–9.0	RE46-10-11947	NC	10	1269
SWMU 46-002	46-611384	3.0–4.0	RE46-10-11948	NC	10	1269
SWMU 46-002	46-611384	3.0–4.0	RE46-10-11949	NC	10	1269
SWMU 46-002	46-611384	8.0–9.0	RE46-10-11950	NC	10	1269
SWMU 46-002	46-611385	0.0–1.0	RE46-10-11951	NC	7	909
SWMU 46-002	46-611385	3.0–4.0	RE46-10-11952	NC	7	909
SWMU 46-002	46-611385	8.0–9.0	RE46-10-11953	NC	7	909
SWMU 46-002	46-611386	0.0–1.0	RE46-10-11954	6.7	25	1190

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-002	46-611386	3.0–4.0	RE46-10-11955	NC	7	909
SWMU 46-002	46-611386	8.0–9.0	RE46-10-11956	NC	7	909
SWMU 46-002	46-611387	0.0–1.0	RE46-10-11958	NC	41	1540
SWMU 46-002	46-611387	6.0–7.0	RE46-10-11959	NC	41	1540
SWMU 46-002	46-611388	0.0–1.0	RE46-10-11961	NC	41	1540
SWMU 46-002	46-611388	8.0–9.0	RE46-10-11962	NC	7	909
SWMU 46-002	46-611389	0.0–1.0	RE46-10-11964	NC	41	1540
SWMU 46-002	46-611389	6.0–7.0	RE46-10-11965	NC	41	1540
SWMU 46-002	46-611390	0.0–1.0	RE46-10-11986	NC	41	1540
SWMU 46-002	46-611390	1.0–2.0	RE46-10-11987	NC	41	1540
SWMU 46-003(a)	46-611268	3.5–4.5	RE46-10-11515	NC	13	768
SWMU 46-003(a)	46-611268	8.5–9.5	RE46-10-11516	0.0	13	768
SWMU 46-003(a)	46-611269	9.0–10.0	RE46-10-11517	0.0	18	1838
SWMU 46-003(a)	46-611269	14.0–15.0	RE46-10-11518	0.0	18	1838
SWMU 46-003(a)	46-611270	10.0–11.0	RE46-10-11519	NC	19	805
SWMU 46-003(a)	46-611270	15.0–16.0	RE46-10-11520	NC	19	805
SWMU 46-003(a)	46-611271	9.5–10.5	RE46-10-11521	2.9	19	805
SWMU 46-003(a)	46-611271	14.5–15.5	RE46-10-11522	NC	19	805
SWMU 46-003(b)	46-611590	5.0–6.0	RE46-10-13420	NC	21	918
SWMU 46-003(b)	46-611590	10.0–11.0	RE46-10-13421	0.0	15	951
SWMU 46-003(b)	46-611592	3.5–4.5	RE46-10-13424	11.4	26	1190
SWMU 46-003(b)	46-611592	8.5–9.5	RE46-10-13425	6.9	26	1190
SWMU 46-003(b)	46-611594	1.5–2.5	RE46-10-13428	44.6	26	1190
SWMU 46-003(b)	46-611594	6.5–7.5	RE46-10-13429	16.6	26	1190
SWMU 46-003(b)	46-611595	0.0–1.0	RE46-10-13430	12.6	15	951
SWMU 46-003(b)	46-611595	5.0–6.0	RE46-10-13431	0.0	15	951
SWMU 46-003(b)	46-611596	5.0–6.0	RE46-10-13432	11.1	15	951
SWMU 46-003(b)	46-611596	10.0–11.0	RE46-10-13433	12.6	15	951
SWMU 46-003(c)	46-611255	7.0–8.0	RE46-10-11481	85.7	13	848
SWMU 46-003(c)	46-611255	11.5–12.5	RE46-10-11482	97.1	13	848
SWMU 46-003(c)	46-611257	9.0–10.0	RE46-10-11485	6.7	17	765
SWMU 46-003(c)	46-611257	10.0–11.0	RE46-10-11486	0.8	17	765
SWMU 46-003(c)	46-611259	5.0–6.0	RE46-10-11489	85.0	13	848
SWMU 46-003(c)	46-611259	10.0–11.0	RE46-10-11490	141	13	848
SWMU 46-003(c)	46-611260	4.5–5.5	RE46-10-11491	0.0	47	1348
SWMU 46-003(c)	46-611260	9.5–10.5	RE46-10-11492	0.0	47	1348
SWMU 46-003(c)	46-611261	2.0–3.0	RE46-10-11493	0.0	47	1348

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-003(c)	46-611261	7.0–8.0	RE46-10-11494	0.0	47	1348
SWMU 46-003(c)	46-611262	0.3–1.3	RE46-10-11495	0.0	47	1348
SWMU 46-003(c)	46-611262	5.3–6.3	RE46-10-11496	0.0	47	1348
SWMU 46-003(c)	46-611263	3.0–4.0	RE46-10-11497	0.3	47	1348
SWMU 46-003(c)	46-611263	8.0–9.0	RE46-10-11498	0.0	47	1348
SWMU 46-003(c)	46-611264	3.0–4.0	RE46-10-11499	0.1	47	1348
SWMU 46-003(c)	46-611264	8.0–9.0	RE46-10-11500	0.2	47	1348
SWMU 46-003(d)	46-611597	4.0–5.0	RE46-10-13434	0.0	8	1017
SWMU 46-003(d)	46-611597	9.0–10.0	RE46-10-13435	0.0	8	1017
SWMU 46-003(d)	46-611598	7.0–8.0	RE46-10-13436	0.0	8	1017
SWMU 46-003(d)	46-611598	12.0–13.0	RE46-10-13437	0.0	8	1017
SWMU 46-003(d)	46-611599	4.0–5.0	RE46-10-13438	0.0	8	1017
SWMU 46-003(d)	46-611599	9.0–10.0	RE46-10-13439	0.0	8	1017
SWMU 46-003(d)	46-611600	4.0–5.0	RE46-10-13440	NC	21	918
SWMU 46-003(d)	46-611600	9.0–10.0	RE46-10-13441	NC	21	918
SWMU 46-003(d)	46-611601	4.0–5.0	RE46-10-13442	>2000[c]	7	841
SWMU 46-003(d)	46-611601	9.0–10.0	RE46-10-13443	NC	21	918
SWMU 46-003(d)	46-611602	4.0–5.0	RE46-10-13444	NC	21	918
SWMU 46-003(d)	46-611602	9.0–10.0	RE46-10-13445	NC	21	918
SWMU 46-003(d)	46-611603	4.0–5.0	RE46-10-13446	NC	7	841
SWMU 46-003(d)	46-611603	9.0–10.0	RE46-10-13447	NC	21	918
SWMU 46-003(e)	46-611604	3.0–4.0	RE46-10-13448	42.2	17	1149
SWMU 46-003(e)	46-611604	8.0–9.0	RE46-10-13449	11.8	17	1149
SWMU 46-003(e)	46-611605	8.0–9.0	RE46-10-13466	NC	8	1032
SWMU 46-003(e)	46-611605	13.0–14.0	RE46-10-13467	NC	8	1032
SWMU 46-003(e)	46-611606	3.0–4.0	RE46-10-13468	49.1	17	1149
SWMU 46-003(e)	46-611606	15.0–16.0	RE46-10-13469	NC	8	1032
SWMU 46-003(e)	46-611607	2.0–3.0	RE46-10-13470	1.1	17	1149
SWMU 46-003(e)	46-611607	7.0–8.0	RE46-10-13471	1.0	17	1149
SWMU 46-003(e)	46-611608	6.0–7.0	RE46-10-13472	170.2	17	1078
SWMU 46-003(e)	46-611608	11.0–12.0	RE46-10-13473	0.5	17	1078
SWMU 46-003(e)	46-611609	0.0–1.0	RE46-10-13474	>2000[c]	21	1414
SWMU 46-003(e)	46-611609	5.0–6.0	RE46-10-13475	2.2	21	1414
SWMU 46-003(e)	46-611610	4.0–5.0	RE46-10-13476	>2000[c]	21	1414
SWMU 46-003(e)	46-611610	9.0–10.0	RE46-10-13477	>2000[c]	21	1414
SWMU 46-003(e)	46-611611	4.0–5.0	RE46-10-13478	2.2	17	1078
SWMU 46-003(e)	46-611611	9.0–10.0	RE46-10-13479	1.5	17	1078

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-003(f)	46-611359	3.0–4.0	RE46-10-11875	994.7	0.0	972
SWMU 46-003(f)	46-611359	5.0–6.0	RE46-10-11876	34.7	0.0	972
SWMU 46-003(f)	46-611360	8.0–9.0	RE46-10-11877	NC	25	1190
SWMU 46-003(f)	46-611360	13.0–14.0	RE46-10-11878	NC	25	1190
SWMU 46-003(f)	46-611361	12.0–13.0	RE46-10-11879	NC	25	1190
SWMU 46-003(f)	46-611361	17.0–18.0	RE46-10-11880	NC	25	1190
SWMU 46-003(f)	46-611362	11.0–12.0	RE46-10-11881	NC	25	1190
SWMU 46-003(f)	46-611362	16.0–17.0	RE46-10-11882	NC	25	1190
SWMU 46-003(f)	46-611363	5.0–6.0	RE46-10-11883	NC	12	1551
SWMU 46-003(f)	46-611363	10.0–11.0	RE46-10-11884	NC	12	1551
SWMU 46-003(f)	46-611364	3.0–4.0	RE46-10-11885	NC	6	755
SWMU 46-003(f)	46-611364	8.5–9.5	RE46-10-11886	NC	6	755
SWMU 46-003(f)	46-611365	5.0–6.0	RE46-10-11887	NC	12	1551
SWMU 46-003(f)	46-611365	10.0–11.0	RE46-10-11888	NC	12	1551
SWMU 46-003(f)	46-611366	5.0–6.0	RE46-10-11889	NC	12	1551
SWMU 46-003(f)	46-611366	10.0–11.0	RE46-10-11890	NC	12	1551
SWMU 46-003(f)	46-611367	0.0–1.0	RE46-10-11891	NC	12	1551
SWMU 46-003(f)	46-611367	1.0–2.0	RE46-10-11892	NC	12	1551
SWMU 46-003(g)	46-611612	4.0–5.0	RE46-10-13507	1992	7	841
SWMU 46-003(g)	46-611612	17.0–18.0	RE46-10-13508	0.0	0	1017
SWMU 46-003(g)	46-611613	4.0–5.0	RE46-10-13509	0.0	12	1591
SWMU 46-003(g)	46-611613	9.0–10.0	RE46-10-13510	0.1	12	1591
SWMU 46-003(g)	46-611614	10.–11.0	RE46-10-13511	0.0	12	1591
SWMU 46-003(g)	46-611614	15.0–16.0	RE46-10-13512	0.1	12	1551
SWMU 46-003(g)	46-611615	4.0–5.0	RE46-10-13513	0.0	12	1591
SWMU 46-003(g)	46-611615	9.0–10.0	RE46-10-13514	0.3	12	1591
SWMU 46-003(g)	46-611616	6.0–7.0	RE46-10-13515	NC	7	879
SWMU 46-003(g)	46-611616	11.0–12.0	RE46-10-13516	0.6	7	879
SWMU 46-003(g)	46-611617	6.0–7.0	RE46-10-13517	0.0	7	879
SWMU 46-003(g)	46-611617	11.0–12.0	RE46-10-13518	10.8	7	841
SWMU 46-004(a)	46-611588	3.0–4.0	RE46-10-13379	2.6	49	999
SWMU 46-004(a)	46-611588	8.0–9.0	RE46-10-13380	0.0	48	1208
SWMU 46-004(a)	46-611589	3.0–4.0	RE46-10-13381	4.0	49	999
SWMU 46-004(a)	46-611589	8.0–9.0	RE46-10-13382	25.9	49	999
SWMU 46-004(a2)	46-611618	0.0–1.0	RE46-10-13534	NC	35	1091
SWMU 46-004(a2)	46-611618	2.0–3.0	RE46-10-13535	NC	35	1091
SWMU 46-004(a2)	46-611619	0.0–1.0	RE46-10-13536	NC	35	1091

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(a2)	46-611619	2.0–3.0	RE46-10-13537	NC	35	1091
SWMU 46-004(a2)	46-611620	0.0–1.0	RE46-10-13538	NC	35	1091
SWMU 46-004(a2)	46-611620	2.0–3.0	RE46-10-13539	NC	35	1091
SWMU 46-004(a2)	46-611621	0.0–1.0	RE46-10-13540	22.2	0	1006
SWMU 46-004(a2)	46-611621	2.0–3.0	RE46-10-13541	21.9	0	1006
SWMU 46-004(b)	46-611545	0.0–1.0	RE46-10-13172	6.6	16	1497
SWMU 46-004(b)	46-611545	2.0–3.0	RE46-10-13173	2.3	16	1497
SWMU 46-004(b)	46-611546	0.0–1.0	RE46-10-13174	0.8	16	1497
SWMU 46-004(b)	46-611546	2.0–3.0	RE46-10-13175	0.0	16	1497
SWMU 46-004(b2)	46-611123	0.0–1.0	RE46-10-11167	NC	14	1177
SWMU 46-004(b2)	46-611123	1.0–2.0	RE46-10-11168	NC	14	1177
SWMU 46-004(b2)	46-611124	0.0–1.0	RE46-10-11169	NC	14	1177
SWMU 46-004(b2)	46-611124	1.0–2.0	RE46-10-12044	NC	27	1267
SWMU 46-004(c)	46-611622	8.0–9.0	RE46-10-13546	373	12	827
SWMU 46-004(c)	46-611622	13.0–14.0	RE46-10-13547	421	12	827
SWMU 46-004(c)	46-611622	18.0–19.0	RE46-10-13548	433	12	827
SWMU 46-004(c)	46-611622	23.0–24.0	RE46-10-13549	390	12	827
SWMU 46-004(c)	46-611623	8.0–9.0	RE46-10-13550	265	12	827
SWMU 46-004(c)	46-611623	13.0–14.0	RE46-10-13551	373	12	827
SWMU 46-004(c)	46-611623	18.0–19.0	RE46-10-13552	360	12	827
SWMU 46-004(c)	46-611623	23.0–24.0	RE46-10-13553	323	12	827
SWMU 46-004(c2)	46-611111	0.0–1.0	RE46-10-11132	NC	27	1182
SWMU 46-004(c2)	46-611111	1.0–2.0	RE46-10-11133	NC	27	1182
SWMU 46-004(c2)	46-611112	0.0–1.0	RE46-10-11134	NC	27	1182
SWMU 46-004(c2)	46-611112	1.0–2.0	RE46-10-11135	NC	27	1182
SWMU 46-004(c2)	46-611113	0.0–1.0	RE46-10-11136	NC	27	1182
SWMU 46-004(c2)	46-611113	1.0–2.0	RE46-10-11137	NC	27	1182
SWMU 46-004(c2)	46-611114	0.0–1.0	RE46-10-11138	NC	27	1182
SWMU 46-004(c2)	46-611114	1.0–2.0	RE46-10-12043	NC	18	978
SWMU 46-004(c2)	46-611115	0.0–1.0	RE46-10-11140	NC	27	1182
SWMU 46-004(c2)	46-611115	1.0–2.0	RE46-10-11141	NC	27	1182
SWMU 46-004(c2)	46-611116	0.0–1.0	RE46-10-11142	NC	27	1182
SWMU 46-004(c2)	46-611116	1.0–2.0	RE46-10-11143	NC	27	1182
SWMU 46-004(c2)	46-611117	0.0–1.0	RE46-10-11144	NC	32	1333
SWMU 46-004(c2)	46-611117	1.0–2.0	RE46-10-11145	NC	32	1333
SWMU 46-004(c2)	46-611118	0.0–0.25	RE46-10-11146	NC	32	1333
SWMU 46-004(c2)	46-611118	1.0–2.0	RE46-10-12040	NC	18	978

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(c2)	46-611119	0.0–1.0	RE46-10-11148	NC	32	1333
SWMU 46-004(c2)	46-611119	1.0–2.0	RE46-10-12039	NC	18	978
SWMU 46-004(c2)	46-611120	0.0–0.25	RE46-10-11150	NC	32	1333
SWMU 46-004(c2)	46-611120	1.0–2.0	RE46-10-12041	NC	27	1267
SWMU 46-004(c2)	46-611121	0.0–1.0	RE46-10-11152	NC	32	1333
SWMU 46-004(c2)	46-611121	1.0–2.0	RE46-10-12042	NC	27	1267
SWMU 46-004(d)	46-611557	8.0–9.0	RE46-10-13214	210	14	888
SWMU 46-004(d)	46-611557	13.0–14.0	RE46-10-13215	14.7	16	1497
SWMU 46-004(d)	46-611557	18.0–19.0	RE46-10-13226	40.2	16	1497
SWMU 46-004(d)	46-611557	23.0–24.0	RE46-10-13227	86.5	16	1497
SWMU 46-004(d)	46-611558	0.0–1.0	RE46-10-13216	4.0	16	1497
SWMU 46-004(d)	46-611558	1.0–2.0	RE46-10-13217	0.4	7	906
SWMU 46-004(d)	46-611559	0.0–1.0	RE46-10-13218	0.5	7	906
SWMU 46-004(d)	46-611559	1.0–2.0	RE46-10-13219	2.5	7	906
SWMU 46-004(d)	46-611560	0.0–1.0	RE46-10-13220	2.0	7	906
SWMU 46-004(d)	46-611560	1.0–2.0	RE46-10-13221	0.4	7	906
46-004(d2)-99	46-611481	0.0–1.0	RE46-10-12923	0.0	7	964
46-004(d2)-99	46-611481	1.0–2.0	RE46-10-12924	0.0	7	964
46-004(d2)-99	46-611482	0.0–1.0	RE46-10-12925	0.0	7	964
46-004(d2)-99	46-611482	1.0–2.0	RE46-10-12926	0.0	7	964
46-004(d2)-99	46-611483	0.0–1.0	RE46-10-12927	0.0	7	964
46-004(d2)-99	46-611483	1.0–2.0	RE46-10-12928	0.0	7	964
46-004(d2)-99	46-611484	0.0–1.0	RE46-10-12929	2.0	15	942
46-004(d2)-99	46-611484	1.0–2.0	RE46-10-12930	1.9	15	942
46-004(d2)-99	46-611485	0.0–1.0	RE46-10-12931	21.3	17	1185
46-004(d2)-99	46-611485	1.0–2.0	RE46-10-12932	6.5	17	1185
46-004(d2)-99	46-611486	0.0–1.0	RE46-10-12933	2.7	17	1185
46-004(d2)-99	46-611486	1.0–2.0	RE46-10-12934	0.4	17	1185
46-004(d2)-99	46-611487	0.0–1.0	RE46-10-12935	1.3	15	942
46-004(d2)-99	46-611487	1.0–2.0	RE46-10-12936	0.9	15	942
46-004(d2)-99	46-611488	0.0–1.0	RE46-10-12937	0.0	48	1208
46-004(d2)-99	46-611488	1.0–2.0	RE46-10-12938	0.0	48	1208
46-004(d2)-99	46-611489	0.0–1.0	RE46-10-12939	2.7	49	999
46-004(d2)-99	46-611489	1.0–2.0	RE46-10-12940	NC	49	999
46-004(d2)-99	46-611490	0.0–1.0	RE46-10-12941	8.3	19	802
46-004(d2)-99	46-611490	1.0–2.0	RE46-10-12942	3.2	19	802
46-004(d2)-99	46-611491	0.0–1.0	RE46-10-12943	NC	19	802

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
46-004(d2)-99	46-611491	1.0–2.0	RE46-10-12944	0.6	19	802
46-004(d2)-99	46-611492	0.0–1.0	RE46-10-12945	0.0	49	999
46-004(d2)-99	46-611492	1.0–2.0	RE46-10-12946	0.4	49	999
46-004(d2)-99	46-611493	0.0–1.0	RE46-10-12947	3.4	49	999
46-004(d2)-99	46-611493	1.0–2.0	RE46-10-12948	3.3	49	999
46-004(d2)-99	46-611494	0.0–1.0	RE46-10-12949	1.7	14	925
46-004(d2)-99	46-611494	1.0–2.0	RE46-10-12950	1.2	14	925
46-004(d2)-99	46-611495	0.0–1.0	RE46-10-12951	2.3	19	802
46-004(d2)-99	46-611495	1.0–2.0	RE46-10-12952	5.8	19	802
46-004(d2)-99	46-611496	0.0–1.0	RE46-10-12953	24.3	14	925
46-004(d2)-99	46-611496	1.0–2.0	RE46-10-12954	4.2	14	925
46-004(d2)-99	46-611497	0.0–1.0	RE46-10-12955	0.0	48	1208
46-004(d2)-99	46-611497	1.0–2.0	RE46-10-12956	0.0	48	1208
46-004(d2)-99	46-611498	0.0–1.0	RE46-10-12957	0.6	14	868
46-004(d2)-99	46-611498	1.0–2.0	RE46-10-12958	0.9	14	868
46-004(d2)-99	46-611499	0.0–1.0	RE46-10-12959	0.6	14	868
46-004(d2)-99	46-611499	1.0–2.0	RE46-10-12960	0.6	14	868
46-004(d2)-99	46-611500	0.0–1.0	RE46-10-12961	1.1	14	868
46-004(d2)-99	46-611500	1.0–2.0	RE46-10-12962	0.5	14	868
SWMU 46-004(e)	46-611561	7.5–8.5	RE46-10-13222	707	14	888
SWMU 46-004(e)	46-611561	12.5–13.5	RE46-10-13223	124	14	888
SWMU 46-004(e)	46-611561	17.5–18.5	RE46-10-13228	78.3	14	888
SWMU 46-004(e)	46-611561	22.5–23.5	RE46-10-13229	20.2	14	888
SWMU 46-004(e)	46-611562	0.0–1.0	RE46-10-13224	0.0	0	1006
SWMU 46-004(e)	46-611562	3.0–4.0	RE46-10-13225	0.0	0	1006
AOC 46-004(e2)	46-611022	0.0–1.0	RE46-10-10827	NC	14	1177
AOC 46-004(e2)	46-611022	2.0–3.0	RE46-10-10828	7.1	14	1177
AOC 46-004(e2)	46-611023	0.0–1.0	RE46-10-10829	5.1	14	1177
AOC 46-004(e2)	46-611023	2.0–3.0	RE46-10-10830	8.6	14	1177
AOC 46-004(e2)	46-611024	0.0–1.0	RE46-10-10831	15.7	14	1177
AOC 46-004(e2)	46-611024	2.0–3.0	RE46-10-10832	5.0	14	1177
SWMU 46-004(f)	46-611272	0.0–1.0	RE46-10-11531	>2000[c]	0	1006
SWMU 46-004(f)	46-611272	2.0–3.0	RE46-10-11532	>2000[c]	0	1006
SWMU 46-004(f)	46-611273	0.0–1.0	RE46-10-11533	NC	9	1296
SWMU 46-004(f)	46-611273	2.0–3.0	RE46-10-11534	NC	9	1296
SWMU 46-004(f)	46-611274	0.0–1.0	RE46-10-11535	>2000[c]	0	1006
SWMU 46-004(f)	46-611274	2.0–3.0	RE46-10-11536	>2000[c]	0	1006

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(f)	46-611275	0.0–1.0	RE46-10-11537	NC	61.7	1449
SWMU 46-004(f)	46-611275	2.0–3.0	RE46-10-11538	NC	61.7	1449
AOC 46-004(f2)	46-611475	0.0–1.0	RE46-10-12750	0.1	20	868
AOC 46-004(f2)	46-611475	1.0–2.0	RE46-10-12751	7.0	20	868
AOC 46-004(f2)	46-611476	0.0–1.0	RE46-10-12752	1.5	13	816
AOC 46-004(f2)	46-611476	1.0–2.0	RE46-10-12753	20.8	13	816
AOC 46-004(f2)	46-611477	0.0–1.0	RE46-10-12754	0.4	28	898
AOC 46-004(f2)	46-611477	1.0–2.0	RE46-10-12755	0.1	28	898
AOC 46-004(f2)	46-611478	0.0–1.0	RE46-10-12756	0.7	28	898
AOC 46-004(f2)	46-611478	1.0–2.0	RE46-10-12757	0.5	28	898
AOC 46-004(f2)	46-611479	0.0–1.0	RE46-10-12758	0.4	28	898
AOC 46-004(f2)	46-611479	1.0–2.0	RE46-10-12759	0.1	28	898
AOC 46-004(f2)	46-611480	0.0–1.0	RE46-10-12760	NC	28	898
AOC 46-004(f2)	46-611480	1.0–2.0	RE46-10-12761	0.1	28	898
SWMU 46-004(g)	46-611444	0.0–1.0	RE46-10-12637	NC	9	1123
SWMU 46-004(g)	46-611444	1.0–2.0	RE46-10-12638	NC	9	1123
SWMU 46-004(g)	46-611445	0.0–1.0	RE46-10-12639	3.2	9	1123
SWMU 46-004(g)	46-611445	1.0–2.0	RE46-10-12640	8.0	9	1123
SWMU 46-004(g)	46-611446	0.0–1.0	RE46-10-12641	17.0	9	1123
SWMU 46-004(g)	46-611446	1.0–2.0	RE46-10-12642	3.0	9	1123
SWMU 46-004(g)	46-611447	0.0–1.0	RE46-10-12643	0.3	12	1550
SWMU 46-004(g)	46-611447	1.0–2.0	RE46-10-12644	0.2	12	1550
SWMU 46-004(g)	46-611448	0.0–1.0	RE46-10-12645	0.0	12	1550
SWMU 46-004(g)	46-611448	1.0–2.0	RE46-10-12646	0.4	12	1550
SWMU 46-004(g)	46-611449	0.0–1.0	RE46-10-12647	0.4	12	1550
SWMU 46-004(g)	46-611449	1.0–2.0	RE46-10-12648	0.2	12	1550
SWMU 46-004(g)	46-611450	0.0–1.0	RE46-10-12649	0.3	12	1550
SWMU 46-004(g)	46-611450	1.0–2.0	RE46-10-12650	0.0	12	1550
SWMU 46-004(g)	46-611451	0.0–1.0	RE46-10-12651	39.7	12	1550
SWMU 46-004(g)	46-611451	1.0–2.0	RE46-10-12652	3.0	12	1550
SWMU 46-004(h)	46-611765	0.0–1.0	RE46-10-13963	0.4	7	906
SWMU 46-004(h)	46-611765	1.0–2.0	RE46-10-13964	0.5	7	906
SWMU 46-004(h)	46-611766	0.0–1.0	RE46-10-13966	9.5	7	906
SWMU 46-004(h)	46-611766	1.0–2.0	RE46-10-13965	0.6	7	906
SWMU 46-004(m)	46-611452	0.0–1.0	RE46-10-12661	15.3	19	802
SWMU 46-004(m)	46-611452	5.0–6.0	RE46-10-12662	0.9	48	1208
SWMU 46-004(m)	46-611453	0.0–1.0	RE46-10-12663	1.2	14	925

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(m)	46-611453	1.0–2.0	RE46-10-12664	1.8	14	925
SWMU 46-004(m)	46-611454	0.0–1.0	RE46-10-12665	1.3	14	925
SWMU 46-004(m)	46-611454	1.0–2.0	RE46-10-12666	1.9	14	925
SWMU 46-004(m)	46-611455	0.0–1.0	RE46-10-12667	9.4	0.0	972
SWMU 46-004(m)	46-611455	1.0–2.0	RE46-10-12668	0.0	0.0	972
SWMU 46-004(m)	46-611456	0.0–1.0	RE46-10-12669	0.0	0.0	972
SWMU 46-004(m)	46-611456	1.0–2.0	RE46-10-12670	0.0	0.0	972
SWMU 46-004(m)	46-611457	0.0–1.0	RE46-10-12671	0.0	12	1550
SWMU 46-004(m)	46-611457	1.0–2.0	RE46-10-12672	0.0	12	1550
SWMU 46-004(m)	46-611458	0.0–1.0	RE46-10-12673	5.7	12	1550
SWMU 46-004(m)	46-611458	1.0–2.0	RE46-10-12674	0.1	12	1550
SWMU 46-004(m)	46-611459	0.0–1.0	RE46-10-12675	7.5	12	1550
SWMU 46-004(m)	46-611459	1.0–2.0	RE46-10-12676	9.7	12	1550
SWMU 46-004(m)	46-611460	0.0–1.0	RE46-10-12677	0.0	12	1550
SWMU 46-004(m)	46-611460	1.0–2.0	RE46-10-12678	0.3	12	1550
SWMU 46-004(m)	46-611461	0.0–1.0	RE46-10-12679	NC	12	1550
SWMU 46-004(m)	46-611461	1.0–2.0	RE46-10-12680	0.0	12	1550
SWMU 46-004(p)	46-611626	10.0–11.0	RE46-10-13657	104	0.0	1017
SWMU 46-004(p)	46-611626	15.0–16.0	RE46-10-13658	113	0.0	1017
SWMU 46-004(p)	46-611626	20.0–21.0	RE46-10-13659	124	0.0	1017
SWMU 46-004(p)	46-611626	25.0–26.0	RE46-10-13660	114	0.0	1017
SWMU 46-004(p)	46-611627	10.0–11.0	RE46-10-13661	0.0	0.0	1017
SWMU 46-004(p)	46-611627	15.0–16.0	RE46-10-13662	0.0	0.0	1017
SWMU 46-004(p)	46-611627	20.0–21.0	RE46-10-13663	0.0	0.0	1017
SWMU 46-004(p)	46-611627	25.0–26.0	RE46-10-13664	0.0	0.0	1017
SWMU 46-004(q)	46-611501	0.0–1.0	RE46-10-12967	10.7	7	906
SWMU 46-004(q)	46-611501	1.0–2.0	RE46-10-12968	3.9	7	906
SWMU 46-004(q)	46-611502	0.0–1.0	RE46-10-12969	0.7	7	906
SWMU 46-004(q)	46-611502	1.0–2.0	RE46-10-12970	0.2	7	906
SWMU 46-004(q)	46-611503	0.0–1.0	RE46-10-12971	1.0	7	906
SWMU 46-004(q)	46-611503	1.0–2.0	RE46-10-12972	0.6	7	906
SWMU 46-004(q)	46-611504	0.0–1.0	RE46-10-12973	NC	29	760
SWMU 46-004(q)	46-611504	1.0–2.0	RE46-10-12974	NC	29	760
SWMU 46-004(q)	46-611505	0.0–1.0	RE46-10-12975	NC	29	760
SWMU 46-004(q)	46-611505	1.0–2.0	RE46-10-12976	NC	29	760
SWMU 46-004(q)	46-611506	0.0–1.0	RE46-10-12977	NC	29	760
SWMU 46-004(q)	46-611506	1.0–2.0	RE46-10-12978	NC	29	760

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(q)	46-611507	0.0–1.0	RE46-10-12979	NC	29	760
SWMU 46-004(q)	46-611507	1.0–2.0	RE46-10-12980	NC	29	760
SWMU 46-004(q)	46-611508	0.0–1.0	RE46-10-12981	NC	29	760
SWMU 46-004(q)	46-611508	1.0–2.0	RE46-10-12982	NC	29	760
SWMU 46-004(q)	46-611509	0.0–1.0	RE46-10-12983	NC	29	760
SWMU 46-004(q)	46-611509	1.0–2.0	RE46-10-12984	NC	29	760
SWMU 46-004(q)	46-611510	0.0–1.0	RE46-10-12985	NC	29	760
SWMU 46-004(q)	46-611510	1.0–2.0	RE46-10-12986	NC	29	760
SWMU 46-004(q)	46-611511	0.0–1.0	RE46-10-12987	NC	24.2	1021
SWMU 46-004(q)	46-611511	1.0–2.0	RE46-10-12988	NC	24.2	1021
SWMU 46-004(q)	46-611512	0.0–1.0	RE46-10-12989	NC	24.2	1021
SWMU 46-004(q)	46-611512	1.0–2.0	RE46-10-12990	NC	24.2	1021
SWMU 46-004(q)	46-611513	0.0–1.0	RE46-10-12991	NC	24.2	1021
SWMU 46-004(q)	46-611513	1.0–2.0	RE46-10-12992	NC	24.2	1021
SWMU 46-004(r)	46-612231	0.0–0.25	RE46-10-17386	NC	0	916
SWMU 46-004(r)	46-612231	0.25–0.50	RE46-10-17387	NC	0	916
SWMU 46-004(s)	46-611198	0.0–1.0	RE46-10-11305	NC	14	1177
SWMU 46-004(s)	46-611198	1.0–2.0	RE46-10-11306	NC	14	1177
SWMU 46-004(s)	46-611199	0.0–1.0	RE46-10-11307	NC	14	1177
SWMU 46-004(s)	46-611199	1.0–2.0	RE46-10-11308	NC	14	1177
SWMU 46-004(t)	46-611276	4.5–5.5	RE46-10-11548	332.5	15	1057
SWMU 46-004(t)	46-611276	2.5–3.5	RE46-10-11549	68	15	1057
SWMU 46-004(t)	46-611277	2.5–3.5	RE46-10-11550	850.4	0.0	972
SWMU 46-004(t)	46-611277	4.5–5.5	RE46-10-11551	21.2	0.0	972
SWMU 46-004(t)	46-611278	3.0–4.0	RE46-10-11552	>2000[c]	0.0	972
SWMU 46-004(t)	46-611278	5.0–6.0	RE46-10-11553	16.6	0.0	972
SWMU 46-004(t)	46-611279	0.0–1.0	RE46-10-11554	8.6	39	1055
SWMU 46-004(t)	46-611279	2.0–3.0	RE46-10-11555	4.6	39	1055
SWMU 46-004(t)	46-611280	0.0–1.0	RE46-10-11556	2.3	39	1055
SWMU 46-004(t)	46-611280	2.0–3.0	RE46-10-11557	76.1	39	1055
SWMU 46-004(t)	46-611281	0.0–1.0	RE46-10-11558	NC	61.7	1449
SWMU 46-004(t)	46-611281	2.0–3.0	RE46-10-11559	NC	61.7	1449
SWMU 46-004(t)	46-611282	0.0–1.0	RE46-10-11560	NC	61.7	1449
SWMU 46-004(t)	46-611282	2.0–3.0	RE46-10-11561	NC	61.7	1449
SWMU 46-004(t)	46-611283	0.0–1.0	RE46-10-11562	NC	61.7	1449
SWMU 46-004(t)	46-611283	2.0–3.0	RE46-10-11563	NC	61.7	1449
SWMU 46-004(t)	46-611284	0.0–1.0	RE46-10-11564	NC	61.7	1449

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(t)	46-611284	2.0–3.0	RE46-10-11565	NC	61.7	1449
SWMU 46-004(t)	46-611285	0.0–1.0	RE46-10-11566	NC	15	1057
SWMU 46-004(t)	46-611285	2.0–3.0	RE46-10-11567	NC	15	1057
SWMU 46-004(u)	46-611527	0.0–1.0	RE46-10-13044	13.8	14	1897
SWMU 46-004(u)	46-611527	1.0–2.0	RE46-10-13045	4.5	14	1897
SWMU 46-004(u)	46-611528	0.0–1.0	RE46-10-13046	1.8	14	1897
SWMU 46-004(u)	46-611528	1.0–2.0	RE46-10-13047	0.8	14	1897
SWMU 46-004(u)	46-611529	0.0–1.0	RE46-10-13048	0.0	14	868
SWMU 46-004(u)	46-611529	1.0–2.0	RE46-10-13049	1.4	14	868
SWMU 46-004(u)	46-611530	0.0–1.0	RE46-10-13050	1.9	14	868
SWMU 46-004(u)	46-611530	1.0–2.0	RE46-10-13051	8.0	14	868
SWMU 46-004(u)	46-611531	0.0–1.0	RE46-10-13052	7.3	14	868
SWMU 46-004(u)	46-611531	1.0–2.0	RE46-10-13053	20.0	14	868
SWMU 46-004(u)	46-611532	0.0–1.0	RE46-10-13054	0.2	14	868
SWMU 46-004(u)	46-611532	1.0–2.0	RE46-10-13055	19.5	14	868
SWMU 46-004(u)	46-611533	0.0–1.0	RE46-10-13056	16.3	14	868
SWMU 46-004(u)	46-611533	1.0–2.0	RE46-10-13057	6.4	14	868
SWMU 46-004(u)	46-611534	0.0–1.0	RE46-10-13058	18.1	14	868
SWMU 46-004(u)	46-611534	1.0–2.0	RE46-10-13059	25.1	14	868
SWMU 46-004(u)	46-611535	0.0–1.0	RE46-10-13060	19.5	14	868
SWMU 46-004(u)	46-611535	1.0–2.0	RE46-10-13061	7.8	14	868
SWMU 46-004(u)	46-611536	0.0–1.0	RE46-10-13062	8.2	14	868
SWMU 46-004(u)	46-611536	1.0–2.0	RE46-10-13063	19.4	14	868
SWMU 46-004(v)	46-611821	0.0–1.0	RE46-10-14229	4.8	14	1897
SWMU 46-004(v)	46-611821	1.0–2.0	RE46-10-14230	2.2	14	1897
SWMU 46-004(v)	46-611822	0.0–1.0	RE46-10-14231	4.8	14	1897
SWMU 46-004(v)	46-611822	1.0–2.0	RE46-10-14232	1.8	14	1897
SWMU 46-004(x)	46-611514	0.0–1.0	RE46-10-13006	NC	16	1086
SWMU 46-004(x)	46-611514	1.0–2.0	RE46-10-13007	NC	16	1086
SWMU 46-004(x)	46-611515	0.0–1.0	RE46-10-13008	8.2	16	1086
SWMU 46-004(x)	46-611515	1.0–2.0	RE46-10-13009	14.2	16	1086
SWMU 46-004(x)	46-611516	0.0–1.0	RE46-10-13010	7.1	16	1086
SWMU 46-004(x)	46-611516	1.0–2.0	RE46-10-13011	8.8	16	1086
SWMU 46-004(x)	46-611517	0.0–1.0	RE46-10-13012	NC	24.2	1021
SWMU 46-004(x)	46-611517	1.0–2.0	RE46-10-13013	NC	24.2	1021
SWMU 46-004(x)	46-611526	0.0–1.0	RE46-10-13030	NC	24.2	1021
SWMU 46-004(x)	46-611526	1.0–2.0	RE46-10-13031	NC	24.2	1021

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-004(y)	46-611518	0.0–1.0	RE46-10-13014	0.7	7	923
SWMU 46-004(y)	46-611518	1.0–2.0	RE46-10-13015	0.8	7	923
SWMU 46-004(y)	46-611519	0.0–1.0	RE46-10-13016	2.1	7	923
SWMU 46-004(y)	46-611519	1.0–2.0	RE46-10-13017	1.5	7	923
SWMU 46-004(y)	46-611520	0.0–1.0	RE46-10-13018	NC	24.2	1021
SWMU 46-004(y)	46-611520	1.0–2.0	RE46-10-13019	NC	24.2	1021
SWMU 46-004(y)	46-611521	0.0–1.0	RE46-10-13020	NC	24.2	1021
SWMU 46-004(y)	46-611521	1.0–2.0	RE46-10-13021	NC	24.2	1021
SWMU 46-004(y)	46-611522	0.0–1.0	RE46-10-13022	NC	24.2	1021
SWMU 46-004(y)	46-611522	1.0–2.0	RE46-10-13023	NC	24.2	1021
SWMU 46-004(y)	46-611523	0.0–1.0	RE46-10-13024	NC	24.2	1021
SWMU 46-004(y)	46-611523	1.0–2.0	RE46-10-13025	NC	24.2	1021
SWMU 46-004(y)	46-611524	0.0–1.0	RE46-10-13026	NC	24.2	1021
SWMU 46-004(y)	46-611524	1.0–2.0	RE46-10-13027	NC	24.2	1021
SWMU 46-004(y)	46-611525	0.0–1.0	RE46-10-13028	NC	24.2	1021
SWMU 46-004(y)	46-611525	1.0–2.0	RE46-10-13029	NC	24.2	1021
SWMU 46-004(z)	46-611468	0.0–1.0	RE46-10-12728	2.3	16	1086
SWMU 46-004(z)	46-611468	1.0–2.0	RE46-10-12729	NC	16	1086
SWMU 46-004(z)	46-611469	0.0–1.0	RE46-10-12730	1.8	16	1086
SWMU 46-004(z)	46-611469	1.0–2.0	RE46-10-12731	2.8	16	1086
SWMU 46-004(z)	46-611470	0.0–1.0	RE46-10-12732	0.4	16	1086
SWMU 46-004(z)	46-611470	1.0–2.0	RE46-10-12733	0.1	16	1086
SWMU 46-004(z)	46-611471	0.0–1.0	RE46-10-12734	0.4	28	898
SWMU 46-004(z)	46-611471	1.0–2.0	RE46-10-12735	2.5	28	898
SWMU 46-004(z)	46-611472	0.0–1.0	RE46-10-12736	19.0	28	898
SWMU 46-004(z)	46-611472	1.0–2.0	RE46-10-12737	1.2	28	898
SWMU 46-004(z)	46-611473	0.0–1.0	RE46-10-12738	0.5	28	898
SWMU 46-004(z)	46-611473	1.0–2.0	RE46-10-12739	0.4	28	898
SWMU 46-005	46-611628	0.0–1.0	RE46-10-13673	NC	0	807
SWMU 46-005	46-611628	2.0–3.0	RE46-10-13674	NC	0	807
SWMU 46-005	46-611629	0.0–1.0	RE46-10-13675	NC	0	807
SWMU 46-005	46-611629	2.0–3.0	RE46-10-13676	NC	0	807
SWMU 46-005	46-611630	0.0–1.0	RE46-10-13677	NC	34	1091
SWMU 46-005	46-611630	2.0–3.0	RE46-10-13678	NC	34	1091
SWMU 46-005	46-611631	0.0–1.0	RE46-10-13679	NC	34	1091
SWMU 46-005	46-611631	2.0–3.0	RE46-10-13680	NC	34	1091
SWMU 46-005	46-611632	0.0–1.0	RE46-10-13681	2.2	0	952

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-005	46-611632	5.0–6.0	RE46-10-13682	15.4	0	952
SWMU 46-005	46-611633	0.0–1.0	RE46-10-13683	0.0	0	952
SWMU 46-005	46-611633	5.0–6.0	RE46-10-13684	5.0	0	952
SWMU 46-005	46-611634	0.0–1.0	RE46-10-13685	0.0	17	1100
SWMU 46-005	46-611634	5.0–6.0	RE46-10-13686	0.0	17	1100
SWMU 46-005	46-611635	0.0–1.0	RE46-10-13687	0.0	17	1100
SWMU 46-005	46-611635	5.0–6.0	RE46-10-13688	0.0	17	1100
SWMU 46-005	46-611636	0.0–1.0	RE46-10-13689	0.0	17	1100
SWMU 46-005	46-611636	5.0–6.0	RE46-10-13690	0.0	17	1100
SWMU 46-005	46-611637	0.0–1.0	RE46-10-13691	0.7	0	952
SWMU 46-005	46-611637	3.0–4.0	RE46-10-13692	0.8	0	952
SWMU 46-005	46-611638	0.0–1.0	RE46-10-13693	NC	34	1091
SWMU 46-005	46-611638	3.0–4.0	RE46-10-13694	NC	34	1091
SWMU 46-005	46-611639	0.0–1.0	RE46-10-13695	NC	34	1091
SWMU 46-005	46-611639	2.0–3.0	RE46-10-13696	NC	34	1091
SWMU 46-005	46-611640	0.0–1.0	RE46-10-13697	55	38	1838
SWMU 46-005	46-611640	1.0–2.0	RE46-10-13698	64	38	1838
SWMU 46-005	46-611641	0.0–1.0	RE46-10-13699	35.5	38	1838
SWMU 46-005	46-611641	1.0–2.0	RE46-10-13700	6.5	38	1838
SWMU 46-006(b)	46-611368	0.0–1.0	RE46-10-11901	12.9	13	1132
SWMU 46-006(b)	46-611368	3.0–4.0	RE46-10-11902	5.8	13	1132
SWMU 46-006(b)	46-611369	0.0–1.0	RE46-10-11903	8.6	13	1132
SWMU 46-006(b)	46-611369	3.0–4.0	RE46-10-11904	6.8	13	1132
SWMU 46-006(b)	46-611370	0.0–1.0	RE46-10-11905	5.9	13	1132
SWMU 46-006(b)	46-611370	2.0–3.0	RE46-10-11906	NC	18	978
SWMU 46-006(b)	46-611371	0.0–1.0	RE46-10-11907	7.2	13	1132
SWMU 46-006(b)	46-611371	2.0–3.0	RE46-10-11908	8.6	13	1132
SWMU 46-006(b)	46-611372	0.0–1.0	RE46-10-11909	6.5	13	1132
SWMU 46-006(b)	46-611372	2.0–3.0	RE46-10-11910	6.9	13	1132
SWMU 46-006(c)	46-611298	0.0–1.0	RE46-10-11590	NC	61.7	1449
SWMU 46-006(c)	46-611298	3.0–4.0	RE46-10-11591	NC	61.7	1449
SWMU 46-006(c)	46-611299	0.0–1.0	RE46-10-11592	NC	18	978
SWMU 46-006(c)	46-611299	3.0–4.0	RE46-10-11593	NC	18	978
SWMU 46-006(c)	46-611300	0.0–1.0	RE46-10-11594	NC	61.7	1449
SWMU 46-006(c)	46-611300	2.0–3.0	RE46-10-11595	NC	61.7	1449
SWMU 46-006(c)	46-611301	0.0–1.0	RE46-10-11596	NC	61.7	1449
SWMU 46-006(c)	46-611301	2.0–3.0	RE46-10-11597	NC	61.7	1449

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-006(c)	46-611302	0.0–1.0	RE46-10-11598	NC	61.7	1449
SWMU 46-006(c)	46-611302	2.0–3.0	RE46-10-11599	NC	61.7	1449
SWMU 46-006(c)	46-611303	0.0–1.0	RE46-10-11600	274	39	1055
SWMU 46-006(c)	46-611303	2.0–3.0	RE46-10-11601	18.3	39	1055
SWMU 46-006(c)	46-611304	0.0–1.0	RE46-10-11602	3.8	39	1055
SWMU 46-006(c)	46-611304	2.0–3.0	RE46-10-11603	2.9	39	1055
SWMU 46-006(c)	46-611305	0.0–1.0	RE46-10-11604	4.8	39	1055
SWMU 46-006(c)	46-611305	2.0–3.0	RE46-10-11605	0.0	39	1055
SWMU 46-006(c)	46-611306	0.0–1.0	RE46-10-11606	13.8	39	1055
SWMU 46-006(c)	46-611306	2.0–3.0	RE46-10-11607	11.8	39	1055
SWMU 46-006(d)	46-611568	0.0–1.0	RE46-10-13321	1.3	38	2000
SWMU 46-006(d)	46-611568	4.0–5.0	RE46-10-13322	2.4	38	2000
SWMU 46-006(d)	46-611569	0.0–1.0	RE46-10-13323	0.0	48	1208
SWMU 46-006(d)	46-611569	4.0–5.0	RE46-10-13324	0.0	48	1208
SWMU 46-006(d)	46-611570	0.0–1.0	RE46-10-13325	0.0	38	2000
SWMU 46-006(d)	46-611570	4.0–5.0	RE46-10-13326	0.0	38	2000
SWMU 46-006(d)	46-611571	0.0–1.0	RE46-10-13327	0.0	38	2000
SWMU 46-006(d)	46-611571	4.0–5.0	RE46-10-13328	0.0	38	2000
SWMU 46-006(d)	46-611572	0.0–1.0	RE46-10-13329	0.2	18	1174
SWMU 46-006(d)	46-611572	1.0–2.0	RE46-10-13330	0.1	18	1174
SWMU 46-006(d)	46-611573	0.0–1.0	RE46-10-13331	4.0	18	1174
SWMU 46-006(d)	46-611573	1.0–2.0	RE46-10-13332	1.8	18	1174
SWMU 46-006(d)	46-611574	0.0–1.0	RE46-10-13333	NC	38	2000
SWMU 46-006(d)	46-611574	1.0–2.0	RE46-10-13334	1.3	38	2000
SWMU 46-006(d)	46-611575	0.0–1.0	RE46-10-13335	1.2	38	2000
SWMU 46-006(d)	46-611575	1.0–2.0	RE46-10-13336	1.5	38	2000
SWMU 46-006(d)	46-611576	0.0–1.0	RE46-10-13337	NC	7	904
SWMU 46-006(d)	46-611576	1.0–2.0	RE46-10-13338	0.0	7	904
SWMU 46-006(d)	46-611577	0.0–1.0	RE46-10-13339	NC	26.8	2050
SWMU 46-006(d)	46-611577	1.0–2.0	RE46-10-13340	NC	26.8	2050
SWMU 46-006(d)	46-611578	0.0–1.0	RE46-10-13341	NC	26.8	2050
SWMU 46-006(d)	46-611578	1.0–2.0	RE46-10-13342	NC	26.8	2050
SWMU 46-006(d)	46-611579	0.0–1.0	RE46-10-13343	NC	26.8	2050
SWMU 46-006(d)	46-611579	1.0–2.0	RE46-10-13344	NC	26.8	2050
SWMU 46-006(d)	46-611580	0.0–1.0	RE46-10-13345	>2000[c]	7	904
SWMU 46-006(d)	46-611580	1.0–2.0	RE46-10-13346	>2000[c]	7	904
SWMU 46-006(d)	46-611581	0.0–1.0	RE46-10-13347	>2000[c]	7	904

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-006(d)	46-611581	1.0–2.0	RE46-10-13348	>2000[c]	7	904
SWMU 46-006(d)	46-611582	0.0–1.0	RE46-10-13349	>2000[c]	7	904
SWMU 46-006(d)	46-611582	1.0–2.0	RE46-10-13350	>2000[c]	7	904
SWMU 46-006(d)	46-611583	0.0–1.0	RE46-10-13351	>2000[c]	7	904
SWMU 46-006(d)	46-611583	1.0–2.0	RE46-10-13352	>2000[c]	7	904
SWMU 46-006(d)	46-611584	0.0–1.0	RE46-10-13353	0.0	7	904
SWMU 46-006(d)	46-611584	1.0–2.0	RE46-10-13354	1,920	7	904
SWMU 46-006(d)	46-611585	0.0–1.0	RE46-10-13355	0.0	20	868
SWMU 46-006(d)	46-611585	1.0–2.0	RE46-10-13356	0.0	20	868
SWMU 46-006(d)	46-611586	0.0–1.0	RE46-10-13357	1.4	20	868
SWMU 46-006(d)	46-611586	1.0–2.0	RE46-10-13358	0.2	20	868
SWMU 46-006(d)	46-611587	0.0–1.0	RE46-10-13359	0.0	20	868
SWMU 46-006(d)	46-611587	1.0–2.0	RE46-10-13360	0.0	20	868
SWMU 46-006(f)	46-611737	0.0–1.0	RE46-10-13775	0.0	15	942
SWMU 46-006(f)	46-611737	3.0–4.0	RE46-10-13776	0.0	15	942
SWMU 46-006(f)	46-611738	0.0–1.0	RE46-10-13777	NC	15	942
SWMU 46-006(f)	46-611738	3.0–4.0	RE46-10-13778	NC	15	942
SWMU 46-006(f)	46-611739	0.0–1.0	RE46-10-13779	4.9	15	942
SWMU 46-006(f)	46-611739	2.0–3.0	RE46-10-13780	0.4	15	942
SWMU 46-006(f)	46-611740	0.0–1.0	RE46-10-13781	2.4	15	942
SWMU 46-006(f)	46-611740	2.0–3.0	RE46-10-13782	3.8	15	942
SWMU 46-006(g)	46-611547	0.0–1.0	RE46-10-13176	1.5	18	1174
SWMU 46-006(g)	46-611547	3.0–4.0	RE46-10-13177	0.9	18	1174
SWMU 46-006(g)	46-611548	0.0–1.0	RE46-10-13178	10.2	18	1174
SWMU 46-006(g)	46-611548	3.0–4.0	RE46-10-13179	6.2	18	1174
SWMU 46-006(g)	46-611549	0.0–1.0	RE46-10-13180	5.0	18	1174
SWMU 46-006(g)	46-611549	3.0–4.0	RE46-10-13181	1.0	18	1174
SWMU 46-007	46-611754	0.0–1.0	RE46-10-13860	0.5	12	827
SWMU 46-007	46-611754	2.0–3.0	RE46-10-13861	0.4	12	827
SWMU 46-007	46-611755	0.0–1.0	RE46-10-13863	6.6	12	827
SWMU 46-007	46-611755	2.0–3.0	RE46-10-13862	4.6	12	827
SWMU 46-007	46-611756	0.0–1.0	RE46-10-13864	6.1	12	827
SWMU 46-007	46-611756	2.0–3.0	RE46-10-13865	5.7	12	827
SWMU 46-007	46-611757	0.0–1.0	RE46-10-13866	0.6	12	827
SWMU 46-007	46-611757	2.0–3.0	RE46-10-13867	0.6	12	827
SWMU 46-007	46-611758	0.0–1.0	RE46-10-13868	0.8	12	827
SWMU 46-007	46-611758	2.0–3.0	RE46-10-13869	0.7	12	827

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-008(a)	46-611338	0.0–1.0	RE46-10-11793	4.2	25	1190
SWMU 46-008(a)	46-611338	2.0–3.0	RE46-10-11794	3.8	25	1190
SWMU 46-008(a)	46-611339	0.0–1.0	RE46-10-11795	3.9	25	1190
SWMU 46-008(a)	46-611339	2.0–3.0	RE46-10-11796	2.8	25	1190
SWMU 46-008(a)	46-611340	0.0–1.0	RE46-10-11797	7.3	25	1190
SWMU 46-008(a)	46-611340	2.0–3.0	RE46-10-11798	6.5	25	1190
SWMU 46-008(a)	46-611341	0.0–1.0	RE46-10-11799	3.4	25	1190
SWMU 46-008(a)	46-611341	2.0–3.0	RE46-10-11800	3.3	25	1190
SWMU 46-008(a)	46-611342	0.0–1.0	RE46-10-11801	4.1	25	1190
SWMU 46-008(a)	46-611342	2.0–3.0	RE46-10-11802	3.8	25	1190
SWMU 46-008(b)	46-611200	0.0–1.0	RE46-10-11313	NC	14	1177
SWMU 46-008(b)	46-611200	2.0–3.0	RE46-10-11314	NC	14	1177
SWMU 46-008(b)	46-611201	0.0–1.0	RE46-10-11315	NC	14	1177
SWMU 46-008(b)	46-611201	2.0–3.0	RE46-10-11316	NC	14	1177
SWMU 46-008(b)	46-611202	0.0–1.0	RE46-10-11317	NC	14	1177
SWMU 46-008(b)	46-611202	2.0–3.0	RE46-10-11318	NC	14	1177
SWMU 46-008(b)	46-611203	0.0–1.0	RE46-10-11319	NC	14	1177
SWMU 46-008(b)	46-611203	2.0–3.0	RE46-10-11320	NC	14	1177
SWMU 46-008(d)	46-611343	0.0–1.0	RE46-10-11803	0.0	79	1328
SWMU 46-008(d)	46-611343	2.0–3.0	RE46-10-11804	0.0	79	1328
SWMU 46-008(d)	46-611344	0.0–1.0	RE46-10-11805	0.0	79	1328
SWMU 46-008(d)	46-611344	2.0–3.0	RE46-10-11806	0.0	79	1328
SWMU 46-008(d)	46-611345	0.0–1.0	RE46-10-11807	0.1	30	1329
SWMU 46-008(d)	46-611345	2.0–3.0	RE46-10-11808	0.0	30	1329
SWMU 46-008(d)	46-611346	0.0–1.0	RE46-10-11809	0.0	79	1328
SWMU 46-008(d)	46-611346	2.0–3.0	RE46-10-11810	0.0	79	1328
SWMU 46-008(d)	46-611347	0.0–1.0	RE46-10-11811	0.0	30	1329
SWMU 46-008(d)	46-611347	2.0–3.0	RE46-10-11812	0.0	30	1329
SWMU 46-008(d)	46-611348	0.0–1.0	RE46-10-11813	0.0	30	1329
SWMU 46-008(d)	46-611348	2.0–3.0	RE46-10-11814	0.0	30	1329
SWMU 46-008(e)	46-611349	0.0–1.0	RE46-10-11815	1.0	30	1329
SWMU 46-008(e)	46-611349	2.0–3.0	RE46-10-11816	1.4	30	1329
SWMU 46-008(e)	46-611350	0.0–1.0	RE46-10-11817	NC	30	1329
SWMU 46-008(e)	46-611350	2.0–3.0	RE46-10-11818	NC	30	1329
SWMU 46-008(e)	46-611351	0.0–0.5	RE46-10-11819	2.2	30	1329
SWMU 46-008(e)	46-611351	2.0–3.0	RE46-10-12048	NC	18	978
SWMU 46-008(e)	46-611352	0.0–1.0	RE46-10-11821	NC	30	1329

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-008(e)	46-611352	2.0–3.0	RE46-10-12050	NC	18	978
SWMU 46-008(e)	46-611353	0.0–1.0	RE46-10-11823	0.4	30	1329
SWMU 46-008(e)	46-611353	2.0–3.0	RE46-10-12049	NC	18	978
SWMU 46-008(e)	46-611354	0.0–0.75	RE46-10-11825	NC	30	1329
SWMU 46-008(e)	46-611354	2.0–3.0	RE46-10-12047	NC	30	1329
SWMU 46-008(e)	46-611355	0.0–1.0	RE46-10-11827	0.8	30	1329
SWMU 46-008(e)	46-611355	2.0–3.0	RE46-10-12051	NC	18	978
SWMU 46-008(f)	46-611550	0.0–1.0	RE46-10-13192	0.0	18	1840
SWMU 46-008(f)	46-611550	3.0–4.0	RE46-10-13193	1.5	18	1840
SWMU 46-008(f)	46-611551	0.0–1.0	RE46-10-13194	1.3	18	1840
SWMU 46-008(f)	46-611551	2.0–3.0	RE46-10-13195	9.2	18	1840
SWMU 46-008(f)	46-611552	0.0–1.0	RE46-10-13196	0.0	18	1840
SWMU 46-008(f)	46-611552	2.0–3.0	RE46-10-13197	0.0	18	1840
SWMU 46-008(f)	46-611553	0.0–1.0	RE46-10-13199	0.0	18	1840
SWMU 46-008(f)	46-611553	3.0–4.0	RE46-10-13198	0.0	18	1840
SWMU 46-008(f)	46-611554	0.0–1.0	RE46-10-13201	0.0	18	1840
SWMU 46-008(f)	46-611554	3.0–4.0	RE46-10-13200	NC	18	1840
SWMU 46-008(f)	46-611555	0.0–1.0	RE46-10-13203	NC	18	1840
SWMU 46-008(f)	46-611555	3.0–4.0	RE46-10-13202	NC	18	1840
SWMU 46-008(f)	46-611556	0.0–1.0	RE46-10-13205	NC	18	1840
SWMU 46-008(f)	46-611556	3.0–4.0	RE46-10-13204	0.0	18	1840
SWMU 46-008(g)	46-611746	0.0–1.0	RE46-10-13797	NC	10	1269
SWMU 46-008(g)	46-611746	2.0–3.0	RE46-10-13798	0.8	10	1269
SWMU 46-008(g)	46-611747	0.0–1.0	RE46-10-13799	0.7	10	1269
SWMU 46-008(g)	46-611747	2.0–3.0	RE46-10-13800	1.2	10	1269
SWMU 46-008(g)	46-611748	0.0–1.0	RE46-10-13801	1.9	10	1269
SWMU 46-008(g)	46-611748	2.0–3.0	RE46-10-13802	0.4	10	1269
SWMU 46-008(g)	46-611749	0.0–1.0	RE46-10-13803	1.2	10	1269
SWMU 46-008(g)	46-611749	2.0–3.0	RE46-10-13804	1.1	10	1269
SWMU 46-008(g)	46-611750	0.0–1.0	RE46-10-13805	3.5	10	1269
SWMU 46-008(g)	46-611750	2.0–3.0	RE46-10-13806	2.6	10	1269
SWMU 46-008(g)	46-611751	0.0–1.0	RE46-10-13807	1.2	10	1269
SWMU 46-008(g)	46-611751	2.0–3.0	RE46-10-13808	0.2	10	1269
SWMU 46-008(g)	46-611752	0.0–1.0	RE46-10-13809	0.7	10	1269
SWMU 46-008(g)	46-611752	2.0–3.0	RE46-10-13810	0.4	10	1269
SWMU 46-009(a)	46-610983	4.0–5.0	RE46-10-10012	0.0	17	1458
SWMU 46-009(a)	46-610983	9.0–10.0	RE46-10-10013	NC	9	1296

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-009(a)	46-610983	14.0–15.0	RE46-10-10014	NC	9	1296
SWMU 46-009(a)	46-610984	4.0–5.0	RE46-10-10015	2.0	17	1458
SWMU 46-009(a)	46-610984	9.0–10.0	RE46-10-10016	0.0	17	1458
SWMU 46-009(a)	46-610984	14.0–15.0	RE46-10-10017	0.8	17	1458
SWMU 46-009(a)	46-610985	4.0–5.0	RE46-10-10018	1.6	35.1	1715
SWMU 46-009(a)	46-610985	9.0–10.0	RE46-10-10019	NC	9	1296
SWMU 46-009(a)	46-610985	14.0–15.0	RE46-10-10020	NC	9	1296
SWMU 46-009(a)	46-610986	4.0–5.0	RE46-10-10021	3.6	35.1	1715
SWMU 46-009(a)	46-610986	9.0–10.0	RE46-10-10022	3.7	35.1	1715
SWMU 46-009(a)	46-610986	14.0–15.0	RE46-10-10023	2.1	35.1	1715
SWMU 46-009(a)	46-610987	4.0–5.0	RE46-10-10024	2.0	35.1	1715
SWMU 46-009(a)	46-610987	9.0–10.0	RE46-10-10025	6.1	35.1	1715
SWMU 46-009(a)	46-610987	14.0–15.0	RE46-10-10026	1.4	35.1	1715
SWMU 46-009(a)	46-610988	4.0–5.0	RE46-10-10027	0.8	17	1458
SWMU 46-009(a)	46-610988	9.0–10.0	RE46-10-10028	2.1	17	1458
SWMU 46-009(a)	46-610988	14.0–15.0	RE46-10-10029	2.0	17	1458
SWMU 46-009(a)	46-610989	0.0–1.0	RE46-10-10030	5.1	19.6	1603
SWMU 46-009(a)	46-610989	1.0–2.0	RE46-10-12029	NC	27.5	2080
SWMU 46-009(a)	46-610990	0.0–1.0	RE46-10-10032	4.3	19.6	1603
SWMU 46-009(a)	46-610990	1.0–2.0	RE46-10-10033	0.0	19.6	1603
SWMU 46-009(a)	46-610991	0.0–1.0	RE46-10-10034	0.4	19.6	1603
SWMU 46-009(a)	46-610991	1.0–2.0	RE46-10-10035	1.1	19.6	1603
SWMU 46-009(a)	46-610992	0.0–1.0	RE46-10-10036	0.0	19.6	1603
SWMU 46-009(a)	46-610992	1.0–2.0	RE46-10-12027	NC	27.5	2080
SWMU 46-009(a)	46-610993	0.0–1.0	RE46-10-10038	NC	19.6	1603
SWMU 46-009(a)	46-610993	1.0–2.0	RE46-10-12028	NC	27.5	2080
SWMU 46-009(a)	46-610994	0.0–1.0	RE46-10-10040	0.0	19.6	1603
SWMU 46-009(a)	46-610994	1.0–2.0	RE46-10-12026	NC	27.5	2080
SWMU 46-009(a)	46-610995	0.0–1.0	RE46-10-10042	0.0	19.6	1603
SWMU 46-009(a)	46-610995	1.0–2.0	RE46-10-12025	NC	27.5	2080
SWMU 46-009(a)	46-610996	0.0–1.0	RE46-10-10044	NC	19.6	1603
SWMU 46-009(a)	46-610996	1.0–2.0	RE46-10-12024	NC	27.5	2080
SWMU 46-009(a)	46-610997	0.0–1.0	RE46-10-10046	0.0	19.6	1603
SWMU 46-009(a)	46-610997	1.0–2.0	RE46-10-12023	NC	27.5	2080
SWMU 46-009(a)	46-610998	0.0–1.0	RE46-10-10048	NC	19.6	1603
SWMU 46-009(a)	46-610998	1.0–2.0	RE46-10-12022	NC	27.5	2080
SWMU 46-009(b)	46-610999	0.0–1.0	RE46-10-10066	NC	15	1216

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-009(b)	46-610999	2.0–3.0	RE46-10-10067	NC	15	1216
SWMU 46-009(b)	46-611000	0.0–1.0	RE46-10-10068	NC	15	1216
SWMU 46-009(b)	46-611000	2.0–3.0	RE46-10-10069	NC	15	1216
SWMU 46-009(b)	46-611001	0.0–1.0	RE46-10-10070	NC	15	1216
SWMU 46-009(b)	46-611001	2.0–3.0	RE46-10-10071	NC	15	1216
SWMU 46-009(b)	46-611002	0.0–1.0	RE46-10-10072	NC	15	1216
SWMU 46-009(b)	46-611002	2.0–3.0	RE46-10-10073	NC	15	1216
SWMU 46-009(b)	46-611003	0.0–1.0	RE46-10-10074	NC	15	1216
SWMU 46-009(b)	46-611003	2.0–3.0	RE46-10-10075	NC	15	1216
SWMU 46-009(b)	46-611004	0.0–1.0	RE46-10-10076	NC	15	1216
SWMU 46-009(b)	46-611004	2.0–3.0	RE46-10-10077	NC	15	1216
SWMU 46-009(b)	46-611005	0.0–1.0	RE46-10-10078	NC	15	1216
SWMU 46-009(b)	46-611005	1.0–2.0	RE46-10-10079	NC	15	1216
SWMU 46-009(b)	46-611006	0.0–1.0	RE46-10-10080	NC	15	1216
SWMU 46-009(b)	46-611006	1.0–2.0	RE46-10-10081	NC	15	1216
SWMU 46-009(b)	46-611007	0.0–1.0	RE46-10-10082	NC	32	1333
SWMU 46-009(b)	46-611007	1.0–2.0	RE46-10-12034	NC	27.5	2080
SWMU 46-009(b)	46-611008	0.0–1.0	RE46-10-10084	NC	15	1216
SWMU 46-009(b)	46-611008	1.0–2.0	RE46-10-12033	NC	27.5	2080
SWMU 46-009(b)	46-611009	0.0–1.0	RE46-10-10086	NC	15	1216
SWMU 46-009(b)	46-611009	1.0–2.0	RE46-10-12032	NC	27.5	2080
SWMU 46-009(b)	46-611010	0.0–1.0	RE46-10-10088	NC	15	1216
SWMU 46-009(b)	46-611010	1.0–2.0	RE46-10-12030	NC	27	1267
SWMU 46-009(b)	46-611011	0.0–0.5	RE46-10-10090	NC	32	1333
SWMU 46-009(b)	46-611011	1.0–2.0	RE46-10-12031	NC	27	1267
SWMU 46-009(b)	46-611012	0.0–1.0	RE46-10-10092	NC	32	1333
SWMU 46-009(b)	46-611012	1.0–2.0	RE46-10-10093	NC	32	1333
SWMU 46-009(b)	46-611013	0.0–1.0	RE46-10-10094	NC	32	1333
SWMU 46-009(b)	46-611013	1.0–2.0	RE46-10-10095	NC	32	1333
SWMU 46-009(b)	46-611014	0.0–1.0	RE46-10-10096	NC	32	1333
SWMU 46-009(b)	46-611014	1.0–2.0	RE46-10-10097	NC	32	1333
SWMU 46-010(d)	46-611463	0.0–1.0	RE46-10-12714	5.1	28	898
SWMU 46-010(d)	46-611463	3.0–4.0	RE46-10-12715	15.1	28	898
SWMU 46-010(d)	46-611464	0.0–1.0	RE46-10-12716	1.1	28	898
SWMU 46-010(d)	46-611464	3.0–4.0	RE46-10-12717	15.8	28	898
SWMU 46-010(d)	46-611465	0.0–1.0	RE46-10-12718	9.5	28	898
SWMU 46-010(d)	46-611465	2.0–3.0	RE46-10-12719	0.1	28	898

Table 3.2-2 (continued)

Consolidated Unit/ SWMU/AOC	Location ID	Depth (ft)	Sample ID	PID (ppm)	Alpha (dpm)[a]	Beta/ Gamma (dpm)[a]
SWMU 46-010(d)	46-611466	0.0–1.0	RE46-10-12720	4.6	28	898
SWMU 46-010(d)	46-611466	2.0–3.0	RE46-10-12721	0.3	28	898
SWMU 46-010(d)	46-611467	0.0–1.0	RE46-10-12722	1.7	28	898
SWMU 46-010(d)	46-611467	2.0–3.0	RE46-10-12723	NC	28	898
AOC C-46-001	46-612232	0.0–1.0	RE46-10-17388	35.2	9	1159
AOC C-46-001	46-612232	1.0–2.0	RE46-10-17389	42.1	9	1159

[a] Results reported represent site background levels.

[b] NC = Not collected as a result of moisture-related instrumentation error.

[c] Reported value is not verifiable as a result of moisture-related instrumentation error.

Table 6.2-1
Samples Collected and Analyses Requested at SWMU 04-003(a)

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

Table 6.2-1 (continued)

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

*— = No sample collected.

Table 6.2-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 04-003(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Mercury	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**0.1**	**0.3**	**63.5**
Sediment BV[a]				**0.83**	**127**	**0.4**	**10.5**	**0.1**	**0.3**	**60.2**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**0.1**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**4350**	**309**	**449**[c]	**92.9**[d]	**1550**	**92900**
Industrial SSL[b]				**454**	**224000**	**1120**	**2920**[c]	**310**[e]	**5680**	**341000**
Residential SSL[b]				**31.3**	**15600**	**77.9**	**219**[c]	**23**[e]	**391**	**23500**
0404-95-0056	04-02007	0–1	Soil	—[f]	—	1	—	—	—	—
RE04-98-0018	04-02008	0.5–1.5	Soil	—	—	—	—	0.11 (U)	—	—
RE04-98-0021	04-02009	0–0.5	Sed	—	—	—	—	—	1 (U)	—
RE04-98-0022	04-02009	0.5–1	Sed	—	—	—	—	—	1 (U)	—
RE04-98-0033	04-02033	0–0.5	Sed	—	—	—	—	—	1 (U)	—
RE04-98-0034	04-02033	0.5–0.83	Sed	—	—	—	—	0.11 (U)	1.1 (U)	—
RE04-98-0037	04-02034	0–0.5	Sed	—	—	—	—	—	1 (U)	—
RE04-98-0038	04-02034	0.5–1	Sed	—	—	—	—	—	1 (U)	—
RE52-10-9502	52-610950	1–2	Qbt 3	1.06 (U)	—	—	7.47 (U)	—	1.04 (U)	—
RE52-10-9503	52-610950	2–3	Qbt 3	1.02 (U)	47	—	8.45	—	0.973 (U)	—
RE52-10-9504	52-610950	3–4	Qbt 3	1 (U)	—	—	—	—	0.981 (U)	—
RE52-10-9505	52-610951	1–2	Qbt 3	1.1 (U)	—	—	—	—	1.05 (U)	—
RE52-10-9506	52-610951	2–3	Qbt 3	1.06 (U)	—	—	8.98	—	1.09 (U)	—
RE52-10-9507	52-610951	3–4	Qbt 3	1.12 (U)	—	—	—	—	1.11 (U)	—
RE52-10-9508	52-610952	0–0.5	Soil	1.32 (U)	—	0.662 (U)	—	—	—	—
RE52-10-12020	52-610952	2–3	Soil	—	—	0.536 (U)	—	—	—	57.2 (J-)

Table 6.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Chromium	Mercury	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**7.14**	**0.1**	**0.3**	**63.5**
Sediment BV[a]				**0.83**	**127**	**0.4**	**10.5**	**0.1**	**0.3**	**60.2**
Soil BV[a]				**0.83**	**295**	**0.4**	**19.3**	**0.1**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**4350**	**309**	**449**[c]	**92.9**[d]	**1550**	**92900**
Industrial SSL[b]				**454**	**224000**	**1120**	**2920**[c]	**310**[e]	**5680**	**341000**
Residential SSL[b]				**31.3**	**15600**	**77.9**	**219**[c]	**23**[e]	**391**	**23500**
RE52-10-9510	52-610953	0–1	Soil	1.14 (U)	—	0.57 (U)	—	—	—	—
RE52-10-12021	52-610953	2–3	Soil	1.3 (U)	—	0.652 (U)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 6.2-3
Organic Chemicals Detected at SWMU 04-003(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Pentachlorophenol	Phenanthrene	Pyrene
Construction Worker SSL[a]				**18600**	**6680[b]**	**66800**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**20600**	**8910**	**8910**	**213**	**1240[c]**	**702**	**1030**	**7150**	**6680**
Industrial SSL[a]				**36700**	**18300[b]**	**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**2340**	**24400**	**24400**	**23.4**	**4100[d]**	**252**	**100**	**20500**	**18300**
Residential SSL[a]				**3440**	**1720[b]**	**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**621**	**2290**	**2290**	**6.21**	**310[d]**	**45**	**29.8**	**1830**	**1720**
RE04-98-0022	04-02009	0.5–1	Sed	—[e]	—	—	—	0.54	0.55	0.45	0.41	0.7	1.3	—	0.38	—	—	—	0.55	1
0404-95-0070	04-02010	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.07 (J)	—	—
RE52-10-9508	52-610952	0–0.5	Soil	—	—	—	—	—	—	—	—	—	0.0228 (J)	—	—	—	—	—	—	0.0242 (J)
RE52-10-12020	52-610952	2–3	Soil	—	—	—	—	0.0124 (J)	0.015 (J)	—	—	—	0.0333 (J)	—	0.119	—	—	—	0.0175 (J)	0.0332 (J)
RE52-10-9510	52-610953	0–1	Soil	0.0999	0.013 (J)	0.201	1.46	1.89	2.54	1.13	0.899	2.21	5.06	0.0915	1.02 (J)	0.0299 (J)	0.0358 (J)	—	2.03	4.94
RE52-10-12021	52-610953	2–3	Soil	—	—	0.00884 (J)	—	0.0749	0.0765	0.0512	0.0219 (J)	0.0784	0.15	—	0.157	—	—	—	0.0637	0.174

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

Table 6.2-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 04-003(a)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240
Soil BV[a]				**0.054**
Construction Worker SAL[b]				**36**
Industrial SAL[b]				**210**
Residential SAL[b]				**33**
0404-95-0053	04-02006	0–1	Soil	0.631
0404-95-0056	04-02007	0–1	Soil	0.056
0404-95-0070	04-02010	1–2	Soil	—[c]
RE52-10-9508	52-610952	0–0.5	Soil	0.0925
RE52-10-12021	52-610953	2–3	Soil	0.0307

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 6.3-1
Samples Collected and Analyses Requested at AOC 04-004

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	High Explosives	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
RE04-98-0001	04-02001	0–0.5	Soil	4383R	—	4381R	—	—*	4382R-1, 4382R-2	—	—	—	—	—
0404-95-0075	04-02001	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0002	04-02001	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0076	04-02001	1–2	Soil	—	—	583	—	—	—	585	585	—	—	—
RE04-98-0003	04-02001	1.5–2.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0078	04-02001	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0004	04-02001	2.5–3.33	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0005	04-02002	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0081	04-02002	0–1	Soil	584	—	—	—	—	—	585	585	—	—	—
RE04-98-0006	04-02002	0.5–1.5	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0083	04-02002	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0007	04-02002	1.5–2.5	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0084	04-02002	2–3	Soil	—	—	—	—	—	—	585	585	—	585	585
RE04-98-0008	04-02002	2.5–3.75	Soil	4383R	4381R	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0009	04-02003	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0086	04-02003	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0010	04-02003	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0087	04-02003	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0011	04-02003	1.5–2.17	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0088	04-02003	2–3	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0013	04-02004	0–0.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0090	04-02004	0–1	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0014	04-02004	0.5–1.5	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0091	04-02004	1–2	Soil	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0015	04-02004	1.5–2.08	Soil	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
0404-95-0092	04-02004	2–3	Qbt 3	—	—	—	—	—	—	585	585	—	—	—
RE04-98-0029	04-02032	0–0.5	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0030	04-02032	0.5–1.5	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE04-98-0031	04-02032	1.5–2.17	Fill	4383R	—	4381R	—	—	4382R, 4382R-2	—	—	—	—	—
RE52-10-9515	52-610954	1–2	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9516	52-610954	2–3	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9517	52-610954	3–4	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—

Table 6.3-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	High Explosives	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy	Gross Alpha/Beta
RE52-10-9518	52-610955	1–2	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9519	52-610955	2–3	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9520	52-610955	3–4	Qbt 3	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9521	52-610956	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9522	52-610956	2–3	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9523	52-610956	3–4	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9524	52-610957	1–2	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9525	52-610957	2–3	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9526	52-610957	3–4	Soil	10-1119	—	10-1118	10-1118	10-1119	—	10-1120	10-1120	10-1120	—	—
RE52-10-9527	52-610958	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9528	52-610958	2–3	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9529	52-610958	3–4	Qbt 3	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9530	52-610959	1–2	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9531	52-610959	2–3	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—
RE52-10-9532	52-610959	3–4	Soil	10-1145	—	10-1144	10-1144	10-1145	—	10-1146	10-1146	10-1146	—	—

*— = No sample collected.

Table 6.3-2
Inorganic Chemicals Detected or Detected above BVs at AOC 04-004

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**482**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**671**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**[c]	**449**	**34.6**[d]	**12400**	**800**	**463**	**92.9**[d]	**6190**	**1550**	**1550**	**20.4**	**1550**	**92900**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**	**300**[e]	**45400**	**800**	**145000**	**310**[e]	**22700**	**5680**	**5680**	**74.9**	**5680**	**341000**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**	**23**	**3130**	**400**	**10700**	**23**[e]	**1560**	**391**	**391**	**5.16**	**391**	**23500**
RE04-98-0002	04-02001	0.5–1.5	Soil	—[f]	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0003	04-02001	1.5–2.5	Soil	—	—	—	—	—	—	—	—	—	—	31	—	0.11 (U)	—	—	—	—	—	83
RE04-98-0004	04-02001	2.5–3.33	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
0404-95-0081	04-02002	0–1	Soil	—	—	210 (J-)	355	6	5.4	—	34.8	60.2	35.6	63.7 (J-)	—	—	63	361	5.2	225	75.7	87.9
RE04-98-0007	04-02002	1.5–2.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0008	04-02002	2.5–3.75	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0010	04-02003	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0011	04-02003	1.5–2.17	Soil	—	—	—	—	—	—	—	—	—	—	30	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0014	04-02004	0.5–1.5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	56
RE04-98-0015	04-02004	1.5–2.08	Soil	—	—	—	—	—	—	—	—	—	—	23	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0029	04-02032	0–0.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	77
RE04-98-0030	04-02032	0.5–1.5	Fill	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE04-98-0031	04-02032	1.5–2.17	Fill	—	—	—	—	—	—	—	—	—	—	—	—	0.11 (U)	—	—	—	—	—	—
RE52-10-9515	52-610954	1–2	Soil	—	1.07 (U)	—	—	—	0.537 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9516	52-610954	2–3	Qbt 3	—	1.06 (U)	—	—	—	—	—	9.64	—	—	—	—	—	—	1.05 (U)	—	—	—	—
RE52-10-9517	52-610954	3–4	Qbt 3	—	1.1 (U)	—	57.6	—	—	—	9.93	—	—	—	—	—	—	1.08 (U)	—	—	—	—
RE52-10-9518	52-610955	1–2	Qbt 3	—	1.11 (U)	—	—	—	—	—	—	—	—	—	—	—	—	1.07 (U)	—	—	—	—
RE52-10-9519	52-610955	2–3	Qbt 3	—	1.05 (U)	—	—	—	—	—	9.96	—	—	—	—	—	—	1.03 (U)	—	—	—	—
RE52-10-9520	52-610955	3–4	Qbt 3	—	1.04 (U)	—	—	—	—	—	11.5	—	—	—	—	—	—	1.05 (U)	—	—	—	—
RE52-10-9521	52-610956	1–2	Soil	—	1.13 (U)	—	—	—	0.567 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9522	52-610956	2–3	Soil	—	1.09 (U)	—	—	—	0.544 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9523	52-610956	3–4	Qbt 3	—	1.11 (U)	—	183	—	—	2240	—	—	8.37	13	—	—	—	1.12 (U)	—	—	—	—
RE52-10-9524	52-610957	1–2	Soil	—	1.03 (U)	—	—	—	0.514 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9525	52-610957	2–3	Soil	—	1.06 (U)	—	—	—	0.529 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9526	52-610957	3–4	Soil	—	1.05 (U)	—	—	—	0.527 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9527	52-610958	1–2	Soil	—	—	—	351	—	0.506 (U)	—	—	—	—	—	753 (J-)	—	—	—	—	—	—	—
RE52-10-9528	52-610958	2–3	Qbt 3	7630	—	—	346	—	—	2270	7.57	3.44	11.4	14.2	573 (J-)	—	—	1.04 (U)	—	—	—	—
RE52-10-9529	52-610958	3–4	Qbt 3	—	1.02 (U)	—	170	—	—	—	—	—	—	—	—	—	—	1.04 (U)	—	—	17.2	—
RE52-10-9530	52-610959	1–2	Soil	—	1.13 (U)	—	—	—	0.565 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 6.3-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Arsenic	Barium	Beryllium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Manganese	Mercury	Nickel	Selenium	Silver	Thallium	Vanadium	Zinc
Qbt2, 3, 4 BV[a]				**7340**	**0.5**	**2.79**	**46**	**1.21**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**482**	**0.1**	**6.58**	**0.3**	**1**	**1.1**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**8.17**	**295**	**1.83**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**671**	**0.1**	**15.4**	**1.52**	**1**	**0.73**	**39.6**	**48.8**
Construction Worker SSL[b]				**40700**	**124**	**65.4**	**4350**	**144**	**309**	**na**[c]	**449**	**34.6**[d]	**12400**	**800**	**463**	**92.9**[d]	**6190**	**1550**	**1550**	**20.4**	**1550**	**92900**
Industrial SSL[b]				**1130000**	**454**	**17.7**	**224000**	**2260**	**1120**	**na**	**2920**	**300**[e]	**45400**	**800**	**145000**	**310**[e]	**22700**	**5680**	**5680**	**74.9**	**5680**	**341000**
Residential SSL[b]				**78100**	**31.3**	**3.9**	**15600**	**156**	**77.9**	**na**	**219**	**23**	**3130**	**400**	**10700**	**23**[e]	**1560**	**391**	**391**	**5.16**	**391**	**23500**
RE52-10-9531	52-610959	2–3	Soil	—	—	—	—	—	0.586 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE52-10-9532	52-610959	3–4	Soil	—	1.15 (U)	—	—	—	0.573 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 6.3-3
Organic Chemicals Detected at AOC 04-004

Sample ID	Location ID	Depth (ft)	Media	Anthracene	Aroclor-1260	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	Pyrene
Construction Worker SSL[a]				**66800**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**8910**	**213**	**7150**	**6680**
Industrial SSL[a]				**183000**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**24400**	**23.4**	**20500**	**18300**
Residential SSL[a]				**17200**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**2290**	**6.21**	**1830**	**1720**
RE52-10-9518	52-610955	1–2	Qbt 3	—[c]	0.0019 (J)	—	—	—	—	—	—	—	—	—	—
RE52-10-9532	52-610959	3–4	Soil	0.015 (J)	—	0.0325 (J)	0.0276 (J)	0.0308 (J)	0.0176 (J)	0.0124 (J)	0.0231 (J)	0.0709	0.0148 (J)	0.0568	0.0652

Notes: Units are 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 6.3-4
Radionuclides Detected or Detected above BVs/FVs at AOC 04-004

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na[b]**	**0.09**
Soil BV[a]				**0.054**	**0.2**
Construction Worker SAL[c]				**36**	**43**
Industrial SAL[c]				**210**	**87**
Residential SAL[c]				**33**	**17**
0404-95-0084	04-02002	2–3	Soil	—[d]	—
0404-95-0087	04-02003	1–2	Soil	0.024	—
RE52-10-9515	52-610954	1–2	Soil	0.0363	—
RE52-10-9517	52-610954	3–4	Qbt 3	—	0.0999
RE52-10-9521	52-610956	1–2	Soil	0.0271	—
RE52-10-9532	52-610959	3–4	Soil	0.0252	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.2-1
Samples Collected and Analyses Requested at SWMU 46-002

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11915	46-611373	0–1	Soil	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11916	46-611373	1–2	Qbt 3	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11917	46-611373	6–7	Qbt 3	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11918	46-611374	0–1	Soil	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11919	46-611374	1.5–2.5	Soil	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11920	46-611374	6.5–7.5	Qbt 3	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11921	46-611375	0–1.5	Soil	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11922	46-611375	1.5–2.5	Soil	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11923	46-611375	6.5–7.5	Qbt 3	10-3224	10-3223	10-3223	10-3223	10-3224	10-3224	10-3224	10-3225	10-3225	10-3225	10-3225	10-3225
RE46-10-11924	46-611376	0–1	Soil	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318	10-2318
RE46-10-11925	46-611376	14–15	Qbt 3	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305
RE46-10-11926	46-611376	19–20	Qbt 3	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305	10-2305
RE46-10-11927	46-611377	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11928	46-611377	12–13	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11929	46-611377	17–18	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11930	46-611378	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11931	46-611378	12–13	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11932	46-611378	17–18	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11933	46-611379	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11934	46-611379	12–13	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11935	46-611379	17–18	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11936	46-611380	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11937	46-611380	1–2	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11938	46-611380	6–7	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11939	46-611381	0–0.5	Soil	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241
RE46-10-11940	46-611381	0.5–1.5	Soil	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241
RE46-10-11941	46-611381	5.5–6.5	Qbt 3	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241	10-3241
RE46-10-11942	46-611382	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11943	46-611382	3–4	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11944	46-611382	8–9	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11945	46-611383	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11946	46-611383	3–4	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11947	46-611383	8–9	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257

Table 7.2-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11948	46-611384	0–1	Soil	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11949	46-611384	3–4	Qbt 3	10-2256	10-2255	10-2255	10-2255	10-2256	10-2256	10-2256	10-2257	10-2257	10-2257	10-2257	10-2257
RE46-10-11950	46-611384	8–9	Qbt 3	10-2259	10-2258	10-2258	10-2258	10-2259	10-2259	10-2259	10-2259	10-2259	10-2259	10-2259	10-2259
RE46-10-11951	46-611385	0–1	Soil	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11952	46-611385	3–4	Qbt 3	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11953	46-611385	8–9	Qbt 3	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11954	46-611386	0–1	Soil	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462	10-1462
RE46-10-11955	46-611386	3–4	Qbt 3	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11956	46-611386	8–9	Qbt 3	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11958	46-611387	0–1	Soil	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11959	46-611387	6–7	Qbt 3	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11961	46-611388	0–1	Soil	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11962	46-611388	8–9	Qbt 3	10-2214	10-2213	10-2213	10-2213	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214	10-2214
RE46-10-11964	46-611389	0–1	Soil	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11965	46-611389	6–7	Qbt 3	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11986	46-611390	0–1	Soil	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505
RE46-10-11987	46-611390	1–2	Qbt 3	10-1506	10-1505	10-1505	10-1505	10-1506	10-1506	10-1506	10-1505	10-1505	10-1505	10-1505	10-1505

Table 7.2-2
Inorganic Chemicals Detected or Detected Above BVs at SWMU 46-002

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Cyanide	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**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**	**0.4**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**449[d]**	**12400**	**6190**	**800**	**92.9[e]**	**496000**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**1820000**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**125000**	**54.8**	**391**	**391**	**23500**
RE46-10-11915	46-611373	0–1	Soil	1.22 (U)	1.07 (U)	20.3	207	—[g]	34.1	3.83	3.51	—	—	15	181 (J-)
RE46-10-11916	46-611373	1–2	Qbt 3	1.05 (U)	—	—	38.8	—	—	0.461	3.96	—	1.09 (U)	1.99	—
RE46-10-11917	46-611373	6–7	Qbt 3	1.06 (U)	—	—	—	—	—	—	2.64	—	1.01 (U)	—	—
RE46-10-11918	46-611374	0–1	Soil	0.923 (U)	1.71 (U)	64.4	417	—	46.8	3.57	2.16	—	2.71	29.7	259 (J-)
RE46-10-11919	46-611374	1.5–2.5	Soil	1.1 (U)	0.551 (U)	—	27.6	—	—	0.251	1.51	—	—	1.6	—
RE46-10-11920	46-611374	6.5–7.5	Qbt 3	1.07 (U)	—	13.5	27.3	—	—	0.248	1.51	—	1.03 (U)	2.04	—
RE46-10-11921	46-611375	0–1.5	Soil	1.66 (U)	1.58 (U)	30.2	304	0.755 (J-)	38.6	3.1	4.64	—	—	24.4	220 (J-)
RE46-10-11922	46-611375	1.5–2.5	Soil	1.11 (U)	—	—	17.4	—	—	0.226	2.07	—	—	4.44	—
RE46-10-11923	46-611375	6.5–7.5	Qbt 3	1.05 (U)	—	—	9.76	—	—	—	1.32	—	1.06 (U)	—	—
RE46-10-11924	46-611376	0–1	Soil	1.15 (UJ)	0.575 (U)	—	—	—	—	—	1.55	—	—	—	—
RE46-10-11925	46-611376	14–15	Qbt 3	0.986 (U)	—	—	—	—	—	—	1.2 (J-)	—	1 (U)	—	—
RE46-10-11926	46-611376	19–20	Qbt 3	0.957 (U)	—	—	—	—	—	—	1.48 (J-)	—	1.01 (U)	—	—
RE46-10-11927	46-611377	0–1	Soil	1.17 (U)	0.587 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11928	46-611377	12–13	Qbt 3	1.01 (U)	—	—	—	—	—	—	—	—	1.02 (U)	—	—
RE46-10-11929	46-611377	17–18	Qbt 3	0.978 (U)	—	—	—	—	—	—	—	—	1.04 (U)	—	—
RE46-10-11930	46-611378	0–1	Soil	—	0.533 (U)	—	—	—	—	—	1.45	—	—	—	—
RE46-10-11931	46-611378	12–13	Qbt 3	—	—	—	—	—	—	—	—	—	1.02 (U)	—	—
RE46-10-11932	46-611378	17–18	Qbt 3	—	—	—	—	—	—	—	—	—	1.01 (U)	—	—
RE46-10-11933	46-611379	0–1	Soil	—	0.519 (U)	—	—	—	—	—	1.38	—	—	—	—
RE46-10-11934	46-611379	12–13	Qbt 3	1.01 (U)	—	—	—	—	—	—	—	—	0.951 (U)	—	—
RE46-10-11935	46-611379	17–18	Qbt 3	—	—	—	—	—	—	—	—	0.000741 (J)	1.03 (U)	—	—
RE46-10-11936	46-611380	0–1	Soil	—	—	—	—	—	—	—	1.54	—	—	—	—
RE46-10-11937	46-611380	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	0.989 (U)	—	—
RE46-10-11938	46-611380	6–7	Qbt 3	0.6 (U)	—	—	—	—	—	—	—	—	0.908 (U)	—	—
RE46-10-11939	46-611381	0–0.5	Soil	0.916 (U)	0.458 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11940	46-611381	0.5–1.5	Soil	1.02 (U)	0.51 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11941	46-611381	5.5–6.5	Qbt 3	1.04 (U)	—	—	—	—	—	—	—	—	1.03 (U)	—	—

Table 7.2-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Cyanide	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**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**	**0.4**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**449[d]**	**12400**	**6190**	**800**	**92.9[e]**	**496000**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**1820000**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**125000**	**54.8**	**391**	**391**	**23500**
RE46-10-11942	46-611382	0–1	Soil	1.09 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11943	46-611382	3–4	Soil	1.05 (U)	0.524 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11944	46-611382	8–9	Qbt 3	1.03 (U)	—	—	—	—	—	—	1.03	—	1.03 (U)	—	—
RE46-10-11945	46-611383	0–1	Soil	—	0.532 (U)	—	—	—	—	—	1.2	—	—	—	50.7
RE46-10-11946	46-611383	3–4	Qbt 3	—	—	—	—	—	—	—	1.12	—	0.993 (U)	—	—
RE46-10-11947	46-611383	8–9	Qbt 3	0.984 (U)	—	—	—	—	—	—	—	—	1.04 (U)	—	—
RE46-10-11949	46-611384	3–4	Qbt 3	0.995 (U)	—	—	—	—	—	—	—	—	1.06 (U)	—	—
RE46-10-11950	46-611384	8–9	Qbt 3	0.993 (U)	—	—	—	—	—	—	1.47	—	1.02 (U)	—	—
RE46-10-11951	46-611385	0–1	Soil	1.04 (U)	0.522 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11952	46-611385	3–4	Qbt 3	1.1 (U)	—	—	—	—	—	—	—	—	1.08 (U)	—	—
RE46-10-11953	46-611385	8–9	Qbt 3	1.04 (U)	—	—	—	—	—	—	—	—	0.542 (U)	—	—
RE46-10-11954	46-611386	0–1	Soil	—	0.546 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11955	46-611386	3–4	Qbt 3	1.02 (U)	—	—	—	—	—	—	—	—	1.02 (U)	—	—
RE46-10-11956	46-611386	8–9	Qbt 3	0.996 (U)	—	—	—	—	—	—	—	—	0.623 (U)	—	—
RE46-10-11958	46-611387	0–1	Soil	1.06 (U)	0.529 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11959	46-611387	6–7	Qbt 3	1.03 (U)	—	—	—	—	—	—	—	—	1 (U)	—	—
RE46-10-11961	46-611388	0–1	Soil	1.05 (U)	0.527 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11962	46-611388	8–9	Qbt 3	0.972 (U)	—	—	—	—	—	—	1.34	—	0.965 (U)	—	—
RE46-10-11964	46-611389	0–1	Soil	1.11 (U)	0.555 (U)	—	—	—	—	—	1.77	—	—	—	—
RE46-10-11965	46-611389	6–7	Qbt 3	1.08 (U)	—	—	—	—	—	—	—	—	1.06 (U)	—	—
RE46-10-11986	46-611390	0–1	Soil	1.1 (U)	0.552 (U)	—	—	—	—	—	3.61	0.000761 (J)	—	—	—
RE46-10-11987	46-611390	1–2	Qbt 3	1.04 (U)	—	—	—	—	—	—	2.28	0.000682 (J)	1.01 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.2-3
Organic Chemicals Detected at SWMU 46-002

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1248	Aroclor-1254	Aroclor-1260	Benzo(b)fluoranthene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Ethylbenzene	Fluoranthene	Hexanone[2-]	Iodomethane	Isopropyltoluene[4-]	Phenanthrene	Pyrene	Toluene	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**263000**	**7.58**	**4.36**	**7.58**	**213**	**952000**[b]	**4760**	**20600**	**6630**	**8910**	**148000**[c]	**na**[d]	**10300**[e]	**7150**	**6680**	**21100**	**27500**	**3130**[f]
Industrial SSL[a]				**851000**	**8.26**	**8.26**	**8.26**	**23.4**	**2500000**[g]	**1370**	**2340**	**385**	**24400**	**1400**[g]	**na**	**14900**[e]	**20500**	**18300**	**57900**	**31500**	**3610**[f]
Residential SSL[a]				**67500**	**2.22**	**1.12**	**2.22**	**6.21**	**240000**[g]	**347**	**621**	**69.7**	**2290**	**210**[g]	**na**	**3210**[e]	**1830**	**1720**	**5570**	**9550**	**1090**[f]
RE46-10-11915	46-611373	0–1	Soil	—[h]	—	0.329	0.175	—	—	—	—	0.00133	—	—	—	—	—	—	0.00266	0.000561 (J)	0.00281
RE46-10-11916	46-611373	1–2	Qbt 3	—	—	0.0506	0.0285	0.0189 (J)	—	—	0.0165 (J)	0.000402 (J)	0.0293 (J)	—	—	—	0.0228 (J)	0.0293 (J)	0.000591 (J)	—	0.000881 (J)
RE46-10-11917	46-611373	6–7	Qbt 3	—	—	0.0041	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11918	46-611374	0–1	Soil	—	—	0.326	0.185	0.197 (J)	—	0.889 (J)	0.165 (J)	0.000508 (J)	0.285 (J)	—	—	—	0.186 (J)	0.254 (J)	0.00136	—	0.0012 (J)
RE46-10-11919	46-611374	1.5–2.5	Soil	—	—	0.0104	0.0063	—	—	—	—	—	—	—	—	—	—	—	0.000505 (J)	—	—
RE46-10-11920	46-611374	6.5–7.5	Qbt 3	—	—	0.0103	0.0067	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11921	46-611375	0–1.5	Soil	—	0.261	0.208	0.117	—	2.53 (J)	1.43 (J)	—	0.000524 (J)	0.17 (J)	—	0.00238 (J)	—	—	0.151 (J)	0.000824 (J)	—	0.00135 (J)
RE46-10-11922	46-611375	1.5–2.5	Soil	—	—	0.0789	0.0418	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000467 (J)
RE46-10-11923	46-611375	6.5–7.5	Qbt 3	—	—	0.0134	0.0079	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11925	46-611376	14–15	Qbt 3	0.00459 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11926	46-611376	19–20	Qbt 3	0.00431 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11927	46-611377	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.000948 (J)	—	—	—	—	—
RE46-10-11936	46-611380	0–1	Soil	—	—	—	—	—	—	—	—	—	0.0176 (J)	—	—	—	—	0.0156 (J)	—	—	—
RE46-10-11951	46-611385	0–1	Soil	—	—	0.0036	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11953	46-611385	8–9	Qbt 3	0.00208 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11965	46-611389	6–7	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.00179 (J)	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[c] Butanone [2-] is used as a surrogate based onstructural similarity.

[d] na = Not available.

[e] Isopropylbenzene used as surrogate based on structural similarity.

[f] Xylene used as surrogate based on structural similarity.

[g] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[h] — = Not detected.

Table 7.2-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-002

Sample ID	Location ID	Depth (ft)	Media	Uranium-238
Soil BV[a]				**2.29**
Construction Worker SAL[b]				**160**
Industrial SAL[b]				**430**
Residential SAL[b]				**87**
RE46-10-11918	46-611374	0–1	Soil	2.73

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.3-1
Samples Collected and Analyses Requested at SWMU 46-003(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11515	46-611268	3.5–4.5	Soil	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242
RE46-10-11516	46-611268	8.5–9.5	Soil	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242	10-3242
RE46-10-11517	46-611269	9–10	Qbt 3	10-3192	10-3191	10-3191	10-3191	10-3192	10-3192	10-3192	10-3192	10-3192	10-3192	10-3192
RE46-10-11518	46-611269	14–15	Qbt3	10-3192	10-3191	10-3191	10-3191	10-3192	10-3192	10-3192	10-3192	10-3192	10-3192	10-3192
RE46-10-11519	46-611270	10–11	Soil	10-3096	10-3095	10-3095	10-3095	10-3096	10-3096	10-3096	10-3095	10-3095	10-3095	10-3095
RE46-10-11520	46-611270	15–16	Qbt 3	10-3096	10-3095	10-3095	10-3095	10-3096	10-3096	10-3096	10-3095	10-3095	10-3095	10-3095
RE46-10-11521	46-611271	9.5–10.5	Soil	10-3096	10-3095	10-3095	10-3095	10-3096	10-3096	10-3096	10-3095	10-3095	10-3095	10-3095
RE46-10-11522	46-611271	14.5–15.5	Qbt 3	10-3096	10-3095	10-3095	10-3095	10-3096	10-3096	10-3096	10-3095	10-3095	10-3095	10-3095

Table 7.3-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cyanide	Manganese	Nitrate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**0.5**	**482**	**na**[b]	**0.3**
Soil BV[a]				**0.83**	**0.4**	**0.5**	**671**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**6190**	**463**	**496000**	**1550**
Industrial SSL[c]				**454**	**1120**	**22700**	**145000**	**1820000**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**1560**	**10700**	**125000**	**391**
RE46-10-11515	46-611268	3.5–4.5	Soil	1.09 (U)	0.545 (U)	—[d]	—	1.7	—
RE46-10-11516	46-611268	8.5–9.5	Soil	1.07 (U)	—	—	852 (J)	2.01	—
RE46-10-11517	46-611269	9–10	Qbt 3	0.53 (U)	—	0.53 (U)	—	63.4	2.3 (J+)
RE46-10-11518	46-611269	14–15	Qbt3	0.52 (U)	—	0.52 (U)	—	10.5	2.3 (J+)
RE46-10-11519	46-611270	10–11	Soil	1.1 (U)	0.549 (U)	—	—	4.12	—
RE46-10-11520	46-611270	15–16	Qbt 3	1.02 (U)	—	—	—	2.66	1.06 (U)
RE46-10-11521	46-611271	9.5–10.5	Soil	—	0.589 (U)	—	—	3.06	—
RE46-10-11522	46-611271	14.5–15.5	Qbt 3	1.02 (U)	—	—	—	6.58	1.07 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070).
[d] — = Not detected or not detected above BV.

Table 7.3-3
Organic Chemicals Detected at SWMU 46-003(a)

Sample ID	Location ID	Depth (ft)	Media	Methylene Chloride
Construction Worker SSL*				**10600**
Industrial SSL*				**1090**
Residential SSL*				**199**
RE46-10-11517	46-611269	9–10	Qbt 3	0.0048 (J)
RE46-10-11518	46-611269	14–15	Qbt 3	0.0057

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED (2009,108070).

Table 7.4-1
Samples Collected and Analyses Requested at SWMU 46-003(b)

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

Table 7.4-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Nitrate	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**2200**	**na**[b]	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**6120**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**na**	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**1120**	**na**	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**na**	**125000**	**54.8**	**391**
RE46-10-13420	46-611590	5–6	Soil	0.994 (U)	0.497 (U)	—[d]	—	0.000957 (J-)	—
RE46-10-13421	46-611590	10–11	Qbt 3	0.994 (U)	—	3790 (J-)	—	0.000823 (J)	1 (U)
RE46-10-13424	46-611592	3.5–4.5	Soil	1.03 (U)	0.515 (U)	—	1.21 (J-)	0.00174 (J)	—
RE46-10-13425	46-611592	8.5–9.5	Qbt 3	0.984 (U)	—	—	—	—	0.995 (U)
RE46-10-13428	46-611594	1.5–2.5	Soil	1.03 (U)	0.515 (U)	—	—	0.000902 (J)	—
RE46-10-13429	46-611594	6.5–7.5	Qbt 3	1.03 (U)	—	—	—	0.00113 (J)	1.02 (U)
RE46-10-13430	46-611595	0–1	Soil	1.08 (U)	0.542 (U)	—	—	—	—
RE46-10-13431	46-611595	5–6	Qbt 3	1.04 (U)	—	—	—	0.000591 (J)	1.05 (U)
RE46-10-13432	46-611596	5–6	Soil	1.03 (U)	0.513 (U)	—	—	0.000712 (J)	—
RE46-10-13433	46-611596	10–11	Qbt 3	0.987 (U)	—	—	—	—	0.996 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070).
[d] — = Not detected or not detected above BV.

Table 7.4-3
Organic Chemicals Detected at SWMU 46-003(b)

Sample ID	Location ID	Depth (ft)	Media	Benzo(k)fluoranthene	Chrysene	Hexanone[2-]
Construction Worker SSL[a]				**2060**	**20600**	**148000**[b]
Industrial SSL[a]				**234**	**2340**	**1400**[c]
Residential SSL[a]				**62.1**	**621**	**210**[c]
RE46-10-13425	46-611592	8.5–9.5	Qbt 3	—[d]	0.0191 (J)	—
RE46-10-13428	46-611594	1.5–2.5	Soil	—	0.0109 (J)	—
RE46-10-13429	46-611594	6.5–7.5	Qbt 3	—	—	0.0128 (J)
RE46-10-13430	46-611595	0–1	Soil	0.0121 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070) unless otherwise noted.
[b] Butanone[2-] used as a surrogate based on structural similarity.
[c] SSLs from http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/Generic_Tables/pdf/master_sl_table_run_MAY2010.pdf.
[d] — = Not detected.

Table 7.5-1
Samples Collected and Analyses Requested at SWMU 46-003(c)

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

Table 7.5-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Cobalt	Copper	Lead	Nitrate	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**3.14**	**4.66**	**11.2**	**na[b]**	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**8.64**	**14.7**	**22.3**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**449[d]**	**34.6[e]**	**12400**	**800**	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**300[f]**	**45400**	**800**	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**23[f]**	**3130**	**400**	**125000**	**54.8**	**391**
RE46-10-11481	46-611255	7–8	Soil	1.13 (U)	0.563 (U)	—[g]	—	—	—	1.54	—	—
RE46-10-11482	46-611255	11.5–12.5	Qbt 3	—	—	31.5	—	—	—	1.39	—	1.01 (U)
RE46-10-11485	46-611257	9–10	Soil	1.03 (U)	0.516 (U)	—	—	—	—	2.22	—	—
RE46-10-11486	46-611257	10–11	Qbt 3	1.08 (U)	—	—	—	—	—	1.93	—	1.09 (U)
RE46-10-11489	46-611259	5–6	Soil	1.13 (U)	0.564 (U)	—	—	—	—	1.53	—	—
RE46-10-11490	46-611259	10–11	Qbt 3	1.11 (U)	—	—	—	—	—	—	—	1.11 (U)
RE46-10-11491	46-611260	4.5–5.5	Soil	0.977 (U)	0.488 (U)	—	—	—	—	3.1 (J-)	—	—
RE46-10-11492	46-611260	9.5–10.5	Qbt 3	1.05 (U)	—	—	—	—	—	2.04 (J-)	—	1 (UJ)
RE46-10-11493	46-611261	2–3	Soil	0.949 (U)	0.475 (U)	—	—	—	—	40.8 (J-)	0.000606 (J)	—
RE46-10-11494	46-611261	7–8	Qbt 3	0.594 (U)	—	—	—	—	12.6	1.78 (J-)	—	1.07 (UJ)
RE46-10-11495	46-611262	0.3–1.3	Soil	—	0.521 (U)	—	—	—	—	—	—	—
RE46-10-11496	46-611262	5.3–6.3	Qbt 3	5.69	2.03	13.2 (J)	3.88 (J)	7.06 (J)	11.3	—	—	1.02 (UJ)
RE46-10-11497	46-611263	3–4	Soil	—	0.486 (U)	—	—	—	—	86.4 (J-)	0.00253	—
RE46-10-11498	46-611263	8–9	Qbt 3	—	—	—	—	—	12.8	—	—	1.02 (UJ)
RE46-10-11499	46-611264	3–4	Soil	—	0.511 (U)	—	—	—	—	5.53 (J-)	0.00162 (J)	—
RE46-10-11500	46-611264	8–9	Qbt 3	0.964 (U)	—	—	—	—	—	—	—	0.949 (UJ)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.5-3
Organic Chemicals Detected at SWMU 46-003(c)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1260	Fluoranthene
Construction Worker SSL[a]				**7.58**	**8910**
Industrial SSL[a]				**8.26**	**24400**
Residential SSL[a]				**2.22**	**2290**
RE46-10-11482	46-611255	11.5–12.5	Qbt 3	0.0016 (J)	0.0153 (J)
RE46-10-11498	46-611263	8–9	Qbt 3	0.0016 (J)	—[b]

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070).
[b] — = Not detected.

Table 7.5-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-003(c)

Sample ID	Location ID	Depth (ft)	Media	Uranium-235/236
Qbt2, 3, 4 BV[a]				**0.09**
Construction Worker SAL[b]				**43**
Industrial SAL[b]				**87**
Residential SAL[b]				**17**
RE46-10-11486	46-611257	10–11	Qbt 3	0.151

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.6-1
Samples Collected and Analyses Requested at SWMU 46-003(d)

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

Table 7.6-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Lead	Mercury	Nickel	Nitrate	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**11.2**	**0.1**	**6.58**	**na[b]**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**800**	**92.9[e]**	**6190**	**496000**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**800**	**310[f]**	**22700**	**1820000**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**400**	**23[f]**	**1560**	**125000**	**54.8**	**391**	**23500**
RE46-10-13434	46-611597	4–5	Soil	1.14 (U)	—[g]	0.569 (U)	—	—	—	—	—	—	1.43	—	—	—
RE46-10-13435	46-611597	9–10	Qbt 3	1.2 (U)	52.1	—	2290	—	16.7	—	—	—	2.68	—	1.13 (U)	65 (J-)
RE46-10-13436	46-611598	7–8	Qbt 3	1.19 (U)	—	—	—	—	26.7	17.6	0.11	8.13	2.87	—	1.05 (U)	73.3 (J-)
RE46-10-13437	46-611598	12–13	Qbt 3	1.21 (U)	—	—	—	—	18.2	—	—	—	2.12	—	1.21 (U)	106 (J-)
RE46-10-13438	46-611599	4–5	Soil	1.19 (U)	—	0.594 (U)	—	—	—	—	—	—	1.43	—	—	—
RE46-10-13439	46-611599	9–10	Qbt 3	1.11 (U)	—	—	—	—	7.79	—	0.171	—	2.01	—	1.1 (U)	—
RE46-10-13440	46-611600	4–5	Soil	1.11 (U)	—	0.553 (U)	—	—	—	—	—	—	1.41	0.00105 (J)	—	—
RE46-10-13441	46-611600	9–10	Qbt 3	1.07 (U)	—	—	—	—	—	—	—	—	1.84	—	1.05 (U)	—
RE46-10-13442	46-611601	4–5	Qbt 3	1.06 (U)	—	—	—	—	—	—	—	—	—	—	1.17 (U)	—
RE46-10-13443	46-611601	9–10	Qbt 3	0.728 (U)	—	—	—	13.6 (J)	—	—	—	—	1.54	—	1.12 (U)	—
RE46-10-13444	46-611602	4–5	Qbt 3	1.17 (U)	—	—	—	—	—	—	—	—	1.33	—	1.07 (U)	—
RE46-10-13445	46-611602	9–10	Qbt 3	1.1 (U)	—	—	—	—	—	—	—	—	1.24	—	1.09 (U)	—
RE46-10-13446	46-611603	4–5	Qbt 3	1.14 (U)	—	—	—	—	—	—	—	—	—	—	1.07 (U)	—
RE46-10-13447	46-611603	9–10	Qbt 3	1.17 (U)	—	—	—	—	—	—	—	—	—	—	1.1 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.6-3
Organic Chemicals Detected at SWMU 46-003(d)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzoic Acid	Bis(2-ethylhexyl)phthalate	Chrysene	Dichlorobenzene[1,4-]	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Tetrachloroethene	Trichloroethene
Construction Worker SSL[a]				**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**952000**[c]	**4760**	**20600**	**3780**	**8910**	**213**	**7150**	**6680**	**338**	**4600**
Industrial SSL[a]				**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2500000**[d]	**1370**	**2340**	**180**	**24400**	**23.4**	**20500**	**18300**	**36.4**	**253**
Residential SSL[a]				**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**240000**[d]	**347**	**621**	**32.2**	**2290**	**6.21**	**1830**	**1720**	**6.99**	**45.7**
RE46-10-13434	46-611597	4–5	Soil	0.0954 (J)	—[e]	0.0051	0.0091	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13435	46-611597	9–10	Qbt 3	—	0.0125 (J)	0.0257	0.0168	—	0.063	0.116	0.0326 (J)	—	—	0.0664	0.00189	0.0911	0.0288 (J)	0.032 (J)	0.0774	—	—
RE46-10-13436	46-611598	7–8	Qbt 3	0.125 (J)	0.025 (J)	0.23	0.129	—	0.0381 (J)	0.0936	0.0269 (J)	—	0.16 (J)	0.0586	0.000937 (J)	0.0638	0.0244 (J)	0.0457	0.0466	0.000817 (J)	0.00139
RE46-10-13437	46-611598	12–13	Qbt 3	—	0.0154 (J)	0.0279	0.0164	—	—	0.0881	—	—	—	—	—	0.0846	—	0.0403 (J)	0.0634	—	—
RE46-10-13438	46-611599	4–5	Soil	—	—	0.0236	0.0115	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13439	46-611599	9–10	Qbt 3	0.0138 (J)	—	0.0647	0.0403	—	—	—	—	—	—	—	0.000619 (J)	—	—	—	—	—	0.000654 (J)
RE46-10-13440	46-611600	4–5	Soil	—	0.0121 (J)	—	—	0.0229 (J)	0.0153 (J)	0.0249 (J)	—	—	—	0.0195 (J)	—	0.0474	—	0.0354 (J)	0.0363 (J)	—	—
RE46-10-13444	46-611602	4–5	Qbt 3	—	—	0.12	0.0411	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13445	46-611602	9–10	Qbt 3	—	—	0.0045	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13446	46-611603	4–5	Qbt 3	—	—	—	—	—	—	—	—	1.04	—	—	—	—	—	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

Table 7.6-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-003(d)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Thorium-230	Uranium-234	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**1.98**	**1.98**	**0.09**
Soil BV[a]				**0.013**	**2.29**	**2.59**	**0.2**
Construction Worker SAL[c]				**34**	**5**	**220**	**43**
Industrial SAL[c]				**180**	**5**	**1500**	**87**
Residential SAL[c]				**30**	**5**	**170**	**17**
RE46-10-13434	46-611597	4–5	Soil	—[d]	2.74	—	—
RE46-10-13435	46-611597	9–10	Qbt 3	—	—	—	0.11
RE46-10-13436	46-611598	7–8	Qbt 3	—	2.26	—	0.346
RE46-10-13437	46-611598	12–13	Qbt 3	0.0619	—	3.54	0.177
RE46-10-13439	46-611599	9–10	Qbt 3	0.0755	—	—	0.107
RE46-10-13441	46-611600	9–10	Qbt 3	—	—	—	0.124
RE46-10-13444	46-611602	4–5	Qbt 3	—	—	—	0.0946

Note: All activities are in pCi/g.

[a] BVs are 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 7.7-1
Samples Collected and Analyses Requested at SWMU 46-003(e)

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

Table 7.7-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Lead	Mercury	Nitrate	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**11.2**	**0.1**	**na[b]**	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**22.3**	**0.1**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**800**	**92.9[d]**	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**1120**	**800**	**310[e]**	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**400**	**23[e]**	**125000**	**54.8**	**391**
RE46-10-13448	46-611604	3–4	Soil	1.04 (U)	0.52 (U)	101	0.345	1.25 (J-)	0.000647 (J)	—[f]
RE46-10-13449	46-611604	8–9	Qbt 3	1.03 (U)	—	—	—	—	0.00151 (J)	0.911 (U)
RE46-10-13466	46-611605	8–9	Qbt 3	0.99 (U)	—	15.3	—	—	0.00062 (J)	0.983 (U)
RE46-10-13467	46-611605	13–14	Qbt 3	1.07 (U)	—	—	—	—	—	1.05 (U)
RE46-10-13468	46-611606	3–4	Soil	1.05 (U)	0.527 (U)	—	0.222	3.58 (J-)	0.00358	—
RE46-10-13469	46-611606	15–16	Qbt 3	1 (U)	—	12.6	—	—	—	0.988 (U)
RE46-10-13470	46-611607	2–3	Qbt 3	1.18 (U)	—	—	11.2	—	—	1.09 (U)
RE46-10-13471	46-611607	7–8	Qbt 3	1.26 (U)	—	—	2.09	—	—	1.16 (U)
RE46-10-13472	46-611608	6–7	Soil	1.02 (U)	0.512 (U)	—	—	—	—	—
RE46-10-13473	46-611608	11–12	Qbt 3	1.01 (U)	—	—	—	—	0.00143 (J)	1 (U)
RE46-10-13474	46-611609	0–1	Soil	1.13 (U)	0.563 (U)	25.3	—	1.33	—	—
RE46-10-13475	46-611609	5–6	Qbt 3	1.19 (U)	—	12.7	—	1.37	—	1.14 (U)
RE46-10-13476	46-611610	4–5	Soil	1.03 (U)	0.515 (U)	—	—	—	0.000675 (J)	—
RE46-10-13477	46-611610	9–10	Qbt 3	1.02 (U)	—	—	—	—	—	1.03 (U)
RE46-10-13478	46-611611	4–5	Qbt 3	1.01 (U)	—	12.4	—	1.24 (J-)	—	1 (U)
RE46-10-13479	46-611611	9–10	Qbt 3	1 (U)	—	15.7	—	1.27 (J-)	—	0.985 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.7-3
Organic Chemicals Detected at SWMU 46-003(e)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	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	Chrysene	Di-n-butylphthalate	Fluoranthene	Phenanthrene	Pyrene
Construction Worker SSL[a]				**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**952000**[c]	**4760**	**20600**	**23800**	**8910**	**7150**	**6680**
Industrial SSL[a]				**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2500000**[d]	**1370**	**2340**	**68400**	**24400**	**20500**	**18300**
Residential SSL[a]				**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**240000**[d]	**347**	**621**	**6110**	**2290**	**1830**	**1720**
RE46-10-13448	46-611604	3–4	Soil	—[e]	—	0.103	0.0467	—	—	—	—	—	4.66 (J)	0.833 (J)	—	—	—	—	—
RE46-10-13449	46-611604	8–9	Qbt 3	—	—	0.0027 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13466	46-611605	8–9	Qbt 3	0.00634 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13467	46-611605	13–14	Qbt 3	0.0104 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13468	46-611606	3–4	Soil	—	0.00958 (J)	0.0248	0.0156	0.0262 (J)	0.0165 (J)	0.0324 (J)	0.0116 (J)	—	—	—	0.0223 (J)	—	0.0557	0.0383	0.0402
RE46-10-13469	46-611606	15–16	Qbt 3	—	—	0.0052	0.0023 (J)	—	—	—	0.0108 (J)	—	—	—	—	—	—	—	—
RE46-10-13470	46-611607	2–3	Qbt 3	—	—	0.0021 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13473	46-611608	11–12	Qbt 3	—	0.0102 (J)	0.0407	0.0221	—	—	—	—	0.0102 (J)	—	0.254 (J)	—	0.28 (J)	0.0151 (J)	—	0.0103 (J)
RE46-10-13478	46-611611	4–5	Qbt 3	0.00176 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13479	46-611611	9–10	Qbt 3	—	—	0.0032 (J)	0.0017 (J)	—	—	—	—	—	—	0.115 (J)	—	0.113 (J)	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.
[e] — = Not detected.

Table 7.7-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-003(e)

Sample ID	Location ID	Depth (ft)	Media	Uranium-235/236
Qbt2, 3, 4 BV[a]				**0.09**
Construction Worker SAL[b]				**43**
Industrial SAL[b]				**87**
Residential SAL[b]				**17**
RE46-10-13467	46-611605	13–14	Qbt 3	0.105

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.8-1
Samples Collected and Analyses Requested at SWMU 46-003(f)

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

Table 7.8-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Lead	Mercury	Nitrate	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**11.2**	**0.1**	**na[b]**	**na**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**22.3**	**0.1**	**na**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**800**	**92.9[d]**	**496000**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**800**	**310[e]**	**1820000**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**400**	**23[e]**	**125000**	**54.8**	**391**	**391**	**23500**
RE46-10-11875	46-611359	3–4	Soil	1.09 (U)	—[f]	0.545 (U)	—	—	1.58	0.00206 (J)	—	—	—
RE46-10-11876	46-611359	5–6	Qbt 3	—	—	—	—	—	—	0.000688 (J)	0.997 (U)	—	—
RE46-10-11877	46-611360	8–9	Soil	1.13 (U)	—	0.566 (U)	—	—	1.87	—	—	2.83 (U)	—
RE46-10-11878	46-611360	13–14	Soil	1.11 (U)	—	0.555 (U)	—	—	4.78	—	—	—	—
RE46-10-11879	46-611361	12–13	Qbt 3	1.09 (U)	49.4 (J)	—	11.2 (J)	—	1.72	—	1.09 (U)	—	—
RE46-10-11880	46-611361	17–18	Qbt 3	1.05 (U)	—	—	—	—	1.68	—	1.05 (U)	—	—
RE46-10-11881	46-611362	11–12	Soil	—	—	0.526 (U)	—	0.237	1.99	—	—	—	—
RE46-10-11882	46-611362	16–17	Qbt 3	1.04 (U)	—	—	—	—	1.18	—	1.06 (U)	—	—
RE46-10-11883	46-611363	5–6	Qbt 3	0.995 (U)	—	—	—	—	—	—	0.974 (U)	—	—
RE46-10-11884	46-611363	10–11	Qbt 3	0.993 (U)	—	—	—	—	—	—	0.942 (U)	—	—
RE46-10-11885	46-611364	3–4	Soil	1.02 (U)	—	0.512 (U)	—	—	—	—	—	—	—
RE46-10-11886	46-611364	8.5–9.5	Qbt 3	1.01 (U)	—	—	43.1	—	—	—	1.04 (U)	—	77.2
RE46-10-11887	46-611365	5–6	Soil	0.942 (U)	—	0.471 (U)	—	—	—	0.000554 (J)	—	—	—
RE46-10-11888	46-611365	10–11	Qbt 3	0.975 (U)	—	—	—	—	—	—	0.964 (U)	—	—
RE46-10-11889	46-611366	5–6	Qbt 3	0.964 (U)	—	—	—	—	1.3 (J-)	—	0.988 (U)	—	—
RE46-10-11890	46-611366	10–11	Qbt 3	0.931 (U)	—	—	—	—	—	—	0.974 (U)	—	—
RE46-10-11891	46-611367	0–1	Soil	1.03 (U)	—	0.513 (U)	—	—	—	—	—	—	—
RE46-10-11892	46-611367	1–2	Soil	1.06 (U)	—	0.53 (U)	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] na = Not available.

[d] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.8-3
Organic Chemicals Detected at SWMU 46-003(f)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1254	Aroclor-1260	Fluoranthene	Isopropyltoluene[4-]	Pyrene	Toluene
Construction Worker SSL[a]				**263000**	**4.36**	**7.58**	**8910**	**10300[b]**	**6680**	**21100**
Industrial SSL[a]				**851000**	**8.26**	**8.26**	**24400**	**14900[b]**	**18300**	**57900**
Residential SSL[a]				**67500**	**1.12**	**2.22**	**2290**	**3210[b]**	**1720**	**5570**
RE46-10-11877	46-611360	8–9	Soil	—[c]	0.002 (J)	—	—	—	—	—
RE46-10-11878	46-611360	13–14	Soil	—	0.0193	—	—	—	—	—
RE46-10-11879	46-611361	12–13	Qbt 3	—	0.0044	0.0016 (J)	—	—	—	—
RE46-10-11880	46-611361	17–18	Qbt 3	—	0.0349	0.0118	—	—	—	—
RE46-10-11881	46-611362	11–12	Soil	—	0.031	0.017	0.0178 (J)	—	0.017 (J)	—
RE46-10-11882	46-611362	16–17	Qbt 3	—	0.0031 (J)	—	—	—	—	—
RE46-10-11886	46-611364	8.5–9.5	Qbt 3	0.00786 (J)	0.0016 (J)	—	—	—	—	—
RE46-10-11887	46-611365	5–6	Soil	—	0.0031 (J)	0.002 (J)	—	—	—	—
RE46-10-11889	46-611366	5–6	Qbt 3	—	0.0067	0.0042	—	—	—	—
RE46-10-11891	46-611367	0–1	Soil	—	0.0027 (J)	0.002 (J)	—	—	—	—
RE46-10-11892	46-611367	1–2	Soil	0.0236	0.0034 (J)	0.0034 (J)	—	0.00885	—	0.00111

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070).

[b] Isopropylbenzene used as surrogate based on structural similarity.

[c] — = Not detected.

Table 7.8-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-003(f)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**0.09**
Soil BV[a]				**1.65**	**0.2**
Construction Worker SAL[c]				**18**	**43**
Industrial SAL[c]				**23**	**87**
Residential SAL[c]				**5.6**	**17**
RE46-10-11877	46-611360	8–9	Soil	0.0951	—[d]
RE46-10-11882	46-611362	16–17	Qbt 3	—	0.123
RE46-10-11888	46-611365	10–11	Qbt 3	—	0.109
RE46-10-11890	46-611366	10–11	Qbt 3	—	0.0929

Note: All activities are in pCi/g.
[a] BVs are 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 7.9-1
Samples Collected and Analyses Requested at SWMU 46-003(g)

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

Table 7.9-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-003(g)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Nitrate	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**na[b]**	**na**	**0.3**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**800**	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**800**	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**400**	**125000**	**54.8**	**391**
RE46-10-13507	46-611612	4–5	Soil	1.09 (U)	—[g]	—	—	—	—	—	27.8 (J)	1.8 (J-)	0.000973 (J)	—
RE46-10-13508	46-611612	17–18	Qbt 3	1.03 (U)	—	—	—	—	9.99	15	—	2.75	—	1.05 (U)
RE46-10-13509	46-611613	4–5	Soil	1.07 (UJ)	—	0.536 (U)	—	—	—	—	—	1.54	—	—
RE46-10-13510	46-611613	9–10	Qbt 3	1.21 (UJ)	—	—	—	—	—	—	—	—	—	1.21 (U)
RE46-10-13511	46-611614	10–11	Qbt 3	1.07 (UJ)	61.6	—	—	—	3.45	6.15	—	—	0.000614 (J)	1.07 (U)
RE46-10-13512	46-611614	15–16	Qbt 3	0.98 (UJ)	—	—	—	—	—	—	—	—	—	0.991 (U)
RE46-10-13513	46-611615	4–5	Soil	1 (UJ)	—	0.5 (U)	—	—	—	—	—	—	0.00126 (J)	—
RE46-10-13514	46-611615	9–10	Qbt 3	1.01 (UJ)	—	—	—	—	—	—	—	—	—	0.978 (U)
RE46-10-13515	46-611616	6–7	Soil	1.06 (U)	—	—	13900	—	—	—	—	2.7	0.000895 (J)	—
RE46-10-13516	46-611616	11–12	Qbt 3	—	—	—	—	—	—	—	—	1.28	—	1.09 (U)
RE46-10-13517	46-611617	6–7	Qbt 3	0.988 (U)	47.1	—	6210	9.15	—	—	—	1.27	—	0.994 (U)
RE46-10-13518	46-611617	11–12	Qbt 3	1.05 (U)	—	—	—	—	—	—	—	—	—	0.964 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.9-3
Organic Chemicals Detected at SWMU 46-003(g)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260
Construction Worker SSL[a]				**4.36**	**7.58**
Industrial SSL[a]				**8.26**	**8.26**
Residential SSL[a]				**1.12**	**2.22**
RE46-10-13507	46-611612	4–5	Soil	—[b]	0.0027 (J)
RE46-10-13508	46-611612	17–18	Qbt 3	0.0016 (J)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070).
[b] — = Not detected.

Table 7.9-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-003(g)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-238
Qbt2, 3, 4 BV[a]				**na[b]**	**1.98**	**1.93**
Soil BV[a]				**1.65**	**2.59**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**160**
Industrial SAL[c]				**23**	**1500**	**430**
Residential SAL[c]				**5.6**	**170**	**87**
RE46-10-13507	46-611612	4–5	Soil	0.219	2.62	2.72
RE46-10-13509	46-611613	4–5	Soil	0.137	—[d]	—
RE46-10-13511	46-611614	10–11	Qbt 3	0.154	—	—
RE46-10-13513	46-611615	4–5	Soil	0.161	—	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.10-1
Samples Collected and Analyses Requested at SWMU 46-004(a)

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

Table 7.10-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cesium	Chromium	Copper	Lead	Mercury	Nitrate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na**[b]	**7.14**	**4.66**	**11.2**	**0.1**	**na**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**na**	**19.3**	**14.7**	**22.3**	**0.1**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**na**	**449**	**12400**	**800**	**92.9**[d]	**496000**	**1550**
Industrial SSL[c]				**454**	**1120**	**na**	**2920**	**45400**	**800**	**310**[e]	**1820000**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219**	**3130**	**400**	**23**[e]	**125000**	**391**
RE46-10-13379	46-611588	3–4	Soil	1.22 (U)	0.611 (U)	1.19	—[f]	—	—	—	1.44	—
RE46-10-13380	46-611588	8–9	Qbt 3	1.21 (U)	—	2.3	14.1 (J)	11.1	—	—	1.28	1.16 (U)
RE46-10-13381	46-611589	3–4	Soil	1.22 (U)	—	2.62	—	16.9	—	13.4	1.25	—
RE46-10-13382	46-611589	8–9	Qbt 3	1.11 (U)	—	9.95	8.67	75	36.5	0.781	1.14 (J)	0.637 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.10-3
Organic Chemicals Detected at SWMU 46-004(a)

Sample ID	Location ID	Depth (ft)	Media	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Methylene Chloride	Methylnaphthalene[2-]	Toluene	Trichloroethane[1,1,1-]	Trichloroethene
Construction Worker SSL[a]				**4760**	**20100[b]**	**10600**	**1240[c]**	**21100**	**64300**	**4600**
Industrial SSL[a]				**1370**	**560[d]**	**1090**	**4100[e]**	**57900**	**77100**	**253**
Residential SSL[a]				**347**	**140[d]**	**199**	**310[e]**	**5570**	**21800**	**45.7**
RE46-10-13379	46-611588	3–4	Soil	—[f]	—	—	—	—	0.00176	0.00937
RE46-10-13380	46-611588	8–9	Qbt 3	—	—	0.00358 (J)	—	—	—	—
RE46-10-13381	46-611589	3–4	Soil	—	—	—	—	—	0.00175	0.00548
RE46-10-13382	46-611589	8–9	Qbt 3	1.45 (J)	0.00458	—	0.0157 (J)	0.000394 (J)	—	0.000661 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from 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] SSL from EPA (2007, 099314).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[f] — = Not detected.

Table 7.11-1
Samples Collected and Analyses Requested at SWMU 46-004(a2)

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

Table 7.11-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(a2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**4.66**	**na**[b]	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**14.7**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**12400**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**45400**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**3130**	**54.8**	**391**	**23500**
RE46-10-13534	46-611618	0–1	Soil	—[d]	—	26.9	—	—	150
RE46-10-13535	46-611618	2–3	Qbt 3	—	—	—	—	1.05 (U)	—
RE46-10-13536	46-611619	0–1	Qbt 3	1.15 (U)	—	—	—	1.14 (U)	—
RE46-10-13537	46-611619	2–3	Qbt 3	1.11 (U)	—	—	—	1.09 (U)	—
RE46-10-13538	46-611620	0–1	Qbt 3	0.535 (U)	—	6.88	0.0067	1.14 (U)	—
RE46-10-13539	46-611620	2–3	Qbt 3	1.03 (U)	—	—	0.00239	1.09 (U)	—
RE46-10-13540	46-611621	0–1	Soil	1.07 (U)	0.537 (U)	—	0.00208 (J)	—	—
RE46-10-13541	46-611621	2–3	Soil	1.16 (U)	—	22.1 (J)	0.00445	—	92.4

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

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

Table 7.11-3
Organic Chemicals Detected at SWMU 46-004(a2)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene
Construction Worker SSL[a]				**18600**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**20600**	**8910**	**8910**	**213**	**10300**[c]	**10600**	**7150**	**6680**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**24400**	**24400**	**23.4**	**14900**[c]	**1090**	**20500**	**18300**
Residential SSL[a]				**3440**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2290**	**2290**	**6.21**	**3210**[c]	**199**	**1830**	**1720**
RE46-10-13534	46-611618	0–1	Soil	0.15 (J)	0.24	—[d]	0.0176 (J)	—	0.729	0.596	1.19	0.231	0.763	1.81	0.145 (J)	0.253	—	—	1.3	1.74
RE46-10-13535	46-611618	2–3	Qbt 3	—	—	—	—	—	0.0167 (J)	0.0108 (J)	0.0213 (J)	—	0.0153 (J)	0.0334 (J)	—	—	—	—	0.0166 (J)	0.0283 (J)
RE46-10-13538	46-611620	0–1	Qbt 3	—	—	—	—	0.0025 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13539	46-611620	2–3	Qbt 3	—	—	0.0073	0.0086	0.004	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13540	46-611621	0–1	Soil	—	—	—	0.0045	0.0046	0.0112 (J)	—	0.0159 (J)	—	0.0159 (J)	0.0207 (J)	—	—	0.000955 (J)	—	—	0.019 (J)
RE46-10-13541	46-611621	2–3	Soil	—	—	—	0.0164	0.0227	—	—	—	—	—	—	—	—	0.000456 (J)	0.00381 (J)	—	—

Notes: Units are 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] Isopropylbenzene used as a surrogate based on structural similarity.

[d] — = Not detected.

Table 7.12-1
Samples Collected and Analyses Requested at SWMU 46-004(b)

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

Table 7.12-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cesium	Copper	Zinc
Soil BV[a]				**0.83**	**0.4**	**na**[b]	**14.7**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**na**	**12400**	**92900**
Industrial SSL[c]				**454**	**1120**	**na**	**45400**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**na**	**3130**	**23500**
RE46-10-13172	46-611545	0–1	Soil	1.12 (U)	0.558 (U)	4.43	—[d]	—
RE46-10-13173	46-611545	2–3	Soil	1.16 (U)	0.579 (U)	1.04	—	—
RE46-10-13174	46-611546	0–1	Soil	1.1 (U)	—	4.52	85.8	62.8
RE46-10-13175	46-611546	2–3	Soil	1.1 (U)	0.55 (U)	7.95	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070).
[d] — = Not detected or not detected above BV.

Table 7.12-3
Organic Chemicals Detected at SWMU 46-004(b)

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	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	TPH-DRO	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**20600**	**8910**	**8910**	**213**	**1240**[c]	**702**	**7150**	**6680**	**na**[d]	**64300**	**4600**	**688**	**27500**	**3130**[f]
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**24400**	**24400**	**23.4**	**4100**[e]	**252**	**20500**	**18300**	**na**	**77100**	**253**	**260**	**31500**	**3610**[f]
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2290**	**2290**	**6.21**	**310**[e]	**45**	**1830**	**1720**	**na**	**21800**	**45.7**	**62**	**9550**	**1090**[f]
RE46-10-13172	46-611545	0–1	Soil	—[g]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00199	0.00533	—	—	—
RE46-10-13173	46-611545	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3.74 (J)	—	—	—	—	—
RE46-10-13174	46-611546	0–1	Soil	—	—	0.0998	0.0899	0.0144 (J)	—	—	—	0.0129 (J)	0.0246 (J)	—	—	—	—	0.0129 (J)	0.0218 (J)	25.3 (J)	—	—	0.000395 (J)	0.00115	0.00286
RE46-10-13175	46-611546	2–3	Soil	0.0512	0.092	0.167	0.118	0.149	0.119	0.197	0.0743	0.117	0.367	0.046	0.0707	0.0118 (J)	0.0263 (J)	0.275	0.289	10.1 (J)	—	—	—	—	—

Notes: Units are 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] 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] na = Not available.
[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.
[f] Xylene used as surrogate based on structural similarity.
[g] — = Not detected.

Table 7.12-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(b)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-238
Soil BV[a]				**2.59**	**2.29**
Construction Worker SAL[b]				**220**	**160**
Industrial SAL[b]				**1500**	**430**
Residential SAL[b]				**170**	**87**
RE46-10-13174	46-611546	0–1	Soil	2.62	3.24

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.13-1
Samples Collected and Analyses Requested at SWMU 46-004(b2)

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

Table 7.13-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(b2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Lead	Mercury	Zinc
Soil BV[a]				**0.83**	**0.4**	**14.7**	**22.3**	**0.1**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**12400**	**800**	**92.9**[c]	**92900**
Industrial SSL[b]				**454**	**1120**	**45400**	**800**	**310**[d]	**341000**
Residential SSL[b]				**31.3**	**77.9**	**3130**	**400**	**23**[d]	**23500**
RE46-10-11167	46-611123	0–1	Soil	0.89 (U)	—[e]	42.1 (J)	31.3 (J)	0.274	141 (J)
RE46-10-11168	46-611123	1–2	Soil	—	—	28.2 (J)	27.9 (J)	0.234	118 (J)
RE46-10-11169	46-611124	0–1	Soil	—	0.562 (U)	66.8 (J)	—	0.308	149 (J)
RE46-10-12044	46-611124	1–2	Soil	—	0.628 (U)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm

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

Table 7.13-3
Organic Chemicals Detected at SWMU 46-004(b2)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	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	Dibenzofuran	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Construction Worker SSL[a]				**18600**	**6680**[b]	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**21.3**	**552**[c]	**8910**	**8910**	**213**	**1240**[d]	**702**	**7150**	**6680**
Industrial SSL[a]				**36700**	**18300**[b]	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**2.34**	**1000**[e]	**24400**	**24400**	**23.4**	**4100**[e]	**252**	**20500**	**18300**
Residential SSL[a]				**3440**	**1720**[b]	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**0.621**	**78**[e]	**2290**	**2290**	**6.21**	**310**[e]	**45**	**1830**	**1720**
RE46-10-11167	46-611123	0–1	Soil	2.08	0.137 (J)	3.19	1.55	0.679	6.89	7.01	8	4.18	3.85	7.45	1.07	1.36 (J)	19.1	2.15	3.94	0.838	3.02	16	15.2
RE46-10-11168	46-611123	1–2	Soil	1.34	—[f]	2.26	1.68	0.764	3.97	3.74	4.42	2.22	1.97	4.33	0.669	0.846 (J)	12.5	1.39	2.11	0.391	1.28	11.2	9.51
RE46-10-11169	46-611124	0–1	Soil	0.47	0.0188 (J)	0.785	0.0316 (J)	—	1.72	1.51	1.85	0.755	0.876	1.77	0.268	0.293 (J)	4.82	0.479	0.799	0.152	0.496	4.03	3.72
RE46-10-12044	46-611124	1–2	Soil	0.025 (J)	—	0.0333 (J)	—	—	0.0822	0.0918	—	0.0497	0.0231 (J)	0.0856	—	—	0.207	0.0225 (J)	0.172	—	0.0295 (J)	0.176	0.204

Notes: Units are 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] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[f] — = Not detected.

Table 7.13-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(b2)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236
Soil BV[a]				**1.65**	**2.59**	**0.2**
Construction Worker SAL[b]				**18**	**220**	**43**
Industrial SAL[b]				**23**	**1500**	**87**
Residential SAL[b]				**5.6**	**170**	**17**
RE46-10-11167	46-611123	0–1	Soil	—[c]	5.14	0.309
RE46-10-11168	46-611123	1–2	Soil	0.157	5	0.308

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.14-1
Samples Collected and Analyses Requested at SWMU 46-004(c)

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

Table 7.14-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cesium	Chromium	Copper	Lead	Mercury	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**na[b]**	**7.14**	**4.66**	**11.2**	**0.1**	**0.3**	**1**	**63.5**
Construction Worker SSL[c]				**124**	**na**	**449[d]**	**12400**	**800**	**92.9[e]**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**na**	**2920[d]**	**45400**	**800**	**310[f]**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**na**	**219[d]**	**3130**	**400**	**23[f]**	**391**	**391**	**23500**
RE46-10-13546	46-611622	8–9	Qbt 3	0.784 (J)	0.647	—[g]	—	—	15	1.13 (U)	114	—
RE46-10-13547	46-611622	13–14	Qbt 3	1.01 (U)	0.393	—	—	—	2.1	1.01 (U)	3.78	—
RE46-10-13548	46-611622	18–19	Qbt 3	1.07 (U)	0.572	—	—	—	64.3	1.04 (U)	3.91	—
RE46-10-13549	46-611622	23–24	Qbt 3	1.05 (U)	2.93	10.8	21.1	—	28.4	1.17 (U)	16.8	—
RE46-10-13550	46-611623	8–9	Qbt 3	1.22 (U)	29.9	16.7	420	77.7	12.6	1.11 (U)	9.71	100
RE46-10-13551	46-611623	13–14	Qbt 3	1.08 (U)	6.61	—	43.4	11.9	9.25	1.12 (U)	55.1	—
RE46-10-13552	46-611623	18–19	Qbt 3	0.989 (U)	0.91	—	—	—	3.21	1.07 (U)	—	—
RE46-10-13553	46-611623	23–24	Qbt 3	1.09 (U)	1.61	—	8.39	—	—	1.01 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.14-3
Organic Chemicals Detected at SWMU 46-004(c)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzene	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Butylbenzene[sec-]	Carbon Tetrachloride	Chlorodibromomethane	Dichloroethene[1,1-]	Dichloroethene[cis-1,2-]	Dichloropropane[1,2-]	Ethylbenzene	Fluoranthene	Fluorene
Construction Worker SSL[a]				**263000**	**7.58**	**4.36**	**7.58**	**471**	**4760**	**20100[b]**	**18000[b]**	**199**	**1990**	**1830**	**3100**	**117**	**6630**	**8910**	**8910**
Industrial SSL[a]				**851000**	**8.26**	**8.26**	**8.26**	**85.4**	**1370**	**560[c]**	**420[c]**	**24.3**	**61.3**	**2220**	**11400**	**81.7**	**385**	**24400**	**24400**
Residential SSL[a]				**67500**	**2.22**	**1.12**	**2.22**	**15.5**	**347**	**140[c]**	**110[c]**	**4.38**	**11.9**	**618**	**782**	**14.7**	**69.7**	**2290**	**2290**
RE46-10-13546	46-611622	8–9	Qbt 3	0.0793	—[d]	0.359	0.197	0.000456 (J)	34.2 (J)	0.114	0.0496	0.000985 (J)	—	0.0691	0.000398 (J)	0.00592	0.00517	0.242 (J)	0.147 (J)
RE46-10-13547	46-611622	13–14	Qbt 3	0.0682	—	0.0237	0.0161 (J)	—	18.3 (J)	0.0429	0.0198	—	0.000353 (J)	0.0126	—	0.00298	0.00396	—	—
RE46-10-13548	46-611622	18–19	Qbt 3	0.0698 (J)	—	0.0645	0.0472	0.000684 (J)	0.53 (J)	0.024	0.00561	—	—	—	0.000888 (J)	—	—	—	—
RE46-10-13549	46-611622	23–24	Qbt 3	0.0649	—	0.0237	0.0178	—	0.84 (J)	0.00458	—	—	—	—	—	—	—	—	—
RE46-10-13550	46-611623	8–9	Qbt 3	0.114 (J-)	—	0.0208	0.0075	—	—	—	—	—	—	—	0.000564 (J-)	—	—	—	—
RE46-10-13551	46-611623	13–14	Qbt 3	0.0373	—	0.183	0.101	0.000407 (J)	12.8 (J)	0.103	0.0471	0.000606 (J)	—	0.0388	0.00041 (J)	0.00447	0.0039	—	—
RE46-10-13552	46-611623	18–19	Qbt 3	0.0629 (J)	—	0.048	0.0228	—	1.11 (J)	0.0198	0.00777	—	—	—	—	—	0.000404 (J)	—	—
RE46-10-13553	46-611623	23–24	Qbt 3	0.0713	0.108	0.124	0.0313	—	0.236 (J)	0.0012	—	—	—	—	—	—	—	—	—

Table 7.14-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Propylbenzene[1-]	Pyrene	Tetrachloroethane[1,1,2-]	Tetrachloroethene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**10300**	**10300[e]**	**1240[f]**	**702**	**7150**	**20100**	**6680**	**2780**	**338**	**21100**	**64300**	**4600**	**688[f]**	**3100[f]**	**27500**	**3130[h]**
Industrial SSL[a]				**14900**	**14900[e]**	**4100[g]**	**252**	**20500**	**21000**	**18300**	**161**	**36.4**	**57900**	**77100**	**253**	**260[g]**	**10000[g]**	**31500**	**3610[h]**
Residential SSL[a]				**3210**	**3210[e]**	**310[g]**	**45**	**1830**	**3400**	**1720**	**29.2**	**6.99**	**5570**	**21800**	**45.7**	**62[g]**	**78000[g]**	**9550**	**1090[h]**
RE46-10-13546	46-611622	8–9	Qbt 3	0.00626	0.0738	0.753 (J)	—	0.225 (J)	0.0239	0.178 (J)	0.00489	1.39 (J-)	0.0115	0.414 (J-)	11.9 (J-)	—	0.0821	0.00822	—
RE46-10-13547	46-611622	13–14	Qbt 3	0.0038	0.0268	1.7 (J)	0.681 (J)	—	0.0121	—	0.00238	0.749 (J-)	0.0153	0.1 (J)	4.51 (J-)	0.0194	0.0408	0.00682	0.0005 (J)
RE46-10-13548	46-611622	18–19	Qbt 3	—	0.0108	—	—	—	0.00116 (J)	—	—	0.00057 (J)	—	0.00182	0.0105	0.00292	0.00666	—	—
RE46-10-13549	46-611622	23–24	Qbt 3	—	0.00206	0.00913 (J)	—	—	—	—	—	—	—	0.000393 (J)	0.00258	0.0019	0.000878 (J)	—	—
RE46-10-13550	46-611623	8–9	Qbt 3	—	—	—	—	—	—	—	—	0.00239 (J-)	—	0.0077 (J-)	0.043 (J-)	—	—	—	—
RE46-10-13551	46-611623	13–14	Qbt 3	0.00562	0.0658	0.743 (J)	—	—	0.0221	—	0.00337	0.368 (J-)	0.0115	0.101 (J-)	2.77 (J-)	0.0497	0.0797	0.00722	0.000756 (J)
RE46-10-13552	46-611623	18–19	Qbt 3	0.000866 (J)	0.0119	—	—	—	0.00338	—	—	0.00336	—	—	0.0109	0.00983	0.0125	0.000908 (J)	—
RE46-10-13553	46-611623	23–24	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	0.00154	0.00123	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[c] SSL from EPA (2007, 099314).

[d] — = Not detected.

[e] Isopropylbenzene 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).

[g] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[h] Xylene used as a surrogate based on structural similarity.

Table 7.15-1
Samples Collected and Analyses Requested at SWMU 46-004(c2)

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

Table 7.15-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(c2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cesium	Chromium	Copper	Lead	Lithium	Mercury	Nitrate	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na[b]**	**7.14**	**4.66**	**11.2**	**na**	**0.1**	**na**	**na**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**na**	**19.3**	**14.7**	**22.3**	**na**	**0.1**	**na**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**na**	**449[d]**	**12400**	**800**	**na**	**92.9[e]**	**496000**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**na**	**2920[d]**	**45400**	**800**	**na**	**310[f]**	**1820000**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219[d]**	**3130**	**400**	**na**	**23[f]**	**125000**	**54.8**	**391**	**23500**
RE46-10-11132	46-611111	0–1	Soil	—[g]	—	2.85	—	16.9 (J)	36.3	12	0.105	—	0.0012 (J)	—	84.1
RE46-10-11133	46-611111	1–2	Soil	1.07 (U)	—	3.05	—	—	—	16.4	—	—	0.00168 (J)	—	—
RE46-10-11134	46-611112	0–1	Soil	—	—	1.64	29.2 (J)	—	—	8.68	—	—	0.000788 (J)	—	63.9
RE46-10-11135	46-611112	1–2	Soil	—	—	2.27	—	—	25.3	11.5	—	—	0.00116 (J)	—	64
RE46-10-11136	46-611113	0–1	Soil	1.11 (U)	0.53 (J)	1.25	—	45.4	34.6	11.4	—	—	—	—	286
RE46-10-11137	46-611113	1–2	Soil	—	—	0.781	—	32.5	50.1	10.7	—	—	0.00288	—	193
RE46-10-11138	46-611114	0–1	Soil	—	—	1.07	—	20.4	42.1	7.45	—	—	—	—	114
RE46-10-12043	46-611114	1–2	Soil	1.21 (U)	—	0.635	—	—	56.6	7.76 (J+)	—	—	—	—	77.9
RE46-10-11140	46-611115	0–1	Soil	1.1 (U)	0.552 (U)	1.23	—	—	—	7.47	—	—	0.000626 (J)	—	—
RE46-10-11141	46-611115	1–2	Soil	0.851 (U)	0.529 (U)	2.29	—	—	—	14	—	—	0.00123 (J)	—	196
RE46-10-11142	46-611116	0–1	Soil	—	—	0.974	—	18.9	65.1	7.78	0.107	—	—	—	120
RE46-10-11143	46-611116	1–2	Soil	1.12 (U)	—	0.631	—	—	28.7	5.94	—	—	—	—	60.1
RE46-10-11144	46-611117	0–1	Soil	0.859 (U)	0.599 (U)	5.68	—	—	—	14.9 (J-)	—	1.34	0.000613 (J)	—	—
RE46-10-11145	46-611117	1–2	Soil	1.09 (U)	0.546 (U)	1.88	—	—	—	11.6 (J-)	—	1.31	0.00218 (J)	—	—
RE46-10-11146	46-611118	0–0.25	Soil	—	0.59 (U)	0.866	—	—	—	6.17 (J-)	—	1.37	—	—	49
RE46-10-12040	46-611118	1–2	Qbt 3	1.06 (U)	—	1.16	—	—	—	5.26 (J+)	—	—	—	1.1 (U)	—
RE46-10-11148	46-611119	0–1	Soil	—	0.622 (U)	1.22	—	—	—	6.84 (J-)	—	—	—	—	—
RE46-10-12039	46-611119	1–2	Qbt 3	1.1 (U)	—	1.14	—	—	—	6.69 (J+)	—	—	—	1.06 (U)	—
RE46-10-11150	46-611120	0–0.25	Soil	1.44 (U)	—	1.14	—	—	32.3	4.49 (J-)	—	5.03	—	—	64.5
RE46-10-12041	46-611120	1–2	Qbt 3	0.508 (U)	—	0.153	—	—	—	3.29	—	1.83	—	1.11 (U)	—
RE46-10-11152	46-611121	0–1	Soil	1.16 (U)	0.581 (U)	0.759	—	—	—	5.42 (J-)	—	3.03	—	—	—
RE46-10-12042	46-611121	1–2	Qbt 3	—	—	0.162	—	—	—	2.65	—	—	—	1.03 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.15-3
Organic Chemicals Detected at SWMU 46-004(c2)

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	Chrysene	Dibenz(a,h)anthracene	Di-n-butylphthalate	Di-n-octylphthalate	Fluoranthene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**20600**	**21.3**	**23800**	**4760**	**8910**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**2.34**	**68400**	**25000**	**24400**
Residential SSL[a]				**3440**	**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**0.621**	**6110**	**2400**	**2290**
RE46-10-11132	46-611111	0–1	Soil	0.0178 (J)	—[c]	0.0352 (J)	0.137	0.0822	0.137	0.13	0.18	0.078 (J)	0.0685	—	0.145	0.0221 (J)	—	—	0.334
RE46-10-11133	46-611111	1–2	Soil	—	—	—	0.0223	0.0134	0.0142 (J)	—	0.0129 (J)	—	—	—	—	—	—	—	0.0183 (J)
RE46-10-11134	46-611112	0–1	Soil	0.0444	—	0.087	0.0854	0.0546	0.224	0.197	0.283	0.111 (J)	0.0997	—	0.237	0.0327 (J)	0.123 (J)	—	0.609
RE46-10-11135	46-611112	1–2	Soil	0.0407	—	0.0534	0.0083	0.0069	0.135	0.146	0.2	0.117 (J)	0.0778	—	0.153	0.032 (J)	—	—	0.349
RE46-10-11136	46-611113	0–1	Soil	0.015 (J)	—	0.0227 (J)	0.0068	0.0052	0.0882	0.0955	0.114	0.0801 (J)	0.0472	—	0.0988	0.0245 (J)	—	—	0.228
RE46-10-11137	46-611113	1–2	Soil	—	—	—	0.002 (J)	0.0015 (J)	—	—	—	—	—	—	—	—	—	—	0.0156 (J)
RE46-10-11138	46-611114	0–1	Soil	—	—	0.0108 (J)	0.0099	0.0074	0.0422 (J)	0.0415 (J)	0.0637	0.0391 (J)	0.021 (J)	—	0.051	—	—	0.124 (J)	0.104
RE46-10-12043	46-611114	1–2	Soil	0.0192 (J)	—	0.0271 (J)	0.0083	0.0073	0.0817	0.0716	0.102	0.0568	0.0357 (J)	0.132 (J)	0.0798	—	—	—	0.187
RE46-10-11140	46-611115	0–1	Soil	—	—	—	0.0023 (J)	0.0018 (J)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11142	46-611116	0–1	Soil	0.0384 (J)	—	0.0586	0.0318	0.0221	0.159	0.181	0.237	0.139 (J)	0.0922	—	0.187	—	—	—	0.474
RE46-10-11143	46-611116	1–2	Soil	0.0369 (J)	—	0.0705	0.0114	0.0132	0.145	0.147	0.169	0.107 (J)	0.0742	—	0.148	0.0281 (J)	—	—	0.397
RE46-10-11146	46-611118	0–0.25	Soil	—	0.00236 (J)	—	—	0.0044	0.0161 (J)	0.0148 (J)	0.0179 (J)	—	—	—	0.0154 (J)	—	—	—	0.0309 (J)
RE46-10-11148	46-611119	0–1	Soil	—	0.0042 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11150	46-611120	0–0.25	Soil	—	0.00897 (J)	—	0.0125	0.0109	0.0389 (J)	0.0372 (J)	0.049 (J)	0.0291 (J)	0.0238 (J)	—	0.0392 (J)	—	—	—	0.0855
RE46-10-11152	46-611121	0–1	Soil	—	—	—	—	—	—	0.0128 (J)	0.0161 (J)	—	—	—	0.012 (J)	—	—	—	0.0249 (J)

Table 7.15-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropylbenzene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Trichloroethane[1,1,1-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**8910**	**213**	**10300**	**10300**[d]	**1240**[e]	**702**	**7150**	**6680**	**64300**	**3130**[f]
Industrial SSL[a]				**24400**	**23.4**	**14900**	**14900**[d]	**4100**[g]	**252**	**20500**	**18300**	**77100**	**3610**[f]
Residential SSL[a]				**2290**	**6.21**	**3210**	**3210**[d]	**310**[g]	**45**	**1830**	**1720**	**21800**	**1090**[f]
RE46-10-11132	46-611111	0–1	Soil	0.0155 (J)	0.0732 (J)	—	—	—	—	0.174	0.271	—	0.00051 (J)
RE46-10-11133	46-611111	1–2	Soil	—	—	—	—	—	—	—	0.0156 (J)	—	—
RE46-10-11134	46-611112	0–1	Soil	0.0396	0.102 (J)	—	—	—	0.014 (J)	0.391	0.487	0.000455 (J)	—
RE46-10-11135	46-611112	1–2	Soil	0.0354 (J)	0.101 (J)	—	—	0.0101 (J)	0.0251 (J)	0.276	0.323	—	—
RE46-10-11136	46-611113	0–1	Soil	0.0131 (J)	0.0711 (J)	—	—	—	—	0.13	0.184	—	—
RE46-10-11137	46-611113	1–2	Soil	—	—	—	—	—	—	—	0.0135 (J)	—	0.000367 (J)
RE46-10-11138	46-611114	0–1	Soil	—	0.0358 (J)	—	—	—	—	0.0672	0.107	—	—
RE46-10-12043	46-611114	1–2	Soil	0.0141 (J)	0.162	—	—	—	—	0.137	0.175	—	—
RE46-10-11140	46-611115	0–1	Soil	—	—	—	—	—	—	—	—	—	0.000458 (J)
RE46-10-11142	46-611116	0–1	Soil	0.034 (J)	0.117 (J)	—	—	—	0.0216 (J)	0.32	0.384	—	—
RE46-10-11143	46-611116	1–2	Soil	0.0373 (J)	0.0999 (J)	—	—	0.012 (J)	0.0384 (J)	0.294	0.311	—	—
RE46-10-11146	46-611118	0–0.25	Soil	—	—	0.00219	0.00201	—	—	0.0167 (J)	0.029 (J)	—	—
RE46-10-11148	46-611119	0–1	Soil	—	—	—	—	—	—	—	—	—	—
RE46-10-11150	46-611120	0–0.25	Soil	—	0.165	—	—	—	—	0.0446 (J)	0.0799	—	—
RE46-10-11152	46-611121	0–1	Soil	—	—	—	—	—	—	0.0123 (J)	0.0227 (J)	—	—

Notes: Units are 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] 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] Xylene used as a surrogate based on structural similarity.

[g] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

Table 7.15-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(c2)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt2, 3, 4 BV[a]				**na[b]**	**na**	**na**	**1.98**	**0.09**	**1.93**
Soil BV[a]				**0.013**	**1.65**	**0.054**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**34**	**18**	**36**	**220**	**43**	**160**
Industrial SAL[c]				**180**	**23**	**210**	**1500**	**87**	**430**
Residential SAL[c]				**30**	**5.6**	**33**	**170**	**17**	**87**
RE46-10-11146	46-611118	0–0.25	Soil	—[d]	—	0.0591	—	—	—
RE46-10-11148	46-611119	0–1	Soil	0.0307	—	0.0984	—	—	—
RE46-10-12039	46-611119	1–2	Qbt 3	—	—	—	—	0.1	—
RE46-10-11150	46-611120	0–0.25	Soil	0.0574	4.5	0.237	3.36	—	4.7
RE46-10-11152	46-611121	0–1	Soil	—	—	0.0668	—	—	—
RE46-10-12042	46-611121	1–2	Qbt 3	—	—	—	—	0.107	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.16-1
Samples Collected and Analyses Requested at SWMU 46-004(d)

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

Table 7.16-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Lead	Mercury	Nitrate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**11.2**	**0.1**	**na[b]**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**22.3**	**0.1**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**449[d]**	**12400**	**800**	**92.9[e]**	**496000**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**45400**	**800**	**310[f]**	**1820000**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**3130**	**400**	**23[f]**	**125000**	**391**	**391**	**23500**
RE46-10-13214	46-611557	8–9	Soil	4.21	0.488 (U)	53.4	540	488	6.41	1.21	—[g]	3.14	—
RE46-10-13215	46-611557	13–14	Qbt 3	1.02 (U)	—	20.2	190	11.9	—	1.35	1.04 (U)	—	—
RE46-10-13226	46-611557	18–19	Qbt 3	1.05 (U)	—	16.8	221	13.8	—	—	1.05 (U)	—	—
RE46-10-13227	46-611557	23–24	Qbt 3	1.05 (U)	—	19	113	17.6	—	—	1.03 (U)	—	—
RE46-10-13216	46-611558	0–1	Soil	1.23 (U)	—	31.5 (J)	16.1	—	7.78	—	—	—	58.7
RE46-10-13217	46-611558	1–2	Soil	1.11 (U)	0.554 (U)	—	—	—	1.37	1.33	—	—	—
RE46-10-13218	46-611559	0–1	Soil	1.34 (U)	0.67 (U)	—	—	—	0.152	—	—	—	—
RE46-10-13219	46-611559	1–2	Soil	1.08 (U)	0.542 (U)	—	—	—	—	—	—	—	—
RE46-10-13220	46-611560	0–1	Soil	1.05 (U)	0.527 (U)	—	—	23.9	1.67	1.31	—	—	—
RE46-10-13221	46-611560	1–2	Soil	1.01 (U)	0.505 (U)	—	—	26.1	—	1.26	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.16-3
Organic Chemicals Detected at SWMU 46-004(d)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	Trichloroethene
Construction Worker SSL[a]				**18600**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**20600**	**8910**	**8910**	**213**	**10600**	**7150**	**6680**	**4600**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**24400**	**24400**	**23.4**	**1090**	**20500**	**18300**	**253**
Residential SSL[a]				**3440**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2290**	**2290**	**6.21**	**199**	**1830**	**1720**	**45.7**
RE46-10-13214	46-611557	8–9	Soil	0.06	0.154	—[c]	0.116	0.0377	0.481	—	0.573	0.149	0.431	0.813	0.0461	0.147	—	0.542	0.991	—
RE46-10-13226	46-611557	18–19	Qbt 3	—	—	0.0347	0.06	0.0267	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13216	46-611558	0–1	Soil	—	0.0117 (J)	—	0.0291	0.0177	0.0262 (J)	0.0156 (J)	0.0302 (J)	—	0.0201 (J)	0.029 (J)	—	—	0.00291 (J)	—	0.0258 (J)	—
RE46-10-13218	46-611559	0–1	Soil	—	—	0.0542	0.0559	0.0216	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13219	46-611559	1–2	Soil	1.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13220	46-611560	0–1	Soil	—	—	—	0.0137	0.007	—	—	—	—	—	—	—	—	0.00297 (J)	—	—	0.000396 (J)
RE46-10-13221	46-611560	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00226 (J)	—	—	—

Notes: Units are 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.

Table 7.16-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(d)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236
Soil BV[a]				**2.59**	**0.2**
Construction Worker SAL[b]				**220**	**43**
Industrial SAL[b]				**1500**	**87**
Residential SAL[b]				**170**	**17**
RE46-10-13214	46-611557	8–9	Soil	3.96	0.264
RE46-10-13216	46-611558	0–1	Soil	3.13	—[c]
RE46-10-13217	46-611558	1–2	Soil	2.67	—

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.16-5
Samples Collected and Analyses Requested at SWMU 46-004(e)

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

Table 7.16-6
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Cyanide	Lead	Mercury	Nickel	Nitrate	Selenium	Silver	Zinc
Qbt2, 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**	**15.4**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**449**[d]	**12400**	**6190**	**800**	**92.9**[e]	**6190**	**496000**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**2920**[d]	**45400**	**22700**	**800**	**310**[f]	**22700**	**1820000**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**219**[d]	**3130**	**1560**	**400**	**23**[f]	**1560**	**125000**	**391**	**391**	**23500**
RE46-10-13216	46-611558	0–1	Soil	1.23 (U)	—[g]	31.5 (J)	16.1	—	—	7.78	—	—	—	—	58.7
RE46-10-13217	46-611558	1–2	Soil	1.11 (U)	0.554 (U)	—	—	—	—	1.37	—	1.33	—	—	—
RE46-10-13218	46-611559	0–1	Soil	1.34 (U)	0.67 (U)	—	—	—	—	0.152	—	—	—	—	—
RE46-10-13219	46-611559	1–2	Soil	1.08 (U)	0.542 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13220	46-611560	0–1	Soil	1.05 (U)	0.527 (U)	—	—	—	23.9	1.67	—	1.31	—	—	—
RE46-10-13221	46-611560	1–2	Soil	1.01 (U)	0.505 (U)	—	—	—	26.1	—	—	1.26	—	—	—
RE46-10-13222	46-611561	7.5–8.5	Soil	14	2.4	177	1650	0.826	432	39.6	—	494	—	69.5	295
RE46-10-13223	46-611561	12.5–13.5	Qbt 3	1.04 (U)	—	—	228	—	—	—	—	3.46	1.06 (U)	—	—
RE46-10-13228	46-611561	17.5–18.5	Qbt 3	1.06 (U)	—	7.69	102	—	—	—	—	1.53	1.05 (U)	—	—
RE46-10-13229	46-611561	22.5–23.5	Qbt 3	1.06 (U)	—	—	126	—	—	—	—	—	1.07 (U)	—	—
RE46-10-13224	46-611562	0–1	Soil	1.12 (U)	0.419 (J)	—	63.5	—	27.3	6.33	17.4	1.37	—	—	51.1
RE46-10-13225	46-611562	3–4	Qbt 3	1.08 (U)	—	—	36.7	—	—	0.183	—	—	1.08 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.16-7
Organic Chemicals Detected at SWMU 46-004(e)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Bis(2-ethylhexyl)phthalate	Chloroaniline[4-]	Chrysene	Fluoranthene	Methylene Chloride	Methylnaphthalene[2-]	Phenanthrene	Pyrene	Tetrachloroethene	Toluene	Trichloroethene
Construction Worker SSL[a]				**18600**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**4760**	**1080[b]**	**20600**	**8910**	**10600**	**1240[b]**	**7150**	**6680**	**338**	**21100**	**4600**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**1370**	**86.3[c]**	**2340**	**24400**	**1090**	**4100[c]**	**20500**	**18300**	**36.4**	**57900**	**253**
Residential SSL[a]				**3440**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**347**	**24[c]**	**621**	**2290**	**199**	**310[c]**	**1830**	**1720**	**6.99**	**5570**	**45.7**
RE46-10-13216	46-611558	0–1	Soil	—[d]	0.0117 (J)	—	0.0291	0.0177	0.0262 (J)	0.0156 (J)	0.0302 (J)	—	—	0.0201 (J)	0.029 (J)	0.00291 (J)	—	—	0.0258 (J)	—	—	—
RE46-10-13218	46-611559	0–1	Soil	—	—	0.0542	0.0559	0.0216	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13219	46-611559	1–2	Soil	1.35	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13220	46-611560	0–1	Soil	—	—	—	0.0137	0.007	—	—	—	—	—	—	—	0.00297 (J)	—	—	—	—	—	0.000396 (J)
RE46-10-13221	46-611560	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.00226 (J)	—	—	—	—	—	—
RE46-10-13222	46-611561	7.5–8.5	Soil	—	—	—	1.45	0.333	—	—	—	0.429 (J)	0.387 (J)	1.4	—	0.00362 (J+)	0.0367 (J)	—	—	0.000414 (J+)	0.00058 (J+)	0.00114 (J+)
RE46-10-13224	46-611562	0–1	Soil	—	—	0.0218	0.0129	0.0054	0.0151 (J)	—	0.0225 (J)	0.208 (J)	—	0.0134 (J)	0.0269 (J)	—	—	0.0175 (J)	0.0252 (J)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[c] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[d] — = Not detected.

Table 7.16-8
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(e)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**1.98**	**0.09**
Soil BV[a]				**0.054**	**2.59**	**0.2**
Construction Worker SAL[c]				**36**	**220**	**43**
Industrial SAL[c]				**210**	**1500**	**87**
Residential SAL[c]				**33**	**170**	**17**
RE46-10-13216	46-611558	0–1	Soil	—[d]	3.13	—
RE46-10-13217	46-611558	1–2	Soil	—	2.67	—
RE46-10-13222	46-611561	7.5–8.5	Soil	0.0722	22.3	1.33
RE46-10-13229	46-611561	22.5–23.5	Qbt 3	—	—	0.0917

Note: All activities are in pCi/g.

[a] BVs are 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 7.17-1
Samples Collected and Analyses Requested at Consolidated Unit 46-004(d2)-99

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	SVOCs	PCBs	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12923	46-611481	0–1	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12924	46-611481	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12925	46-611482	0–1	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12926	46-611482	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12927	46-611483	0–1	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12928	46-611483	1–2	Soil	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412	10-2412
RE46-10-12929	46-611484	0–1	Soil	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12930	46-611484	1–2	Qbt 3	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12931	46-611485	0–1	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320

Table 7.17-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	SVOCs	PCBs	Cyanide	Perchlorate	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12932	46-611485	1–2	Qbt 3	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12933	46-611486	0–1	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12934	46-611486	1–2	Soil	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320	10-2320
RE46-10-12935	46-611487	0–1	Soil	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12936	46-611487	1–2	Qbt 3	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315	10-2315
RE46-10-12937	46-611488	0–1	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12938	46-611488	1–2	Qbt 3	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12939	46-611489	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12940	46-611489	1–2	Qbt 3	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12941	46-611490	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12942	46-611490	1–2	Qbt 3	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12943	46-611491	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12944	46-611491	1–2	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12945	46-611492	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12946	46-611492	1–2	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12947	46-611493	0–1	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12948	46-611493	1–2	Soil	10-1941	10-1940	10-1940	10-1941	10-1941	10-1942	10-1942	10-1942	10-1942	10-1942
RE46-10-12949	46-611494	0–1	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12950	46-611494	1–2	Qbt 3	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12951	46-611495	0–1	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12952	46-611495	1–2	Soil	10-1893	10-1892	10-1892	10-1893	10-1893	10-1894	10-1894	10-1894	10-1894	10-1894
RE46-10-12953	46-611496	0–1	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12954	46-611496	1–2	Soil	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879	10-1879
RE46-10-12955	46-611497	0–1	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12956	46-611497	1–2	Soil	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963	10-1963
RE46-10-12957	46-611498	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12958	46-611498	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12959	46-611499	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12960	46-611499	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12961	46-611500	0–1	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813
RE46-10-12962	46-611500	1–2	Soil	10-1812	10-1811	10-1811	10-1812	10-1812	10-1813	10-1813	10-1813	10-1813	10-1813

Table 7.17-2
Inorganic Chemicals Detected or Detected above BVs at Consolidated Unit 46-004(d2)-99

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Mercury	Perchlorate	Potassium	Selenium	Sodium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**0.1**	**na[b]**	**3500**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**0.1**	**na**	**3460**	**1.52**	**915**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**800**	**92.9[e]**	**217**	**na**	**1550**	**na**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**800**	**310[f]**	**795**	**na**	**5680**	**na**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**400**	**23[f]**	**54.8**	**na**	**391**	**na**	**23500**
RE46-10-12923	46-611481	0–1	Soil	1.13 (U)	—[g]	0.564 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12924	46-611481	1–2	Soil	1.07 (U)	—	0.535 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12925	46-611482	0–1	Soil	1.09 (U)	—	0.545 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12926	46-611482	1–2	Soil	1.15 (U)	—	0.577 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12927	46-611483	0–1	Soil	1.11 (U)	—	0.556 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12928	46-611483	1–2	Soil	1.18 (U)	—	0.591 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12929	46-611484	0–1	Soil	1.09 (UJ)	—	0.547 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12930	46-611484	1–2	Qbt 3	1.09 (UJ)	—	—	—	16.6	—	—	—	—	—	—	0.99 (U)	—	—
RE46-10-12931	46-611485	0–1	Soil	1.18 (U)	—	0.716	—	—	—	39.2	25.1	0.231	—	—	—	—	120
RE46-10-12932	46-611485	1–2	Qbt 3	1.21 (U)	—	—	—	—	—	16.5	21.2	0.177	—	—	1.18 (U)	—	—
RE46-10-12933	46-611486	0–1	Soil	1.14 (U)	—	0.572 (U)	—	—	—	—	—	0.872	—	—	—	—	—
RE46-10-12934	46-611486	1–2	Soil	1.01 (U)	—	0.503 (U)	—	—	—	—	—	0.244	—	—	—	—	—
RE46-10-12935	46-611487	0–1	Soil	1.12 (UJ)	—	0.561 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12936	46-611487	1–2	Qbt 3	1.09 (UJ)	—	—	—	—	—	—	—	—	—	—	1.11 (U)	—	—
RE46-10-12937	46-611488	0–1	Soil	1.07 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12938	46-611488	1–2	Qbt 3	1.08 (U)	—	—	—	16.9 (J)	—	—	—	—	—	—	1.04 (U)	—	—
RE46-10-12939	46-611489	0–1	Soil	1.14 (U)	—	0.572 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12940	46-611489	1–2	Qbt 3	1.14 (U)	—	—	—	—	—	—	—	—	—	—	0.641 (J)	—	—
RE46-10-12941	46-611490	0–1	Soil	1.16 (U)	—	0.582 (U)	—	—	—	—	—	—	0.00164 (J)	—	—	—	—
RE46-10-12942	46-611490	1–2	Qbt 3	1.05 (U)	—	—	—	—	—	—	—	—	—	—	1.05 (U)	—	—
RE46-10-12943	46-611491	0–1	Soil	1.14 (U)	—	0.569 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12944	46-611491	1–2	Soil	1.19 (U)	—	0.593 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12945	46-611492	0–1	Soil	1.08 (U)	—	0.538 (U)	—	—	—	—	—	—	0.00661	—	—	—	—
RE46-10-12946	46-611492	1–2	Soil	1.16 (U)	340	0.579 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12947	46-611493	0–1	Soil	1.08 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12948	46-611493	1–2	Soil	1.15 (U)	—	0.577 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12949	46-611494	0–1	Soil	1.14 (UJ)	—	0.571 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12950	46-611494	1–2	Qbt 3	1.05 (UJ)	—	—	—	—	—	—	—	—	—	—	1.06 (U)	—	—

Table 7.17-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Lead	Mercury	Perchlorate	Potassium	Selenium	Sodium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**11.2**	**0.1**	**na[b]**	**3500**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**22.3**	**0.1**	**na**	**3460**	**1.52**	**915**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**800**	**92.9[e]**	**217**	**na**	**1550**	**na**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**800**	**310[f]**	**795**	**na**	**5680**	**na**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**400**	**23[f]**	**54.8**	**na**	**391**	**na**	**23500**
RE46-10-12951	46-611495	0–1	Soil	1.4 (U)	—	—	—	61.6 (J)	—	73.1	235	1.43	—	—	—	—	117
RE46-10-12952	46-611495	1–2	Soil	1.18 (U)	—	—	—	—	—	68.9	28.5	0.588	—	—	—	—	103
RE46-10-12953	46-611496	0–1	Soil	1.15 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12954	46-611496	1–2	Soil	1.17 (UJ)	—	0.587 (U)	7320 (J+)	—	—	—	—	—	—	—	—	—	—
RE46-10-12955	46-611497	0–1	Soil	1.03 (U)	—	0.513 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12956	46-611497	1–2	Soil	1.02 (U)	—	0.508 (U)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12957	46-611498	0–1	Soil	11.3 (UJ)	—	—	—	—	8.99	—	—	—	—	3480 (J+)	—	1030	—
RE46-10-12958	46-611498	1–2	Soil	11.2 (UJ)	—	—	—	—	8.96	—	—	—	—	—	—	1220	—
RE46-10-12959	46-611499	0–1	Soil	1.22 (UJ)	—	0.608 (U)	—	—	—	—	22.4	—	—	—	—	—	—
RE46-10-12960	46-611499	1–2	Soil	1.01 (UJ)	—	—	—	—	—	—	—	—	0.0033	—	—	—	—
RE46-10-12961	46-611500	0–1	Soil	1.14 (UJ)	—	—	—	—	—	—	—	—	0.00129 (J)	—	—	—	—
RE46-10-12962	46-611500	1–2	Soil	1.06 (UJ)	—	—	—	—	—	—	—	—	0.000875 (J)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.17-3
Organic Chemicals Detected at Consolidated Unit 46-004(d2)-99

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	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	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Construction Worker SSL[a]				**18600**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**4760**	**20600**	**21.3**	**8910**	**8910**	**213**	**1240**[c]	**702**	**7150**	**6680**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**2.34**	**24400**	**24400**	**23.4**	**4100**[d]	**252**	**20500**	**18300**
Residential SSL[a]				**3440**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**0.621**	**2290**	**2290**	**6.21**	**310**[d]	**45**	**1830**	**1720**
RE46-10-12923	46-611481	0–1	Soil	0.0232 (J)	0.051	—[e]	—	0.0184 (J)	0.399	0.431	0.663	0.294	—	—	0.362	—	0.796	0.0135 (J)	0.244	—	—	0.271	0.708
RE46-10-12924	46-611481	1–2	Soil	—	—	—	—	0.0017 (J)	—	0.0299 (J)	0.0492	0.0242 (J)	—	—	—	—	0.0432	—	0.0208 (J)	—	—	—	0.0419
RE46-10-12925	46-611482	0–1	Soil	0.0237 (J)	0.0324 (J)	—	—	—	0.0851	0.064	0.111	0.0378 (J)	—	—	0.0793	—	0.165	0.0151 (J)	0.0354 (J)	—	—	0.112	0.148
RE46-10-12927	46-611483	0–1	Soil	0.0498	0.0797	—	—	—	0.167	0.13	0.205	0.0882	—	—	0.136	—	0.404	0.0436	0.0745	0.0128 (J)	0.0368 (J)	0.32	0.312
RE46-10-12928	46-611483	1–2	Soil	—	—	—	—	—	—	0.0229 (J)	0.0383 (J)	0.0166 (J)	—	—	—	—	0.0598	—	0.0142 (J)	—	—	0.0343 (J)	0.0498
RE46-10-12931	46-611485	0–1	Soil	—	0.0264 (J)	—	0.0925	0.0601	0.104	0.101	0.18	0.0587	—	0.149 (J)	0.103	0.018 (J)	0.204	—	0.0469	—	—	0.123	0.195
RE46-10-12932	46-611485	1–2	Qbt 3	—	0.0142 (J)	—	—	—	0.0484	0.0424	0.0599	0.0261 (J)	0.0229 (J)	—	0.0435	—	0.0905	—	0.022 (J)	—	—	0.0544	0.0897
RE46-10-12933	46-611486	0–1	Soil	—	—	—	0.0067	0.0045	0.0157 (J)	—	0.0152 (J)	—	—	—	—	—	0.0224 (J)	—	—	—	—	0.0144 (J)	0.0182 (J)
RE46-10-12934	46-611486	1–2	Soil	—	—	—	0.0027 (J)	0.0019 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12937	46-611488	0–1	Soil	—	—	—	0.0026 (J)	0.002 (J)	0.0187 (J)	0.0114 (J)	0.0269 (J)	—	—	—	0.0196 (J)	—	0.0348 (J)	—	—	—	—	0.0184 (J)	0.0269 (J)
RE46-10-12939	46-611489	0–1	Soil	—	—	0.19	0.199	0.0753	—	—	—	0.0675 (J)	—	—	—	—	—	—	—	—	—	—	0.0139 (J)
RE46-10-12941	46-611490	0–1	Soil	—	—	—	—	—	—	—	—	—	0.0121 (J)	—	—	—	0.0196 (J)	—	—	—	—	—	0.0165 (J)
RE46-10-12944	46-611491	1–2	Soil	—	0.0112 (J)	—	—	—	0.0297 (J)	0.0259 (J)	0.0408 (J)	0.0212 (J)	—	—	0.0323 (J)	—	0.0598	—	0.0143 (J)	—	—	0.0469	0.0531
RE46-10-12945	46-611492	0–1	Soil	—	—	—	—	0.0018 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12948	46-611493	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0132 (J)	—	—	—	—	—	0.0125 (J)
RE46-10-12949	46-611494	0–1	Soil	—	—	—	—	—	—	—	0.0136 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12951	46-611495	0–1	Soil	0.456	0.599	—	0.352	0.17	1.51	1.41	2.38	0.986 (J)	—	—	1.73	0.343 (J)	4.02	0.422	0.934 (J)	0.118 (J)	0.358 (J)	3.4	3.21
RE46-10-12952	46-611495	1–2	Soil	0.228 (J)	0.357 (J)	—	0.0202	0.0131 (J)	0.862	0.77	1.27	0.449 (J)	—	—	0.857	0.14 (J)	2.09	0.258 (J)	0.444 (J)	—	0.181 (J)	1.75	1.65
RE46-10-12953	46-611496	0–1	Soil	0.112	0.154	—	—	—	0.332	0.322	0.529	0.163	—	—	0.338	—	0.606	0.1	0.135	0.0412	0.096	0.693	0.814
RE46-10-12954	46-611496	1–2	Soil	—	—	—	—	—	0.031 (J)	0.034 (J)	0.0494	0.0245 (J)	—	—	0.0436	—	0.0369 (J)	—	0.0151 (J)	—	—	0.021 (J)	0.0528
RE46-10-12955	46-611497	0–1	Soil	—	—	—	0.0018 (J)	—	—	—	0.018 (J)	—	—	—	0.0124 (J)	—	0.0279 (J)	—	—	—	—	0.0197 (J)	0.0203 (J)
RE46-10-12956	46-611497	1–2	Soil	—	—	—	—	—	0.0173 (J)	0.014 (J)	0.025 (J)	0.0121 (J)	—	—	0.0159 (J)	—	0.0332 (J)	—	—	—	—	0.0181 (J)	0.0263 (J)
RE46-10-12959	46-611499	0–1	Soil	—	—	—	—	0.0089	0.0166 (J)	—	0.0137 (J)	—	—	—	—	—	0.0294 (J)	—	—	—	—	0.0243 (J)	0.0247 (J)
RE46-10-12960	46-611499	1–2	Soil	—	—	—	—	—	0.0143 (J)	—	0.017 (J)	—	—	—	—	—	0.0231 (J)	—	—	—	—	0.0148 (J)	0.0209 (J)
RE46-10-12961	46-611500	0–1	Soil	—	—	—	—	—	0.0148 (J)	—	0.0157 (J)	0.0127 (J)	—	—	0.0128 (J)	—	0.0231 (J)	—	—	—	0.0154 (J)	0.0149 (J)	0.0205 (J)

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

Table 7.17-4
Radionuclides Detected or Detected above
BVs/FVs at Consolidated Unit 46-004(d2)-99

Sample ID	Location ID	Depth (ft)	Media	Plutonium-238	Uranium-234
Soil BV[a]				**0.023**	**2.59**
Construction Worker SAL[b]				**40**	**220**
Industrial SAL[b]				**240**	**1500**
Residential SAL[b]				**37**	**170**
RE46-10-12934	46-611486	1–2	Soil	—[c]	2.64
RE46-10-12959	46-611499	0–1	Soil	0.032	—

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.17-5
Samples Collected and Analyses Requested at SWMU 46-004(g)

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

Table 7.17-6
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(g)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Lead	Mercury	Nickel	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**11.2**	**0.1**	**6.58**	**na[b]**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**22.3**	**0.1**	**15.4**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**449[d]**	**12400**	**800**	**92.9[e]**	**6190**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**2920[d]**	**45400**	**800**	**310[f]**	**22700**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**219[d]**	**3130**	**400**	**23[f]**	**1560**	**54.8**	**391**	**391**	**23500**
RE46-10-12637	46-611444	0–1	Soil	1.14 (U)	0.571 (U)	—[g]	—	—	—	—	—	—	—	50.2
RE46-10-12638	46-611444	1–2	Soil	0.992 (U)	0.496 (U)	—	—	—	—	—	—	—	—	—
RE46-10-12639	46-611445	0–1	Soil	1.19 (U)	3.38	—	118 (J+)	76	2.44 (J+)	—	—	—	7.8	86.4
RE46-10-12640	46-611445	1–2	Qbt 3	1.18 (U)	—	—	36 (J+)	34.5	0.492 (J+)	—	—	1.19 (U)	1.68	—
RE46-10-12641	46-611446	0–1	Soil	1.25 (U)	1.03	—	170 (J+)	22.6	0.857 (J+)	—	0.000755 (J)	—	16.8	61.5
RE46-10-12642	46-611446	1–2	Soil	0.952 (U)	0.476 (U)	—	—	—	0.222 (J+)	—	—	—	4.34	—
RE46-10-12643	46-611447	0–1	Soil	1.12 (U)	—	—	15	—	0.345	—	—	—	1.03	—
RE46-10-12644	46-611447	1–2	Soil	1.07 (U)	1.26	—	163	24.5	4.04	36.9	0.00101 (J)	—	8.32	60.1
RE46-10-12645	46-611448	0–1	Soil	1.22 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-12646	46-611448	1–2	Soil	1.08 (U)	—	22.3	—	—	—	—	—	—	—	—
RE46-10-12647	46-611449	0–1	Soil	1.18 (U)	1.51	21.4	222	36.4	1.33	20.8	—	—	12.2	68.8
RE46-10-12648	46-611449	1–2	Soil	1.12 (U)	0.458 (J)	—	36	—	0.128	—	—	—	2.3	—
RE46-10-12649	46-611450	0–1	Soil	1.06 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-12650	46-611450	1–2	Qbt 3	1.02 (U)	—	—	—	—	—	—	—	1.01 (U)	—	—
RE46-10-12651	46-611451	0–1	Soil	1.2 (U)	—	—	—	—	—	—	—	—	—	56.1
RE46-10-12652	46-611451	1–2	Soil	1.23 (U)	—	—	—	—	—	—	—	—	—	52.7

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.17-7
Organic Chemicals Detected at SWMU 46-004(g)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	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	Dibenzofuran	Di-n-butylphthalate	Ethylbenzene	Fluoranthene
Construction Worker SSL[a]				**18600**	**6680**[b]	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**21.3**	**552**[c]	**23800**	**6630**	**8910**
Industrial SSL[a]				**36700**	**18300**[b]	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**2.34**	**1000**[d]	**68400**	**385**	**24400**
Residential SSL[a]				**3440**	**1720**[b]	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**0.621**	**78**[d]	**6110**	**69.7**	**2290**
RE46-10-12637	46-611444	0–1	Soil	—[e]	—	—	—	—	—	0.0185 (J)	0.027 (J)	0.0166 (J)	—	0.017 (J)	—	—	—	—	0.0344 (J)
RE46-10-12638	46-611444	1–2	Soil	—	—	—	—	—	—	—	0.0156 (J)	0.0207 (J)	—	—	—	—	—	—	0.0135 (J)
RE46-10-12639	46-611445	0–1	Soil	0.0607	—	0.112	0.0421	0.0213	0.282	0.291	0.374	0.178	0.145	0.302	—	—	—	—	0.641
RE46-10-12640	46-611445	1–2	Qbt 3	—	—	0.0141 (J)	0.0066	0.0032 (J)	0.0597	0.0591	0.0714	0.0459	0.032 (J)	0.065	0.147	—	—	—	0.108
RE46-10-12641	46-611446	0–1	Soil	—	—	—	0.0153	0.0082	—	0.016 (J)	0.0357 (J)	—	—	0.0158 (J)	—	—	—	0.000373 (J)	0.0269 (J)
RE46-10-12642	46-611446	1–2	Soil	0.176	0.0173 (J-)	0.34	—	—	0.728	0.709	0.854	0.379	0.395	0.753	—	0.117 (J-)	0.154 (J)	—	1.71
RE46-10-12643	46-611447	0–1	Soil	—	—	—	—	—	0.0327 (J)	0.0297 (J)	0.0502	0.0152 (J)	—	0.0305 (J)	—	—	—	—	0.0671
RE46-10-12644	46-611447	1–2	Soil	—	—	—	0.12	—	0.0281 (J)	0.0292 (J)	0.0642	0.0303 (J)	—	0.0318 (J)	—	—	—	—	0.0488
RE46-10-12645	46-611448	0–1	Soil	—	—	—	—	—	0.0146 (J)	—	0.0164 (J)	—	—	—	—	—	—	—	0.0203 (J)
RE46-10-12647	46-611449	0–1	Soil	—	—	—	0.027	—	—	—	0.0172 (J)	—	—	—	—	—	—	—	—
RE46-10-12648	46-611449	1–2	Soil	—	—	—	0.0089	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12651	46-611451	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 7.17-7 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**8910**	**213**	**10300**[f]	**10600**	**1240**[c]	**702**	**7150**	**6680**	**21100**	**64300**	**688**[c]	**27500**	**3130**[g]
Industrial SSL[a]				**24400**	**23.4**	**14900**[f]	**1090**	**4100**[d]	**252**	**20500**	**18300**	**57900**	**77100**	**260**[d]	**31500**	**3610**[g]
Residential SSL[a]				**2290**	**6.21**	**3210**[f]	**199**	**310**[d]	**45**	**1830**	**1720**	**5570**	**21800**	**62**[d]	**9550**	**1090**[g]
RE46-10-12637	46-611444	0–1	Soil	—	—	0.00041 (J)	—	—	—	0.028 (J)	0.0331 (J)	—	—	—	—	—
RE46-10-12638	46-611444	1–2	Soil	—	—	—	0.00258 (J)	—	—	—	0.0206 (J)	0.000466 (J)	—	—	—	0.000409 (J)
RE46-10-12639	46-611445	0–1	Soil	0.0642	0.165	—	—	0.0252 (J-)	0.0741 (J-)	0.494	0.58	—	0.000486 (J)	—	—	—
RE46-10-12640	46-611445	1–2	Qbt 3	—	0.0401	—	—	—	—	0.067	0.109	0.00043 (J)	—	—	—	—
RE46-10-12641	46-611446	0–1	Soil	—	—	—	0.00286 (J)	—	—	0.013 (J)	0.0276 (J)	0.00121	—	0.000431 (J)	0.000373 (J)	0.000956 (J)
RE46-10-12642	46-611446	1–2	Soil	0.198	0.368	—	—	0.0865 (J-)	0.289 (J-)	1.45	1.58	0.000666 (J)	—	0.000924 (J)	0.00043 (J)	0.00112 (J)
RE46-10-12643	46-611447	0–1	Soil	—	0.0123 (J)	—	—	—	—	0.043	0.0585	—	—	—	—	—
RE46-10-12644	46-611447	1–2	Soil	—	0.028 (J)	—	—	—	—	0.0279 (J)	0.0452	—	—	—	—	—
RE46-10-12645	46-611448	0–1	Soil	—	—	—	—	—	—	—	0.0181 (J)	—	—	—	—	—
RE46-10-12647	46-611449	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12648	46-611449	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12651	46-611451	0–1	Soil	—	—	—	—	—	—	—	—	0.00129	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] Xylene used as a surrogate based on structural similarity.

Table 7.17-8
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(g)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt2, 3, 4 BV[a]				**na**[b]	**1.98**	**0.09**	**1.93**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE46-10-12639	46-611445	0–1	Soil	—[d]	31.7	1.65	2.33
RE46-10-12640	46-611445	1–2	Qbt 3	—	4.19	0.165	—
RE46-10-12641	46-611446	0–1	Soil	—	32.4	1.71	—
RE46-10-12642	46-611446	1–2	Soil	—	2.93	—	—
RE46-10-12643	46-611447	0–1	Soil	—	3.88	—	—
RE46-10-12644	46-611447	1–2	Soil	0.118	49.9	2.78	—
RE46-10-12647	46-611449	0–1	Soil	—	20.7	1.04	—
RE46-10-12652	46-611451	1–2	Soil	0.134	—	—	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.17-9
Samples Collected and Analyses Requested at SWMU 46-004(h)

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

Table 7.17-10
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(h)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Mercury	Perchlorate
Soil BV[a]				**0.83**	**0.4**	**0.1**	**na**[b]
Construction Worker SSL[c]				**124**	**309**	**92.9**[d]	**217**
Industrial SSL[c]				**454**	**1120**	**310**[e]	**795**
Residential SSL[c]				**31.3**	**77.9**	**23**[e]	**54.8**
RE46-10-13963	46-611765	0–1	Soil	1.23 (U)	0.617 (U)	0.563	0.000661 (J)
RE46-10-13964	46-611765	1–2	Soil	1.05 (U)	0.523 (U)	0.3	0.000709 (J)
RE46-10-13966	46-611766	0–1	Soil	1.19 (U)	0.597 (U)	0.261	—[f]
RE46-10-13965	46-611766	1–2	Soil	1.09 (U)	0.547 (U)	0.528	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.17-11
Organic Chemicals Detected at SWMU 46-004(h)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254
Construction Worker SSL*				**4.36**
Industrial SSL*				**8.26**
Residential SSL*				**1.12**
RE46-10-13965	46-611766	1–2	Soil	0.0232

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
*SSLs from NMED (2009,108070).

Table 7.18-1
Samples Collected and Analyses Requested at AOC 46-004(e2)

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

Table 7.18-2
Inorganic Chemicals Detected or Detected above BVs at AOC 46-004(e2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Lead	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**11.2**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**22.3**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**449**[c]	**12400**	**800**	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**2920**[c]	**45400**	**800**	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**219**[c]	**3130**	**400**	**391**	**23500**
RE46-10-10827	46-611022	0–1	Soil	1.8 (U)	0.521 (U)	20.5 (J)	57.1 (J)	103 (J)	—[d]	94.8 (J)
RE46-10-10828	46-611022	2–3	Qbt 3	1.13 (U)	—	8.31 (J)	97.3 (J)	47.6 (J)	1.15 (U)	70.9 (J)
RE46-10-10829	46-611023	0–1	Soil	—	0.571 (U)	—	56 (J)	34.7 (J)	—	57.8 (J)
RE46-10-10830	46-611023	2–3	Qbt 3	0.565 (U)	—	—	20.2 (J)	21.3 (J)	1.01 (U)	—
RE46-10-10831	46-611024	0–1	Soil	0.911 (U)	0.614 (U)	—	—	—	—	71.3 (J)
RE46-10-10832	46-611024	2–3	Qbt 3	—	—	—	—	—	1.04 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070).

[c] SSL for hexavalent chromium.

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

Table 7.18-3
Organic Chemicals Detected at AOC 46-004(e2)

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	Dibenzofuran	Ethylbenzene	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**21.3**	**552**[c]	**6630**	**8910**	**8910**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**2.34**	**1000**[d]	**385**	**24400**	**24400**
Residential SSL[a]				**3440**	**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**0.621**	**78**[d]	**69.7**	**2290**	**2290**
RE46-10-10827	46-611022	0–1	Soil	0.553	0.0818 (J)	0.795	0.108	0.0978	1.37	1.34	1.69	0.672	0.711	1.45	0.211	0.287 (J)	0.000788 (J+)	4.65	0.477
RE46-10-10828	46-611022	2–3	Qbt 3	0.0334 (J)	0.00297 (J)	0.0446	0.0275	0.0148 (J)	0.0981	0.0925	0.11	0.0678	0.0502	0.106	—[e]	—	—	0.294	0.0269 (J)
RE46-10-10829	46-611023	0–1	Soil	0.0809	—	0.103	0.0693	0.0355	0.231	0.242	0.324	0.129	0.134	0.27	0.0375 (J)	—	—	0.763	0.069
RE46-10-10830	46-611023	2–3	Qbt 3	0.018 (J)	—	0.0247 (J)	0.0278	0.015	0.0658	0.0592	0.0711	0.0474	0.0334 (J)	0.0711	—	—	—	0.194	0.0146 (J)
RE46-10-10831	46-611024	0–1	Soil	—	—	—	0.0052	0.0031 (J)	—	—	—	—	—	—	—	—	—	0.0188 (J)	—
RE46-10-10832	46-611024	2–3	Qbt 3	—	—	0.00769 (J)	—	—	—	0.0123 (J)	0.0155 (J)	—	—	0.0133 (J)	—	—	—	0.0441	—

Table 7.18-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Methylphenol[2-]	Methylphenol[4-]	Naphthalene	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**213**	**10300[f]**	**10600**	**1240[c]**	**Na[g]**	**na**	**702**	**7150**	**6680**	**21100**	**64300**	**3100[c]**	**27500**	**3130[i]**
Industrial SSL[a]				**23.4**	**14900[f]**	**1090**	**4100[d]**	**34000[d]**	**3400[d]**	**252**	**20500**	**18300**	**57900**	**77100**	**10000[d]**	**31500**	**3610[d]**
Residential SSL[a]				**6.21**	**3210[f]**	**199**	**310[d]**	**3100[d]**	**310[d]**	**45**	**1830**	**1720**	**5570**	**21800**	**78000[d]**	**9550**	**1090[d]**
RE46-10-10827	46-611022	0–1	Soil	0.673	0.0158 (J+)	0.00423 (J+)	0.136	—	—	0.451	4.1	3.85	0.00814 (J+)	—	0.000436 (J+)	0.000703 (J+)	0.00195 (J+)
RE46-10-10828	46-611022	2–3	Qbt 3	0.0549	—	—	—	—	—	0.0216 (J)	0.239	0.243	—	0.000362 (J)	—	0.000548 (J)	0.000642 (J)
RE46-10-10829	46-611023	0–1	Soil	0.125	—	—	0.0188 (J)	—	—	0.0612	0.576	0.614	—	—	—	—	—
RE46-10-10830	46-611023	2–3	Qbt 3	0.0338 (J)	—	—	—	—	—	—	0.144	0.163	—	—	—	—	—
RE46-10-10831	46-611024	0–1	Soil	—	—	—	—	0.0836 (J)	0.224 (J)	—	0.0128 (J)	0.0154 (J)	—	—	—	—	—
RE46-10-10832	46-611024	2–3	Qbt 3	—	—	—	—	—	—	—	0.0348 (J)	0.0346 (J)	—	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] na = Not available.

[h] Xylene used as a surrogate based on structural similarity.

Table 7.19-1
Samples Collected and Analyses Requested at SWMU 46-004(f)

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

Table 7.19-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Lead	Selenium	Sodium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**11.2**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**22.3**	**1.52**	**915**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**800**	**1550**	**na**[c]	**92900**
Industrial SSL[b]				**454**	**1120**	**800**	**5680**	**na**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**400**	**391**	**na**	**23500**
RE46-10-11531	46-611272	0–1	Soil	1.1 (U)	0.55 (U)	—[d]	—	—	—
RE46-10-11532	46-611272	2–3	Qbt 3	1.11 (U)	—	—	1.12 (U)	—	—
RE46-10-11533	46-611273	0–1	Soil	0.989 (UJ)	0.494 (U)	42.8 (J)	—	—	—
RE46-10-11534	46-611273	2–3	Soil	1.05 (UJ)	0.523 (U)	43.4 (J)	—	—	—
RE46-10-11535	46-611274	0–1	Soil	1.05 (U)	0.523 (U)	—	—	—	—
RE46-10-11536	46-611274	2–3	Soil	1.03 (U)	0.515 (U)	—	—	—	—
RE46-10-11537	46-611275	0–1	Soil	1.2 (U)	0.486 (J)	—	—	1990	82.5
RE46-10-11538	46-611275	2–3	Qbt 3	1.2 (U)	—	—	1.19 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070).

[c] na = Not available.

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

Table 7.19-3
Organic Chemicals Detected at SWMU 46-004(f)

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	Chrysene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	Toluene
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**4760**	**20600**	**8910**	**8910**	**213**	**10600**	**7150**	**6680**	**21100**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**24400**	**24400**	**23.4**	**1090**	**20500**	**18300**	**57900**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**2290**	**2290**	**6.21**	**199**	**1830**	**1720**	**5570**
RE46-10-11531	46-611272	0–1	Soil	—[c]	—	—	—	0.0141 (J)	0.0131 (J)	0.0184 (J)	—	—	—	0.0129 (J)	0.0243 (J)	—	—	—	0.0135 (J)	0.0229 (J)	0.000577 (J)
RE46-10-11532	46-611272	2–3	Qbt 3	—	—	0.0563	0.0482	—	—	—	—	—	0.19 (J)	—	—	—	—	—	—	0.0122 (J)	—
RE46-10-11534	46-611273	2–3	Soil	—	—	—	0.0015 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11535	46-611274	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	0.162 (J)	—	—	0.00336 (J)	0.162 (J)	0.139 (J)	—
RE46-10-11536	46-611274	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00247 (J)	—	—	—
RE46-10-11537	46-611275	0–1	Soil	0.015 (J)	0.0335 (J)	0.0132 (J)	0.0107 (J)	0.115	0.0862	0.125	0.0435	0.0537	—	0.109	0.234	0.0127 (J)	0.04 (J)	—	0.139	—	—
RE46-10-11538	46-611275	2–3	Qbt 3	—	—	0.0037 (J)	0.0026 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are 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 7.20-1
Samples Collected and Analyses Requested at AOC 46-004(f2)

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

Table 7.20-2
Inorganic Chemicals Detected or Detected above BVs at AOC 46-004(f2)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Copper	Cyanide	Mercury	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**4.66**	**0.5**	**0.1**	**na[b]**	**0.3**
Soil BV[a]				**0.83**	**295**	**0.4**	**14.7**	**0.5**	**0.1**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**4350**	**309**	**12400**	**6190**	**92.9[d]**	**217**	**1550**
Industrial SSL[c]				**454**	**224000**	**1120**	**45400**	**22700**	**310[e]**	**795**	**5680**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**3130**	**1560**	**23[e]**	**54.8**	**391**
RE46-10-12750	46-611475	0–1	Soil	0.86 (U)	—[f]	—	—	0.59 (U)	—	—	—
RE46-10-12751	46-611475	1–2	Soil	—	—	—	—	0.54 (U)	—	—	—
RE46-10-12752	46-611476	0–1	Qbt 3	1.05 (U)	—	—	—	—	1.57	—	1.08 (U)
RE46-10-12753	46-611476	1–2	Qbt 3	1.08 (U)	—	—	—	—	0.564	—	1.08 (U)
RE46-10-12754	46-611477	0–1	Soil	1.06 (U)	—	—	—	—	—	—	—
RE46-10-12755	46-611477	1–2	Soil	1 (U)	—	—	—	—	—	—	—
RE46-10-12756	46-611478	0–1	Soil	1.12 (U)	—	—	—	—	0.325	0.000798 (J)	—
RE46-10-12757	46-611478	1–2	Soil	1.04 (U)	—	—	—	—	—	0.000695 (J)	—
RE46-10-12758	46-611479	0–1	Soil	1.09 (U)	—	0.544 (U)	—	—	—	0.000598 (J)	—
RE46-10-12759	46-611479	1–2	Soil	1.05 (U)	—	0.527 (U)	—	—	—	—	—
RE46-10-12760	46-611480	0–1	Soil	1.17 (U)	—	0.584 (U)	18.8	—	—	—	—
RE46-10-12761	46-611480	1–2	Qbt 3	1.12 (U)	88.4	—	7.21	—	—	—	1.12 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.20-3
Organic Chemicals Detected at AOC 46-004(f2)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260	Benzo(b)fluoranthene	Benzoic Acid	Chrysene	Fluoranthene	Phenanthrene	Pyrene	Trichloroethene
Construction Worker SSL[a]				**4.36**	**7.58**	**213**	**952000[b]**	**20600**	**8910**	**7150**	**6680**	**4600**
Industrial SSL[a]				**8.26**	**8.26**	**23.4**	**2500000[c]**	**2340**	**24400**	**20500**	**18300**	**253**
Residential SSL[a]				**1.12**	**2.22**	**6.21**	**240000[c]**	**621**	**2290**	**1830**	**1720**	**45.7**
RE46-10-12750	46-611475	0–1	Soil	0.03 (J)	0.035 (J)	0.16 (J)	—[d]	—	0.086 (J)	0.051 (J)	0.089 (J)	—
RE46-10-12751	46-611475	1–2	Soil	0.014 (J)	0.015 (J)	—	—	—	—	—	—	—
RE46-10-12754	46-611477	0–1	Soil	0.0045	0.0062	—	—	0.0167 (J)	—	—	—	—
RE46-10-12756	46-611478	0–1	Soil	—	0.0146 (J)	—	—	0.0181 (J)	—	—	—	—
RE46-10-12757	46-611478	1–2	Soil	0.003 (J)	0.0018 (J)	—	—	—	—	—	—	0.000409 (J)
RE46-10-12758	46-611479	0–1	Soil	—	—	—	0.861	—	—	0.0909	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[c] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[d] — = Not detected.

Table 7.20-4
Radionuclides Detected or Detected above BVs/FVs at AOC 46-004(f2)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240
Soil BV[a]				**1.65**	**0.054**
Construction Worker SAL[b]				**18**	**36**
Industrial SAL[b]				**23**	**210**
Residential SAL[b]				**5.6**	**33**
RE46-10-12757	46-611478	1–2	Soil	0.128	0.0221

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.21-1
Samples Collected and Analyses Requested at SWMU 46-004(m)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-12661	46-611452	0–1	Soil	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896	10-1896
RE46-10-12662	46-611452	5–6	Qbt 3	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967	10-1967
RE46-10-12663	46-611453	0–1	Soil	10-1877	10-1876	10-1876	10-1876	10-1877	10-1877	10-1876	10-1878	10-1878	10-1878	10-1878	10-1878
RE46-10-12664	46-611453	1–2	Soil	10-1877	10-1876	10-1876	10-1876	10-1877	10-1877	10-1876	10-1878	10-1878	10-1878	10-1878	10-1878
RE46-10-12665	46-611454	0–1	Soil	10-1877	10-1876	10-1876	10-1876	10-1877	10-1877	10-1876	10-1878	10-1878	10-1878	10-1878	10-1878
RE46-10-12666	46-611454	1–2	Qbt 3	10-1877	10-1876	10-1876	10-1876	10-1877	10-1877	10-1876	10-1878	10-1878	10-1878	10-1878	10-1878
RE46-10-12667	46-611455	0–1	Soil	10-3031	10-3030	10-3030	10-3030	10-3031	10-3031	10-3030	10-3031	10-3031	10-3031	10-3031	10-3031
RE46-10-12668	46-611455	1–2	Qbt 3	10-3031	10-3030	10-3030	10-3030	10-3031	10-3031	10-3030	10-3031	10-3031	10-3031	10-3031	10-3031
RE46-10-12669	46-611456	0–1	Soil	10-3031	10-3030	10-3030	10-3030	10-3031	10-3031	10-3030	10-3031	10-3031	10-3031	10-3031	10-3031
RE46-10-12670	46-611456	1–2	Soil	10-3031	10-3030	10-3030	10-3030	10-3031	10-3031	10-3030	10-3031	10-3031	10-3031	10-3031	10-3031
RE46-10-12671	46-611457	0–1	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12672	46-611457	1–2	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12673	46-611458	0–1	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12674	46-611458	1–2	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12675	46-611459	0–1	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12676	46-611459	1–2	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12677	46-611460	0–1	Soil	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12678	46-611460	1–2	Qbt 3	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12679	46-611461	0–1	Qbt 3	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715
RE46-10-12680	46-611461	1–2	Qbt 3	10-1714	10-1713	10-1713	10-1713	10-1714	10-1714	10-1713	10-1715	10-1715	10-1715	10-1715	10-1715

Table 7.21-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(m)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Iron	Manganese	Mercury	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**4.66**	**14500**	**482**	**0.1**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**14.7**	**21500**	**671**	**0.1**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**12400**	**217000**	**463**	**92.9**[c]	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**45400**	**795000**	**145000**	**310**[d]	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**3130**	**54800**	**10700**	**23**[d]	**391**	**23500**
RE46-10-12661	46-611452	0–1	Soil	1.14 (UJ)	—[e]	—	—	—	—	—	—
RE46-10-12662	46-611452	5–6	Qbt 3	0.599 (J)	—	—	—	—	—	1.05 (UJ)	—
RE46-10-12663	46-611453	0–1	Soil	0.953 (UJ)	0.476 (U)	—	—	—	—	—	—
RE46-10-12664	46-611453	1–2	Soil	1.09 (UJ)	0.545 (U)	—	—	—	—	—	—
RE46-10-12665	46-611454	0–1	Soil	1.07 (UJ)	—	22.5	34800	—	0.199	—	238
RE46-10-12666	46-611454	1–2	Qbt 3	1.21 (UJ)	—	—	—	—	—	1.24 (U)	—
RE46-10-12667	46-611455	0–1	Soil	1.07 (U)	0.536 (U)	—	—	—	—	—	—
RE46-10-12668	46-611455	1–2	Qbt 3	1.02 (U)	—	—	—	—	—	1.08 (U)	—
RE46-10-12669	46-611456	0–1	Soil	1.22 (U)	0.608 (U)	—	—	—	—	—	87.7
RE46-10-12670	46-611456	1–2	Soil	1.21 (U)	0.607 (U)	—	—	—	—	—	55.5
RE46-10-12671	46-611457	0–1	Soil	1.17 (U)	—	—	—	—	0.125 (U)	—	—
RE46-10-12672	46-611457	1–2	Soil	1.22 (U)	—	—	—	—	—	—	—
RE46-10-12673	46-611458	0–1	Soil	1.08 (U)	—	—	—	—	—	—	—
RE46-10-12674	46-611458	1–2	Soil	1.05 (U)	0.44 (J)	—	—	—	—	—	—
RE46-10-12675	46-611459	0–1	Soil	1.26 (U)	—	—	—	—	—	—	—
RE46-10-12676	46-611459	1–2	Soil	1.21 (U)	—	—	—	—	—	—	—
RE46-10-12677	46-611460	0–1	Soil	1.02 (U)	—	—	—	—	—	—	50
RE46-10-12678	46-611460	1–2	Qbt 3	1.02 (U)	—	—	—	680	—	1.04 (U)	—
RE46-10-12679	46-611461	0–1	Qbt 3	1.03 (U)	—	10.7	—	—	—	1.08 (U)	—
RE46-10-12680	46-611461	1–2	Qbt 3	1.02 (U)	—	8.93	—	—	—	1.02 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.21-3
Organic Chemicals Detected at SWMU 46-004(m)

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	Chrysene	Dibenzofuran	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**20600**	**552[c]**	**8910**	**8910**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**1000[d]**	**24400**	**24400**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**78[d]**	**2290**	**2290**
RE46-10-12661	46-611452	0–1	Soil	—[e]	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12662	46-611452	5–6	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12663	46-611453	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12665	46-611454	0–1	Soil	0.207	0.428	0.0189 (J)	—	1.07	1.08	2.1	0.502	—	0.0854 (J)	1.11	0.0838 (J)	2.26	0.18
RE46-10-12666	46-611454	1–2	Qbt 3	0.158	0.354	0.0134 (J)	—	0.779	0.765	1.31	0.378	—	—	0.703	—	1.67	0.147
RE46-10-12667	46-611455	0–1	Soil	—	—	—	0.0028 (J)	—	—	—	—	—	0.608	—	—	—	—
RE46-10-12669	46-611456	0–1	Soil	—	0.0092 (J)	0.01	—	—	0.0292 (J)	0.0434	0.0209 (J)	0.0152 (J)	—	0.0336 (J)	—	0.0765	—
RE46-10-12670	46-611456	1–2	Soil	—	—	0.006	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12671	46-611457	0–1	Soil	—	0.00988 (J)	0.0109	0.0069	0.0285 (J)	0.0213 (J)	0.0284 (J)	0.0203 (J)	—	0.094 (J)	0.0248 (J)	—	0.0667	—
RE46-10-12672	46-611457	1–2	Soil	—	—	0.0022 (J)	—	—	—	—	—	—	0.153 (J)	—	—	—	—
RE46-10-12673	46-611458	0–1	Soil	—	—	0.0026 (J)	—	—	—	—	—	—	0.0811 (J)	—	—	0.0177 (J)	—
RE46-10-12674	46-611458	1–2	Soil	—	—	—	—	—	—	—	—	—	0.145 (J)	—	—	—	—
RE46-10-12675	46-611459	0–1	Soil	—	—	—	—	0.0212 (J)	0.0135 (J)	0.0154 (J)	—	—	0.109 (J)	0.0164 (J)	—	0.0433	—
RE46-10-12679	46-611461	0–1	Qbt 3	—	—	—	—	—	—	—	—	—	0.0843 (J)	—	—	—	—

Table 7.21-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Tetrachloroethene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**213**	**10600**	**1240[c]**	**702**	**7150**	**6680**	**338**	**21100**	**64300**	**4600**	**3130[f]**
Industrial SSL[a]				**23.4**	**1090**	**4100[d]**	**252**	**20500**	**18300**	**36.4**	**57900**	**77100**	**253**	**3610[f]**
Residential SSL[a]				**6.21**	**199**	**310[d]**	**45**	**1830**	**1720**	**6.99**	**5570**	**21800**	**45.7**	**1090[f]**
RE46-10-12661	46-611452	0–1	Soil	—	—	—	—	—	—	—	0.00236	—	—	—
RE46-10-12662	46-611452	5–6	Qbt 3	—	0.00252 (J)	—	—	—	—	—	—	—	—	—
RE46-10-12663	46-611453	0–1	Soil	—	0.00308 (J+)	—	—	—	—	0.000432 (J+)	0.00117 (J+)	0.00255 (J+)	0.00378 (J+)	0.000358 (J+)
RE46-10-12665	46-611454	0–1	Soil	0.536	—	0.0289 (J)	0.0637	1.43	2.37	—	—	—	—	—
RE46-10-12666	46-611454	1–2	Qbt 3	0.375	—	0.0245 (J)	0.0554	1.16	1.58	—	—	—	—	—
RE46-10-12667	46-611455	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12669	46-611456	0–1	Soil	0.0813	—	—	—	0.0554	0.0679	—	—	—	—	—
RE46-10-12670	46-611456	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12671	46-611457	0–1	Soil	0.0164 (J)	—	—	—	0.0504	0.0517	—	—	—	—	—
RE46-10-12672	46-611457	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12673	46-611458	0–1	Soil	—	—	—	—	0.012 (J)	0.0141 (J)	—	—	—	—	—
RE46-10-12674	46-611458	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12675	46-611459	0–1	Soil	—	—	—	—	0.0297 (J)	0.0327 (J)	—	—	—	0.000725 (J)	—
RE46-10-12679	46-611461	0–1	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] Xylene used as a surrogate based on structural similarity.

Table 7.21-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(m)

Sample ID	Location ID	Depth (ft)	Media	Uranium-234	Uranium-235/236
Qbt2, 3, 4 BV[a]				**1.98**	**0.09**
Construction Worker SAL[b]				**220**	**43**
Industrial SAL[b]				**1500**	**87**
Residential SAL[b]				**170**	**17**
RE46-10-12678	46-611460	1–2	Qbt 3	—[c]	0.0929
RE46-10-12679	46-611461	0–1	Qbt 3	3.14	0.247
RE46-10-12680	46-611461	1–2	Qbt 3	2.39	0.178

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).
[c] — = Not detected or not detected above BV/FV.

Table 7.22-1
Samples Collected and Analyses Requested at SWMU 46-004(p)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	Cesium	VOCs	SVOCs	PCBs	Cyanide	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13657	46-611626	10–11	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13658	46-611626	15–16	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13659	46-611626	20–21	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13660	46-611626	25–26	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13661	46-611627	10–11	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13662	46-611627	15–16	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13663	46-611627	20–21	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326
RE46-10-13664	46-611627	25–26	Qbt 3	10-3326	10-3326	10-3324	10-3324	10-3324	10-3326	10-3325	10-3326	10-3326	10-3326	10-3326

Table 7.22-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(p)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cesium	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**na**[b]	**0.3**	**63.5**
Construction Worker SSL[c]				**124**	**na**	**1550**	**92900**
Industrial SSL[c]				**454**	**na**	**5680**	**341000**
Residential SSL[c]				**31.3**	**na**	**391**	**23500**
RE46-10-13657	46-611626	10–11	Qbt 3	1.08 (U)	0.104 (J)	1.1 (U)	—[d]
RE46-10-13658	46-611626	15–16	Qbt 3	1.07 (U)	0.128	1.1 (U)	72.7
RE46-10-13659	46-611626	20–21	Qbt 3	1.09 (U)	0.12	1.05 (U)	—
RE46-10-13660	46-611626	25–26	Qbt 3	1.04 (U)	0.133	1.06 (U)	—
RE46-10-13661	46-611627	10–11	Qbt 3	1.07 (U)	0.156	1.08 (U)	—
RE46-10-13662	46-611627	15–16	Qbt 3	1.08 (U)	0.11 (J)	1.14 (U)	—
RE46-10-13663	46-611627	20–21	Qbt 3	1.09 (U)	0.119	1.12 (U)	—
RE46-10-13664	46-611627	25–26	Qbt 3	1.15 (U)	0.227	1.15 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

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

Table 7.23-1
Samples Collected and Analyses Requested at SWMU 46-004(q)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-12967	46-611501	0–1	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12968	46-611501	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12969	46-611502	0–1	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12970	46-611502	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12971	46-611503	0–1	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12972	46-611503	1–2	Soil	10-2434	10-2436	10-2436	10-2436	10-2434	10-2434	10-2436	10-2435	10-2435	10-2435	10-2435
RE46-10-12973	46-611504	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12974	46-611504	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12975	46-611505	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12976	46-611505	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12977	46-611506	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12978	46-611506	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12979	46-611507	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12980	46-611507	1–2	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12981	46-611508	0–1	Soil	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12982	46-611508	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12983	46-611509	0–1	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12984	46-611509	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12985	46-611510	0–1	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12986	46-611510	1–2	Qbt 3	10-1819	10-1818	10-1818	10-1818	10-1819	10-1819	10-1818	10-1820	10-1820	10-1820	10-1820
RE46-10-12987	46-611511	0–1	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12988	46-611511	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12989	46-611512	0–1	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12990	46-611512	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12991	46-611513	0–1	Soil	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833
RE46-10-12992	46-611513	1–2	Qbt 3	10-1833	10-1834	10-1834	10-1834	10-1833	10-1833	10-1834	10-1833	10-1833	10-1833	10-1833

Table 7.23-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(q)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Beryllium	Cadmium	Copper	Lead	Manganese	Mercury	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.21**	**1.63**	**4.66**	**11.2**	**482**	**0.1**	**na[b]**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**295**	**1.83**	**0.4**	**14.7**	**22.3**	**671**	**0.1**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**144**	**309**	**12400**	**800**	**463**	**92.9[d]**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**2260**	**1120**	**45400**	**800**	**145000**	**310[e]**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**156**	**77.9**	**3130**	**400**	**10700**	**23[e]**	**54.8**	**391**	**391**	**23500**
RE46-10-12967	46-611501	0–1	Soil	1.26 (U)	—[f]	—	1.06	38.3	32.3	—	456 (J)	0.00166 (J)	—	—	126
RE46-10-12968	46-611501	1–2	Soil	1.1 (U)	—	—	—	24.5	49.5	—	824 (J)	0.000603 (J)	—	—	70.5
RE46-10-12969	46-611502	0–1	Soil	1.14 (U)	—	—	—	18.1	22.4	—	0.989 (J)	—	—	—	99.6
RE46-10-12970	46-611502	1–2	Soil	1.18 (U)	—	—	0.591 (U)	—	—	—	0.165 (J)	—	—	—	54.7
RE46-10-12971	46-611503	0–1	Soil	1.21 (U)	—	—	0.929	20.2	30.6	—	13.6 (J)	—	—	2.84	143
RE46-10-12972	46-611503	1–2	Soil	1.12 (U)	—	—	0.56 (U)	—	—	—	2.04 (J)	—	—	—	—
RE46-10-12973	46-611504	0–1	Soil	1.16 (U)	—	—	—	—	—	—	5.55	0.000671 (J)	—	—	55
RE46-10-12974	46-611504	1–2	Soil	1.1 (U)	—	—	—	—	—	—	2.73	—	—	—	—
RE46-10-12975	46-611505	0–1	Soil	1.04 (U)	—	—	0.518 (U)	—	—	—	—	—	—	—	—
RE46-10-12976	46-611505	1–2	Qbt 3	0.99 (U)	62.9	—	—	—	—	—	—	0.000762 (J)	1.03 (U)	—	—
RE46-10-12977	46-611506	0–1	Soil	1.05 (U)	—	—	—	—	—	—	2.31	0.000958 (J)	—	—	—
RE46-10-12978	46-611506	1–2	Soil	0.941 (U)	—	—	0.47 (U)	—	—	—	0.433	0.000752 (J)	—	—	—
RE46-10-12979	46-611507	0–1	Soil	0.992 (U)	—	—	—	—	29.6	—	—	—	—	—	—
RE46-10-12980	46-611507	1–2	Soil	0.922 (U)	—	—	0.461 (U)	—	—	—	—	—	—	—	—
RE46-10-12981	46-611508	0–1	Soil	1.23 (U)	—	—	—	—	77.6	—	—	—	—	—	51.1
RE46-10-12982	46-611508	1–2	Qbt 3	1 (U)	—	—	—	—	—	546	—	—	1.03 (U)	—	—
RE46-10-12983	46-611509	0–1	Qbt 3	1.05 (U)	—	—	—	—	—	—	—	—	1.03 (U)	—	—
RE46-10-12984	46-611509	1–2	Qbt 3	1.04 (U)	—	—	—	—	—	—	—	—	1.06 (U)	—	65.6
RE46-10-12985	46-611510	0–1	Qbt 3	1.07 (U)	—	—	—	—	—	—	—	—	0.957 (U)	—	—
RE46-10-12986	46-611510	1–2	Qbt 3	0.937 (U)	—	—	—	—	—	—	—	—	1.04 (U)	—	—
RE46-10-12987	46-611511	0–1	Qbt 3	1.07 (U)	—	—	—	—	—	—	—	—	1.01 (U)	—	—
RE46-10-12988	46-611511	1–2	Qbt 3	1.02 (U)	—	—	—	—	—	—	—	—	1.05 (U)	—	—
RE46-10-12989	46-611512	0–1	Qbt 3	0.962 (U)	—	1.27	—	—	—	—	—	—	1.09 (U)	—	—
RE46-10-12990	46-611512	1–2	Qbt 3	1.04 (U)	—	—	—	—	—	—	—	—	1.06 (U)	—	—
RE46-10-12991	46-611513	0–1	Soil	1.01 (U)	—	—	0.507 (U)	—	—	1010	—	—	—	—	52.3
RE46-10-12992	46-611513	1–2	Qbt 3	0.89 (U)	—	—	—	—	14.3	559	—	—	1.05 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.23-3
Organic Chemicals Detected at SWMU 46-004(q)

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	Bis(2-ethylhexyl)phthalate	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Trichloroethene
Construction Worker SSL[a]				**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**4760**	**20600**	**8910**	**213**	**7150**	**6680**	**4600**
Industrial SSL[a]				**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**1370**	**2340**	**24400**	**23.4**	**20500**	**18300**	**253**
Residential SSL[a]				**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**347**	**621**	**2290**	**6.21**	**1830**	**1720**	**45.7**
RE46-10-12967	46-611501	0–1	Soil	0.073	0.051	0.0235 (J)	0.145	0.0799	0.17	0.0397 (J)	0.211 (J)	0.2	0.32	0.0342 (J)	0.109	0.267	—[c]
RE46-10-12968	46-611501	1–2	Soil	—	0.151	0.0581 (J)	0.0285 (J)	0.0174 (J)	0.0346 (J)	0.0116 (J)	0.105 (J)	0.0268 (J)	0.0432	—	0.0214 (J)	0.042	—
RE46-10-12969	46-611502	0–1	Soil	—	—	—	0.0387 (J)	0.0271 (J)	0.0502 (J)	0.0254 (J)	—	0.0342 (J)	0.0597 (J)	—	0.0383 (J)	0.056 (J)	—
RE46-10-12970	46-611502	1–2	Soil	—	—	—	0.0378 (J)	—	0.0424 (J)	—	—	0.0254 (J)	0.0448 (J)	—	0.0313 (J)	0.0537 (J)	—
RE46-10-12971	46-611503	0–1	Soil	—	0.265	0.0961 (J)	—	0.0316 (J)	0.0554	0.0217 (J)	—	0.0337 (J)	0.0554	0.0152 (J)	0.0302 (J)	0.0587	—
RE46-10-12972	46-611503	1–2	Soil	—	0.0107	0.0042	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12973	46-611504	0–1	Soil	—	0.0179	0.0102	0.0198 (J)	—	0.0251 (J)	—	—	—	0.0213 (J)	—	—	0.0238 (J)	0.00059 (J)
RE46-10-12974	46-611504	1–2	Soil	—	0.0057	0.0038	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12977	46-611506	0–1	Soil	—	0.0037 (J)	0.0033 (J)	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are 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 7.23-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(q)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Cobalt-60	Uranium-234	Uranium-235/236
Soil BV[a]				**1.65**	**na**[b]	**2.59**	**0.2**
Construction Worker SAL[c]				**18**	**4.1**	**220**	**43**
Industrial SAL[c]				**23**	**5.1**	**1500**	**87**
Residential SAL[c]				**5.6**	**1.3**	**170**	**17**
RE46-10-12967	46-611501	0–1	Soil	—[d]	—	86.7	4.33
RE46-10-12968	46-611501	1–2	Soil	0.119	—	34.2	1.75
RE46-10-12970	46-611502	1–2	Soil	—	0.182	—	—
RE46-10-12971	46-611503	0–1	Soil	—	—	4.25	—
RE46-10-12974	46-611504	1–2	Soil	0.33	—	—	—
RE46-10-12977	46-611506	0–1	Soil	—	—	3.13	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.24-1
Samples Collected and Analyses Requested at SWMU 46-004(r)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-17386	46-612231	0–0.25	Soil	10-3200	10-3199	10-3199	10-3199	10-3200	10-3200	10-3199	10-3200	10-3200	10-3200	10-3200
RE46-10-17387	46-612231	0.25–0.5	Soil	10-3200	10-3199	10-3199	10-3199	10-3200	10-3200	10-3199	10-3200	10-3200	10-3200	10-3200

Table 7.24-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(r)

Sample ID	Location ID	Depth (ft)	Media	Cadmium	Copper	Cyanide	Lead	Mercury	Silver	Zinc
Soil BV[a]				**0.4**	**14.7**	**0.5**	**22.3**	**0.1**	**1**	**48.8**
Construction Worker SSL[b]				**309**	**12400**	**6190**	**800**	**92.9[c]**	**1550**	**92900**
Industrial SSL[b]				**1120**	**45400**	**22700**	**800**	**310[d]**	**5680**	**341000**
Residential SSL[b]				**77.9**	**3130**	**1560**	**400**	**23[d]**	**391**	**23500**
RE46-10-17386	46-612231	0–0.25	Soil	0.98	98.9 (J)	0.93	73.5	0.111	—[e]	414 (J+)
RE46-10-17387	46-612231	0.25–0.5	Soil	1.1	108 (J)	0.8	47.8	0.344	1.6 (J+)	357 (J+)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.24-3
Organic Chemicals Detected at SWMU 46-004(r)

Sample ID	Location ID	Depth (ft)	Media	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzylphthalate	Chlordane[gamma-]	Chrysene	DDD[4,4'-]	Dibenz(a,h)anthracene	Dichloroethane[1,1-]	Dichloroethene[1,1-]	Dichloroethene[cis/trans-1,2-]
Construction Worker SSL[a]				**66800**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**47600[c]**	**135[d]**	**20600**	**695**	**21.3**	**688**	**1830**	**na[e]**
Industrial SSL[a]				**183000**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**9100[f]**	**71.9[d]**	**2340**	**79.8**	**2.34**	**350**	**2220**	**9200**
Residential SSL[a]				**17200**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**2600[f]**	**16.2[d]**	**621**	**20.3**	**0.621**	**62.9**	**618**	**700**
RE46-10-17386	46-612231	0–0.25	Soil	0.05 (J)	0.2 (J)	0.19 (J)	0.22 (J)	0.5	0.19 (J)	3.5	0.091 (J)	0.029 (J)	0.27 (J)	0.025 (J)	0.25 (J)	0.0011 (J)	0.0015 (J)	0.00073 (J)
RE46-10-17387	46-612231	0.25–0.5	Soil	0.057 (J)	0.22 (J)	0.23 (J)	0.23 (J)	0.21 (J)	0.22 (J)	2.6	0.072 (J)	—[g]	0.3 (J)	—	0.045 (J)	—	0.00057 (J)	—

Table 7.24-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Dieldrin	Di-n-octylphthalate	Endosulfan Sulfate	Fluoranthene	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Phenanthrene	Pyrene	Tetrachloroethene	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Trichloroethene
Construction Worker SSL[a]				**10.3**	**na**	**71.5[h]**	**8910**	**213**	**10600**	**7150**	**6680**	**338**	**298000**	**64300**	**4600**
Industrial SSL[a]				**1.2**	**84000[i]**	**205[h]**	**24400**	**23.4**	**1090**	**20500**	**18300**	**36.4**	**339000**	**77100**	**253**
Residential SSL[a]				**0.304**	**2400[i]**	**18.3[h]**	**2290**	**6.21**	**199**	**1830**	**1720**	**6.99**	**104000**	**21800**	**45.7**
RE46-10-17386	46-612231	0–0.25	Soil	0.041 (J)	0.32 (J)	0.036 (J)	0.46	0.3 (J)	0.0055 (J)	0.25 (J)	0.62	0.0015 (J)	2.5	0.17	0.045 (J)
RE46-10-17387	46-612231	0.25–0.5	Soil	—	—	—	0.61	0.16 (J)	0.0084	0.32 (J)	0.65	0.0026 (J)	0.69	0.067	0.014 (J)

Notes: Units are 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] 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] Chlordane SSL used as surrogate based on structural similarity.

[e] na = Not available.

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[g] — = Not detected.

[h] Endrin used as surrogate based on structural similarity.

[i] SSLs from EPA (2006, 094321).

Table 7.25-1
Samples Collected and Analyses Requested at SWMU 46-004(s)

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

Table 7.25-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(s)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Mercury	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**0.1**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**0.1**	**1.52**
Construction Worker SSL[b]				**124**	**309**	**449**[c]	**12400**	**92.9**[d]	**1550**
Industrial SSL[b]				**454**	**1120**	**2920**[c]	**45400**	**310**[e]	**5680**
Residential SSL[b]				**31.3**	**77.9**	**219**[c]	**3130**	**23**[e]	**391**
RE46-10-11305	46-611198	0–1	Soil	1.14 (U)	0.569 (U)	—[f]	484	—	—
RE46-10-11306	46-611198	1–2	Qbt 3	1.12 (U)	—	12.6 (J)	249	—	1.14 (U)
RE46-10-11307	46-611199	0–1	Soil	—	0.543 (U)	—	22.5	1.12	—
RE46-10-11308	46-611199	1–2	Qbt 3	—	—	18.6 (J)	12.5	0.405	1.09 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SSLs from NMED (2009,108070) unless otherwise noted.
[c] SSL for hexavalent chromium.
[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.
[f] — = Not detected or not detected above BV.

Table 7.25-3
Organic Chemicals Detected at SWMU 46-004(s)

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	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Tetrachloroethene	Toluene	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**8910**	**213**	**7150**	**6680**	**338**	**21100**	**3130**[c]
Industrial SSL[a]				**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**24400**	**23.4**	**20500**	**18300**	**36.4**	**57900**	**3610**[c]
Residential SSL[a]				**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**2290**	**6.21**	**1830**	**1720**	**6.99**	**5570**	**1090**[c]
RE46-10-11305	46-611198	0–1	Soil	—[d]	—	—	—	—	—	—	—	—	—	—	—	—	0.000445 (J)	0.00228	0.000631 (J)
RE46-10-11306	46-611198	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.00109 (J)	0.00061 (J)
RE46-10-11307	46-611199	0–1	Soil	—	0.0331	0.0133 (J)	0.141 (J)	0.137 (J)	0.152	0.087	0.0857 (J)	0.141 (J)	0.345 (J)	0.0714	—	0.295 (J)	—	—	—
RE46-10-11308	46-611199	1–2	Qbt 3	0.0721 (J)	0.0173 (J)	—	0.19 (J)	0.184 (J)	0.24	0.0869	0.105 (J)	0.192 (J)	0.445 (J)	0.0764	0.343 (J)	0.388 (J)	—	—	—

Notes: Units are 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] Xylene used as a surrogate based on structural similarity.
[d] — = Not detected.

Table 7.26-1
Samples Collected and Analyses Requested at SWMU 46-004(t)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-11548	46-611276	4.5–5.5	Soil	10-2763	10-2762	10-2762	10-2762	10-2763	10-2763	10-2762	10-2763	10-2763	10-2763	10-2763
RE46-10-11549	46-611276	9.5–10.5	Qbt 3	10-2763	10-2762	10-2762	10-2762	10-2763	10-2763	10-2762	10-2763	10-2763	10-2763	10-2763
RE46-10-11550	46-611277	2.5–3.5	Soil	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11551	46-611277	4.5–5.5	Qbt 3	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11552	46-611278	3–4	Soil	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11553	46-611278	5–6	Qbt 3	10-3029	10-3028	10-3028	10-3028	10-3029	10-3029	10-3028	10-3029	10-3029	10-3029	10-3029
RE46-10-11554	46-611279	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11555	46-611279	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11556	46-611280	0–1	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11557	46-611280	2–3	Soil	10-1365	10-1364	10-1364	10-1364	10-1365	10-1365	10-1364	10-1366	10-1366	10-1366	10-1366
RE46-10-11558	46-611281	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11559	46-611281	2–3	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11560	46-611282	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11561	46-611282	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11562	46-611283	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11563	46-611283	2–3	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11564	46-611284	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11565	46-611284	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11566	46-611285	0–1	Soil	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349
RE46-10-11567	46-611285	2–3	Qbt 3	10-1348	10-1347	10-1347	10-1347	10-1348	10-1348	10-1347	10-1349	10-1349	10-1349	10-1349

Table 7.26-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(t)

Sample ID	Location ID	Depth (ft)	Media	Aluminum	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide	Iron	Lead	Magnesium	Manganese	Mercury	Nickel	Perchlorate	Selenium	Vanadium	Zinc
Qbt2, 3, 4 BV[a]				**7340**	**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**14500**	**11.2**	**1690**	**482**	**0.1**	**6.58**	**na**[b]	**0.3**	**17**	**63.5**
Soil BV[a]				**29200**	**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**21500**	**22.3**	**4610**	**671**	**0.1**	**15.4**	**na**	**1.52**	**39.6**	**48.8**
Construction Worker SSL[c]				**40700**	**124**	**4350**	**309**	**na**	**449**[d]	**34.6**[e]	**12400**	**6190**	**217000**	**800**	**na**	**463**	**92.9**[e]	**6190**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**1130000**	**454**	**224000**	**1120**	**na**	**2920**[d]	**300**[f]	**45400**	**22700**	**795000**	**800**	**na**	**145000**	**310**[f]	**22700**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**78100**	**31.3**	**15600**	**77.9**	**na**	**219**[d]	**23**[f]	**3130**	**1560**	**54800**	**400**	**na**	**10700**	**23**[f]	**1560**	**54.8**	**391**	**391**	**23500**
RE46-10-11548	46-611276	4.5–5.5	Soil	—[g]	—	—	—	—	—	—	—	0.59 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-11549	46-611276	9.5–10.5	Qbt 3	—	—	—	—	—	—	—	—	0.54 (U)	—	—	—	—	—	—	—	1.3 (J+)	—	—
RE46-10-11550	46-611277	2.5–3.5	Soil	—	1.1 (U)	—	0.549 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11551	46-611277	4.5–5.5	Qbt 3	—	1.02 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.02 (U)	—	—
RE46-10-11552	46-611278	3–4	Soil	—	1.03 (U)	—	0.516 (U)	—	—	—	—	—	—	—	—	—	—	—	0.00143 (J)	—	—	—
RE46-10-11553	46-611278	5–6	Qbt 3	—	1 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000691 (J)	1.03 (U)	—	—
RE46-10-11554	46-611279	0–1	Soil	—	—	—	—	—	—	—	15.5	—	—	30.3	—	—	—	—	—	—	—	52.8
RE46-10-11555	46-611279	2–3	Soil	—	1.11 (U)	—	0.554 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11556	46-611280	0–1	Soil	—	—	—	0.543 (U)	—	23.8	—	34.3	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11557	46-611280	2–3	Soil	—	1.09 (U)	—	0.546 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	53.2
RE46-10-11558	46-611281	0–1	Soil	—	1.14 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	64.8
RE46-10-11559	46-611281	2–3	Soil	—	1.26 (U)	—	0.632 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	59.1
RE46-10-11560	46-611282	0–1	Soil	—	—	—	0.564 (J)	—	23.3	—	21.8	—	30300	58.7 (J)	—	—	0.185 (J)	—	—	—	—	334
RE46-10-11561	46-611282	2–3	Qbt 3	—	0.541 (U)	—	—	—	—	—	13.8	—	—	11.7 (J)	—	—	—	—	—	1.2 (U)	—	—
RE46-10-11562	46-611283	0–1	Soil	—	1.8 (U)	—	—	—	—	—	—	—	—	—	—	—	0.127 (J)	—	—	—	—	68.3
RE46-10-11563	46-611283	2–3	Soil	—	—	—	0.573 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11564	46-611284	0–1	Soil	—	1.23 (U)	—	—	—	—	—	16.3	—	—	—	—	—	0.112 (J)	—	—	—	—	66
RE46-10-11565	46-611284	2–3	Qbt 3	—	0.54 (U)	71.1 (J+)	—	—	—	—	9.45	—	—	11.5 (J)	—	—	—	—	—	1.21 (U)	—	—
RE46-10-11566	46-611285	0–1	Soil	—	1.21 (U)	—	0.606 (U)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11567	46-611285	2–3	Qbt 3	10200	1.15 (U)	167 (J+)	—	2600	12.2	4.46	—	—	—	15.2 (J)	2390 (J+)	487 (J+)	—	9.76	—	1.12 (U)	25.6	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.26-3
Organic Chemicals Detected at SWMU 46-004(t)

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	Chrysene	DDD[4,4'-]
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**20600**	**695**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**2340**	**79.8**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**621**	**20.3**
RE46-10-11549	46-611276	9.5–10.5	Qbt 3	—[c]	—	—	—	—	—	—	—	—	—	—	0.00036 (J)
RE46-10-11554	46-611279	0–1	Soil	0.0576	0.0784	0.0299	0.0432	0.337	0.353	0.453	0.191	0.207	—	0.366	—
RE46-10-11555	46-611279	2–3	Soil	0.0569	0.0771	0.0292	0.0419	0.291	0.308	0.37	0.184	0.158	—	0.317	—
RE46-10-11556	46-611280	0–1	Soil	—	0.012 (J)	0.0314	0.0269	0.0542	0.051	0.0645	0.0375	—	—	0.0539	—
RE46-10-11557	46-611280	2–3	Soil	—	0.0192 (J)	0.009 (J)	—	0.0608	0.0589	0.0859	0.0522	0.0384	—	0.069	—
RE46-10-11558	46-611281	0–1	Soil	0.0189 (J)	0.0343 (J)	0.0073	0.0067	0.12	0.102	0.148	0.0532	0.0417	—	0.113	—
RE46-10-11560	46-611282	0–1	Soil	0.108	0.209	0.0493	0.107	0.644	0.614	0.918	0.296	0.339	0.0856 (J)	0.713	—
RE46-10-11561	46-611282	2–3	Qbt 3	—	0.0105 (J)	0.0144 (J)	—	0.0389 (J)	0.0205 (J)	0.0478	0.0355 (J)	0.0236 (J)	0.569	0.0401 (J)	—
RE46-10-11562	46-611283	0–1	Soil	0.0792	0.124	0.0442	0.0362	0.23	0.235	0.312	0.128	0.0721	—	0.264	—
RE46-10-11563	46-611283	2–3	Soil	—	—	0.0034 (J)	0.0027 (J)	—	—	—	—	—	—	—	—
RE46-10-11564	46-611284	0–1	Soil	—	0.0195 (J)	0.0199 (J)	0.0149 (J)	0.0776	0.0803	0.123	0.0517	0.0234 (J)	—	0.0779	—
RE46-10-11565	46-611284	2–3	Qbt 3	—	0.0175 (J)	0.0171	0.0138	0.0401 (J)	0.0309 (J)	0.0431	0.0414 (J)	0.0324 (J)	—	0.0591	—
RE46-10-11566	46-611285	0–1	Soil	—	0.00856 (J)	0.0137 (J)	0.0113 (J)	0.0397 (J)	0.0432	0.0468	0.0247 (J)	0.0183 (J)	—	0.0439	—
RE46-10-11567	46-611285	2–3	Qbt 3	—	—	—	0.0017 (J)	—	—	—	—	—	—	—	—

Table 7.26-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	DDE[4,4'-]	Dibenz(a,h)anthracene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene
Construction Worker SSL[a]				**490**	**21.3**	**8910**	**8910**	**213**	**10300[d]**	**1240[e]**	**702**	**7150**	**6680**	**21100**
Industrial SSL[a]				**56.3**	**2.34**	**24400**	**24400**	**23.4**	**14900[d]**	**4100[f]**	**252**	**20500**	**18300**	**57900**
Residential SSL[a]				**14.3**	**0.621**	**2290**	**2290**	**6.21**	**3210[d]**	**310[f]**	**45**	**1830**	**1720**	**5570**
RE46-10-11549	46-611276	9.5–10.5	Qbt 3	0.00047 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-11554	46-611279	0–1	Soil	—	0.0478	0.809	0.0447	0.18	—	0.00977 (J)	0.021 (J)	0.511	0.846	—
RE46-10-11555	46-611279	2–3	Soil	—	0.0476	0.667	0.0455	0.16	—	0.0131 (J)	0.036 (J)	0.457	0.783	—
RE46-10-11556	46-611280	0–1	Soil	—	—	0.112	—	0.0301 (J)	—	—	—	0.0584	0.106	—
RE46-10-11557	46-611280	2–3	Soil	—	0.0173 (J)	0.117	—	0.0418	—	—	—	0.0711	0.115	—
RE46-10-11558	46-611281	0–1	Soil	—	—	0.339	0.0191 (J)	0.161	0.00225	—	—	0.198	0.242	—
RE46-10-11560	46-611282	0–1	Soil	—	0.142	1.75	0.11	0.38	0.000442 (J+)	0.0189 (J)	0.0411	1.07	1.39	—
RE46-10-11561	46-611282	2–3	Qbt 3	—	0.116	0.0854	—	0.149	0.00339	—	—	0.0549	0.0723	—
RE46-10-11562	46-611283	0–1	Soil	—	—	0.643	0.0741	0.224	—	0.0239 (J)	0.0554	0.505	0.591	—
RE46-10-11563	46-611283	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11564	46-611284	0–1	Soil	—	—	0.209	—	0.163	—	—	—	0.116	0.179	—
RE46-10-11565	46-611284	2–3	Qbt 3	—	—	0.164	—	0.142	0.021	—	—	0.104	0.121	0.000846 (J)
RE46-10-11566	46-611285	0–1	Soil	—	—	0.0986	—	—	0.000514 (J)	—	—	0.0536	0.0935	—
RE46-10-11567	46-611285	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.000377 (J)

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

Table 7.26-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(t)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**0.09**
Soil BV[a]				**1.65**	**0.2**
Construction Worker SAL[c]				**18**	**43**
Industrial SAL[c]				**23**	**87**
Residential SAL[c]				**5.6**	**17**
RE46-10-11551	46-611277	4.5–5.5	Qbt 3	—[d]	0.0928
RE46-10-11555	46-611279	2–3	Soil	0.154	—
RE46-10-11557	46-611280	2–3	Soil	0.115	—
RE46-10-11567	46-611285	2–3	Qbt 3	—	0.104

Note: All activities are in pCi/g.

[a] BVs are 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 7.27-1
Samples Collected and Analyses Requested at SWMU 46-004(u)

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

Table 7.27-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(u)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Cobalt	Copper	Cyanide	Lead	Perchlorate	Selenium	Thallium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**3.14**	**4.66**	**0.5**	**11.2**	**na[b]**	**0.3**	**1.1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**8.64**	**14.7**	**0.5**	**22.3**	**na**	**1.52**	**0.73**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**34.6[e]**	**12400**	**6190**	**800**	**217**	**1550**	**20.4**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**300[f]**	**45400**	**22700**	**800**	**795**	**5680**	**74.9**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**23[f]**	**3130**	**1560**	**400**	**54.8**	**391**	**5.16**	**23500**
RE46-10-13044	46-611527	0–1	Soil	—[g]	—	—	—	—	—	—	0.68 (U)	—	—	—	—	—
RE46-10-13045	46-611527	1–2	Qbt 3	—	—	—	—	—	—	5.3	0.53 (U)	58.7	0.0028 (J)	2.1	6.3	69.3
RE46-10-13046	46-611528	0–1	Soil	—	—	—	—	—	—	—	0.63 (U)	—	—	—	—	—
RE46-10-13047	46-611528	1–2	Qbt 3	—	—	—	—	—	—	9.8	0.63 (U)	—	—	0.86	—	—
RE46-10-13048	46-611529	0–1	Soil	1.37 (UJ)	—	0.684 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13049	46-611529	1–2	Soil	1.07 (UJ)	—	0.535 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13050	46-611530	0–1	Soil	1.1 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13051	46-611530	1–2	Soil	1.03 (UJ)	—	0.513 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13052	46-611531	0–1	Soil	1.09 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13053	46-611531	1–2	Soil	1.05 (UJ)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13054	46-611532	0–1	Soil	1.15 (UJ)	—	—	—	—	—	—	—	—	0.000704 (J)	—	—	—
RE46-10-13055	46-611532	1–2	Soil	1.02 (UJ)	—	0.511 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13056	46-611533	0–1	Soil	1.03 (UJ)	—	0.515 (U)	—	—	—	17.7	—	—	—	—	—	70.5
RE46-10-13057	46-611533	1–2	Soil	1.07 (UJ)	—	0.534 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13058	46-611534	0–1	Qbt 3	1.2 (UJ)	—	—	—	7.15	—	10.7	—	—	—	1.17 (UJ)	—	—
RE46-10-13059	46-611534	1–2	Soil	1.11 (UJ)	—	0.557 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13060	46-611535	0–1	Soil	1.16 (UJ)	—	0.581 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13061	46-611535	1–2	Qbt 3	1.09 (UJ)	—	—	—	15.8	—	—	—	—	—	1.07 (UJ)	—	—
RE46-10-13062	46-611536	0–1	Soil	1.16 (UJ)	—	0.58 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13063	46-611536	1–2	Qbt 3	1.12 (UJ)	106	—	2240	—	4.26	6.67	—	—	—	1.13 (UJ)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.27-3
Organic Chemicals Detected at SWMU 46-004(u)

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	Endrin Aldehyde	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**20600**	**71.5[c]**	**8910**	**213**	**7150**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**2340**	**205[c]**	**24400**	**23.4**	**20500**
Residential SSL[a]				**3440**	**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**621**	**18.3[c]**	**2290**	**6.21**	**1830**
RE46-10-13044	46-611527	0–1	Soil	—[d]	—	—	0.041 (J)	—	—	—	—	—	—	0.00054 (J)	0.093 (J)	—	0.059 (J)
RE46-10-13045	46-611527	1–2	Qbt 3	—	—	—	0.046	—	—	—	—	—	—	—	—	—	—
RE46-10-13046	46-611528	0–1	Soil	—	—	—	—	0.038 (J)	—	—	—	—	—	—	0.044 (J)	—	—
RE46-10-13047	46-611528	1–2	Qbt 3	—	—	—	—	0.017 (J)	—	—	—	—	—	—	—	—	—
RE46-10-13048	46-611529	0–1	Soil	0.0168 (J)	—	0.0318 (J)	0.0463	0.0493	0.138	0.0952	0.174	0.049	0.0958	—	0.251	0.0472	0.154
RE46-10-13049	46-611529	1–2	Soil	—	—	—	0.0425	0.0449	0.0218 (J)	—	0.0154 (J)	—	—	—	0.0198 (J)	—	0.0115 (J)
RE46-10-13050	46-611530	0–1	Soil	—	—	—	—	0.0032 (J)	—	—	0.0148 (J)	—	—	—	0.0156 (J)	—	—
RE46-10-13054	46-611532	0–1	Soil	—	—	—	0.0022 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-13055	46-611532	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13056	46-611533	0–1	Soil	—	—	—	0.0036 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-13058	46-611534	0–1	Qbt 3	—	0.0118	—	0.0042	—	0.0182 (J)	0.0125 (J)	0.0223 (J)	—	0.012 (J)	—	0.0213 (J)	—	—
RE46-10-13059	46-611534	1–2	Soil	—	—	—	0.0021 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-13060	46-611535	0–1	Soil	—	—	—	0.0037 (J)	—	—	—	0.0173 (J)	—	—	—	0.0211 (J)	—	0.0151 (J)
RE46-10-13061	46-611535	1–2	Qbt 3	—	—	—	0.0039	—	—	—	—	—	—	—	—	—	—

Tabel 7.27-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Pyrene	Toluene	Trichloroethene	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**6680**	**21100**	**4600**	**688[e]**	**27500**	**3130[f]**
Industrial SSL[a]				**18300**	**57900**	**253**	**260[g]**	**31500**	**3610[f]**
Residential SSL[a]				**1720**	**5570**	**45.7**	**62[g]**	**9550**	**1090[f]**
RE46-10-13044	46-611527	0–1	Soil	0.074 (J)	—	—	—	NA[h]	NA
RE46-10-13045	46-611527	1–2	Qbt 3	—	—	—	—	NA	NA
RE46-10-13046	46-611528	0–1	Soil	—	—	—	—	NA	NA
RE46-10-13047	46-611528	1–2	Qbt 3	—	—	—	—	NA	NA
RE46-10-13048	46-611529	0–1	Soil	0.205	0.000464 (J)	—	—	—	—
RE46-10-13049	46-611529	1–2	Soil	0.0167 (J)	0.000359 (J)	—	—	—	—
RE46-10-13050	46-611530	0–1	Soil	0.0119 (J)	0.00126	0.000607 (J)	—	—	0.000821 (J)
RE46-10-13054	46-611532	0–1	Soil	—	—	0.00254	—	—	—
RE46-10-13055	46-611532	1–2	Soil	—	—	0.000909 (J)	—	—	—
RE46-10-13056	46-611533	0–1	Soil	—	—	—	—	—	—
RE46-10-13058	46-611534	0–1	Qbt 3	0.0233 (J)	—	—	—	—	—
RE46-10-13059	46-611534	1–2	Soil	—	—	—	—	—	—
RE46-10-13060	46-611535	0–1	Soil	0.0205 (J)	—	—	0.000397 (J)	0.000432 (J)	0.000817 (J)
RE46-10-13061	46-611535	1–2	Qbt 3	—	0.000358 (J)	—	—	—	—

Notes: Units are 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] Endrin used as surrogate based on structural similarity.

[d] — = Not detected.

[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] Xylene used as a surrogate based on structural similarity.

[g] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[h] NA = Not analyzed.

Table 7.27-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(u)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**na**	**0.09**
Soil BV[a]				**1.65**	**0.054**	**0.2**
Construction Worker SAL[c]				**18**	**36**	**43**
Industrial SAL[c]				**23**	**210**	**87**
Residential SAL[c]				**5.6**	**33**	**17**
RE46-10-13058	46-611534	0–1	Qbt 3	0.627	0.0541	0.144
RE46-10-13062	46-611536	0–1	Soil	—[d]	0.0558	—

Note: All activities are in pCi/g.
[a] BVs are 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 7.28-1
Samples Collected and Analyses Requested at SWMU 46-004(v)

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

Table 7.28-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(v)

Sample ID	Location ID	Depth (ft)	Media	Copper	Cyanide	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**4.66**	**0.5**	**na**[b]	**0.3**	**63.5**
Soil BV[a]				**14.7**	**0.5**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**12400**	**6190**	**217**	**1550**	**92900**
Industrial SSL[c]				**45400**	**22700**	**795**	**5680**	**341000**
Residential SSL[c]				**3130**	**1560**	**54.8**	**391**	**23500**
RE46-10-14229	46-611821	0–1	Soil	—[d]	0.67 (U)	—	—	—
RE46-10-14230	46-611821	1–2	Soil	—	0.56 (U)	0.0023 (J)	—	112
RE46-10-14231	46-611822	0–1	Qbt 3	6.6	0.55 (U)	—	1	—
RE46-10-14232	46-611822	1–2	Qbt 3	5.7	0.52 (U)	—	1.1	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070).
[d] — = Not detected or not detected above BV.

Table 7.28-3
Organic Chemicals Detected at SWMU 46-004(v)

Sample ID	Location ID	Depth (ft)	Media	Aldrin	Aroclor-1254	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(k)fluoranthene	Chrysene	DDE[4,4'-]	Endrin Aldehyde	Endrin Ketone	Fluoranthene	Isopropyltoluene[4-]	Methylene Chloride	Phenanthrene	Pyrene	Trichloroethene
Construction Worker SSL[a]				**7.15**	**4.36**	**213**	**21.3**	**213**	**2060**	**20600**	**490**	**71.5**[b]	**71.5**[b]	**8910**	**10300**[c]	**10600**	**7150**	**6680**	**4600**
Industrial SSL[a]				**1.12**	**8.26**	**23.4**	**2.34**	**23.4**	**234**	**2340**	**56.3**	**205**[b]	**205**[b]	**24400**	**14900**[c]	**1090**	**20500**	**18300**	**253**
Residential SSL[a]				**0.284**	**1.12**	**6.21**	**0.621**	**6.21**	**62.1**	**621**	**14.3**	**18.3**[b]	**18.3**[b]	**2290**	**3210**[c]	**199**	**1830**	**1720**	**45.7**
RE46-10-14229	46-611821	0–1	Soil	—[d]	0.08 (J)	—	—	—	—	—	0.00095 (J+)	0.0017 (J+)	—	—	—	0.0073 (J+)	—	—	—
RE46-10-14230	46-611821	1–2	Soil	0.0009 (J+)	0.033 (J)	—	—	—	—	—	0.00052 (J+)	—	0.0012 (J+)	—	—	—	—	—	—
RE46-10-14232	46-611822	1–2	Qbt 3	—	—	0.067 (J)	0.059 (J)	0.072 (J)	0.073 (J)	0.072 (J)	—	—	—	0.18 (J)	0.00074 (J)	0.0027 (J)	0.089 (J)	0.13 (J)	0.0003 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070).
[b] Endrin used as surrogate based on structural similarity.
[c] Isopropylbenzene used as a surrogate based on structural similarity.
[d] — = Not detected.

Table 7.30-1
Samples Collected and Analyses Requested at SWMU 46-004(x)

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

Table 7.30-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(x)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Perchlorate	Zinc
Soil BV[a]				**0.83**	**0.4**	**14.7**	**na**[b]	**48.8**
Construction Worker SSL[c]				**124**	**309**	**12400**	**217**	**92900**
Industrial SSL[c]				**454**	**1120**	**45400**	**795**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**3130**	**54.8**	**23500**
RE46-10-13006	46-611514	0–1	Soil	1.2 (U)	0.601 (U)	—[d]	—	93 (J+)
RE46-10-13007	46-611514	1–2	Soil	1.15 (U)	0.575 (U)	—	—	—
RE46-10-13008	46-611515	0–1	Soil	1.18 (U)	0.588 (U)	—	0.00105 (J)	—
RE46-10-13009	46-611515	1–2	Soil	1.09 (U)	0.547 (U)	—	0.000661 (J)	—
RE46-10-13010	46-611516	0–1	Soil	1.23 (U)	0.616 (U)	—	—	—
RE46-10-13011	46-611516	1–2	Soil	1.03 (U)	0.514 (U)	—	—	—
RE46-10-13012	46-611517	0–1	Soil	1.11 (U)	0.555 (U)	—	—	—
RE46-10-13013	46-611517	1–2	Soil	0.991 (U)	0.496 (U)	—	—	—
RE46-10-13030	46-611526	0–1	Soil	1.38 (U)	—	16.8	—	107
RE46-10-13031	46-611526	1–2	Soil	1.07 (U)	—	18.2	0.000945 (J)	96.2

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

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

Table 7.30-3
Organic Chemicals Detected at SWMU 46-004(x)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	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
Construction Worker SSL[a]				**18600**	**6680**[b]	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**21.3**	**8910**	**8910**	**213**
Industrial SSL[a]				**36700**	**18300**[b]	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**2.34**	**24400**	**24400**	**23.4**
Residential SSL[a]				**3440**	**1720**[b]	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**0.621**	**2290**	**2290**	**6.21**
RE46-10-13006	46-611514	0–1	Soil	0.0439	0.0603	0.0975	—[c]	0.0026 (J)	0.354	0.214	0.525	0.0881	0.242	0.796	0.176	2.5	0.0479	0.0886
RE46-10-13007	46-611514	1–2	Soil	—	—	—	—	—	—	0.0163 (J)	0.0302 (J)	0.0159 (J)	0.0157 (J)	0.0321 (J)	—	0.0631	—	0.0131 (J)
RE46-10-13008	46-611515	0–1	Soil	—	—	—	—	—	—	—	0.0172 (J)	—	—	0.0211 (J)	—	0.0537	—	—
RE46-10-13010	46-611516	0–1	Soil	—	—	—	—	—	—	—	0.0197 (J)	—	—	0.0167 (J)	—	0.0337 (J)	—	—
RE46-10-13011	46-611516	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13013	46-611517	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13030	46-611526	0–1	Soil	—	—	—	0.0899	0.112	—	0.0304 (J)	0.0574	0.0185 (J)	—	—	—	0.025 (J)	—	0.0177 (J)
RE46-10-13031	46-611526	1–2	Soil	—	—	—	0.0083 (J+)	0.009 (J+)	—	—	0.0154 (J)	—	—	—	—	0.0136 (J)	—	—

Table 7.30-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Isopropyltoluene[4-]	MethylNaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene	Trichloroethene	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**10300**[d]	**1240**[e]	**702**	**7150**	**6680**	**21100**	**4600**	**3130**[f]
Industrial SSL[a]				**14900**[d]	**4100**[g]	**252**	**20500**	**18300**	**57900**	**253**	**3610**[f]
Residential SSL[a]				**3210**[d]	**310**[g]	**45**	**1830**	**1720**	**5570**	**45.7**	**1090**[f]
RE46-10-13006	46-611514	0–1	Soil	—	0.0105 (J)	0.0252 (J)	1.21	2.16	—	—	—
RE46-10-13007	46-611514	1–2	Soil	0.000676 (J)	—	—	0.0318 (J)	0.0554	—	—	—
RE46-10-13008	46-611515	0–1	Soil	0.000687 (J)	—	—	0.0269 (J)	0.0468	—	0.000445 (J)	—
RE46-10-13010	46-611516	0–1	Soil	—	—	—	0.0151 (J)	0.0289 (J)	—	0.00116 (J)	—
RE46-10-13011	46-611516	1–2	Soil	—	—	—	—	—	0.000389 (J)	0.000484 (J)	—
RE46-10-13013	46-611517	1–2	Soil	—	—	—	—	—	0.00072 (J)	0.000811 (J)	0.000588 (J)
RE46-10-13030	46-611526	0–1	Soil	—	—	—	—	0.0251 (J)	0.0015	—	0.000729 (J)
RE46-10-13031	46-611526	1–2	Soil	—	—	—	—	0.0136 (J)	0.000917 (J)	—	0.000852 (J)

Notes: Units are 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] 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] Xylene used as a surrogate based on structural similarity.

[g] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

Table 7.30-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(x)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240
Soil BV[a]				**0.054**
Construction Worker SAL[b]				**36**
Industrial SAL[b]				**210**
Residential SAL[b]				**33**
RE46-10-13007	46-611514	1–2	Soil	0.0174

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.31-1
Samples Collected and Analyses Requested at SWMU 46-004(y)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-13014	46-611518	0–1	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13015	46-611518	1–2	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13016	46-611519	0–1	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13017	46-611519	1–2	Soil	10-2472	10-2471	10-2471	10-2471	10-2472	10-2472	10-2471	10-2472	10-2472	10-2472	10-2472	10-2472
RE46-10-13018	46-611520	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13019	46-611520	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13020	46-611521	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13021	46-611521	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13022	46-611522	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13023	46-611522	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13024	46-611523	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13025	46-611523	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13026	46-611524	0–1	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13027	46-611524	1–2	Soil	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13028	46-611525	0–1	Qbt 3	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835
RE46-10-13029	46-611525	1–2	Qbt 3	10-1835	10-1836	10-1836	10-1836	10-1835	10-1835	10-1836	10-1835	10-1835	10-1835	10-1835	10-1835

Table 7.31-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(y)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Iron	Lead	Manganese	Mercury	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**14500**	**11.2**	**482**	**0.1**	**na[b]**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**21500**	**22.3**	**671**	**0.1**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**217000**	**800**	**463**	**92.9[e]**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**795000**	**800**	**145000**	**310[f]**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**54800**	**400**	**10700**	**23[f]**	**54.8**	**391**	**23500**
RE46-10-13014	46-611518	0–1	Soil	1.2 (U)	—[g]	0.599 (U)	—	—	—	—	—	—	—	0.000934 (J)	—	—
RE46-10-13015	46-611518	1–2	Soil	1.03 (U)	—	0.516 (U)	—	—	—	—	—	—	—	0.00173 (J)	—	—
RE46-10-13016	46-611519	0–1	Soil	1.19 (U)	—	0.543 (J)	—	—	49.2 (J+)	—	33.1	—	4.8 (J+)	—	—	326
RE46-10-13017	46-611519	1–2	Soil	1.14 (U)	—	—	—	—	—	—	—	—	0.836 (J+)	—	—	105
RE46-10-13018	46-611520	0–1	Soil	1.06 (U)	—	1.04	—	20.3	72.8	—	29.1	—	1.79 (J+)	—	—	493
RE46-10-13019	46-611520	1–2	Soil	1.11 (U)	—	—	—	—	—	—	—	—	0.179 (J+)	—	—	98.9
RE46-10-13020	46-611521	0–1	Soil	1.21 (U)	—	0.489 (J)	—	—	16	—	—	—	0.139 (J+)	—	—	170
RE46-10-13021	46-611521	1–2	Soil	1.13 (U)	—	—	—	—	—	—	—	—	—	—	—	62
RE46-10-13022	46-611522	0–1	Soil	5.65 (U)	—	—	—	—	—	27100	—	—	—	—	—	67.3
RE46-10-13023	46-611522	1–2	Soil	1.03 (U)	—	0.514 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13024	46-611523	0–1	Soil	1.11 (U)	—	0.424 (J)	—	—	—	—	—	—	0.16 (J+)	—	—	121
RE46-10-13025	46-611523	1–2	Soil	1.1 (U)	—	—	—	—	—	—	—	—	—	—	—	73.4
RE46-10-13026	46-611524	0–1	Soil	1.24 (U)	—	—	7160 (J+)	—	—	—	—	—	—	—	—	—
RE46-10-13027	46-611524	1–2	Soil	1.08 (U)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13028	46-611525	0–1	Qbt 3	1.14 (U)	76.1	—	—	—	4.73	—	—	606	—	—	1.15 (U)	—
RE46-10-13029	46-611525	1–2	Qbt 3	1.06 (U)	—	—	—	—	—	—	—	—	—	—	1.04 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.31-3
Organic Chemicals Detected at SWMU 46-004(y)

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	Bis(2-ethylhexyl)phthalate	Chrysene	Ethylbenzene	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**4760**	**20600**	**6630**	**8910**	**8910**	**213**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**1370**	**2340**	**385**	**24400**	**24400**	**23.4**
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**347**	**621**	**69.7**	**2290**	**2290**	**6.21**
RE46-10-13014	46-611518	0–1	Soil	0.0676	—[c]	—	—	—	—	—	0.0287 (J)	0.0485	0.0192 (J)	—	—	—	—	—	0.0201 (J)
RE46-10-13015	46-611518	1–2	Soil	0.143	—	—	—	—	—	—	0.0122 (J)	0.019 (J)	—	—	—	—	—	—	—
RE46-10-13016	46-611519	0–1	Soil	0.136	—	0.333	—	0.0934	—	0.778	0.746	1.17	0.467	—	0.862	—	1.69	0.136	0.419
RE46-10-13017	46-611519	1–2	Soil	0.111	—	0.286	—	0.0309	—	0.8	0.568	0.997	0.278	0.316 (J)	0.623	—	1.48	0.106	0.256
RE46-10-13018	46-611520	0–1	Soil	—	—	0.037 (J)	—	0.0693	0.0457	0.132	0.109	0.214	0.0706	—	0.124	0.00043 (J)	0.23	—	0.063
RE46-10-13019	46-611520	1–2	Soil	—	—	—	—	0.0037 (J+)	0.0028 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-13020	46-611521	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13022	46-611522	0–1	Soil	—	—	—	0.18	0.216	0.0748	—	—	—	—	—	—	—	—	—	—
RE46-10-13023	46-611522	1–2	Soil	—	0.00801	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13024	46-611523	0–1	Soil	—	—	—	—	0.0043 (J+)	0.0031 (J)	—	0.0156 (J)	0.0264 (J)	—	—	—	—	0.0149 (J)	—	—
RE46-10-13026	46-611524	0–1	Soil	—	0.0162	—	—	—	—	—	—	—	—	—	—	0.000443 (J)	—	—	—
RE46-10-13027	46-611524	1–2	Soil	—	0.00369 (J)	—	—	—	—	—	—	—	—	—	—	0.000348 (J)	—	—	—
RE46-10-13028	46-611525	0–1	Qbt 3	—	0.00244 (J)	—	—	—	—	—	—	—	—	—	—	0.000765 (J)	—	—	—

Table 7.31-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**10600**	**1240**[d]	**702**	**7150**	**6680**	**21100**	**64300**	**4600**	**688**[d]	**3100**[d]	**27500**	**3130**[e]
Industrial SSL[a]				**1090**	**4100**[f]	**252**	**20500**	**18300**	**57900**	**77100**	**253**	**260**[f]	**10000**[f]	**31500**	**3610**[e]
Residential SSL[a]				**199**	**310**[f]	**45**	**1830**	**1720**	**5570**	**21800**	**45.7**	**62**[f]	**78000**[f]	**9550**	**1090**[e]
RE46-10-13014	46-611518	0–1	Soil	—	—	—	—	—	—	—	0.000915 (J)	—	—	—	—
RE46-10-13015	46-611518	1–2	Soil	—	—	—	—	—	—	—	0.00125	—	—	—	—
RE46-10-13016	46-611519	0–1	Soil	0.00595 (J)	0.0544	0.12	0.997	1.15	—	0.000413 (J)	0.00928	—	—	—	—
RE46-10-13017	46-611519	1–2	Soil	—	0.0433	0.107	0.943	1.18	—	—	0.00118	—	—	—	—
RE46-10-13018	46-611520	0–1	Soil	0.00579 (J)	—	—	0.159	0.278	0.00226	0.00184	0.0206	—	—	0.000488 (J)	0.001 (J)
RE46-10-13019	46-611520	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13020	46-611521	0–1	Soil	—	—	—	—	—	0.000371 (J)	—	—	0.00051 (J)	0.000371 (J)	0.000695 (J)	0.00139 (J)
RE46-10-13022	46-611522	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13023	46-611522	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13024	46-611523	0–1	Soil	—	—	—	—	0.0234 (J)	0.000399 (J)	—	—	0.00049 (J)	—	0.000468 (J)	0.000867 (J)
RE46-10-13026	46-611524	0–1	Soil	—	—	—	—	—	0.00181	—	—	—	—	0.000484 (J)	0.00114 (J)
RE46-10-13027	46-611524	1–2	Soil	—	—	—	—	—	0.001 (J)	—	—	—	—	0.00043 (J)	0.00112 (J)
RE46-10-13028	46-611525	0–1	Qbt 3	—	—	—	—	—	0.00413	—	—	0.000506 (J)	—	0.000918 (J)	0.00218 (J)

Notes: Units are 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] 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] Xylene used as a surrogate based on structural similarity.

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

Table 7.31-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(y)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234
Soil BV[a]				**0.054**	**2.59**
Construction Worker SAL[b]				**36**	**220**
Industrial SAL[b]				**210**	**1500**
Residential SAL[b]				**33**	**170**
RE46-10-13015	46-611518	1–2	Soil	0.0888	—[c]
RE46-10-13016	46-611519	0–1	Soil	—	2.95
RE46-10-13017	46-611519	1–2	Soil	0.0698	—
RE46-10-13018	46-611520	0–1	Soil	—	2.73

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.32-1
Samples Collected and Analyses Requested at SWMU 46-004(z)

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

Table 7.32-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-004(z)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Lead	Manganese	Mercury	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**4.66**	**11.2**	**482**	**0.1**	**na[b]**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**14.7**	**22.3**	**671**	**0.1**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**12400**	**800**	**463**	**92.9[d]**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**1120**	**45400**	**800**	**145000**	**310[e]**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**3130**	**400**	**10700**	**23[e]**	**54.8**	**391**	**23500**
RE46-10-12728	46-611468	0–1	Soil	1.23 (U)	—[f]	42.9 (J+)	50.9	—	1.41 (J)	—	—	189
RE46-10-12729	46-611468	1–2	Soil	1.23 (U)	—	—	—	—	0.491 (J)	—	—	65.9
RE46-10-12730	46-611469	0–1	Soil	1.12 (U)	0.56 (U)	—	—	—	—	—	—	—
RE46-10-12731	46-611469	1–2	Soil	1.08 (U)	0.539 (U)	—	—	—	—	0.000676 (J)	—	—
RE46-10-12732	46-611470	0–1	Soil	0.956 (U)	—	—	—	—	0.126	—	—	—
RE46-10-12733	46-611470	1–2	Soil	1.07 (U)	—	—	—	—	—	—	—	—
RE46-10-12734	46-611471	0–1	Soil	1.15 (U)	—	—	—	—	—	0.000722 (J)	—	—
RE46-10-12735	46-611471	1–2	Soil	1.07 (U)	—	—	—	—	—	0.00493	—	—
RE46-10-12736	46-611472	0–1	Soil	0.976 (U)	—	—	—	—	—	—	—	—
RE46-10-12737	46-611472	1–2	Qbt 3	1.04 (U)	—	—	—	—	—	—	0.963 (UJ)	—
RE46-10-12738	46-611473	0–1	Soil	1.09 (U)	—	—	—	—	—	—	—	—
RE46-10-12739	46-611473	1–2	Qbt 3	1.05 (U)	—	—	11.7 (J)	497 (J)	—	—	1.07 (UJ)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.32-3
Organic Chemicals Detected at SWMU 46-004(z)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Trimethylbenzene[1,2,4-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**4.36**	**688**[b]	**3130**[c]
Industrial SSL[a]				**8.26**	**260**[d]	**3610**[c]
Residential SSL[a]				**1.12**	**62**[d]	**1090**[c]
RE46-10-12728	46-611468	0–1	Soil	—[e]	0.00046 (J)	0.000435 (J)
RE46-10-12734	46-611471	0–1	Soil	0.0026 (J)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[c] Xylene used as a surrogate based on structural similarity.

[d] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

Table 7.32-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-004(z)

Sample ID	Location ID	Depth (ft)	Media	Plutonium-239/240	Uranium-234	Uranium-235/236
Soil BV[a]				**0.054**	**2.59**	**0.2**
Construction Worker SAL[b]				**36**	**220**	**43**
Industrial SAL[b]				**210**	**1500**	**87**
Residential SAL[b]				**33**	**170**	**17**
RE46-10-12729	46-611468	1–2	Soil	—[c]	2.6	0.239
RE46-10-12731	46-611469	1–2	Soil	0.0185	—	—

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.33-1
Samples Collected and Analyses Requested at SWMU 46-005

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

Table 7.33-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-005

Sample ID	Location ID	Depth (ft)	Media	Antimony	Beryllium	Cadmium	Calcium	Cesium	Cyanide	Mercury	Nitrate	Perchlorate	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.21**	**1.63**	**2200**	**na**[b]	**0.5**	**0.1**	**na**	**na**	**0.3**
Soil BV[a]				**0.83**	**1.83**	**0.4**	**6120**	**na**	**0.5**	**0.1**	**na**	**na**	**1.52**
Construction Worker SSL[c]				**124**	**144**	**309**	**na**	**na**	**6190**	**92.9**[d]	**496000**	**217**	**1550**
Industrial SSL[c]				**454**	**2260**	**1120**	**na**	**na**	**22700**	**310**[e]	**1820000**	**795**	**5680**
Residential SSL[c]				**31.3**	**156**	**77.9**	**na**	**na**	**1560**	**23**[e]	**125000**	**54.8**	**391**
RE46-10-13673	46-611628	0–1	Soil	1 (U)	—[f]	0.502 (U)	—	1.45	—	—	2.08	—	—
RE46-10-13674	46-611628	2–3	Soil	1.18 (U)	—	0.59 (U)	—	3.78	—	—	—	—	—
RE46-10-13675	46-611629	0–1	Soil	5.03 (U)	—	0.503 (U)	—	1.7	—	—	1.41	—	—
RE46-10-13676	46-611629	2–3	Soil	1.2 (U)	—	0.601 (U)	6870 (J+)	3.13	—	—	—	—	—
RE46-10-13677	46-611630	0–1	Soil	—	—	—	—	0.66 (J)	0.54 (U)	—	1.1	—	—
RE46-10-13678	46-611630	2–3	Qbt 3	—	—	—	—	0.21 (J)	0.52 (U)	—	0.18 (J)	—	1
RE46-10-13679	46-611631	0–1	Soil	—	—	—	7480 (J+)	1.2 (J)	0.52 (U)	—	0.68	—	—
RE46-10-13680	46-611631	2–3	Soil	—	—	—	—	1.9 (J)	0.53 (U)	—	0.14 (J)	—	—
RE46-10-13681	46-611632	0–1	Soil	—	—	—	—	0.56	0.52 (U)	—	0.52	—	—
RE46-10-13682	46-611632	5–6	Qbt 3	0.55 (UJ)	—	—	—	0.096	0.55 (U)	—	1.3	—	1.5
RE46-10-13683	46-611633	0–1	Soil	—	—	—	—	0.69	0.53 (U)	—	0.59	—	—
RE46-10-13684	46-611633	5–6	Qbt 3	0.56 (UJ)	—	—	—	0.14	0.56 (U)	—	0.29	—	1.5
RE46-10-13685	46-611634	0–1	Soil	—	—	—	—	1.9	0.52 (U)	—	4.2	—	—
RE46-10-13686	46-611634	5–6	Qbt 3	—	—	—	—	0.18	0.52 (U)	—	0.96	—	1.5
RE46-10-13687	46-611635	0–1	Soil	—	—	—	—	0.62	0.51 (U)	—	—	0.0047 (J)	—
RE46-10-13688	46-611635	5–6	Qbt 3	—	—	—	—	0.22	0.51 (U)	—	0.074 (J)	—	1.8
RE46-10-13689	46-611636	0–1	Qbt 3	—	—	—	—	0.15	0.53 (U)	—	0.43	0.0056	1.5
RE46-10-13690	46-611636	5–6	Qbt 3	—	—	—	—	0.49	0.54 (U)	—	—	—	1.9
RE46-10-13691	46-611637	0–1	Soil	—	—	—	9550 (J-)	1.7	0.6 (U)	—	—	—	—
RE46-10-13692	46-611637	3–4	Soil	—	2.7	—	10200 (J-)	3.5	0.61 (U)	—	0.15 (J)	—	—
RE46-10-13693	46-611638	0–1	Soil	—	—	—	—	1.1 (J)	0.54 (U)	—	0.095 (J)	—	—
RE46-10-13694	46-611638	3–4	Qbt 3	—	—	—	—	0.15 (J)	—	—	0.13 (J)	—	0.79
RE46-10-13695	46-611639	0–1	Soil	—	—	—	—	1.1 (J)	0.57 (U)	—	0.3	—	—
RE46-10-13696	46-611639	2–3	Soil	—	—	—	—	0.83 (J)	0.56 (U)	—	0.13 (J)	—	—
RE46-10-13697	46-611640	0–1	Soil	—	—	—	—	1.4	0.64 (U)	—	4.6	—	1.6 (J+)
RE46-10-13698	46-611640	1–2	Soil	—	—	—	—	1.8	0.64 (U)	0.152	1.7	—	—
RE46-10-13699	46-611641	0–1	Soil	—	—	—	—	0.93	0.57 (U)	—	0.21 (J)	—	1.7 (J+)
RE46-10-13700	46-611641	1–2	Soil	—	—	—	—	1.1	0.59 (U)	—	0.77	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.33-3
Organic Chemicals Detected at SWMU 46-005

Sample ID	Location ID	Depth (ft)	Media	Acetone	Aroclor-1254	Aroclor-1260	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Isopropyltoluene[4-]	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]
Construction Worker SSL[a]				**263000**	**4.36**	**7.58**	**4760**	**20100[b]**	**10300[c]**	**298000**	**64300**
Industrial SSL[a]				**851000**	**8.26**	**8.26**	**1370**	**560[d]**	**14900[c]**	**339000**	**77100**
Residential SSL[a]				**67500**	**1.12**	**2.22**	**347**	**140[d]**	**3210[c]**	**104000**	**21800**
RE46-10-13677	46-611630	0–1	Soil	—[e]	—	—	0.048 (J)	—	—	—	—
RE46-10-13678	46-611630	2–3	Qbt 3	—	—	—	0.047 (J)	—	—	—	—
RE46-10-13680	46-611631	2–3	Soil	—	—	—	0.22 (J)	—	—	—	—
RE46-10-13681	46-611632	0–1	Soil	—	—	—	0.14 (J)	—	—	—	—
RE46-10-13683	46-611633	0–1	Soil	—	—	—	0.09 (J)	—	—	0.0012 (J)	0.0007 (J)
RE46-10-13684	46-611633	5–6	Qbt 3	—	—	—	0.21 (J)	—	—	—	—
RE46-10-13687	46-611635	0–1	Soil	—	—	—	5.4	—	—	—	—
RE46-10-13688	46-611635	5–6	Qbt 3	—	—	—	0.17 (J)	—	—	—	—
RE46-10-13689	46-611636	0–1	Qbt 3	—	—	—	0.77	—	—	—	—
RE46-10-13690	46-611636	5–6	Qbt 3	—	—	—	0.048 (J)	—	—	—	—
RE46-10-13692	46-611637	3–4	Soil	—	—	—	0.27 (J)	—	—	—	—
RE46-10-13693	46-611638	0–1	Soil	—	—	—	0.049 (J)	—	—	—	—
RE46-10-13694	46-611638	3–4	Qbt 3	—	—	—	0.075 (J)	—	—	—	—
RE46-10-13695	46-611639	0–1	Soil	—	—	—	0.19 (J)	0.00027 (J)	—	—	—
RE46-10-13697	46-611640	0–1	Soil	—	0.018 (J)	0.015 (J)	0.14 (J)	—	—	—	—
RE46-10-13698	46-611640	1–2	Soil	—	0.015 (J)	0.017 (J)	0.27 (J)	—	—	—	—
RE46-10-13699	46-611641	0–1	Soil	0.0097 (J)	—	—	—	—	0.0012 (J)	—	—
RE46-10-13700	46-611641	1–2	Soil	—	0.013 (J)	0.011 (J)	0.15 (J)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[c] Isopropylbenzene used as a surrogate based on structural similarity.

[d] SSL from EPA (2007, 099314).

[e] — = Not detected.

Table 7.33-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-005

Sample ID	Location ID	Depth (ft)	Media	Cesium-137
Soil BV[a]				**1.65**
Construction Worker SAL[b]				**18**
Industrial SAL[b]				**23**
Residential SAL[b]				**5.6**
RE46-10-13698	46-611640	1–2	Soil	0.227

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.35-1
Samples Collected and Analyses Requested at SWMU 46-006(b)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	Perchlorate	Pesticides	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Isotopic Thorium	Americium-241	Gamma Spectroscopy
RE46-10-11901	46-611368	0–1	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11902	46-611368	3–4	Qbt 3	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11903	46-611369	0–1	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11904	46-611369	3–4	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11905	46-611370	0–1	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11906	46-611370	2–3	Soil	10-1603	10-1602	10-1602	10-1602	10-1603	10-1603	10-1602	10-1602	10-1603	10-1603	10-1603	10-1603	10-1603
RE46-10-11907	46-611371	0–1	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11908	46-611371	2–3	Qbt 3	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11909	46-611372	0–1	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451
RE46-10-11910	46-611372	2–3	Soil	10-1450	10-1449	10-1449	10-1449	10-1450	10-1450	10-1449	10-1449	10-1451	10-1451	10-1451	10-1451	10-1451

Table 7.35-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-006(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Chromium	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**2200**	**7.14**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**6120**	**19.3**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**na[c]**	**449[d]**	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**na**	**2920[d]**	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**na**	**219[d]**	**391**	**23500**
RE46-10-11901	46-611368	0–1	Soil	—[e]	0.54 (U)	6840	—	—	—
RE46-10-11902	46-611368	3–4	Qbt 3	1.14 (U)	—	—	—	1.18 (U)	—
RE46-10-11903	46-611369	0–1	Soil	—	0.854	—	—	—	—
RE46-10-11904	46-611369	3–4	Soil	—	0.612 (U)	—	—	—	—
RE46-10-11905	46-611370	0–1	Soil	1.15 (U)	0.69	—	—	—	53
RE46-10-11906	46-611370	2–3	Soil	—	0.613 (U)	—	—	—	—
RE46-10-11907	46-611371	0–1	Soil	—	0.577 (U)	—	—	—	—
RE46-10-11908	46-611371	2–3	Qbt 3	1.06 (U)	—	—	10.7 (J)	1.07 (U)	—
RE46-10-11909	46-611372	0–1	Soil	—	0.599 (U)	—	—	—	—
RE46-10-11910	46-611372	2–3	Soil	1.11 (U)	0.556 (U)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SSLs from NMED (2009,108070).
[c] na = Not available.
[d] SSL for hexavalent chromium.
[e] — = Not detected or not detected above BV.

Table 7.35-3
Organic Chemicals Detected at SWMU 46-006(b)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1242	Aroclor-1254	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butylbenzene[n-]	Butylbenzene[sec-]	Chrysene	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**4.36**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**4760**	**20100**[c]	**18000**[c]	**20600**	**8910**	**8910**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**560**[d]	**420**[d]	**2340**	**24400**	**24400**
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**1.12**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**140**[d]	**110**[d]	**621**	**2290**	**2290**
RE46-10-11901	46-611368	0–1	Soil	—[e]	—	—	—	—	—	—	—	—	—	—	0.000545 (J+)	—	—	—	—
RE46-10-11903	46-611369	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	0.00073 (J+)	—	—	—
RE46-10-11904	46-611369	3–4	Soil	—	—	—	0.0107 (J)	0.012 (J)	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11905	46-611370	0–1	Soil	0.0162 (J)	—	0.0237 (J)	—	0.0143 (J)	0.0929	0.102	0.173	0.0518	0.0464	0.109 (J)	—	—	0.0949	0.203	0.0127 (J)
RE46-10-11906	46-611370	2–3	Soil	—	—	—	—	0.0016 (J)	—	—	—	—	—	—	—	—	—	0.0181 (J)	—
RE46-10-11907	46-611371	0–1	Soil	0.016 (J)	—	0.019 (J)	—	—	0.0604	0.0683	0.0744	0.0296 (J)	0.0346 (J)	—	—	—	0.054	0.127	—
RE46-10-11908	46-611371	2–3	Qbt 3	—	0.00241 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11909	46-611372	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0134 (J)	—

Table 7.35-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	MethylNaphthalene[2-]	Phenanthrene	Propylbenzene[1-]	Pyrene	Toluene	TPH-DRO	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**213**	**10300**[f]	**1240**[g]	**7150**	**20100**	**6680**	**21100**	**na**[h]	**688**[g]	**3100**[g]	**27500**	**3130**[i]
Industrial SSL[a]				**23.4**	**14900**[f]	**4100**[j]	**20500**	**21000**	**18300**	**57900**	**1120**[k]	**260**[j]	**10000**[j]	**31500**	**3610**[i]
Residential SSL[a]				**6.21**	**3210**[f]	**310**[j]	**1830**	**3400**	**1720**	**5570**	**520**[k]	**62**[j]	**78000**[j]	**9550**	**1090**[i]
RE46-10-11901	46-611368	0–1	Soil	—	—	—	—	0.000413 (J+)	—	0.000399 (J+)	—	0.00199 (J+)	0.000517 (J+)	0.000366 (J+)	0.00058 (J+)
RE46-10-11903	46-611369	0–1	Soil	—	0.000493 (J+)	0.0152 (J)	—	0.000526 (J+)	—	—	380	0.00375 (J+)	0.000995 (J+)	—	0.000362 (J+)
RE46-10-11904	46-611369	3–4	Soil	—	—	—	—	—	—	—	11.1	—	—	—	—
RE46-10-11905	46-611370	0–1	Soil	0.163	—	—	—	—	0.245	0.000379 (J+)	150 (J)	—	—	—	—
RE46-10-11906	46-611370	2–3	Soil	—	—	—	—	—	0.0163 (J)	—	—	—	—	—	—
RE46-10-11907	46-611371	0–1	Soil	0.152	—	—	0.0878	—	0.111	—	3.57 (J)	—	—	—	—
RE46-10-11908	46-611371	2–3	Qbt 3	—	—	—	—	—	—	—	3.28 (J)	—	—	—	—
RE46-10-11909	46-611372	0–1	Soil	—	—	—	—	—	0.0146 (J)	—	6.69 (J)	—	—	—	—

Notes: Units are 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] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[d] SSL from EPA (2007, 099314).

[e] — = Not detected.

[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] na = Not available.

[i] Xylenes used as a surrogate based on structural similarity.

[j] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[k] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.36-1
Samples Collected and Analyses Requested at SWMU 46-006(c)

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

Table 7.36-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-006(c)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Lead	Manganese	Perchlorate	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**11.2**	**482**	**na[b]**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**22.3**	**671**	**na**	**1.52**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**800**	**463**	**217**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**800**	**145000**	**795**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**400**	**10700**	**54.8**	**391**	**23500**
RE46-10-11590	46-611298	0–1	Soil	1.32 (U)	—[e]	0.494 (U)	9500	—	—	—	—	—	—	—
RE46-10-11591	46-611298	3–4	Soil	0.843 (U)	—	0.572 (U)	—	—	—	—	792	—	—	—
RE46-10-11592	46-611299	0–1	Soil	—	—	0.498 (U)	7450	20.2 (J)	—	—	—	—	—	—
RE46-10-11593	46-611299	3–4	Qbt 3	1.1 (UJ)	—	—	—	—	—	—	—	0.00115 (J)	1.06 (U)	—
RE46-10-11594	46-611300	0–1	Soil	—	—	0.53 (U)	—	—	—	—	—	0.00241	—	—
RE46-10-11595	46-611300	2–3	Soil	—	—	0.523 (U)	—	—	—	—	—	0.00116 (J)	—	—
RE46-10-11596	46-611301	0–1	Soil	1.1 (UJ)	—	0.551 (U)	—	—	—	—	—	0.000943 (J)	—	—
RE46-10-11597	46-611301	2–3	Soil	1.07 (UJ)	—	0.537 (U)	—	—	—	—	—	0.000836 (J)	—	—
RE46-10-11598	46-611302	0–1	Soil	—	—	—	—	—	19.5	43	—	—	—	735
RE46-10-11599	46-611302	2–3	Qbt 3	0.881 (U)	53.6	—	—	9.9	—	—	—	—	1.2 (U)	168
RE46-10-11600	46-611303	0–1	Soil	1.06 (U)	—	0.531 (U)	—	—	—	—	—	—	—	—
RE46-10-11601	46-611303	2–3	Qbt 3	1.01 (U)	—	—	—	—	—	—	—	0.000572 (J)	1.03 (U)	—
RE46-10-11602	46-611304	0–1	Soil	1.24 (U)	—	0.618 (U)	—	—	—	—	—	—	—	—
RE46-10-11603	46-611304	2–3	Soil	1.02 (U)	—	0.509 (U)	—	—	—	—	—	—	—	—
RE46-10-11604	46-611305	0–1	Soil	1.09 (U)	—	0.546 (U)	—	—	—	—	—	—	—	—
RE46-10-11605	46-611305	2–3	Soil	1.09 (U)	—	0.545 (U)	—	—	—	—	—	0.00118 (J)	—	—
RE46-10-11606	46-611306	0–1	Soil	1.15 (U)	—	0.574 (U)	—	—	—	—	—	—	—	—
RE46-10-11607	46-611306	2–3	Soil	1.04 (U)	—	0.521 (U)	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

[d] SSL for hexavalent chromium

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

Table 7.36-3
Organic Chemicals Detected at SWMU 46-006(c)

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	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Toluene	TPH-DRO	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**4760**	**148000**	**20600**	**8910**	**213**	**7150**	**6680**	**21100**	**na**[c]	**3130**[d]
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**1370**	**369000**	**2340**	**24400**	**23.4**	**20500**	**18300**	**57900**	**1120**[e]	**3610**[d]
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**347**	**39600**	**621**	**2290**	**6.21**	**1830**	**1720**	**5570**	**520**[e]	**1090**[d]
RE46-10-11590	46-611298	0–1	Soil	—[f]	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.000606 (J)	—	0.000418 (J)
RE46-10-11591	46-611298	3–4	Soil	—	0.113 (J)	—	—	0.244	0.407	—	—	—	—	—	0.0218	—	—	—	—	—	0.000554 (J)	3.43 (J)	—
RE46-10-11592	46-611299	0–1	Soil	—	—	—	0.0159	0.0265	0.0288	—	—	—	—	—	—	—	—	—	—	—	—	3.23 (J+)	—
RE46-10-11594	46-611300	0–1	Soil	—	—	—	—	0.0698	0.129	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11595	46-611300	2–3	Soil	—	—	—	—	0.0611	0.121	—	—	—	—	—	—	—	—	—	—	—	0.000354 (J)	—	—
RE46-10-11596	46-611301	0–1	Soil	0.055	—	—	—	—	0.019 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11597	46-611301	2–3	Soil	—	—	—	—	—	0.0014 (J)	—	—	—	—	—	—	—	—	—	—	—	—	4.76 (J)	—
RE46-10-11598	46-611302	0–1	Soil	—	—	—	—	—	0.029 (J)	—	—	—	—	0.267 (J)	—	—	—	—	—	—	0.000699 (J)	64.1 (J)	0.000424 (J)
RE46-10-11599	46-611302	2–3	Qbt 3	—	—	—	—	—	0.0026 (J)	—	—	—	—	—	—	—	—	—	—	—	—	8.02 (J)	—
RE46-10-11600	46-611303	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	7.21	—
RE46-10-11601	46-611303	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	26.3	—
RE46-10-11602	46-611304	0–1	Soil	—	—	—	0.0314	0.0136	0.0053	—	—	—	—	—	—	—	—	—	—	—	—	17.6	—
RE46-10-11604	46-611305	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	29.4	—
RE46-10-11606	46-611306	0–1	Soil	—	—	0.0143 (J)	—	—	—	0.0439	0.0392 (J)	0.0575	0.0236 (J)	—	—	0.0444	0.0914	0.0208 (J)	0.0616	0.0972	0.000366 (J-)	—	—
RE46-10-11607	46-611306	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	51.1	—

Notes: Units are 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 available.

[d] Xylene used as a surrogate based on structural similarity.

[e] Screening guidelines for diesel #2 from NMED (2006, 094614).

[f] — = Not detected.

Table 7.36-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-006(c)

Sample ID	Location ID	Depth (ft)	Media	Americium-241	Cesium-137	Plutonium-239/240	Uranium-238
Soil BV[a]				**0.013**	**1.65**	**0.054**	**2.29**
Construction Worker SAL[b]				**34**	**18**	**36**	**160**
Industrial SAL[b]				**180**	**23**	**210**	**430**
Residential SAL[b]				**30**	**5.6**	**33**	**87**
RE46-10-11591	46-611298	3–4	Soil	—[c]	0.0835	0.0457	—
RE46-10-11595	46-611300	2–3	Soil	—	—	0.034	—
RE46-10-11604	46-611305	0–1	Soil	0.0955	—	0.0806	—
RE46-10-11606	46-611306	0–1	Soil	—	—	—	2.31

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

[c] — = Not detected or not detected above BV/FV.

Table 7.37-1
Samples Collected and Analyses Requested at SWMU 46-006(d)

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

Table 7.37-1 (continued)

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

Table 7.37-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-006(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide	Lead	Mercury	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**0.1**	**na[b]**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**6190**	**800**	**92.9[e]**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**54.8**	**391**	**391**	**23500**
RE46-10-13321	46-611568	0–1	Soil	1.03 (U)	—[g]	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13322	46-611568	4–5	Qbt 3	1.11 (U)	—	—	—	—	—	—	—	—	—	1.12 (U)	—	—
RE46-10-13323	46-611569	0–1	Soil	1.1 (U)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13324	46-611569	4–5	Qbt 3	1.13 (U)	—	—	—	—	—	—	—	—	—	1.11 (U)	—	—
RE46-10-13325	46-611570	0–1	Soil	1.15 (U)	—	—	—	—	—	—	—	115	—	—	—	52.3
RE46-10-13326	46-611570	4–5	Soil	1.14 (U)	—	0.569 (U)	—	—	—	—	—	9.74	—	—	—	—
RE46-10-13327	46-611571	0–1	Soil	1.17 (U)	—	0.764	—	—	403	—	—	—	—	—	—	252
RE46-10-13328	46-611571	4–5	Soil	1.25 (U)	—	0.625 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13329	46-611572	0–1	Soil	—	—	—	—	—	38.9	—	—	—	—	—	—	115
RE46-10-13330	46-611572	1–2	Soil	1.1 (U)	—	0.549 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13331	46-611573	0–1	Soil	0.919 (U)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13332	46-611573	1–2	Soil	1.02 (U)	—	0.508 (U)	—	—	—	—	—	—	0.00078 (J)	—	9.12	52.3
RE46-10-13333	46-611574	0–1	Soil	1.14 (U)	—	0.568 (U)	—	—	—	—	—	1.39	—	—	—	—
RE46-10-13334	46-611574	1–2	Soil	1.18 (U)	—	0.588 (U)	—	—	—	—	—	0.288	—	—	—	—
RE46-10-13335	46-611575	0–1	Soil	1.11 (U)	—	0.556 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13336	46-611575	1–2	Soil	1.06 (U)	—	0.531 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13337	46-611576	0–1	Soil	1.2 (U)	—	0.598 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13338	46-611576	1–2	Soil	1.07 (U)	—	0.537 (U)	—	—	—	—	—	0.413	—	—	—	—
RE46-10-13339	46-611577	0–1	Soil	1.15 (U)	—	0.567 (J)	—	—	16.1 (J)	—	—	—	—	—	—	123 (J+)
RE46-10-13340	46-611577	1–2	Soil	1.15 (U)	—	0.574 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13341	46-611578	0–1	Soil	1.14 (U)	—	0.568 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13342	46-611578	1–2	Soil	0.993 (U)	—	0.497 (U)	—	—	—	—	—	—	0.000719 (J)	—	—	—
RE46-10-13343	46-611579	0–1	Soil	—	—	—	—	24.5 (J)	—	—	24.9 (J)	—	—	—	—	90.7 (J+)
RE46-10-13344	46-611579	1–2	Soil	1.05 (U)	—	0.523 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13345	46-611580	0–1	Soil	1.18 (U)	—	0.591 (U)	—	—	—	—	—	—	0.00181 (J)	—	—	—
RE46-10-13346	46-611580	1–2	Soil	1.18 (U)	—	0.591 (U)	—	—	—	—	—	—	0.0025	—	—	—
RE46-10-13347	46-611581	0–1	Soil	1.12 (U)	—	0.562 (U)	—	—	—	—	—	—	0.000871 (J)	—	—	—
RE46-10-13348	46-611581	1–2	Soil	1.1 (U)	—	0.55 (U)	—	—	—	—	—	—	0.0019 (J)	—	—	—

Table 7.37-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Barium	Cadmium	Calcium	Chromium	Copper	Cyanide	Lead	Mercury	Perchlorate	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**46**	**1.63**	**2200**	**7.14**	**4.66**	**0.5**	**11.2**	**0.1**	**na[b]**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**295**	**0.4**	**6120**	**19.3**	**14.7**	**0.5**	**22.3**	**0.1**	**na**	**1.52**	**1**	**48.8**
Construction Worker SSL[c]				**124**	**4350**	**309**	**na**	**449[d]**	**12400**	**6190**	**800**	**92.9[e]**	**217**	**1550**	**1550**	**92900**
Industrial SSL[c]				**454**	**224000**	**1120**	**na**	**2920[d]**	**45400**	**22700**	**800**	**310[f]**	**795**	**5680**	**5680**	**341000**
Residential SSL[c]				**31.3**	**15600**	**77.9**	**na**	**219[d]**	**3130**	**1560**	**400**	**23[f]**	**54.8**	**391**	**391**	**23500**
RE46-10-13349	46-611582	0–1	Soil	1.12 (U)	—	0.561 (U)	—	—	—	—	—	—	0.00104 (J)	—	—	—
RE46-10-13350	46-611582	1–2	Qbt 3	1.04 (U)	—	—	—	—	—	—	—	—	—	1.09 (U)	—	—
RE46-10-13351	46-611583	0–1	Soil	1.19 (U)	—	0.594 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13352	46-611583	1–2	Soil	1.25 (U)	—	0.627 (U)	—	—	—	—	—	—	—	—	—	—
RE46-10-13353	46-611584	0–1	Soil	1.16 (U)	—	0.579 (U)	—	—	—	—	—	2.52	—	—	—	51.3
RE46-10-13354	46-611584	1–2	Soil	1.15 (U)	—	0.573 (U)	—	—	—	—	—	—	0.00121 (J)	—	—	—
RE46-10-13355	46-611585	0–1	Soil	—	—	—	—	—	—	0.66 (U)	—	—	—	—	—	—
RE46-10-13356	46-611585	1–2	Qbt 3	—	—	—	—	—	—	0.55 (U)	—	—	—	1.2 (J-)	—	—
RE46-10-13357	46-611586	0–1	Soil	—	—	—	—	—	—	0.66 (U)	—	—	—	—	—	—
RE46-10-13358	46-611586	1–2	Qbt 3	—	—	—	—	—	—	0.52 (U)	—	—	—	1.3 (J-)	—	—
RE46-10-13359	46-611587	0–1	Soil	—	—	—	—	—	—	0.61 (U)	—	—	0.0027 (J+)	—	—	—
RE46-10-13360	46-611587	1–2	Qbt 3	—	74.7	—	2670	—	—	0.59 (U)	—	—	—	1.2 (J-)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[e] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[f] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.37-3
Organic Chemicals Detected at SWMU 46-006(d)

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	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Dibenz(a,h)anthracene	Fluoranthene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**148000**	**20600**	**21.3**	**8910**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**369000**	**2340**	**2.34**	**24400**
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**39600**	**621**	**0.621**	**2290**
RE46-10-13321	46-611568	0–1	Soil	—[c]	0.00202 (J)	—	0.0288	0.0316	0.0127	—	—	—	—	—	—	—	—	—	—
RE46-10-13323	46-611569	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0139 (J)
RE46-10-13324	46-611569	4–5	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13325	46-611570	0–1	Soil	—	—	—	—	—	0.0086	—	—	0.0137 (J)	—	—	—	—	—	—	0.0228 (J)
RE46-10-13326	46-611570	4–5	Soil	0.022 (J)	0.00826 (J)	0.0228 (J)	—	—	—	0.0238 (J)	—	—	—	—	—	—	0.0128 (J)	—	0.0638
RE46-10-13327	46-611571	0–1	Soil	—	0.038 (J)	—	—	0.0107 (J)	—	—	—	0.214 (J)	—	—	—	—	—	—	0.212 (J)
RE46-10-13328	46-611571	4–5	Soil	—	—	—	—	—	—	—	0.0156 (J)	0.0351 (J)	0.0163 (J)	—	—	—	0.0192 (J)	—	0.0405 (J)
RE46-10-13329	46-611572	0–1	Soil	0.0293 (J)	—	0.0455	—	—	0.0971	0.0956	0.0837	0.109	0.069	0.0466	—	—	0.133	0.0226 (J)	0.28
RE46-10-13331	46-611573	0–1	Soil	—	0.00822 (J)	—	—	—	0.0052	—	—	—	—	—	—	—	—	—	0.0112 (J)
RE46-10-13332	46-611573	1–2	Soil	0.707	0.267 (J)	0.00927 (J)	—	—	0.0263	—	0.0217 (J)	0.0273 (J)	0.0165 (J)	0.0117 (J)	—	0.0164	0.037	—	0.0446
RE46-10-13333	46-611574	0–1	Soil	—	—	—	—	0.0046	0.0063	—	—	—	—	—	—	—	—	—	—
RE46-10-13335	46-611575	0–1	Soil	—	—	—	—	—	0.003 (J)	0.041	0.0348 (J)	0.0587	0.0178 (J)	—	—	—	0.0426	—	0.0696
RE46-10-13337	46-611576	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0167 (J)
RE46-10-13338	46-611576	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0143 (J)
RE46-10-13339	46-611577	0–1	Soil	—	—	—	—	—	0.0058	—	0.0217 (J)	0.0354 (J)	0.0134 (J)	0.0131 (J)	—	—	0.0423	—	0.0348 (J)
RE46-10-13340	46-611577	1–2	Soil	—	0.00278 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13341	46-611578	0–1	Soil	—	—	—	—	—	—	—	0.0119 (J)	0.0185 (J)	—	—	—	—	0.0295 (J)	—	0.0302 (J)
RE46-10-13343	46-611579	0–1	Soil	—	—	—	—	1.36	0.496	—	0.0227 (J)	0.0308 (J)	0.0179 (J)	0.0138 (J)	—	—	0.0436 (J)	—	0.0523
RE46-10-13344	46-611579	1–2	Soil	—	—	—	—	0.143	0.0541	—	—	—	—	—	—	—	—	—	—
RE46-10-13345	46-611580	0–1	Soil	—	—	—	—	0.0064	0.0063	0.0209 (J)	0.0147 (J)	0.0314 (J)	—	—	—	—	0.0203 (J)	—	0.0516
RE46-10-13346	46-611580	1–2	Soil	—	—	—	—	—	—	—	—	0.014 (J)	—	—	—	—	—	—	0.0225 (J)
RE46-10-13347	46-611581	0–1	Soil	—	—	0.0274 (J)	—	—	—	0.0481	0.0426	0.111	0.0248 (J)	—	—	—	0.109	—	0.237
RE46-10-13348	46-611581	1–2	Soil	—	—	0.0366 (J)	—	—	—	0.109	0.0627	0.168	0.0251 (J)	—	—	—	0.158	—	0.446

Table 7.37-3 (continued)

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	Benzo(k)fluoranthene	Bis(2-ethylhexyl)phthalate	Butanone[2-]	Chrysene	Dibenz(a,h)anthracene	Fluoranthene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**4760**	**148000**	**20600**	**21.3**	**8910**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**1370**	**369000**	**2340**	**2.34**	**24400**
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**347**	**39600**	**621**	**0.621**	**2290**
RE46-10-13349	46-611582	0–1	Soil	—	—	—	—	—	0.0036 (J)	0.0205 (J)	0.0152 (J)	0.0346 (J)	—	—	—	—	0.0275 (J)	—	0.0563
RE46-10-13350	46-611582	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.026 (J)
RE46-10-13351	46-611583	0–1	Soil	—	—	—	—	—	0.0031 (J)	—	—	0.0141 (J)	—	—	—	—	—	—	0.0196 (J)
RE46-10-13353	46-611584	0–1	Soil	—	—	0.00809 (J)	—	—	0.0089	0.0248 (J)	0.0252 (J)	0.043	0.02 (J)	—	—	—	0.0324 (J)	—	0.0588
RE46-10-13354	46-611584	1–2	Soil	0.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13355	46-611585	0–1	Soil	—	—	—	—	—	—	—	—	0.16 (J)	—	—	—	—	—	—	0.063 (J)
RE46-10-13358	46-611586	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	0.062 (J)	—	—	—	—
RE46-10-13360	46-611587	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	0.0019 (J)	—	—	—

Table 7.37-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**8910**	**213**	**10300**[d]	**10600**	**1240**[e]	**7150**	**6680**	**21100**	**64300**	**4600**	**141**
Industrial SSL[a]				**24400**	**23.4**	**14900**[d]	**1090**	**4100**[f]	**20500**	**18300**	**57900**	**77100**	**253**	**469**
Residential SSL[a]				**2290**	**6.21**	**3210**[d]	**199**	**310**[f]	**1830**	**1720**	**5570**	**21800**	**45.7**	**35.9**
RE46-10-13321	46-611568	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13323	46-611569	0–1	Soil	—	—	—	0.00388 (J)	—	—	—	0.000724 (J)	—	—	—
RE46-10-13324	46-611569	4–5	Qbt 3	—	—	—	0.0031 (J)	—	—	—	—	—	—	—
RE46-10-13325	46-611570	0–1	Soil	—	—	—	—	—	0.0131 (J)	0.0158 (J)	—	—	—	—
RE46-10-13326	46-611570	4–5	Soil	0.0268 (J)	—	—	—	0.00838 (J)	0.106	0.0428	—	—	—	—
RE46-10-13327	46-611571	0–1	Soil	—	—	—	—	—	—	0.239 (J)	—	—	—	—
RE46-10-13328	46-611571	4–5	Soil	—	0.0145 (J)	—	—	—	0.0135 (J)	0.0344 (J)	—	—	—	—
RE46-10-13329	46-611572	0–1	Soil	0.0207 (J)	0.0636	—	—	—	0.263	0.225	—	—	—	—
RE46-10-13331	46-611573	0–1	Soil	—	—	0.00258	—	—	—	0.0106 (J)	—	—	—	—
RE46-10-13332	46-611573	1–2	Soil	—	0.0152 (J)	0.0704	—	—	0.104	0.0476	—	0.000676 (J)	—	—
RE46-10-13333	46-611574	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13335	46-611575	0–1	Soil	—	0.0168 (J)	—	—	—	0.0289 (J)	0.0596	—	—	—	—
RE46-10-13337	46-611576	0–1	Soil	—	—	—	—	—	—	0.0154 (J)	—	—	0.000621 (J)	—
RE46-10-13338	46-611576	1–2	Soil	—	—	—	—	—	—	0.0129 (J)	—	—	—	—
RE46-10-13339	46-611577	0–1	Soil	—	0.0132 (J)	—	—	—	0.091	0.0318 (J)	—	—	—	—
RE46-10-13340	46-611577	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13341	46-611578	0–1	Soil	—	—	—	—	—	0.0965	0.0319 (J)	—	—	—	—
RE46-10-13343	46-611579	0–1	Soil	—	0.0148 (J)	—	—	—	0.111	0.0457	—	—	—	—
RE46-10-13344	46-611579	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13345	46-611580	0–1	Soil	—	0.0309 (J)	—	—	—	0.0249 (J)	0.0438	—	—	—	—
RE46-10-13346	46-611580	1–2	Soil	—	—	—	—	—	0.0136 (J)	0.021 (J)	—	—	—	—
RE46-10-13347	46-611581	0–1	Soil	—	0.0446	—	—	—	0.146	0.193	—	—	—	—
RE46-10-13348	46-611581	1–2	Soil	—	0.0484	—	—	—	0.272	0.344	—	—	—	—
RE46-10-13349	46-611582	0–1	Soil	—	—	—	—	—	0.025 (J)	0.0516	—	—	—	—
RE46-10-13350	46-611582	1–2	Qbt 3	—	—	—	—	—	0.0145 (J)	0.0238 (J)	—	—	—	—
RE46-10-13351	46-611583	0–1	Soil	—	—	—	—	—	—	0.0165 (J)	—	—	—	—
RE46-10-13353	46-611584	0–1	Soil	—	0.038 (J)	—	—	—	0.0323 (J)	0.0571	—	—	—	—
RE46-10-13354	46-611584	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13355	46-611585	0–1	Soil	—	—	—	—	—	0.061 (J)	0.065 (J)	—	—	—	—

Table 7.37-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Phenanthrene	Pyrene	Toluene	Trichloroethane[1,1,1-]	Trichloroethene	Trinitrotoluene[2,4,6-]
Construction Worker SSL[a]				**8910**	**213**	**10300**[d]	**10600**	**1240**[e]	**7150**	**6680**	**21100**	**64300**	**4600**	**141**
Industrial SSL[a]				**24400**	**23.4**	**14900**[d]	**1090**	**4100**[f]	**20500**	**18300**	**57900**	**77100**	**253**	**469**
Residential SSL[a]				**2290**	**6.21**	**3210**[d]	**199**	**310**[f]	**1830**	**1720**	**5570**	**21800**	**45.7**	**35.9**
RE46-10-13358	46-611586	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.0078 (J+)
RE46-10-13360	46-611587	1–2	Qbt 3	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

Table 7.37-4

Radionuclides Detected or Detected above BVs/FVs at SWMU 46-006(d)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240	Uranium-234	Uranium-235/236	Uranium-238
Qbt2, 3, 4 BV[a]				**na**[b]	**na**	**1.98**	**0.09**	**1.93**
Soil BV[a]				**1.65**	**0.054**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**36**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**210**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**33**	**170**	**17**	**87**
RE46-10-13332	46-611573	1–2	Soil	0.0947	—[d]	—	—	—
RE46-10-13346	46-611580	1–2	Soil	0.16	—	—	—	—
RE46-10-13350	46-611582	1–2	Qbt 3	0.22	0.0222	2.08	0.155	2.41
RE46-10-13352	46-611583	1–2	Soil	0.0641	0.0271	—	—	—

Note: All activities are in pCi/g.

[a] BVs are 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 7.38-1
Samples Collected and Analyses Requested at SWMU 46-006(f)

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

Table 7.38-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-006(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Lead	Mercury	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**11.2**	**0.1**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**22.3**	**0.1**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**449**[c]	**800**	**92.9**[d]	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**2920**[c]	**800**	**310**[e]	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**219**[c]	**400**	**23**[e]	**391**	**23500**
RE46-10-13775	46-611737	0–1	Soil	1.08 (UJ)	0.542 (U)	—[f]	—	—	—	—
RE46-10-13776	46-611737	3–4	Qbt 3	1.07 (UJ)	—	—	—	—	1.09 (U)	—
RE46-10-13777	46-611738	0–1	Soil	1.19 (UJ)	0.595 (U)	—	—	—	—	—
RE46-10-13778	46-611738	3–4	Qbt 3	1.22 (UJ)	—	—	—	—	1.21 (U)	—
RE46-10-13779	46-611739	0–1	Soil	1.24 (UJ)	0.619 (U)	—	—	—	—	52.6
RE46-10-13780	46-611739	2–3	Qbt 3	1.12 (UJ)	—	16.4	—	—	1.22 (U)	—
RE46-10-13781	46-611740	0–1	Soil	1.2 (UJ)	0.599 (U)	114	23.4	0.121	—	—
RE46-10-13782	46-611740	2–3	Qbt 3	1.15 (UJ)	—	—	—	—	1.11 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm

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

Table 7.38-3
Organic Chemicals Detected at SWMU 46-006(f)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Anthracene	Aroclor-1254	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Bis(2-ethylhexyl)phthalate	Chrysene	Ethylbenzene	Fluoranthene	Indeno(1,2,3-cd)pyrene	Phenanthrene	Pyrene	Toluene	TPH-DRO	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**263000**	**66800**	**4.36**	**21.3**	**213**	**6680**[b]	**4760**	**20600**	**6630**	**8910**	**213**	**7150**	**6680**	**21100**	**na**[c]	**3130**[d]
Industrial SSL[a]				**851000**	**183000**	**8.26**	**2.34**	**23.4**	**18300**[b]	**1370**	**2340**	**385**	**24400**	**23.4**	**20500**	**18300**	**57900**	**1120**[e]	**3610**[d]
Residential SSL[a]				**67500**	**17200**	**1.12**	**0.621**	**6.21**	**1720**[b]	**347**	**621**	**69.7**	**2290**	**6.21**	**1830**	**1720**	**5570**	**520**[e]	**1090**[d]
RE46-10-13775	46-611737	0–1	Soil	—[f]	—	—	—	0.0111 (J)	—	—	—	—	0.0149 (J)	—	—	0.0126 (J)	—	3.87 (J)	—
RE46-10-13776	46-611737	3–4	Qbt 3	0.00188 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13777	46-611738	0–1	Soil	—	0.0191 (J)	—	0.0447	0.0711	0.0425	—	0.0452	0.000392 (J)	0.102	0.032 (J)	0.0858	0.0829	0.00641	—	0.00085 (J)
RE46-10-13778	46-611738	3–4	Qbt 3	—	—	—	—	—	—	0.0833 (J)	—	—	—	—	—	—	—	4.24 (J)	—
RE46-10-13779	46-611739	0–1	Soil	—	0.0121 (J)	0.0725 (J)	0.0341 (J)	0.0549	0.0225 (J)	—	0.0357 (J)	—	0.0791	0.0184 (J)	0.0545	0.0647	—	—	—
RE46-10-13781	46-611740	0–1	Soil	—	0.0161 (J)	—	0.0556	0.0882	0.0327 (J)	—	0.0592	—	0.125	0.0323 (J)	0.0767	0.0949	—	7.17 (J)	—

Notes: Units are 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 available.

[d] Xylene used as a surrogate based on structural similarity.

[e] Screening guidelines for diesel #2 from NMED (2006, 094614).

[f] — = Not detected.

Table 7.39-1
Samples Collected and Analyses Requested at SWMU 46-006(g)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Cyanide	TPH-DRO	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-13176	46-611547	0–1	Soil	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033
RE46-10-13177	46-611547	3–4	Qbt 3	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033
RE46-10-13178	46-611548	0–1	Soil	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033
RE46-10-13179	46-611548	3–4	Qbt 3	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033
RE46-10-13180	46-611549	0–1	Soil	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033
RE46-10-13181	46-611549	3–4	Qbt 3	10-2032	10-2031	10-2031	10-2031	10-2032	10-2031	10-2033	10-2033	10-2033	10-2033

Table 7.39-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-006(g)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**1.52**
Construction Worker SSL[b]				**124**	**309**	**1550**
Industrial SSL[b]				**454**	**1120**	**5680**
Residential SSL[b]				**31.3**	**77.9**	**391**
RE46-10-13176	46-611547	0–1	Soil	1.09 (U)	—[c]	—
RE46-10-13177	46-611547	3–4	Qbt 3	1.04 (U)	—	1.05 (U)
RE46-10-13178	46-611548	0–1	Soil	0.996 (U)	0.498 (U)	—
RE46-10-13179	46-611548	3–4	Qbt 3	1.1 (U)	—	1.1 (U)
RE46-10-13180	46-611549	0–1	Soil	0.956 (U)	0.478 (U)	—
RE46-10-13181	46-611549	3–4	Qbt 3	1.06 (U)	—	1.01 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SSLs from NMED (2009,108070).
[c] — = Not detected or not detected above BV.

Table 7.39-3
Organic Chemicals Detected at SWMU 46-006(g)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1242	Aroclor-1254	Aroclor-1260	Toluene	TPH-DRO	Trichloroethene
Construction Worker SSL[a]				**7.58**	**4.36**	**7.58**	**21100**	**na**[b]	**4600**
Industrial SSL[a]				**8.26**	**8.26**	**8.26**	**57900**	**1120**[c]	**253**
Residential SSL[a]				**2.22**	**1.12**	**2.22**	**5570**	**520**[c]	**45.7**
RE46-10-13176	46-611547	0–1	Soil	—[d]	—	—	0.00351	64 (J)	0.000505 (J)
RE46-10-13177	46-611547	3–4	Qbt 3	—	—	—	0.000706 (J)	—	—
RE46-10-13178	46-611548	0–1	Soil	—	—	—	0.000629 (J)	—	—
RE46-10-13179	46-611548	3–4	Qbt 3	—	—	—	—	4.08 (J)	—
RE46-10-13180	46-611549	0–1	Soil	—	0.0244	0.0512	0.000765 (J)	—	0.00164
RE46-10-13181	46-611549	3–4	Qbt 3	0.0015 (J)	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] SSLs from NMED (2009,108070) unless otherwise noted.
[b] na = Not available.
[c] Screening guidelines for diesel #2 from NMED (2006, 094614).
[d] — = Not detected.

Table 7.40-1
Samples Collected and Analyses Requested at SWMU 46-007

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

Table 7.40-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-007

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Cesium	Chromium	Copper	Lead	Mercury	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na[b]**	**7.14**	**4.66**	**11.2**	**0.1**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**na**	**19.3**	**14.7**	**22.3**	**0.1**	**1.52**
Construction Worker SSL[c]				**124**	**309**	**na**	**449[d]**	**12400**	**800**	**92.9[e]**	**1550**
Industrial SSL[c]				**454**	**1120**	**na**	**2920[d]**	**45400**	**800**	**310[f]**	**5680**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219[d]**	**3130**	**400**	**23[f]**	**391**
RE46-10-13860	46-611754	0–1	Soil	1.09 (UJ)	—[g]	0.995	—	—	—	7.71	—
RE46-10-13861	46-611754	2–3	Qbt 3	1.1 (UJ)	—	0.229	20.3	—	—	0.355	1.12 (U)
RE46-10-13863	46-611755	0–1	Soil	1.1 (UJ)	0.551 (U)	0.123	—	—	—	—	—
RE46-10-13862	46-611755	2–3	Qbt 3	1.11 (UJ)	—	3.11	—	8.32	15.9	1.2	1.01 (U)
RE46-10-13864	46-611756	0–1	Soil	1.05 (UJ)	0.524 (U)	1.21	—	—	—	0.766	—
RE46-10-13865	46-611756	2–3	Qbt 3	1.09 (UJ)	—	0.134	—	—	—	—	1.08 (U)
RE46-10-13866	46-611757	0–1	Soil	1.07 (UJ)	0.537 (U)	0.704	—	—	—	—	—
RE46-10-13867	46-611757	2–3	Qbt 3	1.06 (UJ)	—	0.132	14.4	—	—	—	1.08 (U)
RE46-10-13868	46-611758	0–1	Soil	1.06 (UJ)	0.53 (U)	0.313	—	—	—	—	—
RE46-10-13869	46-611758	2–3	Qbt 3	1.07 (UJ)	—	0.108	—	—	—	—	1.07 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070) unless otherwise noted.

[d] SSL for hexavalent chromium.

[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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.40-3
Organic Chemicals Detected at SWMU 46-007

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	Di-n-octylphthalate	Fluoranthene
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**20600**	**4760**	**8910**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**2340**	**25000**	**24400**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**621**	**2400**	**2290**
RE46-10-13860	46-611754	0–1	Soil	—[c]	—	0.0064 (J)	—	—	—	—	—	—	—	0.116 (J)
RE46-10-13863	46-611755	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13862	46-611755	2–3	Qbt 3	—	0.0114 (J)	0.0274	0.0209	0.0371 (J)	0.0378	0.0602	0.0309 (J)	0.0371 (J)	0.0845 (J)	0.0691
RE46-10-13864	46-611756	0–1	Soil	0.0367 (J)	0.0602	—	—	0.181	0.19	0.32	0.151 (J)	0.206	—	0.438
RE46-10-13865	46-611756	2–3	Qbt 3	—	—	—	—	0.0204 (J)	0.0155 (J)	0.027 (J)	0.0169 (J)	0.0197 (J)	—	0.0413
RE46-10-13866	46-611757	0–1	Soil	—	—	—	—	0.0207 (J)	0.0198 (J)	0.0321 (J)	0.0203 (J)	0.0181 (J)	—	0.0357 (J)
RE46-10-13867	46-611757	2–3	Qbt 3	—	—	—	—	0.0217 (J)	0.0307 (J)	0.0576	0.0255 (J)	0.029 (J)	—	0.0197 (J)

Table 7.40-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Naphthalene	Phenanthrene	Pyrene	Toluene	TPH-DRO	Trichloroethane[1,1,1-]	Trichloroethene
Construction Worker SSL[a]				**8910**	**213**	**702**	**7150**	**6680**	**21100**	**na[d]**	**64300**	**4600**
Industrial SSL[a]				**24400**	**23.4**	**252**	**20500**	**18300**	**57900**	**1120[e]**	**77100**	**253**
Residential SSL[a]				**2290**	**6.21**	**45**	**1830**	**1720**	**5570**	**520[e]**	**21800**	**45.7**
RE46-10-13860	46-611754	0–1	Soil	—	—	—	—	0.119 (J)	0.00255 (J+)	163	0.000674 (J+)	0.00388 (J+)
RE46-10-13863	46-611755	0–1	Soil	—	0.0128 (J)	—	—	—	—	—	—	—
RE46-10-13862	46-611755	2–3	Qbt 3	—	0.0229 (J)	—	0.0435	0.0669	—	62.2 (J)	—	—
RE46-10-13864	46-611756	0–1	Soil	0.0321 (J)	0.14 (J)	0.018 (J)	0.327	0.438	—	11.1	—	—
RE46-10-13865	46-611756	2–3	Qbt 3	—	0.014 (J)	—	0.0278 (J)	0.0387	—	—	—	—
RE46-10-13866	46-611757	0–1	Soil	—	0.0164 (J)	—	0.0254 (J)	0.0318 (J)	—	14.8 (J)	—	0.000893 (J)
RE46-10-13867	46-611757	2–3	Qbt 3	—	0.0238 (J)	—	0.0152 (J)	0.0191 (J)	—	—	—	—

Notes: Units are 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 available.

[e] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.40-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-007

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240
Qbt2, 3, 4 BV				**na[a]**	**na**
Construction Worker SAL[b]				**18**	**36**
Industrial SAL[b]				**23**	**210**
Residential SAL[b]				**5.6**	**33**
RE46-10-13862	46-611755	2–3	Qbt 3	0.286	0.0207

Note: All activities are in pCi/g.

[a] na = Not available.

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.41-1
Samples Collected and Analyses Requested at SWMU 46-008(a)

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

Table 7.41-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium
Soil BV[a]				**0.83**	**0.4**
Construction Worker SSL[b]				**124**	**309**
Industrial SSL[b]				**454**	**1120**
Residential SSL[b]				**31.3**	**77.9**
RE46-10-11793	46-611338	0–1	Soil	—[c]	0.556 (U)
RE46-10-11794	46-611338	2–3	Soil	1.18 (U)	0.592 (U)
RE46-10-11795	46-611339	0–1	Soil	1.07 (U)	0.536 (U)
RE46-10-11796	46-611339	2–3	Soil	—	0.583 (U)
RE46-10-11797	46-611340	0–1	Soil	—	0.567 (U)
RE46-10-11798	46-611340	2–3	Soil	1.16 (U)	0.578 (U)
RE46-10-11799	46-611341	0–1	Soil	1.13 (U)	0.564 (U)
RE46-10-11800	46-611341	2–3	Soil	1.17 (U)	0.584 (U)
RE46-10-11801	46-611342	0–1	Soil	—	0.548 (U)
RE46-10-11802	46-611342	2–3	Soil	—	0.583 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] SSLs from NMED (2009,108070).
[c] — = Not detected or not detected above BV.

Table 7.41-3
Organic Chemicals Detected at SWMU 46-008(a)

Sample ID	Location ID	Depth (ft)	Media	Acetone	Toluene	TPH-DRO	Trichloroethane[1,1,1-]	Trichloroethene	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**263000**	**21100**	**na**[b]	**64300**	**4600**	**3130**[c]
Industrial SSL[a]				**851000**	**57900**	**1120**[d]	**77100**	**253**	**3610**[c]
Residential SSL[a]				**67500**	**5570**	**520**[d]	**21800**	**45.7**	**1090**[c]
RE46-10-11793	46-611338	0–1	Soil	—[e]	0.00155	123 (J)	0.00201	—	—
RE46-10-11794	46-611338	2–3	Soil	—	—	9.7	0.000391 (J)	—	—
RE46-10-11795	46-611339	0–1	Soil	—	0.000506 (J)	46.9 (J)	—	—	0.000439 (J)
RE46-10-11796	46-611339	2–3	Soil	—	—	107 (J)	—	0.000434 (J)	—
RE46-10-11797	46-611340	0–1	Soil	0.0451	—	—	—	—	—
RE46-10-11798	46-611340	2–3	Soil	—	—	6.01 (J)	—	—	—
RE46-10-11799	46-611341	0–1	Soil	—	—	7.59	—	—	—
RE46-10-11801	46-611342	0–1	Soil	—	0.000692 (J)	38.6 (J)	—	—	0.000749 (J)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] na = Not available.

[c] Xylene used as a surrogate based on structural similarity.

[d] Screening guidelines for diesel #2 from NMED (2006, 094614).

[e] — = Not detected.

Table 7.42-1
Samples Collected and Analyses Requested at SWMU 46-008(b)

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

Table 7.42-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Copper	Lead	Mercury	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**4.66**	**11.2**	**0.1**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**14.7**	**22.3**	**0.1**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**12400**	**800**	**92.9**[c]	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**45400**	**800**	**310**[d]	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**3130**	**400**	**23**[d]	**391**	**23500**
RE46-10-11313	46-611200	0–1	Soil	1.07 (U)	0.537 (U)	—[e]	—	—	—	—
RE46-10-11314	46-611200	2–3	Qbt 3	1.12 (U)	—	—	—	—	0.61 (J)	—
RE46-10-11315	46-611201	0–1	Soil	—	0.569 (U)	—	—	—	—	—
RE46-10-11316	46-611201	2–3	Soil	—	0.533 (U)	—	36.7	—	—	—
RE46-10-11317	46-611202	0–1	Soil	—	0.531 (U)	81.1	—	0.854	—	150
RE46-10-11318	46-611202	2–3	Soil	1.14	0.537 (U)	53.7	—	0.453	—	106
RE46-10-11319	46-611203	0–1	Soil	1.29	0.569 (U)	—	—	—	—	—
RE46-10-11320	46-611203	2–3	Soil	—	0.58 (U)	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070) unless otherwise noted.

[c] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

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

Table 7.42-3
Organic Chemicals Detected at SWMU 46-008(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	Chrysene	Dibenzofuran	Dinitrotoluene[2,4-]	Ethylbenzene
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**2060**	**20600**	**552[c]**	**476**	**6630**
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**234**	**2340**	**1000[d]**	**103**	**385**
Residential SSL[a]				**3440**	**67500**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**62.1**	**621**	**78[d]**	**15.7**	**69.7**
RE46-10-11313	46-611200	0–1	Soil	—[e]	—	—	—	—	—	—	0.0533	0.0369	—	—	—	—	0.000361 (J)
RE46-10-11314	46-611200	2-3	Qbt 3	—	0.00354 (J)	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11315	46-611201	0-1	Soil	—	—	—	0.0905	0.0295	0.18 (J)	0.19 (J)	0.236	0.121	0.115 (J)	0.209 (J)	—	—	—
RE46-10-11316	46-611201	2-3	Soil	—	—	—	—	—	—	—	0.0165 (J)	0.0137 (J)	—	—	—	—	—
RE46-10-11317	46-611202	0-1	Soil	0.352 (J)	—	0.548 (J)	0.017 (J)	—	1.59	1.51	1.99	0.736	0.902	1.79	0.171 (J)	—	—
RE46-10-11318	46-611202	2-3	Soil	0.178 (J)	—	0.311 (J)	0.0212 (J)	—	0.851 (J)	0.854	1.1	0.508	0.434 (J)	0.91	—	1.05	—
RE46-10-11319	46-611203	0-1	Soil	—	—	—	—	—	0.103 (J)	0.105 (J)	0.132	0.0567	—	0.112 (J)	—	—	—
RE46-10-11320	46-611203	2–3	Soil	7.79	—	9.75	—	—	13	12	13.7	7.24	5.53	12	4.21	—	—

Table 7.42-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene	TPH-DRO	Trichloro-1,2,2-trifluoroethane[1,1,2-]	Trichloroethane[1,1,1-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**8910**	**8910**	**213**	**1240**[c]	**702**	**7150**	**6680**	**21100**	**na**[f]	**298000**	**64300**	**27500**	**3130**[g]
Industrial SSL[a]				**24400**	**24400**	**23.4**	**4100**[d]	**252**	**20500**	**18300**	**57900**	**1120**[h]	**339000**	**77100**	**31500**	**3610**[g]
Residential SSL[a]				**2290**	**2290**	**6.21**	**310**[d]	**45**	**1830**	**1720**	**5570**	**520**[h]	**104000**	**21800**	**9550**	**1090**[g]
RE46-10-11313	46-611200	0–1	Soil	0.154 (J)	—	0.035 (J)	—	—	0.137 (J)	0.142 (J)	0.00286	33.1 (J)	—	—	0.00036 (J)	0.00103 (J)
RE46-10-11314	46-611200	2-3	Qbt 3	—	—	—	—	—	—	—	0.00222	—	—	—	—	0.000462 (J)
RE46-10-11315	46-611201	0-1	Soil	0.451 (J)	—	0.12	—	—	0.281 (J)	0.399 (J)	—	—	—	—	—	—
RE46-10-11316	46-611201	2-3	Soil	—	—	0.0134 (J)	—	—	—	—	—	3.64 (J)	—	—	—	—
RE46-10-11317	46-611202	0-1	Soil	3.71	0.327 (J)	0.776	0.0609 (J)	0.141 (J)	—	—	—	73.4 (J)	0.00489 (J)	0.00407	—	—
RE46-10-11318	46-611202	2-3	Soil	1.99	0.17 (J)	0.494	—	0.0728 (J)	1.46	1.83	—	65.4 (J)	—	—	—	—
RE46-10-11319	46-611203	0-1	Soil	0.272 (J)	—	0.0543	—	—	0.202 (J)	0.24 (J)	0.00166	37.5 (J)	—	—	—	0.00035 (J)
RE46-10-11320	46-611203	2–3	Soil	27.4	7.15	7.06	3.43	10.2 (J)	28.7	24.9	—	—	—	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] na = Not available.

[g] Xylene used as a surrogate based on structural similarity.

[h] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.42-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-008(b)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-235/236
Qbt2, 3, 4 BV[a]				**na**[b]	**0.09**
Soil BV[a]				**1.65**	**0.2**
Construction Worker SAL[c]				**18**	**43**
Industrial SAL[c]				**23**	**87**
Residential SAL[c]				**5.6**	**17**
RE46-10-11314	46-611200	2–3	Qbt 3	—[d]	0.112
RE46-10-11318	46-611202	2–3	Soil	0.0989	—

Note: All activities are in pCi/g.

[a] BVs are 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 7.43-1
Samples Collected and Analyses Requested at SWMU 46-008(d)

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

Table 7.43-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Lead	Manganese	Nickel	Selenium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**11.2**	**482**	**6.58**	**0.3**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**22.3**	**671**	**15.4**	**1.52**
Construction Worker SSL[b]				**124**	**309**	**449[c]**	**12400**	**800**	**463**	**6190**	**1550**
Industrial SSL[b]				**454**	**1120**	**2920[c]**	**45400**	**800**	**145000**	**22700**	**5680**
Residential SSL[b]				**31.3**	**77.9**	**219[c]**	**3130**	**400**	**10700**	**1560**	**391**
RE46-10-11803	46-611343	0–1	Soil	0.957 (U)	0.478 (U)	—[d]	—	—	—	—	—
RE46-10-11804	46-611343	2–3	Qbt 3	1.06 (U)	—	7.46	—	14	—	—	1.08 (UJ)
RE46-10-11805	46-611344	0–1	Soil	0.993 (U)	0.496 (U)	—	—	—	—	—	—
RE46-10-11806	46-611344	2–3	Qbt 3	1.02 (U)	—	—	—	—	—	—	1.02 (UJ)
RE46-10-11807	46-611345	0–1	Qbt 3	0.527 (U)	—	—	—	—	705 (J+)	—	1.02 (U)
RE46-10-11808	46-611345	2–3	Qbt 3	1.03 (U)	—	—	—	—	602 (J+)	—	1.02 (U)
RE46-10-11809	46-611346	0–1	Soil	—	0.502 (U)	—	—	—	—	—	—
RE46-10-11810	46-611346	2–3	Qbt 3	1.1 (U)	—	—	—	—	—	—	1.15 (UJ)
RE46-10-11811	46-611347	0–1	Soil	1.08 (U)	0.539 (U)	—	—	—	—	—	—
RE46-10-11812	46-611347	2–3	Qbt 3	1.04 (U)	—	8.91 (J)	—	—	—	—	1.08 (U)
RE46-10-11813	46-611348	0–1	Soil	—	0.558 (U)	—	—	—	—	—	—
RE46-10-11814	46-611348	2–3	Qbt 3	1.05 (U)	—	—	6.35 (J)	—	—	12.6 (J)	1.12 (U)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070).

[c] SSL for hexavalent chromium.

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

Table 7.43-3
Organic Chemicals Detected at SWMU 46-008(d)

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	Chrysene	Dibenzofuran	Ethylbenzene	Fluoranthene	Fluorene
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**552**[c]	**6630**	**8910**	**8910**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**1000**[d]	**385**	**24400**	**24400**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**78**[d]	**69.7**	**2290**	**2290**
RE46-10-11803	46-611343	0–1	Soil	—[e]	—	—	—	0.03 (J)	0.0222 (J)	0.0259 (J)	—	0.015 (J)	0.0263 (J)	—	—	0.0397	—
RE46-10-11805	46-611344	0–1	Soil	—	0.0103 (J)	—	—	—	—	—	—	—	—	—	—	0.0126 (J)	—
RE46-10-11806	46-611344	2–3	Qbt 3	—	—	—	0.002 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-11807	46-611345	0–1	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11808	46-611345	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11809	46-611346	0–1	Soil	0.0515	0.0906	0.0145 (J)	0.0094 (J)	0.3	0.252	0.355	0.122	0.148	0.29	—	—	0.501	0.036 (J)
RE46-10-11810	46-611346	2–3	Qbt 3	0.192	0.275	—	—	0.34	0.273	0.386	0.11	0.159	0.309	0.102 (J)	—	0.682	0.175
RE46-10-11811	46-611347	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	0.000425 (J+)	0.0142 (J)	—
RE46-10-11812	46-611347	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11813	46-611348	0–1	Soil	—	—	—	0.0017 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-11814	46-611348	2–3	Qbt 3	—	—	—	—	0.0367 (J)	0.039	0.0549	0.0247 (J)	0.0227 (J)	0.0473	—	—	0.0942	—

Table 7.43-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	Toluene	TPH-DRO	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**213**	**10600**	**1240**[c]	**702**	**7150**	**6680**	**21100**	**na**[f]	**688**[c]	**27500**	**3130**[g]
Industrial SSL[a]				**23.4**	**1090**	**4100**[d]	**252**	**20500**	**18300**	**57900**	**1120**[h]	**260**[d]	**31500**	**3610**[g]
Residential SSL[a]				**6.21**	**199**	**310**[d]	**45**	**1830**	**1720**	**5570**	**520**[h]	**62**[d]	**9550**	**1090**[g]
RE46-10-11803	46-611343	0–1	Soil	—	0.0022 (J)	—	—	0.0243 (J)	0.047	0.000491 (J)	68.6 (J)	—	—	—
RE46-10-11805	46-611344	0–1	Soil	—	—	—	—	—	0.0249 (J)	0.000691 (J)	—	—	—	0.000611 (J)
RE46-10-11806	46-611344	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	—
RE46-10-11807	46-611345	0–1	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.000594 (J)
RE46-10-11808	46-611345	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.00034 (J)
RE46-10-11809	46-611346	0–1	Soil	0.204	0.00243 (J)	—	—	0.338	0.665	0.000465 (J)	75.6 (J)	—	—	0.000393 (J)
RE46-10-11810	46-611346	2–3	Qbt 3	0.204	—	0.0865	0.262	0.912	0.934	—	—	—	—	—
RE46-10-11811	46-611347	0–1	Soil	—	—	—	—	—	0.0143 (J)	0.00249 (J+)	—	0.0004 (J+)	0.000455 (J+)	0.00117 (J+)
RE46-10-11812	46-611347	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	0.000439 (J)
RE46-10-11813	46-611348	0–1	Soil	—	—	—	—	—	—	—	4.65 (J)	—	—	—
RE46-10-11814	46-611348	2–3	Qbt 3	0.0223 (J)	—	—	—	0.0466	0.0801	—	4.09 (J)	—	—	0.000381 (J)

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] na = Not available.

[g] Xylene used as a surrogate based on structural similarity.

[h] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.44-1
Samples Collected and Analyses Requested at SWMU 46-008(e)

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

Table 7.44-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(e)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Chromium	Perchlorate	Selenium	Silver	Thallium
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**2200**	**7.14**	**na**[b]	**0.3**	**1**	**1.1**
Soil BV[a]				**0.83**	**0.4**	**6120**	**19.3**	**na**	**1.52**	**1**	**0.73**
Construction Worker SSL[c]				**124**	**309**	**na**	**449**[d]	**217**	**1550**	**1550**	**20.4**
Industrial SSL[c]				**454**	**1120**	**na**	**2920**[d]	**795**	**5680**	**5680**	**74.9**
Residential SSL[c]				**31.3**	**77.9**	**na**	**219**[d]	**54.8**	**391**	**391**	**5.16**
RE46-10-11815	46-611349	0–1	Soil	—[e]	0.54 (U)	—	—	0.000703 (J)	—	—	—
RE46-10-11816	46-611349	2–3	Qbt 3	1.02 (U)	—	—	13.2 (J)	—	1.06 (U)	—	—
RE46-10-11817	46-611350	0–1	Qbt 3	1.06 (U)	—	—	—	0.000755 (J)	1.02 (U)	—	—
RE46-10-11818	46-611350	2–3	Qbt 3	1.04 (U)	—	—	—	—	1.08 (U)	—	—
RE46-10-11819	46-611351	0–0.5	Soil	—	0.572 (U)	—	—	—	—	—	—
RE46-10-12048	46-611351	2–3	Qbt 3	1.07 (U)	—	—	—	—	1.05 (U)	—	—
RE46-10-11821	46-611352	0–1	Soil	1.1 (U)	0.552 (U)	—	—	—	—	—	—
RE46-10-12050	46-611352	2–3	Qbt 3	1.1 (U)	—	—	—	—	1.01 (U)	—	—
RE46-10-11823	46-611353	0–1	Soil	—	0.489 (U)	—	—	—	—	—	—
RE46-10-12049	46-611353	2–3	Qbt 3	—	—	2520	—	—	1.03 (U)	—	—
RE46-10-11825	46-611354	0–0.75	Soil	1.05 (U)	0.523 (U)	—	—	—	—	—	—
RE46-10-12047	46-611354	2–3	Qbt 3	1.08 (U)	—	—	—	—	1.11 (U)	2.71 (U)	—
RE46-10-11827	46-611355	0–1	Soil	1.12 (U)	0.561 (U)	—	—	—	—	—	0.926
RE46-10-12051	46-611355	2–3	Qbt 3	—	—	—	—	0.000776 (J)	1.07 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

[d] SSL for hexavalent chromium.

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

Table 7.44-3
Organic Chemicals Detected at SWMU 46-008(e)

Sample ID	Location ID	Depth (ft)	Media	Aroclor-1254	Aroclor-1260	Butylbenzene[n-]	Butylbenzene[sec-]	Ethylbenzene	Isopropyltoluene[4-]	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Propylbenzene[1-]	TPH-DRO	Trichloroethane[1,1,1-]	Trichloroethene	Trimethylbenzene[1,2,4-]	Trimethylbenzene[1,3,5-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**4.36**	**7.58**	**20100[b]**	**18000[b]**	**6630**	**10300[c]**	**10600**	**1240[d]**	**702**	**20100**	**na[e]**	**64300**	**4600**	**688[d]**	**3100[d]**	**27500**	**3130[f]**
Industrial SSL[a]				**8.26**	**8.26**	**560[g]**	**420[g]**	**385**	**14900[c]**	**1090**	**4100[h]**	**252**	**21000**	**1120[i]**	**77100**	**253**	**260[h]**	**10000[h]**	**31500**	**3610[f]**
Residential SSL[a]				**1.12**	**2.22**	**140[g]**	**110[g]**	**69.7**	**3210[c]**	**199**	**310[h]**	**45**	**3400**	**520[i]**	**21800**	**45.7**	**62[h]**	**78000[h]**	**9550**	**1090[f]**
RE46-10-11815	46-611349	0–1	Soil	—[j]	—	—	—	—	—	—	—	—	—	4.87 (J)	—	—	—	—	—	—
RE46-10-11819	46-611351	0–0.5	Soil	—	—	0.00244	0.000848 (J)	0.000429 (J)	0.000677 (J)	—	0.0493	0.0165 (J)	0.000449 (J)	69.9 (J)	—	—	0.00791	0.0026	0.000418 (J)	0.00104 (J)
RE46-10-12048	46-611351	2–3	Qbt 3	—	—	—	—	—	—	0.00237 (J)	—	—	—	4.71 (J+)	—	—	—	—	—	—
RE46-10-11821	46-611352	0–1	Soil	—	—	—	—	—	—	—	0.0179 (J)	—	—	158 (J)	0.00339	0.000648 (J)	—	—	—	—
RE46-10-12050	46-611352	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	3.73 (J+)	—	—	—	—	—	—
RE46-10-11823	46-611353	0–1	Soil	—	—	—	—	—	—	—	—	—	—	65 (J)	—	—	—	—	—	—
RE46-10-12049	46-611353	2–3	Qbt 3	—	—	—	—	—	—	0.00235 (J)	—	—	—	7.69 (J+)	—	—	—	—	—	—
RE46-10-11825	46-611354	0–0.75	Soil	0.0279	0.0129	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-12047	46-611354	2–3	Qbt 3	—	—	—	—	—	—	0.00237 (J)	0.0324 (J)	—	—	32 (J+)	—	—	0.00107 (J)	0.000368 (J)	—	—
RE46-10-12051	46-611355	2–3	Qbt 3	—	—	—	—	—	—	0.00243 (J)	—	—	—	—	—	—	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA (2007, 099314) and equation and parameters from NMED (2009, 108070).

[c] Isopropylbenzene used as a surrogate based on structural similarity.

[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] Xylene used as a surrogate based on structural similarity.

[g] SSL from EPA (2007, 099314).

[h] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[i] Screening guidelines for diesel #2 from NMED (2006, 094614).

[j] — = Not detected.

Table 7.44-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-008(e)

Sample ID	Location ID	Depth (ft)	Media	Americium-241
Soil BV[a]				**0.013**
Construction Worker SAL[b]				**34**
Industrial SAL[b]				**180**
Residential SAL[b]				**30**
RE46-10-11823	46-611353	0–1	Soil	0.0344

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.45-1
Samples Collected and Analyses Requested at SWMU 46-008(f)

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

Table 7.45-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(f)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Calcium	Copper	Selenium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**2200**	**4.66**	**0.3**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**6120**	**14.7**	**1.52**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**na[c]**	**12400**	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**na**	**45400**	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**na**	**3130**	**391**	**23500**
RE46-10-13192	46-611550	0–1	Soil	1.15 (U)	0.573 (U)	—[d]	—	—	—
RE46-10-13193	46-611550	3–4	Qbt 3	1.01 (U)	—	—	—	0.986 (U)	—
RE46-10-13194	46-611551	0–1	Soil	1.08 (U)	—	—	22.8	—	69.3
RE46-10-13195	46-611551	2–3	Soil	1.13 (U)	0.567 (U)	—	—	—	—
RE46-10-13196	46-611552	0–1	Qbt 3	1.04 (U)	—	—	—	1.18 (U)	—
RE46-10-13197	46-611552	2–3	Qbt 3	1.09 (U)	—	—	—	1.07 (U)	—
RE46-10-13199	46-611553	0–1	Soil	1.12 (U)	0.558 (U)	—	—	—	—
RE46-10-13198	46-611553	3–4	Qbt 3	1.15 (U)	—	—	—	1.05 (U)	—
RE46-10-13201	46-611554	0–1	Soil	1.08 (U)	0.538 (U)	—	—	—	—
RE46-10-13200	46-611554	3–4	Qbt 3	1.14 (U)	—	—	—	1.1 (U)	—
RE46-10-13203	46-611555	0–1	Soil	1.22 (UJ)	—	7770 (J)	15.1 (J+)	—	—
RE46-10-13202	46-611555	3–4	Soil	1.27 (UJ)	0.635 (U)	—	—	—	—
RE46-10-13205	46-611556	0–1	Soil	1.14 (U)	0.57 (U)	—	—	—	—
RE46-10-13204	46-611556	3–4	Qbt 3	1.03 (U)	—	—	—	1.07 (U)	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070).

[c] na = Not available.

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

Table 7.45-3
Organic Chemicals Detected at SWMU 46-008(f)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Anthracene	Aroclor-1242	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	Methylene Chloride	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	TPH-DRO
Construction Worker SSL[a]				**18600**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**20600**	**8910**	**8910**	**213**	**10600**	**1240**[c]	**702**	**7150**	**6680**	**na**[d]
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**2340**	**24400**	**24400**	**23.4**	**1090**	**4100**[e]	**252**	**20500**	**18300**	**1120**[f]
Residential SSL[a]				**3440**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**621**	**2290**	**2290**	**6.21**	**199**	**310**[e]	**45**	**1830**	**1720**	**520**[f]
RE46-10-13193	46-611550	3–4	Qbt 3	—[g]	—	0.0034 (J)	0.0015 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13194	46-611551	0–1	Soil	0.0439	0.077	—	0.0759	0.0299	0.339	0.334	0.502	0.175 (J)	0.232	0.433	0.988	0.0288 (J)	0.171 (J)	—	—	—	0.554	0.887	—
RE46-10-13195	46-611551	2–3	Soil	—	—	0.0044	0.0051	0.0027 (J)	0.0296 (J)	0.0242 (J)	0.0497	—	—	0.0331 (J)	0.0676	—	0.0148 (J)	—	—	—	0.0253 (J)	0.0633	6.6 (J)
RE46-10-13196	46-611552	0–1	Qbt 3	0.0666	0.112	—	—	—	0.189	0.138	0.17	0.0696 (J)	0.102	0.201	0.437	0.0597	0.0612 (J)	0.00257 (J)	0.0278 (J)	0.0423	0.36	0.402	—
RE46-10-13197	46-611552	2–3	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	0.0118 (J)	—	—	—	—	—	—	—	—
RE46-10-13199	46-611553	0–1	Soil	—	—	—	—	—	0.0183 (J)	—	0.0123 (J)	—	—	0.0118 (J)	0.0267 (J)	—	—	—	—	—	0.0182 (J)	0.025 (J)	3.76 (J)
RE46-10-13198	46-611553	3–4	Qbt 3	—	—	0.0019 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-13201	46-611554	0–1	Soil	—	0.0104 (J)	0.0017 (J)	—	—	0.0304 (J)	0.0195 (J)	0.025 (J)	—	0.0136 (J)	0.03 (J)	0.0587	—	—	—	—	—	0.0376	0.0517	3.65 (J)
RE46-10-13203	46-611555	0–1	Soil	—	0.0409 (J)	—	0.095	0.0761	0.239	0.225	0.418	0.122	—	0.256	0.586	—	0.108	—	—	—	0.215	0.532	10.9
RE46-10-13202	46-611555	3–4	Soil	—	—	—	0.0043	0.004 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	42.5
RE46-10-13205	46-611556	0–1	Soil	—	—	0.0038 (J)	0.0026 (J)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Notes: Units are 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] 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] na = Not available.
[e] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.
[f] Screening guidelines for diesel #2 from NMED (2006, 094614).
[g] — = Not detected.

Table 7.45-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-008(f)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-235/236
Soil BV[a]				**1.65**	**0.2**
Construction Worker SAL[b]				**18**	**43**
Industrial SAL[b]				**23**	**87**
Residential SAL[b]				**5.6**	**17**
RE46-10-13195	46-611551	2–3	Soil	0.0483	—[c]
RE46-10-13202	46-611555	3–4	Soil	—	0.255

Note: All activities are in pCi/g.
[a] BVs are from LANL (1998, 059730).
[b] SALs for radionuclides from LANL (2009, 107655).
[c] — = Not detected or not detected above BV/FV.

Table 7.46-1
Samples Collected and Analyses Requested at SWMU 46-008(g)

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

Table 7.46-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-008(g)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Chromium	Copper	Lead	Selenium	Silver	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**7.14**	**4.66**	**11.2**	**0.3**	**1**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**19.3**	**14.7**	**22.3**	**1.52**	**1**	**48.8**
Construction Worker SSL[b]				**124**	**309**	**449[c]**	**12400**	**800**	**1550**	**1550**	**92900**
Industrial SSL[b]				**454**	**1120**	**2920[c]**	**45400**	**800**	**5680**	**5680**	**341000**
Residential SSL[b]				**31.3**	**77.9**	**219[c]**	**3130**	**400**	**391**	**391**	**23500**
RE46-10-13797	46-611746	0–1	Soil	1.05 (U)	0.55 (U)	—[d]	—	—	—	—	—
RE46-10-13798	46-611746	2–3	Qbt 3	1.15 (U)	—	—	—	23.8	1.06 (U)	—	—
RE46-10-13799	46-611747	0–1	Soil	1.14 (U)	—	—	—	—	—	1.07	176 (J+)
RE46-10-13800	46-611747	2–3	Soil	1.2 (U)	0.61 (U)	—	—	—	—	—	—
RE46-10-13801	46-611748	0–1	Soil	1.04 (U)	—	—	—	—	—	—	102 (J+)
RE46-10-13802	46-611748	2–3	Soil	1.14 (U)	0.568 (U)	—	—	—	—	—	—
RE46-10-13803	46-611749	0–1	Soil	1.05 (U)	0.608 (U)	—	—	—	—	—	—
RE46-10-13804	46-611749	2–3	Soil	1.06 (U)	0.551 (U)	—	—	—	—	—	—
RE46-10-13805	46-611750	0–1	Soil	1.14 (U)	—	—	—	—	—	—	75.1 (J+)
RE46-10-13806	46-611750	2–3	Soil	1.18 (U)	0.594 (U)	—	—	—	—	—	—
RE46-10-13807	46-611751	0–1	Soil	1.12 (U)	0.574 (U)	—	—	—	—	—	—
RE46-10-13808	46-611751	2–3	Soil	1.14 (U)	0.593 (U)	—	—	—	—	—	—
RE46-10-13809	46-611752	0–1	Soil	2.05	1	494	69.4	180	—	3.01	167 (J+)
RE46-10-13810	46-611752	2–3	Soil	—	—	—	—	40.7	—	—	51.5 (J+)

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] SSLs from NMED (2009,108070).

[c] SSL for hexavalent chromium.

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

Table 7.46-3
Organic Chemicals Detected at SWMU 46-008(g)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acenaphthylene	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
Construction Worker SSL[a]				**18600**	**6680[b]**	**66800**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680[b]**	**20600**	**21.3**	**552[c]**	**8910**	**8910**
Industrial SSL[a]				**36700**	**18300[b]**	**183000**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300[b]**	**2340**	**2.34**	**1000[d]**	**24400**	**24400**
Residential SSL[a]				**3440**	**1720[b]**	**17200**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720[b]**	**621**	**0.621**	**78[d]**	**2290**	**2290**
RE46-10-13799	46-611747	0–1	Soil	0.0609	—[e]	0.0797	—	—	—	0.193	0.199	0.346	0.144	0.207	0.044	—	0.498	0.0422
RE46-10-13800	46-611747	2–3	Soil	—	—	—	—	—	—	—	—	—	0.0195 (J)	—	—	—	0.0174 (J)	—
RE46-10-13801	46-611748	0–1	Soil	0.0435	—	0.0731	—	0.0174	0.0213	0.183	0.178	0.312	0.123	0.204	0.0365 (J)	—	0.469	0.0339 (J)
RE46-10-13802	46-611748	2–3	Soil	—	—	—	—	0.0196	0.025	—	—	—	—	—	—	—	—	—
RE46-10-13803	46-611749	0–1	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0126 (J)	—
RE46-10-13804	46-611749	2–3	Soil	—	—	0.0189 (J)	—	—	—	0.0635	0.0547	0.116	0.0504	0.0821	0.0238 (J)	—	0.156	—
RE46-10-13805	46-611750	0–1	Soil	0.0156 (J)	—	0.0207 (J)	—	0.0118	0.019	0.0606	0.0589	0.099	0.0442 (J)	0.0713	—	—	0.155	—
RE46-10-13806	46-611750	2–3	Soil	—	—	—	—	0.0022 (J)	0.0029 (J)	0.0174 (J)	—	0.012 (J)	—	0.015 (J)	—	—	0.0395 (J)	—
RE46-10-13807	46-611751	0–1	Soil	—	—	0.0197 (J)	0.107	0.125	0.0789	0.112	0.114	0.186	0.0762	0.141	0.0241 (J)	—	0.28	—
RE46-10-13808	46-611751	2–3	Soil	—	—	—	—	—	—	—	—	—	0.0295 (J)	—	0.0304 (J)	—	—	—
RE46-10-13809	46-611752	0–1	Soil	0.749	0.0379	1.05	—	1.06	0.654	3.18	3	4.83	1.66	3.11	0.573	0.329 (J)	7.01	0.651
RE46-10-13810	46-611752	2–3	Soil	0.315	—	0.507	—	—	—	1.36	1.16	2.03	0.648	1.2	0.223	0.155 (J)	2.99	0.296

Table 7.46-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene
Construction Worker SSL[a]				**213**	**1240[c]**	**702**	**7150**	**6680**
Industrial SSL[a]				**23.4**	**4100[d]**	**252**	**20500**	**18300**
Residential SSL[a]				**6.21**	**310[d]**	**45**	**1830**	**1720**
RE46-10-13799	46-611747	0–1	Soil	0.13	0.00963 (J)	0.0275 (J)	0.387	0.452
RE46-10-13800	46-611747	2–3	Soil	0.014 (J)	—	—	—	0.0126 (J)
RE46-10-13801	46-611748	0–1	Soil	0.106	0.00827 (J)	0.022 (J)	0.318	0.405
RE46-10-13802	46-611748	2–3	Soil	—	—	—	—	—
RE46-10-13803	46-611749	0–1	Soil	—	—	—	—	—
RE46-10-13804	46-611749	2–3	Soil	0.0456	—	—	0.0778	0.107
RE46-10-13805	46-611750	0–1	Soil	0.0393 (J)	—	—	0.122	0.135
RE46-10-13806	46-611750	2–3	Soil	—	—	—	0.0296 (J)	0.0263 (J)
RE46-10-13807	46-611751	0–1	Soil	0.0716	—	—	0.153	0.235
RE46-10-13808	46-611751	2–3	Soil	0.0296 (J)	—	—	—	—
RE46-10-13809	46-611752	0–1	Soil	1.63	0.162	0.484	5.48	6.43
RE46-10-13810	46-611752	2–3	Soil	0.626	0.0753	0.217	2.46	2.63

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

Table 7.46-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-008(g)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137
Soil BV[a]				**1.65**
Construction Worker SAL[b]				**18**
Industrial SAL[b]				**23**
Residential SAL[b]				**5.6**
RE46-10-13810	46-611752	2–3	Soil	0.155

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.47-1
Samples Collected and Analyses Requested at SWMU 46-009(a)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Pesticides	TPH-DRO	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-10012	46-610983	4–5	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10013	46-610983	9–10	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10014	46-610983	14–15	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10015	46-610984	4–5	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10016	46-610984	9–10	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10017	46-610984	14–15	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10018	46-610985	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10019	46-610985	9–10	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10020	46-610985	14–15	Qbt 3	10-2170	10-2168	10-2168	10-2168	10-2170	10-2170	10-2168	10-2168	10-2167	10-2170	10-2170	10-2170	10-2170
RE46-10-10021	46-610986	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10022	46-610986	9–10	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10023	46-610986	14–15	Qbt 3	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10024	46-610987	4–5	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10025	46-610987	9–10	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10026	46-610987	14–15	Soil	10-1188	10-1186	10-1186	10-1186	10-1188	10-1188	10-1186	10-1186	10-1191	10-1188	10-1188	10-1188	10-1188
RE46-10-10027	46-610988	4–5	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10028	46-610988	9–10	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10029	46-610988	14–15	Soil	10-1230	10-1229	10-1229	10-1229	10-1230	10-1230	10-1229	10-1229	10-1228	10-1231	10-1231	10-1231	10-1231
RE46-10-10030	46-610989	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175

Table 7.47-1 (continued)

Sample ID	Location ID	Depth (ft)	Media	TAL Metals	VOCs	SVOCs	PCBs	Nitrate	Cyanide	Pesticides	TPH-DRO	Asbestos	Isotopic Uranium	Isotopic Plutonium	Americium-241	Gamma Spectroscopy
RE46-10-12029	46-610989	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10032	46-610990	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10033	46-610990	1–2	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10034	46-610991	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10035	46-610991	1–2	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-10036	46-610992	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12027	46-610992	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10038	46-610993	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12028	46-610993	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10040	46-610994	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12026	46-610994	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10042	46-610995	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12025	46-610995	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10044	46-610996	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12024	46-610996	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10046	46-610997	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12023	46-610997	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523
RE46-10-10048	46-610998	0–1	Soil	10-1174	10-1173	10-1173	10-1173	10-1174	10-1174	10-1173	10-1173	10-1197	10-1175	10-1175	10-1175	10-1175
RE46-10-12022	46-610998	1–2	Soil	10-1523	10-1522	10-1522	10-1522	10-1523	10-1523	10-1522	10-1522	10-1542	10-1523	10-1523	10-1523	10-1523

Table 7.47-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-009(a)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Nitrate	Selenium	Sodium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na[b]**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**na**	**1.52**	**915**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**496000**	**1550**	**na**	**92900**
Industrial SSL[c]				**454**	**1120**	**1820000**	**5680**	**na**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**125000**	**391**	**na**	**23500**
RE46-10-10012	46-610983	4–5	Soil	—[d]	0.529 (U)	1.82	—	—	—
RE46-10-10013	46-610983	9–10	Qbt 3	1.01 (UJ)	—	1.27 (J-)	0.929 (U)	—	—
RE46-10-10014	46-610983	14–15	Qbt 3	1.02 (UJ)	—	1.55 (J-)	0.966 (U)	—	—
RE46-10-10015	46-610984	4–5	Soil	1.03 (U)	0.516 (U)	4.72	—	—	—
RE46-10-10016	46-610984	9–10	Soil	1.01 (U)	0.506 (U)	6.91	—	—	—
RE46-10-10017	46-610984	14–15	Soil	—	0.522 (U)	22.3	—	—	—
RE46-10-10018	46-610985	4–5	Soil	1.13 (U)	0.565 (U)	1.7	—	—	—
RE46-10-10019	46-610985	9–10	Qbt 3	1.16 (UJ)	—	—	1.08 (U)	—	—
RE46-10-10020	46-610985	14–15	Qbt 3	1.09 (UJ)	—	—	1.1 (U)	—	—
RE46-10-10021	46-610986	4–5	Soil	1.03 (U)	0.513 (U)	2.25	—	—	—
RE46-10-10022	46-610986	9–10	Soil	1.05 (U)	0.524 (U)	1.33	—	—	—
RE46-10-10023	46-610986	14–15	Qbt 3	1.03 (U)	—	1.49	1 (U)	—	—
RE46-10-10024	46-610987	4–5	Soil	—	0.521 (U)	12.4	—	—	—
RE46-10-10025	46-610987	9–10	Soil	1.04 (U)	—	8.15	—	—	—
RE46-10-10026	46-610987	14–15	Soil	1.09 (U)	—	—	—	—	—
RE46-10-10027	46-610988	4–5	Soil	0.99 (U)	0.495 (U)	1.28	—	—	—
RE46-10-10028	46-610988	9–10	Soil	0.998 (U)	0.499 (U)	5.01	—	—	—
RE46-10-10029	46-610988	14–15	Soil	1.04 (U)	0.521 (U)	4.95	—	—	—
RE46-10-10030	46-610989	0–1	Soil	1.05 (U)	0.527 (U)	—	—	—	—
RE46-10-12029	46-610989	1–2	Soil	—	0.521 (U)	—	—	—	—
RE46-10-10032	46-610990	0–1	Soil	1.08 (U)	0.541 (U)	—	—	—	—
RE46-10-10033	46-610990	1–2	Soil	—	0.517 (U)	—	—	—	—
RE46-10-10034	46-610991	0–1	Soil	—	0.543 (U)	1.71	—	—	—
RE46-10-10035	46-610991	1–2	Soil	—	0.516 (U)	1.06	—	—	—
RE46-10-10036	46-610992	0–1	Soil	0.89 (U)	—	1.45	—	—	—
RE46-10-12027	46-610992	1–2	Soil	1.1 (UJ)	0.548 (U)	1.71	—	—	—

Table 7.47-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Nitrate	Selenium	Sodium	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na[b]**	**0.3**	**2770**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**na**	**1.52**	**915**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**496000**	**1550**	**na**	**92900**
Industrial SSL[c]				**454**	**1120**	**1820000**	**5680**	**na**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**125000**	**391**	**na**	**23500**
RE46-10-10038	46-610993	0–1	Soil	1.15 (U)	0.575 (U)	—	—	—	—
RE46-10-12028	46-610993	1–2	Soil	1.02 (UJ)	0.509 (U)	1.42	—	—	—
RE46-10-10040	46-610994	0–1	Soil	1.05 (U)	0.525 (U)	—	—	—	—
RE46-10-12026	46-610994	1–2	Soil	1.01 (UJ)	0.503 (U)	—	—	—	—
RE46-10-10042	46-610995	0–1	Soil	1.05 (U)	0.527 (U)	—	—	—	—
RE46-10-12025	46-610995	1–2	Soil	—	0.57 (U)	—	—	—	—
RE46-10-10044	46-610996	0–1	Soil	—	0.531 (U)	—	—	—	—
RE46-10-12024	46-610996	1–2	Soil	1.16 (UJ)	0.578 (U)	—	—	—	—
RE46-10-12023	46-610997	1–2	Soil	1.03 (UJ)	0.517 (U)	—	—	—	—
RE46-10-10048	46-610998	0–1	Soil	0.893 (U)	—	—	—	—	138
RE46-10-12022	46-610998	1–2	Soil	1.2 (UJ)	0.598 (U)	—	—	1270	220

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

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

Table 7.47-3
Organic Chemicals Detected at SWMU 46-009(a)

Sample ID	Location ID	Depth (ft)	Media	Acenaphthene	Acetone	Anthracene	Aroclor-1242	Aroclor-1248	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	Dibenz(a,h)anthracene	Dibenzofuran
Construction Worker SSL[a]				**18600**	**263000**	**66800**	**7.58**	**7.58**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**4760**	**1130**	**20600**	**21.3**	**552**[c]
Industrial SSL[a]				**36700**	**851000**	**183000**	**8.26**	**8.26**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**198**	**2340**	**2.34**	**1000**[d]
Residential SSL[a]				**3440**	**67500**	**17200**	**2.22**	**2.22**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**35.6**	**621**	**0.621**	**78**[d]
RE46-10-10012	46-610983	4–5	Soil	0.367	—[e]	0.624	—	—	—	—	0.939	0.85	1.06	0.539	0.401	—	—	0.94	0.13	0.179 (J)
RE46-10-10015	46-610984	4–5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10019	46-610985	9–10	Qbt 3	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10024	46-610987	4–5	Soil	—	—	—	—	0.0212	0.0146	0.0023 (J)	—	—	0.102	—	—	—	—	—	—	—
RE46-10-10025	46-610987	9–10	Soil	0.0121 (J)	—	0.0159 (J)	—	0.0264	0.0242	0.0346	0.0433	0.0341 (J)	0.156	0.0286 (J)	—	—	—	0.0479	—	—
RE46-10-10026	46-610987	14–15	Soil	—	—	0.0117 (J)	—	0.0183	—	0.0455	0.0387	0.0247 (J)	0.148	0.0155 (J)	—	—	—	0.0336 (J)	—	—
RE46-10-10027	46-610988	4–5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10028	46-610988	9–10	Soil	0.0127 (J)	—	0.0191 (J)	—	—	—	—	0.0392	0.0315 (J)	0.0373	0.0259 (J)	0.0143 (J)	—	—	0.0415	—	—
RE46-10-10029	46-610988	14–15	Soil	—	—	—	0.0536	—	0.039	0.0098	—	—	—	—	—	—	—	—	—	—
RE46-10-10030	46-610989	0–1	Soil	—	—	—	—	—	—	0.0089 (J)	—	—	—	—	—	—	—	—	—	—
RE46-12029	46-610989	1–2	Soil	—	—	—	—	—	—	—	0.0115 (J)	—	0.0138 (J)	—	—	—	0.00048 (J)	—	—	—
RE46-10-10032	46-610990	0–1	Soil	—	—	—	—	—	—	—	0.03 (J)	0.0155 (J)	0.138	—	—	0.103 (J)	—	0.0295 (J)	—	—
RE46-10-10033	46-610990	1–2	Soil	0.1	—	0.12	—	—	—	0.0019 (J)	0.222	0.195	0.399	0.0951	—	—	—	0.207	—	—
RE46-10-10034	46-610991	0–1	Soil	—	—	—	—	—	0.006	0.0053	0.0275 (J)	0.0186 (J)	0.14	—	—	—	—	0.031 (J)	—	—
RE46-10-10035	46-610991	1–2	Soil	0.0212 (J)	—	0.0277 (J)	—	—	0.0018 (J)	—	0.05	0.0331 (J)	0.152	—	—	—	—	0.0466	—	—
RE46-10-10036	46-610992	0–1	Soil	—	—	0.0127 (J)	—	—	—	0.015	0.0438	0.0291 (J)	0.172	—	—	—	—	0.0462	—	—
RE46-10-12027	46-610992	1–2	Soil	—	—	—	—	—	—	0.0023 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-10038	46-610993	0–1	Soil	—	—	0.0208 (J)	—	—	0.0372	0.0244	0.0705	0.0556	0.212	0.0264 (J)	—	—	—	0.0775	—	—
RE46-10-12028	46-610993	1–2	Soil	—	—	—	—	—	—	0.0016 (J)	—	—	—	—	—	—	—	—	—	—
RE46-10-10040	46-610994	0–1	Soil	—	0.0438 (J)	—	—	—	0.0035 (J)	0.004	0.0158 (J)	—	0.116	—	—	—	—	0.0114 (J)	—	—
RE46-10-12026	46-610994	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10042	46-610995	0–1	Soil	—	—	—	—	—	—	—	0.0218 (J)	—	0.222	—	—	—	—	—	—	—
RE46-10-12025	46-610995	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10044	46-610996	0–1	Soil	—	—	—	—	—	—	—	0.028 (J)	0.0201 (J)	0.144	—	—	—	—	0.0359 (J)	—	—
RE46-10-12024	46-610996	1–2	Soil	—	—	—	—	—	—	—	0.0204 (J)	0.0167 (J)	0.0299 (J)	—	—	—	—	0.0201 (J)	—	—
RE46-10-10046	46-610997	0–1	Soil	—	—	0.016 (J)	—	—	0.0037 (J)	0.0044	0.109	0.0707	0.226	0.0265 (J)	—	—	—	0.125	—	—
RE46-10-12023	46-610997	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10048	46-610998	0–1	Soil	—	—	—	—	—	0.0038 (J)	0.0032 (J)	0.0447 (J)	0.0334 (J)	0.21	0.0237 (J)	—	—	—	0.0445 (J)	—	—
RE46-10-12022	46-610998	1–2	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 7.47-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Propylbenzene[1-]	Pyrene	Toluene	TPH-DRO	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**8910**	**8910**	**213**	**10300[f]**	**1240[c]**	**702**	**7150**	**20100**	**6680**	**21100**	**na[g]**	**688[c]**	**27500**	**3130[h]**
Industrial SSL[a]				**24400**	**24400**	**23.4**	**14900[f]**	**4100[d]**	**252**	**20500**	**21000**	**18300**	**57900**	**1120[i]**	**260[d]**	**31500**	**3610[h]**
Residential SSL[a]				**2290**	**2290**	**6.21**	**3210[f]**	**310[d]**	**45**	**1830**	**3400**	**1720**	**5570**	**520[i]**	**62[d]**	**9550**	**1090[h]**
RE46-10-10012	46-610983	4–5	Soil	3	0.324	0.474	—	0.133	0.433	2.64	—	2.39	0.000413 (J)	78 (J)	—	—	—
RE46-10-10015	46-610984	4–5	Soil	—	—	—	—	—	—	—	—	—	0.00145	2.8 (J)	—	—	0.000386 (J)
RE46-10-10019	46-610985	9–10	Qbt 3	—	—	—	—	0.0506	—	—	—	—	—	—	—	—	—
RE46-10-10024	46-610987	4–5	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10025	46-610987	9–10	Soil	0.116	—	—	—	—	—	0.0838	—	0.118	—	—	—	—	—
RE46-10-10026	46-610987	14–15	Soil	0.0809	—	—	—	—	—	0.0541	—	0.0816	—	—	—	—	—
RE46-10-10027	46-610988	4–5	Soil	—	—	—	—	—	—	—	—	—	—	7.57 (J)	—	—	—
RE46-10-10028	46-610988	9–10	Soil	0.111	—	0.0209 (J)	—	—	—	0.0944	—	0.092	—	—	—	—	—
RE46-10-10029	46-610988	14–15	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—
RE46-10-10030	46-610989	0–1	Soil	0.0122 (J)	—	—	—	—	—	—	—	0.0118 (J)	—	18.1 (J)	—	—	—
RE46-10-12029	46-610989	1–2	Soil	0.0173 (J)	—	—	—	—	—	0.012 (J)	—	0.02 (J)	—	—	—	—	—
RE46-10-10032	46-610990	0–1	Soil	0.0619	—	—	—	—	—	0.0361 (J)	—	0.0663	—	16.3 (J)	—	—	—
RE46-10-10033	46-610990	1–2	Soil	0.504	0.0908	0.0683	—	0.0382	0.135	0.494	—	0.566	—	37.8	—	—	—
RE46-10-10034	46-610991	0–1	Soil	0.0578	—	—	—	—	—	0.0348 (J)	—	0.0623	—	67.2	—	—	—
RE46-10-10035	46-610991	1–2	Soil	0.111	0.0179 (J)	—	—	—	0.0242 (J)	0.105	—	0.114	—	4.09 (J)	—	—	—
RE46-10-10036	46-610992	0–1	Soil	0.0967	—	—	—	—	—	0.0557	—	0.098	—	30 (J)	—	—	—
RE46-10-12027	46-610992	1–2	Soil	—	—	—	—	—	—	—	—	—	—	11.4	—	—	—
RE46-10-10038	46-610993	0–1	Soil	0.177	—	—	—	—	—	0.0972	—	0.174	—	46.8	—	—	—
RE46-10-12028	46-610993	1–2	Soil	—	—	—	—	—	—	—	—	—	—	6.99 (J)	—	—	—
RE46-10-10040	46-610994	0–1	Soil	0.0227 (J)	—	—	0.0458	—	—	0.0128 (J)	0.00227	0.0222 (J)	0.0615	20 (J)	0.00235	0.00114	0.00155 (J)
RE46-10-12026	46-610994	1–2	Soil	—	—	—	—	—	—	—	—	—	—	17.8	—	—	—
RE46-10-10042	46-610995	0–1	Soil	0.0342 (J)	—	—	—	—	—	—	—	0.0335 (J)	—	16.3 (J)	—	—	—
RE46-10-12025	46-610995	1–2	Soil	—	—	—	—	—	—	—	—	—	0.000403 (J)	5.11 (J)	—	—	—
RE46-10-10044	46-610996	0–1	Soil	0.067	—	—	—	—	—	0.0379	—	0.0665	—	26.7 (J)	—	—	—
RE46-10-12024	46-610996	1–2	Soil	0.0405	—	—	—	—	—	0.0301 (J)	—	0.0368 (J)	—	7.61 (J)	—	—	—
RE46-10-10046	46-610997	0–1	Soil	0.214	—	—	—	—	—	0.094	—	0.245	—	—	—	—	—
RE46-10-12023	46-610997	1–2	Soil	0.0107 (J)	—	—	—	—	—	—	—	—	—	5.99 (J)	—	—	—

Table 7.47-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluoranthene	Fluorene	Indeno(1,2,3-cd)pyrene	Isopropyltoluene[4-]	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Propylbenzene[1-]	Pyrene	Toluene	TPH-DRO	Trimethylbenzene[1,2,4-]	Xylene[1,2-]	Xylene[1,3-]+Xylene[1,4-]
Construction Worker SSL[a]				**8910**	**8910**	**213**	**10300**[f]	**1240**[c]	**702**	**7150**	**20100**	**6680**	**21100**	**na**[g]	**688**[c]	**27500**	**3130**[h]
Industrial SSL[a]				**24400**	**24400**	**23.4**	**14900**[f]	**4100**[d]	**252**	**20500**	**21000**	**18300**	**57900**	**1120**[i]	**260**[d]	**31500**	**3610**[h]
Residential SSL[a]				**2290**	**2290**	**6.21**	**3210**[f]	**310**[d]	**45**	**1830**	**3400**	**1720**	**5570**	**520**[i]	**62**[d]	**9550**	**1090**[h]
RE46-10-10048	46-610998	0–1	Soil	0.0975	—	—	0.000563 (J)	—	—	0.062	—	0.1	0.000609 (J)	57.4	—	—	—
RE46-10-12022	46-610998	1–2	Soil	—	—	—	—	—	—	—	—	—	—	5.4 (J)	—	—	—

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] Isopropylbenzene used as a surrogate based on structural similarity.

[g] na = Not available.

[h] Xylene used as a surrogate based on structural similarity.

[i] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.47-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-009(a)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Uranium-234	Uranium-235/236	Uranium-238
Qbt2, 3, 4 BV[a]				**na**[b]	**1.98**	**0.09**	**1.93**
Soil BV[a]				**1.65**	**2.59**	**0.2**	**2.29**
Construction Worker SAL[c]				**18**	**220**	**43**	**160**
Industrial SAL[c]				**23**	**1500**	**87**	**430**
Residential SAL[c]				**5.6**	**170**	**17**	**87**
RE46-10-10013	46-610983	9–10	Qbt 3	—[d]	2.08	0.151	2.28
RE46-10-12024	46-610996	1–2	Soil	0.127	—	—	—
RE46-10-12023	46-610997	1–2	Soil	0.179	—	—	—

Note: All activities are in pCi/g.

[a] BVs are 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 7.48-1
Samples Collected and Analyses Requested at SWMU 46-009(b)

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

Table 7.48-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-009(b)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Perchlorate	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na[b]**	**63.5**
Soil BV[a]				**0.83**	**0.4**	**na**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**217**	**92900**
Industrial SSL[c]				**454**	**1120**	**795**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**54.8**	**23500**
RE46-10-10066	46-610999	0–1	Soil	1.03 (U)	0.514 (U)	—[d]	—
RE46-10-10067	46-610999	2–3	Soil	0.98 (U)	0.49 (U)	—	—
RE46-10-10068	46-611000	0–1	Soil	1.02 (U)	0.509 (U)	—	—
RE46-10-10069	46-611000	2–3	Soil	0.994 (U)	0.497 (U)	—	—
RE46-10-10070	46-611001	0–1	Soil	0.976 (U)	0.488 (U)	—	—
RE46-10-10071	46-611001	2–3	Soil	0.991 (U)	0.495 (U)	—	—
RE46-10-10072	46-611002	0–1	Soil	1.03 (U)	0.517 (U)	—	—
RE46-10-10073	46-611002	2–3	Soil	1.02 (U)	0.511 (U)	0.00073 (J)	—
RE46-10-10074	46-611003	0–1	Soil	1.04 (U)	0.518 (U)	—	—
RE46-10-10075	46-611003	2–3	Soil	0.986 (U)	0.493 (U)	0.00133 (J)	—
RE46-10-10076	46-611004	0–1	Soil	—	0.488 (U)	—	—
RE46-10-10077	46-611004	2–3	Soil	1.01 (U)	0.504 (U)	—	—
RE46-10-10078	46-611005	0–1	Soil	1.03 (U)	0.517 (U)	—	—
RE46-10-10079	46-611005	1–2	Soil	0.989 (U)	0.495 (U)	—	—
RE46-10-10080	46-611006	0–1	Soil	1.05 (U)	0.525 (U)	0.000814 (J)	—
RE46-10-10081	46-611006	1–2	Soil	1.06 (U)	0.531 (U)	0.000981 (J)	—
RE46-10-10082	46-611007	0–1	Soil	1.12 (U)	0.561 (U)	—	52
RE46-10-12034	46-611007	1–2	Soil	1.26 (UJ)	0.63 (U)	—	63.6
RE46-10-10084	46-611008	0–1	Soil	1.18 (U)	0.591 (U)	—	58
RE46-10-12033	46-611008	1–2	Soil	1.18 (UJ)	0.591 (U)	—	94.7
RE46-10-10086	46-611009	0–1	Soil	1.05 (U)	0.526 (U)	—	—
RE46-10-12032	46-611009	1–2	Qbt 3	1.11 (UJ)	—	—	—
RE46-10-10088	46-611010	0–1	Soil	1.11 (U)	0.557 (U)	—	61.3
RE46-10-12030	46-611010	1–2	Soil	—	0.567 (U)	—	—
RE46-10-10090	46-611011	0–0.5	Soil	1.12 (U)	0.559 (U)	—	66.1
RE46-10-12031	46-611011	1–2	Soil	—	0.555 (U)	—	—
RE46-10-10092	46-611012	0–1	Soil	—	0.553 (U)	—	—
RE46-10-10093	46-611012	1–2	Soil	1.09 (U)	0.546 (U)	—	—

Table 7.48-2 (continued)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Perchlorate	Zinc
Qbt2, 3, 4 BV[a]				**0.5**	**1.63**	**na**[b]	**63.5**
Soil BV[a]				**0.83**	**0.4**	**na**	**48.8**
Construction Worker SSL[c]				**124**	**309**	**217**	**92900**
Industrial SSL[c]				**454**	**1120**	**795**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**54.8**	**23500**
RE46-10-10094	46-611013	0–1	Soil	1.11 (U)	0.556 (U)	—	—
RE46-10-10095	46-611013	1–2	Soil	1.09 (U)	0.546 (U)	—	—
RE46-10-10096	46-611014	0–1	Soil	1.05 (U)	0.523 (U)	0.000547 (J)	—
RE46-10-10097	46-611014	1–2	Soil	1.02 (U)	0.51 (U)	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

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

[b] na = Not available.

[c] SSLs from NMED (2009,108070).

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

Table 7.48-3
Organic Chemicals Detected at SWMU 46-009(b)

Sample ID	Location ID	Depth (ft)	Media	Anthracene	Aroclor-1254	Aroclor-1260	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzoic Acid	Chloromethane	Chrysene	Fluoranthene	Phenanthrene	Pyrene
Construction Worker SSL[a]				**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**952000[b]**	**1130**	**20600**	**8910**	**7150**	**6680**
Industrial SSL[a]				**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**2500000[c]**	**198**	**2340**	**24400**	**20500**	**18300**
Residential SSL[a]				**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**240000[c]**	**35.6**	**621**	**2290**	**1830**	**1720**
RE46-10-10066	46-610999	0–1	Soil	—[d]	—	0.0022 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10067	46-610999	2–3	Soil	—	—	0.0028 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10068	46-611000	0–1	Soil	—	—	0.0022 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10069	46-611000	2–3	Soil	—	0.0029 (J)	0.0027 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10070	46-611001	0–1	Soil	—	—	0.0032 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10071	46-611001	2–3	Soil	—	—	0.0027 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10072	46-611002	0–1	Soil	—	—	0.0027 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10073	46-611002	2–3	Soil	—	—	0.0022 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10074	46-611003	0–1	Soil	—	—	—	—	—	—	0.628 (J)	—	—	—	—	—
RE46-10-10076	46-611004	0–1	Soil	—	—	0.0019 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10077	46-611004	2–3	Soil	—	—	0.0031 (J)	—	—	—	—	—	—	—	—	—
RE46-10-10082	46-611007	0–1	Soil	0.00902 (J)	—	—	0.0269 (J)	0.0217 (J)	—	—	—	0.022 (J)	0.0503	0.034 (J)	0.0448
RE46-10-12034	46-611007	1–2	Soil	—	—	—	0.0165 (J)	—	0.0205 (J)	—	—	—	0.025 (J)	0.0169 (J)	0.0243 (J)
RE46-10-12033	46-611008	1–2	Soil	—	—	—	0.0156 (J)	—	0.0225 (J)	—	—	—	0.0209 (J)	—	0.0237 (J)
RE46-10-10086	46-611009	0–1	Soil	—	—	—	—	—	—	0.582 (J)	—	—	—	—	—
RE46-10-10088	46-611010	0–1	Soil	—	—	—	—	—	—	—	—	—	0.0121 (J)	—	—
RE46-10-10090	46-611011	0–0.5	Soil	—	—	—	0.0139 (J)	—	—	—	—	—	0.015 (J)	—	0.0167 (J)
RE46-10-10096	46-611014	0–1	Soil	—	—	—	—	—	—	—	0.00307 (J+)	—	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.

[a] SSLs from NMED (2009,108070) unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm and equation and parameters from NMED (2009, 108070).

[c] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[d] — = Not detected.

Table 7.48-4
Radionuclides Detected or Detected above BVs/FVs at SWMU 46-009(b)

Sample ID	Location ID	Depth (ft)	Media	Cesium-137	Plutonium-239/240
Soil BV[a]				**1.65**	**0.054**
Construction Worker SAL[b]				**18**	**36**
Industrial SAL[b]				**23**	**210**
Residential SAL[b]				**5.6**	**33**
RE46-10-12030	46-611010	1–2	Soil	0.323	0.0439

Note: All activities are in pCi/g.

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

[b] SALs for radionuclides from LANL (2009, 107655).

Table 7.49-1
Samples Collected and Analyses Requested at SWMU 46-010(d)

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

Table 7.49-2
Inorganic Chemicals Detected or Detected above BVs at SWMU 46-010(d)

Sample ID	Location ID	Depth (ft)	Media	Antimony	Cadmium	Perchlorate	Zinc
Soil BV[a]				**0.83**	**0.4**	**na**[b]	**48.8**
Construction Worker SSL[c]				**124**	**309**	**217**	**92900**
Industrial SSL[c]				**454**	**1120**	**795**	**341000**
Residential SSL[c]				**31.3**	**77.9**	**54.8**	**23500**
RE46-10-12714	46-611463	0–1	Soil	1.15 (U)	—[d]	—	74.7
RE46-10-12715	46-611463	3–4	Soil	—	0.618 (U)	—	70 (J)
RE46-10-12716	46-611464	0–1	Soil	1.17 (U)	—	—	117
RE46-10-12717	46-611464	3–4	Soil	1.24 (U)	—	—	—
RE46-10-12718	46-611465	0–1	Soil	1.16 (U)	—	0.000762 (J)	75.6
RE46-10-12719	46-611465	2–3	Soil	1.18 (U)	—	0.000747 (J)	—
RE46-10-12720	46-611466	0–1	Soil	1.12 (U)	—	0.00123 (J)	66.1
RE46-10-12721	46-611466	2–3	Soil	1.23 (U)	—	0.000729 (J)	—
RE46-10-12722	46-611467	0–1	Soil	1.14 (U)	—	0.00102 (J)	49
RE46-10-12723	46-611467	2–3	Soil	1.16 (U)	—	—	—

Notes: Units are mg/kg. Data qualifiers are defined in Appendix A.
[a] BVs are from LANL (1998, 059730).
[b] na = Not available.
[c] SSLs from NMED (2009,108070).
[d] — = Not detected or not detected above BV.

Table 7.49-3
Organic Chemicals Detected at SWMU 46-010(d)

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	Chrysene	Dibenz(a,h)anthracene	Dibenzofuran	Fluoranthene
Construction Worker SSL[a]				**18600**	**66800**	**4.36**	**7.58**	**213**	**21.3**	**213**	**6680**[b]	**2060**	**4760**	**20600**	**21.3**	**552**[c]	**8910**
Industrial SSL[a]				**36700**	**183000**	**8.26**	**8.26**	**23.4**	**2.34**	**23.4**	**18300**[b]	**234**	**1370**	**2340**	**2.34**	**1000**[d]	**24400**
Residential SSL[a]				**3440**	**17200**	**1.12**	**2.22**	**6.21**	**0.621**	**6.21**	**1720**[b]	**62.1**	**347**	**621**	**0.621**	**78**[d]	**2290**
RE46-10-12714	46-611463	0–1	Soil	0.0271 (J)	0.0419	0.0051	0.0023 (J)	0.0899	0.0858	0.0969	0.0753 (J)	0.0479	0.0887 (J)	0.102	—[e]	—	0.225
RE46-10-12715	46-611463	3–4	Soil	0.183	0.267	—	—	0.46	0.471	0.546	0.275 (J)	0.237	—	0.494	0.0788	0.0974 (J)	1.13
RE46-10-12716	46-611464	0–1	Soil	0.0253 (J)	0.0395	—	—	0.102	0.0959	0.116	0.0664 (J)	0.0518	0.0816 (J)	0.114	—	—	0.264
RE46-10-12718	46-611465	0–1	Soil	—	0.0164 (J)	0.0275	0.0102	0.0498	0.0477	0.0549	0.0393 (J)	0.0266 (J)	—	0.0522	—	—	0.115
RE46-10-12719	46-611465	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	0.0135 (J)
RE46-10-12720	46-611466	0–1	Soil	0.107	0.186	0.0234	0.0077	0.351	0.339	0.408	0.204 (J)	0.149	0.0922 (J)	0.362	—	—	0.865
RE46-10-12721	46-611466	2–3	Soil	—	—	0.0037 (J)	—	—	—	—	—	—	—	—	—	—	0.0154 (J)
RE46-10-12722	46-611467	0–1	Soil	0.0294 (J)	0.0398	0.013	0.0058	0.0936	0.092	0.11	0.0613 (J)	0.0501	—	0.106	—	—	0.248
RE46-10-12723	46-611467	2–3	Soil	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Table 7.49-3 (continued)

Sample ID	Location ID	Depth (ft)	Media	Fluorene	Indeno(1,2,3-cd)pyrene	Methylnaphthalene[2-]	Naphthalene	Phenanthrene	Pyrene	TPH-DRO
Construction Worker SSL[a]				**8910**	**213**	**1240[c]**	**702**	**7150**	**6680**	**na[f]**
Industrial SSL[a]				**24400**	**23.4**	**4100[d]**	**252**	**20500**	**18300**	**1120[g]**
Residential SSL[a]				**2290**	**6.21**	**310[d]**	**45**	**1830**	**1720**	**520[g]**
RE46-10-12714	46-611463	0–1	Soil	0.0213 (J)	0.0655 (J)	—	0.0134 (J)	0.154	0.171	13.3 (J)
RE46-10-12715	46-611463	3–4	Soil	0.159	0.261 (J)	0.122	0.296	1.13	0.979	9.56
RE46-10-12716	46-611464	0–1	Soil	0.0191 (J)	0.0607 (J)	—	—	0.169	0.195	6.94 (J)
RE46-10-12718	46-611465	0–1	Soil	—	0.0327 (J)	—	—	0.0705	0.0932	5.32 (J)
RE46-10-12719	46-611465	2–3	Soil	—	—	—	—	—	—	—
RE46-10-12720	46-611466	0–1	Soil	0.0962	0.192 (J)	0.0258 (J)	0.0678	0.684	0.681	9.85 (J)
RE46-10-12721	46-611466	2–3	Soil	—	—	—	—	0.0144 (J)	0.013 (J)	—
RE46-10-12722	46-611467	0–1	Soil	0.0225 (J)	0.0565 (J)	—	0.0118 (J)	0.176	0.193	4.37 (J)
RE46-10-12723	46-611467	2–3	Soil	—	—	—	—	—	—	3.62 (J)

Notes: Units are 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] 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] SSLs from http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[e] — = Not detected.

[f] na = Not available.

[g] Screening guidelines for diesel #2 from NMED (2006, 094614).

Table 7.50-1
Samples Collected and Analyses Requested at AOC C-46-001

Sample ID	Location ID	Depth (ft)	Media	Mercury
RE46-10-17388	46-612232	0–1	Soil	10-3226
RE46-10-17389	46-612232	1–2	Qbt 3	10-3226

Table 9.1-1
Summary of Investigation Results and Recommendations

Consolidated Unit	SWMU/AOC	Brief Description	Extent Defined?	Potential Unacceptable Risk?	Recommendation
TA-04					
04-003(a)-00	SWMU 04-003(a)	Outfall	No	n/a*	Additional extent sampling
	AOC 04-004	Potential soil contamination	No	n/a	Additional extent sampling
TA-46					
	SWMU 46-002	Surface impoundment	Yes	No	Corrective action complete
	SWMU 46-003(a)	Septic system	No	n/a	Delayed investigation
	SWMU 46-003(b)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-003(c)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-003(d)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-003(e)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-003(f)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-003(g)	Septic system	No	n/a	Additional extent sampling
	SWMU 46-004(a)	Drainlines	No	n/a	Additional extent sampling
	SWMU 46-004(a2)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(b)	Former tank	No	n/a	Additional extent sampling
	SWMU 46-004(b2)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(c)	Drywell	No	n/a	Additional extent sampling
	SWMU 46-004(c2)	Outfall	No	n/a	Additional extent sampling
46-004(d)-99	SWMU 46-004(d)	Dry well	No	n/a	Additional extent sampling
	SWMU 46-004(e)	Dry well	No	n/a	Additional extent sampling
46-004(d2)-99	SWMU 46-004(d2)	Stack emissions	No	n/a	Additional extent sampling
	SWMU 46-004(g)	Stack emissions/outfall	No	n/a	Additional extent sampling
	SWMU 46-004(h)	Stack emissions/ outfall	No	n/a	Additional extent sampling
	AOC C-46-002	Stack emissions	No	n/a	Additional extent sampling
	AOC-C-46-003	Stack emissions	No	n/a	Additional extent sampling
	AOC 46-004(e2)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(f)	Outfall	No	n/a	Additional extent sampling
	AOC 46-004(f2)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(m)	Outfall	Yes	No	Corrective action complete
	SWMU 46-004(p)	Dry well	Yes	No	Corrective action complete
	SWMU 46-004(q)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(r)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(s)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(t)	Outfall	No	n/a	Additional extent sampling

Table 9.1-1 (continued)

Consolidated Unit	SWMU/AOC	Brief Description	Extent Defined?	Potential Unacceptable Risk?	Recommendation
	SWMU 46-004(u)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(v)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(w)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(x)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(y)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-004(z)	Outfall	No	n/a	Additional extent sampling
	SWMU 46-005	Surface impoundment	No	n/a	Additional extent sampling
	SWMU 46-006(a)	Potential soil contamination	No	n/a	Additional extent sampling
	SWMU 46-006(b)	Former storage shed	Yes	No	Corrective action complete
	SWMU 46-006(c)	Storage shed	No	n/a	Additional extent sampling
	SWMU 46-006(d)	Potential soil contamination	No	n/a	Additional extent sampling
	SWMU 46-006(f)	Storage shed	No	n/a	Additional extent sampling
	SWMU 46-006(g)	Storage area	Yes	No	Corrective action complete
	SWMU 46-007	Potential soil contamination	No	n/a	Additional extent sampling
	SWMU 46-008(a)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-008(b)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-008(d)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-008(e)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-008(f)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-008(g)	Storage area	No	n/a	Additional extent sampling
	SWMU 46-009(a)	Surface disposal area	No	n/a	Additional extent sampling
	SWMU 46-009(b)	Surface disposal area	No	n/a	Additional extent sampling
	SWMU 46-010(d)	Storage area	No	n/a	Additional extent sampling
	AOC C-46-001	Spill/Release area	Yes	No	Corrective action complete
TA-52					
	SWMU 52-001(d)	Former facility equipment	n/a	No	Corrective action complete

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
BHC	benzene hexachloride
BV	background value
CCV	continuing calibration verification
COC	chain of custody
Consent Order	Compliance Order on Consent
COPEC	chemical of potential ecological concern
COPC	chemical of potential concern
CST	Chemical Science and Technology (a Laboratory division)
CVAA	cold vapor atomic absorption
D&D	decontamination and decommissioning
DAF	dilution attenuation factor
DDE	dichlorophenyltrichloroethylene
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
EC	effect concentration
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
GCMS	gas chromatography/mass spectrometry
GPR	ground-penetrating radar
GPS	global-positioning system
GRO	gasoline range organic
HE	high explosives
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
IS	internal standard
K_d	soil-water partition coefficient
K_{oc}	organic carbon-water partition coefficient
K_{ow}	octanol-water partition coefficient
LAL	lower acceptance limit
LANL	Los Alamos National Laboratory
LCS	laboratory control sample
LOAEL	lowest observed adverse effect level
LOEC	lowest observed effect concentration

MATC	maximum allowable toxic concentrations
MDC	minimum detectable concentration
MDL	method detection limit
MLLW	mixed-low-level waste
mm Hg	millimeters of mercury
MS	matrix spike
MSD	matrix spike duplicate
MSW	municipal solid waste
NFA	no further action
NMED	New Mexico Environment Department
NOAEL	no observed adverse effect level
NOEC	no observed effect concentration
NPDES	National Pollutant Discharge Elimination System
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
PRG	preliminary remediation goal
QA	quality assurance
QC	quality control
RAGS	Risk Assessment Guidance for Superfund (EPA)
RCRA	Resource Conservation and Recovery Act
RCT	radiation control technician
RESRAD	residual radioactivity (computer code)
RfD	reference dose
RFI	RCRA facility investigation
RL	reporting limit
RLW	radioactive liquid waste
RLWTF	radioactive liquid waste treatment facility
RME	reasonable maximum exposure

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 System Consolidation
T&E	threatened and endangered
TA	technical area
TAL	target analyte list
TCE	trichloroethene
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
UTREX	Ultra-High Temperature Reactor Experiment
VCA	voluntary corrective action
VCP	vitrified clay pipe
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 2010 investigation at Upper Cañada del Buey Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Table B-1.0-1 summarizes the field investigation methods, and the following sections provide more detailed descriptions of these methods. All activities were conducted in accordance with approved subcontractor procedures technically equivalent to Laboratory standard operating procedures (SOPs) listed in Table B-1.0-2 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 2010 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 organic vapors 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 are presented in Table 3.2-2 of the investigation report.

B-3.1 Field Screening for Organic Vapors

Field screening for organic vapors was conducted for all samples, except when the moisture content of the material exceeded instrument detection limits. 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 Photo Ionization Detector. 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 to detect 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. The RCT calibrated the Eberline E-600 instrument 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 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 RCT calibrated the Eberline E-600 daily before local background levels for radioactivity were measured. The instrument was calibrated using plutonium-239 and chloride-36 sources for alpha and beta emissions, respectively. The following five checks were performed as part of the calibration procedures:

- calibration date
- physical damage
- battery
- response to a source of radioactivity
- background

All calibrations performed for the Eberline E-600 met the manufacturer's specifications and the applicable radiation detection instrument manual.

B-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, 105038.17; NMED 2008, 103429).

B-5.1 Surface Sampling Methods

Surface samples were collected in Technical Area 04 (TA-04) and TA-46 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 (section B-5.7) 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 in 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.

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 organic vapors, 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 volatile organic compound (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 tools used to collect samples were decontaminated (section B-5.7) 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 Quality Control Samples

Quality control (QC) samples were collected in accordance with an approved subcontractor procedure technically equivalent to SOP-5059, Field Quality Control Samples. The QC samples included field duplicates, field rinsate blanks, and field trip blanks. Field duplicate samples were collected from the same material as a regular investigation sample and submitted for the same analyses. Field duplicate samples were collected at a frequency of at least 1 duplicate sample for every 10 samples.

Field rinsate blanks were collected to evaluate field decontamination procedures. Rinsate blanks were collected by rinsing sampling equipment (i.e., 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 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-5.5 Sample Documentation and Handling

Field personnel completed a SCL/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 SCL/COC forms and accepted custody of the samples.

B-5.6 Borehole Abandonment

All boreholes were abandoned in accordance with an approved subcontractor procedure technically equivalent to SOP-5034, Monitoring Well and RFI Borehole Abandonment, by filling the boreholes with bentonite chips up to 2.0–3.0 ft from the ground surface. The chips were hydrated and clean soil placed on top. Pavement was patched as necessary depending on existing site conditions. All cuttings were managed as investigation-derived waste (IDW), as described in Appendix D.

B-5.7 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 an RCT before it was released from the site.

B-5.8 Site Demobilization and Restoration

All drilling equipment was demobilized from the site on June 4, 2010. 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 (except the waste management area) were dismantled and returned to preinvestigation conditions. All excavated and disturbed areas were regraded and reseeded with native grass mix in the spring 2010.

B-6.0 SEPTIC TANK REMOVAL AND EXCAVATION

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 installing fencing and stormwater controls and conducting a preexcavation survey; (3) removal of waste, including the stockpiling, characterizing, and disposing of waste at the appropriate facility; (4) performing confirmation sampling; (5) sealing septic tank inlet/outlet lines with concrete; and (6) backfill, including compacting, and revegetating the surface after demobilization.

Four septic tanks were removed in accordance with the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429). An excavator was used to remove a 2000-gal. concrete septic tank and associated piping from Solid Waste Management Unit (SWMU) 46-003(f), a 1000-gal. fiberglass tank and associated piping from SWMU 46-003(g), and two 1000-gal. steel tanks along with associated piping from SWMUs 46-003(d) and 46-003(e). Septic tank removal is described below in the order of tank removal. The excavated tank debris was managed as IDW as described in Appendix D.

The clean overburden covering the septic tank at SWMU 46-003(f) was removed with an excavator, and a backhoe with a hydraulic rock-breaker attachment was used to break-up the concrete septic tank that appeared to have been cast in place. The excavator removed concrete and rebar, along with as little as possible of the surrounding tuff. The septic tank waste was placed in three 20-yd^3 IP-1 rolloff bins. Immediately following the removal of the septic tank materials, the excavator bucket was used to dig below the tank inlet and outlet locations and beneath the former septic tank location to collect confirmation samples. Specific sample depths and collection dates are presented in Table 7.8-1. The excavator bucket was used to berm a small depression, approximately 3 ft^2 in area, under the septic tank inlet and outlet lines. Concrete was then mixed in the excavator bucket, and the excavator bucket was lowered until the concrete could be placed gently in each bermed depression under the inlet and outlet pipes until the concrete fully covered each exposed pipe end. The concrete was then allowed to cure for several hours before the excavation was backfilled with staged overburden and clean backfill was brought to the site. As overburden and clean fill were placed in the excavation to grade-level, the material was compacted with the excavator bucket.

An excavator was used to remove the steel septic tank and stage overburden at SWMU 46-003(d). While the buried tank was being exposed, the excavator bucket struck the buried sidewall of a sewer line manhole, causing minor damage to the cinder blocks comprising the manhole enclosure. The septic tank, which contained a trace amount of sludge, and surrounding backfill were placed in an IP-1 20-yd^3 rolloff bin. Confirmation samples were collected under the septic tank and inlet and outlet lines. Specific sampling depths and collection dates are presented in Table 7.6-1. Immediately after confirmation samples were collected, concrete was placed manually in and around the exposed septic tank inlet and outlet lines. After the concrete cured for several hours, staged overburden was placed back in the excavation, followed by the emplacement of clean fill to bring the excavation back to grade-level. The fill material was then compacted by driving the excavator back and forth over the material.

The septic tank at SWMU 46-003(g) was found to contain water, most likely from runoff of rain water and snow melt. The field team collected a sample of the water for waste characterization and, once laboratory analytical results were received, the water from the septic tank was approved for land application. Approximately 150 gal. of water was pumped from the tank and discharged along Pajarito Road. After water was removed from the septic tank, the tank was placed in a 20 yd^3 IP-1 rolloff bin. Immediately after the tank was removed, confirmation samples were collected under the septic tank and inlet and outlet lines. Specific sample depths and collection dates are shown in Table 7.9-1. Immediately after confirmation samples were collected, concrete was placed manually in and around the exposed septic tank inlet and outlet lines. After the concrete cured for several hours, staged overburden was placed back in the excavation, followed by emplacement of clean fill to bring the excavation back to grade-level. The fill material was then compacted by driving the excavator back and forth over the material.

While the septic tank at SWMU 46-003(e) was being excavated, the excavator bucket created a small hole at the edge of the unexposed steel tank. Once the opening was created in the tank, the field team observed black oily water and sludge in the tank. Samples of the water were immediately collected for waste characterization, and a Laboratory RCT was called to the site to screen the area and samples for radioactivity. Once laboratory analytical results were received, due diligence was performed on the waste water, and it was characterized as mixed-low-level waste (MLLW). Approximately 150 gal. of viscous liquid was pumped from the tank and stored in a 550-gal. polyethylene container. Waste characterization samples were collected for the remaining sludge and water, and the sludge waste stream was also profiled as MLLW. Both the water, stored in the polyethylene container, and the sludge still in the septic tank, were solidified with Waste Lock polymer. The septic tank was lifted from the excavation using nylon lifting straps attached to the excavator bucket and wrapped in Visqueen before the tank was emplaced in a 20 yd^3 IP-1 rolloff bin for disposal at TA-54. Immediately after the septic tank and adjacent siphon tank were removed, the excavator bucket was used to dig below the former septic tank location and inlet line to collect confirmation samples. The final sampling location, also sampled with the excavator bucket, was located beneath the location of the former siphon tank. Specific sampling depths are presented in Table 7.7-1. After confirmation samples were collected, concrete was placed manually in and around the exposed septic tank inlet and outlet lines. After the concrete cured for several hours, staged overburden was placed back in the excavation, followed by emplacement of clean fill to bring the excavation back to grade level. The fill material was then compacted by driving the excavator back and forth over the material. After confirmation sampling results were received, the siphon tank was added to the rolloff bin containing the septic tank.

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

Sunbelt Geophysics performed a nonintrusive geophysical investigation at SWMUs 03-003(b) and 03-003(c), both of which are inactive septic tanks, using ground-penetrating radar (GPR) and data from the EM-61. The survey was conducted to locate the septic tanks for excavation and removal.

Formal surveying was conducted over spatial control and data acquisition grids that were established using a transit and tape. A Schonstedt magnetic locator (Serial #136193), a Radiodetection line tracer (Serial #C3-34EN-26), a Geonics EM-61 metal detector (Serial #930204), and a Senors & Software 250 MHz GPR (Serial #0057-0006) were used.

Data from the EM-61 and GPR were transferred to a computer for analysis and mapping. The DAT61 (Geonics Ltd.), Ekko_View (Sensors & Software Ltd.), and the Oasis montaj (Geosoft) programs were used for processing and image preparation. 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 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, 105038.17; NMED 2008, 103429). Details of IDW management for the Upper Cañada del Buey Aggregate Area investigation are presented in Appendix D.

B-10.0 DEVIATIONS FROM THE WORK PLAN

Three of the seven septic tank locations identified for excavation and removal in the approved investigation work plan were not excavated either because of the presence of overhead utilities or because geophysical survey results indicated the tanks were not present at the presumed locations. Several proposed sampling locations identified in the approved investigation work plan were moved as a result of site conditions encountered during the field activities because they were sited on top of or next to underground utilities, could not be sampled because of refusal, or were inaccessible. When locations were moved, the new locations were sited as close as possible to the planned locations. Deviations to specific sampling locations are summarized in Table B-10.0-1. Additional deviations to the approved investigation work plan (LANL 2008, 105038.17; NMED 2008, 103429) are discussed below and are also summarized in Table B-10.0-1.

- 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 locations 46-611387, 46-611388, and 46-611389 in SWMU 46-002, samples were planned for 0.0–1.0 ft bgs, soil-tuff interface, and 5 ft below the soil-tuff interface. Since the soil-tuff interface was encountered at the interval of 0.0–1.0 ft below ground surface (bgs), only one sample was collected for both intervals. A second sample was collected at each location that corresponded to the 5 ft below the soil-tuff interface. Therefore, two samples were collected at these locations instead of the three required in the work plan.
- The septic tank at SWMU 46-003(a) was not excavated or removed. The septic tank was located beneath an overhead utility corridor consisting of electrical and telephone lines. The utility lines were low to the ground and prohibited the safe use of heavy equipment at this location (Figure B-10.0-1). Because the septic tank and inlet and outlet lines could not be safely removed, confirmation samples could not be collected beneath these components. However, samples were collected from the four locations downgradient of the septic tank.

- The septic tank at SWMU 46-003(b) was not excavated or removed. A geophysical survey was performed to locate the septic tank before excavation activities were to begin (Appendix E). The EM-61 survey identified a relatively mild feature that suggested a possible septic tank. A GPR survey also detected subsurface features and an area of anomalous compaction that may have been from a septic tank or from backfill material from the removal of a septic tank. Hand-augering was performed in the areas identified by the geophysical surveys in an attempt to locate the tank. Auger refusal occurred at all locations at approximately 9 ft bgs after tuff was encountered. No metallic objects were identified during hand-augering activities. The tank had probably been removed during road construction activities for the TA-46 wastewater treatment plant (WWTP). The tank was located above the road on a steep slope that was excavated when the road was constructed (Figure B-10.0-2). Because the septic tank and inlet and outlet pipes could not be located, samples were collected beneath the presumed location of the former septic tank and at upgradient and downgradient locations. Five of the seven proposed confirmation sampling locations were collected at SWMU 46-003(b).
- The septic tank at SWMU 46-003(c) was not excavated or removed. A walkover geophysical survey was conducted to locate the septic tank before excavation activities began. The geophysical survey could not identify any features consistent with an abandoned septic tank (Appendix E). The septic tank and inlet/outlet piping had probably been removed during road construction activities for the WWTP (Figure B-10.0-3). Hand-augering was also performed in the area where the tank was assumed to be located, with auger refusal at 6 ft bgs after tuff was encountered. Because the septic tank and inlet/outlet piping could not be located, samples were collected beneath the presumed location of the former septic tank and at upgradient and downgradient locations. Eight of the 10 proposed confirmation samples were collected at SWMU 46-003(c).
- The investigation work plan required samples to be collected from the base of line/tank and 5 ft below base of line/tank at location 46-611359 at SWMU 46-003(f). The soil-tuff interface was encountered at 3 ft, and samples were collected from 3.0–4.0 ft bgs and 5.0–6.0 ft bgs.
- The investigation work plan required samples to be collected from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs below the drainline at location 46-611562 at SWMU 46-004(e). The location was moved 6 ft northwest from the marked location to the actual location of the drainline. Also, the drainline was located at a depth of 3 ft bgs, and thus the deeper sampling interval was changed to 3.0–4.0 ft bgs.
- The investigation work plan required VOC and pesticide analyses to be performed on all samples collected at SWMU 46-004(h). VOC and pesticide analyses were inadvertently excluded from the sampling paperwork. Four samples will be collected from the same two locations at SWMU 46-004(h) during the Phase II investigation and analyzed for VOCs and pesticides.
- The investigation work plan required two samples to be collected from sample depths of 0.0–1.0 ft and 1.0–2.0 ft within the storm drain contents at location 46-612231 at SWMU 46-004(r). The storm drain contents were only 0.5 ft thick, and thus the sampling intervals were changed to 0.0–0.25 ft and 0.25–0.5 ft.
- The investigation work plan required 20 samples to be collected from 10 locations in the drainage at and below the outfall at SWMU 46-004(t). A total of 14 samples were collected from seven locations at and below the outfall. The other six samples from three locations (46-601992, 46-601993, 46-601994) were collected as part of the sampling requirements for SWMU 46-009(a). The investigation work plan incorrectly duplicated these three locations in the sampling requirements for SWMU 46-004(t).

- The investigation work plan required two samples to be collected at the base of the drainline and 5 ft below the base of the drainline at locations 46-611277 and 46-611278 at SWMU 46-004(t). The drainline could not be found at location 46-611277 even after pot-holing was performed with a hand-auger. Samples were collected from 2.5–3.5 ft bgs and 4.5–5.5 ft bgs at this location. The drainline could not be found at location 46-611278 even after pot-holing was performed with a hand-auger. Samples were collected from 3.0–4.0 ft bgs and 5.0–6.0 ft bgs at this location.
- The investigation work plan required 16 samples to be collected from eight locations in the drainage at and below the outfall at SWMU 46-004(z). A total of 12 samples were collected from six locations at and below the outfall. The other four samples from two locations were collected as part of the sampling requirements for AOC 46-004(f2). The investigation work plan incorrectly duplicated these two locations in the sampling requirements for SWMU 46-004(z).
- The investigation work plan required total petroleum hydrocarbon diesel range organic (TPH-DRO) analyses to be performed on all samples collected at SWMU 46-006(d). TPH-DRO was inadvertently excluded from the sampling paperwork. Additional samples will be collected at SWMU 46-006(d) and analyzed for TPH-DRO during the Phase II investigation.
- The investigation work plan required two samples to be collected from 0.0–1.0 ft bgs and 2.0–3.0 ft bgs in soil and sediment at location 46-611354 at SWMU 46-008(e). However, soil and sediment extended only to a depth of 0.75 ft bgs; therefore, one sample was collected from 0.0–0.75 ft bgs, and the deeper sample was collected in tuff.
- The investigation work plan required TPH-DRO analyses to be performed on all samples collected at SWMU 46-008(g). TPH-DRO was inadvertently excluded from the sampling paperwork. Additional samples will be collected at SWMU 46-008(g) and analyzed for TPH-DRO during the Phase II investigation.

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), September 2008. "Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-6122, Los Alamos, New Mexico. (LANL 2008, 105038.17)

NMED (New Mexico Environment Department), October 20, 2008. "Notice of Approval, Revision 1, Investigation Work Plan for Upper Cañada del Buey Aggregate Area," 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, 103429)

Figure B-10.0-1 Location of septic tank and overhead utilities at SWMU 46-003(a)

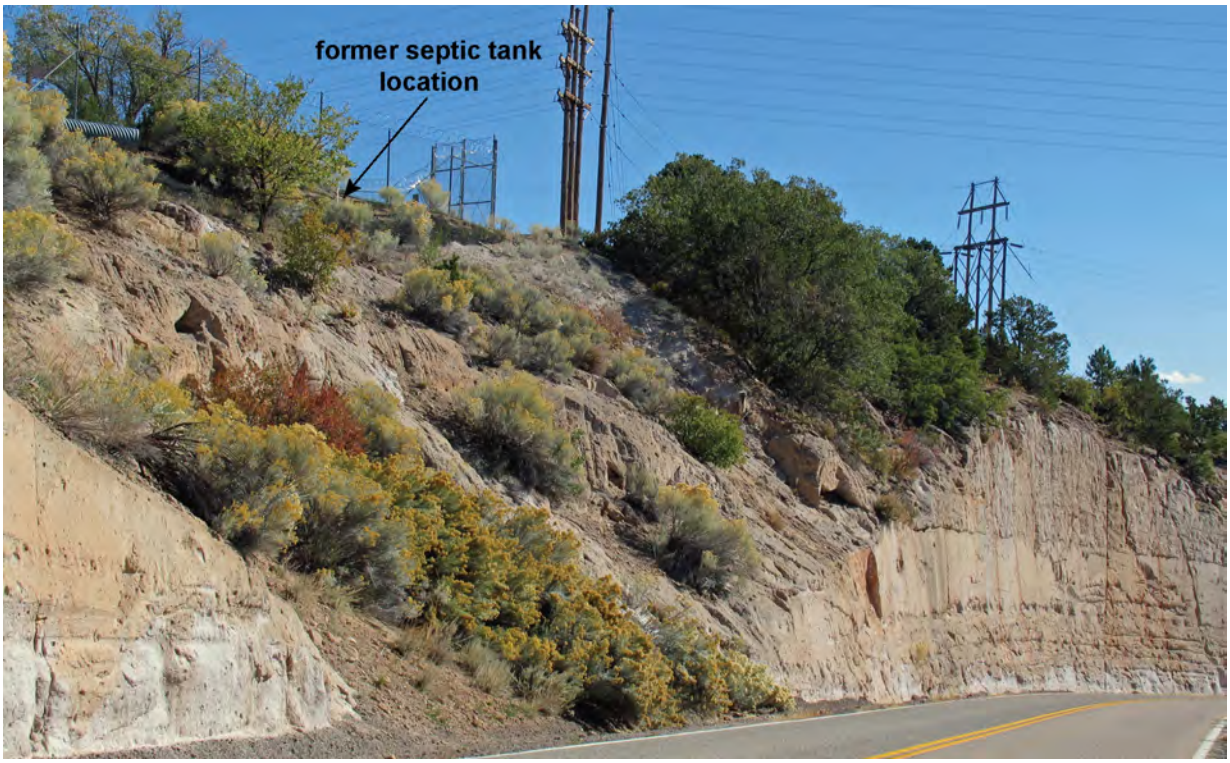

Figure B-10.0-2 Location of former septic tank at SWMU 46-003(b)

Figure B-10.0-3 Location of former septic tank at SWMU 46-003(c)

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 during the investigation, the auger was decontaminated before the hole was advanced through the sampling 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 them to ensure the sample containers and the containers used for transport were free of external contamination. Field team members packaged all samples to minimize the possibility of breakage during transport. After all environmental samples were collected, packaged, and preserved, a field team member transported them to the SMO. The SMO arranged for shipping the samples to analytical laboratories.
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: *Field Duplicates*: At a frequency 10%; collected at the same time as a regular sample and submitted for the same analyses. *Equipment Rinsate Blank*: At a frequency of 10%; collected by rinsing sampling equipment with deionized water that was collected in a sample container and submitted for laboratory analysis. *Trip Blanks*: Required for all field events that include the collection of samples for VOC analysis. Trip 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 with ice in insulated containers to maintain a temperature of 4°C.
Coordinating and Evaluating Geodetic Surveys	Geodetic surveys focused on obtaining survey data of acceptable quality to use during project investigations. Geodetic surveys were conducted with a Trimble 5700 DGPS. The survey data conformed to Laboratory Information Architecture project standards IA-CB02, GIS Horizontal Spatial Reference System, and IA-D802, Geospatial Positioning Accuracy 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 were located in controlled areas of the Laboratory to prevent unauthorized personnel from inadvertently adding or managing wastes. Each container of waste generated was individually labeled with waste classification, item identification number, and radioactivity (if applicable), immediately following containerization. All waste was segregated by classification and compatibility to prevent cross-contamination. Management of IDW is described in Appendix D.

Table B-1.0-2
SOPs Used for Investigation Activities Conducted at Upper Cañada del Buey Aggregate Area

SOP-5018, Integrated Fieldwork Planning and Authorization
SOP-5028, Coordinating and Evaluating Geodetic Surveys
SOP-5034, Monitor Well and RFI 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	Sampling Location	Description of Deviation
TA-46		
SWMU 46-002	46-611387	Only two of three samples collected at each location. Soil-tuff interface corresponded to 0.0–1.0-ft-bgs interval.
	46-611388	
	46-611389	
SWMU 46-003(a)	n/a*	Septic tank not removed because of overhead utilities. Six samples not collected from three locations (beneath the inlet, outlet, and septic tank).
SWMU 46-003(b)	n/a	Septic tank previously removed. Samples collected beneath the presumed location of the former septic tank and at upgradient and downgradient locations.
SWMU 46-003(c)	n/a	Septic tank previously removed. Samples collected beneath the presumed location of the former septic tank and at upgradient and downgradient locations.
SWMU 46-003(f)	46-611359	Soil-tuff interface encountered at 3 ft bgs. Samples collected from 3.0–4.0 ft bgs and 5.0–6.0 ft bgs instead of base of line and 5 ft below base of line/tank.
SWMU 46-004(c2)	46-611116	Moved 6 ft north above wooden log weir
	46-611120	Moved 10 ft north because of bedrock
SWMU 46-004(e)	46-611562	Moved 6 ft northwest from marked location to actual location of drainline
SWMU 46-004(f)	46-611273	Moved hole 10 ft northwest to allow for drill rig access
SWMU 46-004(h)	46-611765	Samples not analyzed for VOCs and pesticides. Additional samples to be collected during Phase II investigation.
	46-611766	
SWMU 46-004(r)	46-612231	Samples collected from 0.0–0.25 ft bgs and 0.25–0.5 ft bgs instead of 0.0–1.0 ft bgs and 1.0–2.0 ft bgs within the storm drain contents.
SWMU 46-004(t)	n/a	Samples collected from seven locations instead of from 10 locations; three other locations sampled for SWMU 46-009(a)
	46-611277	Samples collected from 2.5–3.5 ft bgs and 4.5–5.5 ft bgs instead of base of the drainline and 5 ft below the base of the drainline
	46-611278	Samples collected from 3.0–4.0 ft bgs and 5.0–6.0 ft bgs instead of base of the drainline and 5 ft below the base of the drainline
SWMU 46-004(z)	n/a	Samples collected from six locations instead of eight; two other locations sampled for AOC 46-004(f2)
SMWU 46-005	46-611628	Moved 20 ft northwest because of utilities southeast of building 46-204
	46-611629	Moved 20 ft northwest because of utilities
SWMU 46-006(d)	46-611568	Moved 15 ft northwest because of cement footing
	n/a	Samples not analyzed for TPH-DRO. Additional samples to be collected during Phase II investigation.
SWMU 46-008(e)	46-611354	Soil and sediment at a depth of 0.75 ft bgs; one sample collected from 0.0–0.75 ft bgs and one sample collected in tuff
SWMU 46-008(g)	n/a	Samples not analyzed for TPH-DRO. Additional samples to be collected during Phase II investigation.
SWMU 46-009(a)	46-610983	Moved 10 ft north because of steep slope and inaccessible location
SWMU 46-009(b)	46-611010	Moved 10 ft northeast because of metal fencing
	46-611013	Moved 30 ft northwest because original location was inaccessible

*n/a = Not applicable.

Appendix C

Borehole Logs

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-610985	TA: 46-009(a)-3	Drill Depth: 0 to 15 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 2/26/10 8:45 am	End Date: 2/26/10 9:55am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
						Originally started by hand auger 0 to 5 ft.
0				0' to 5' sample interval. Sandy fill. Brown (7.5 YR 4/2)	Fill	
1						
2						
3						
4	100	PID= 1.6ppm	RE46-10-10018			Hit tuff at 4.5 feet.
5						
6				5' to 10' sample interval. Qbt-3 tuff slightly weathered. Pinkish gray (7.5 YR 6/3).	Qbt3	Auger rig used from 5' to 15 feet.
7						
8						
9	100	PID= NA	RE46-10-10019			PID would not bump check above 87 ppm with 100 ppm isobutylene gas.
10						
11				10' to 15' sample interval. Qbt-3 tuff slightly weathered. Pinkish gray (7.5 YR 6/3).		
12						Borehole back filled with hydrated bentonite from 2' to 15' and cement caped from 0 to 2 feet.
13						
14	100	PID= NA	RE46-10-10020			
15						**TOTAL DEPTH: 15 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611273			TA: 46-004(f)-3			Drill Depth: 0 to 3 ft bgs			Total Pages: 1
Driller: Dave Tony			Start Time: 2/26/10 10:35 am				End Date: 2/26/10 11:00 am		
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger						α BV: <MDA	β BV: <MDA dpm		
Sampling Equipment/Method: 4" x 5' Split-barrel sampler						Logged By: Jim Jordan, TPMC			

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
						Location moved 10' NW due to slope.
0				0 to 1 foot sample interval. Asphalt and fill. Dark brown (7.5 YR 3/2) no odor	Fill	Borehole back filled with hydrated bentonite from 2 to 3 feet and a cement cap from 0 to 2 feet.
1	100	PID= NA	RE46-10-11533			
2				2 to 3 foot sample interval. Fill mixed with tuff. Dark brown (7.5 YR 3/2) and Pinkish gray (7.5 YR 6/3) no odor		
3	100	PID= NA	RE46-10-11534			

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-610983	TA: 46-009(a)-1	Drill Depth: 0 to 15 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 2/26/10 11:05 am	End Date: 2/26/10 11:40am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
						Originally started by hand auger 0 to 5 ft.
0				0 to 5' sample interval. Tuff fill. Reddish gray (5 YR 7/2)	Fill	
1						
2						
3						
4	100	PID= 0 ppm	RE46-10-10012			
5						
6				5' to 10' sample interval. Qbt-3 tuff slightly weathered and slightly moist. Pinkish gray (7.5 YR 6/3).	Qbt3	Auger rig used from 5' to 15 feet. Moved Bore hole 10' north.
7						
8						
9	100	PID= NA	RE46-10-10013			
10						
11				10' to 15' sample interval. Qbt-3 tuff Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 15 feet and cement caped from 0 to 2 feet.
12						
13						
14	100	PID= NA	RE46-10-10014			
15						**TOTAL DEPTH: 15 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611386	TA: 46-002-14	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/01/10 13:48 pm	End Date: 3/01/10 14:10pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
						Originally started by hand auger 0 to 1 ft.
0				0 to 5' sample interval. Coarse sand. Brown (7.5 YR 4/3) and Qbt-3 Tuff. Pinkish gray (7.5 YR 6/3)	Fill	Auger rig used from 2' to 10 feet.
1	100	PID= 6.7ppm	RE46-10-11954			
2						
3					Qbt3	Encountered tuff at 3 feet.
4	100	PID= 0 ppm	RE46-10-11955			
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11956			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611388	TA: 46-002-16	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/01/10 14:55 pm	End Date: 3/01/10 15:15pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
						Originally started by hand auger 0 to 1 ft.
0				0' to 5' sample interval. Sand fill and Qbt-3 tuff. Pinkish gray (5 YR 7/2)	Fill	
1	100	NA	RE46-10-11961			Auger rig used from 1' to 10 feet.
2						
3					Qbt3	Hit tuff at 3 feet.
4						
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled w ith hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11956			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611385	TA: 46-002-13	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/01/10 15:30pm	End Date: 3/01/10 16:05pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand poorly graded, coarse grained Brown (7.5 YR 4/3) and Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Fill	Encountered tuff at 3 feet.
1	100	PID= NA	RE46-10-11951			
2						
3					Qbt3	
4	100	PID= NA	RE46-10-11952			
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11953			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611382	TA: 46-002-10	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 8:15am	End Date: 3/02/10 8:55am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand poorly graded, coarse grained and moist. Brown (7.5 YR 4/3) and Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Fill	Encountered tuff at 3.5 feet.
1	100	PID= NA	RE46-10-11942			
2						
3						
4	100	PID= NA	RE46-10-11943			
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).	Qbt3	Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11944			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611383	TA: 46-002-11	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 9:15am	End Date: 3/02/10 9:45am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand poorly graded, coarse grained and moist. Brown (7.5 YR 4/3) and Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Fill	Encountered tuff at 3.5 feet.
1	100	PID= NA	RE46-10-11945			
2						
3						
4	100	PID= NA	RE46-10-11946			
5					Qbt3	
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11947			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611384	TA: 46-002-12	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 10:20am	End Date: 3/02/10 10:50am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand poorly graded, coarse grained and moist. Brown (7.5 YR 4/3) and Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Fill	Encountered tuff at 3 feet.
1	100	PID= NA	RE46-10-11948			
2						
3					Qbt3	
4	100	PID= NA	RE46-10-11949			
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11950			
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611380	TA: 46-002-8	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 11:55am	End Date: 3/02/10 12:15pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand and weathered tuff, coarse grained and moist. Brown (7.5 YR 4/3) and Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Fill	Encountered tuff at 1 feet.
1	100	PID= NA	RE46-10-11936			
2	100	PID= NA	RE46-10-11937		Qbt3	
3						
4						
5						
6				5' to 10' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7	100	PID= NA	RE46-10-11938			
8						
9						
10						**TOTAL DEPTH: 10 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611379	TA: 46-002-7	Drill Depth: 0 to 20 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 13:00pm	End Date: 3/02/10 14:00pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0						
1	100	PID= NA	RE46-10-11933	0 to 5' sample interval. Sand and weathered tuff, coarse grained and moist. Brown (7.5 YR 4/3)	Fill	
2						
3						
4						
5						
6					Qbt3	
7						
8	100		No sample	5' to 10' interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)		
9						
10						
11						
12						
13	100	PID= NA	RE46-10-11934	10' to 15' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)		
14						
15						
16						
17						
18	100	PID= NA	RE46-10-11935	15' to 20' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 20 feet and cement caped from 0 to 2 feet.
19						
20						**TOTAL DEPTH: 20 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611378	TA: 46-002-6	Drill Depth: 0 to 20 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 14:15pm	End Date: 3/02/10 14:45pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Sand coarse grained and moist. Brown (7.5 YR 4/3)	Fill	
1	100	PID= NA	RE46-10-11930			
2						
3						
4						
5						
6				5' to 10' interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)	Qbt3	
7						
8	100		No sample			
9						
10						
11				10' to 15' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3)		
12						
13	100	PID= NA	RE46-10-11931			
14						
15						
16				15' to 20' sample interval. Qbt-3 tuff. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 20 feet and cement caped from 0 to 2 feet.
17						
18	100	PID= NA	RE46-10-11932			
19						
20						**TOTAL DEPTH: 20 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611377	TA: 46-002-5	Drill Depth: 0 to 20 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/02/10 15:00pm	End Date: 3/02/10 15:45pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0 to 5' sample interval. Clayey Sand fine to coarse grained and moist. Brown (7.5 YR 4/3)	Fill	
1	100	PID= NA	RE46-10-11927			
2						
3						
4						
5						
6				5' to 10' interval. Qbt-3 tuff weatered. Pinkish gray (7.5 YR 6/3)	Qbt3	
7						
8	100		No sample			
9						
10						
11				10' to 15' sample interval. Qbt-3 tuff weathered. Pinkish gray (7.5 YR 6/3)		
12						
13	100	PID= NA	RE46-10-11928			
14						
15						
16				15' to 20' sample interval. Qbt-3 tuff slightly weathered. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 20 feet and cement caped from 0 to 2 feet.
17						
18	100	PID= NA	RE46-10-11929			
19						
20						**TOTAL DEPTH: 20 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611376	TA: 46-002-4	Drill Depth: 0 to 20 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/03/10 8:40am	End Date: 3/03/10 9:20am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0						
1	100	PID= NA	RE46-10-11924	0 to 5' sample interval. Sand coarse grained and weathered tuff, very moist. Brown (7.5 YR 4/3)	Fill	
2						
3						
4						
5						
6					Qbt3	
7						
8	100		no sample	5' to 10' interval. Qbt-3 tuff slightly moist with no odor. Pinkish gray (7.5 YR 6/3)		
9						
10						
11						
12						
13				10' to 15' sample interval. Qbt-3 tuff slightly moist with no odor. Pinkish gray (7.5 YR 6/3)		
14						Base of unit
15	100	PID= NA	RE46-10-11925			
16						Borehole back filled with hydrated bentonite from 2' to 20 feet and cement caped from 0 to 2 feet. (**5' below base of unit**)
17						
18				15' to 20' sample interval. Qbt-3 tuff slightly moist with no odor. Pinkish gray (7.5 YR 6/3).		
19						
20	100	PID= NA	RE46-10-11926			**TOTAL DEPTH: 20 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611622	TA: 46-004c-1	Drill Depth: 0 to 25 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/03/10 10:45am	End Date: 3/03/10 12:30pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0					NR	
1						
2						
3			No Sample			
4						
5						
6				5' to 10' sample interval. Qbt-3 solvent odor. Pinkish gray (7.5 YR 6/3)	Qbt3	Base of well.
7						
8						
9	100	PID= 373ppm	RE46-10-13546			
10						
11				10' to 15' sample interval. Qbt-3 tuff moist and solvent odor. Pinkish gray (7.5 YR 6/3)		5 Feet below base of well.
12						
13						
14	100	PID= 421ppm	RE46-10-13547			
15						
16				15' to 20' sample interval. Qbt-3 tuff slightly moist with solvent odor. Pinkish gray (7.5 YR 6/3).		10 feet below base of well
17						
18						
19	100	PID= 433ppm	RE46-10-13548			
20						
21				20' to 25' sample interval. Qbt-3 tuff slightly moist with solvent odor. Pinkish gray (7.5 YR 6/3		Borehole back filled with hydrated bentonite from 2' to 25 feet and cement caped from 0 to 2 feet.
22						
23						
24	100	PID= 390ppm	RE46-10-13549			
25						**TOTAL DEPTH: 25 ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611623	TA: 46-004c-2	Drill Depth: 0 to 25 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/03/10 13:20pm	End Date: 3/03/10 14:50pm	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0					NR	
1						
2			NO SAMPLE			
3						
4						
5						
6				5' to 10' sample interval. Qbt-3 tuff with solvent odor. Pinkish gray (7.5 YR 6/3)	Qbt3	Base of well.
7						
8						
9	100	PID= 265ppm	RE46-10-13550			
10						
11				10' to 15' sample interval. Sand coarse grained sub angular, sub rounded wet with solvent odor. Brown (7.5 YR 4/3)		5 Feet below base of well.
12						
13						
14	100	PID= 433ppm	RE46-10-13551			
15						
16				15' to 20' sample interval. Qbt-3 tuff moist with solvent odor. Pinkish gray (7.5 YR 6/3).		10 feet below base of well
17						
18						
19	100	PID= 360ppm	RE46-10-13552			
20						
21				20' to 25' sample interval. Qbt-3 tuff slightly moist with solvent odor. Pinkish gray (7.5 YR 6/3		Borehole back filled with hydrated bentonite from 2' to 25 feet and cement caped from 0 to 2 feet.
22						
23						
24	100	PID= 323ppm	RE46-10-13553			
25						**TOTAL DEPTH: 25ft bgs**

BOREHOLE LOG

Technical Area 46 Upper Canada Del Buey

Borehole ID: 46-611364	TA: 46-003f-6	Drill Depth: 0 to 10 ft bgs	Total Pages: 1
Driller: Dave Tony	Start Time: 3/04/10 8:49am	End Date: 3/04/10 9:15am	
Drilling Equipment/Method: CME SS-300 Hollow-Stem Auger		α BV: <MDA	β BV: <MDA dpm
Sampling Equipment/Method: 4" x 5' Split-barrel sampler		Logged By: Jim Jordan, TPMC	

DEPTH (ft bgs)	RECOVERY (%)	FIELD SCREENING RESULTS:alpha:beta (dpm)/PID (ppm)	SAMPLE ID	LITHOLOGICAL DESCRIPTION	LITHOLOGICAL UNIT	NOTES
0				0' to 5' sample interval. Sand and gravel from leach field. Very moist with no odor. Encountered Qbt-3 tuff. Brown (7.5 YR 4/3) and pinkish gray (7.5 YR 6/3)	Fill	
1						
2						
3	100	PID= NA	RE46-10-11885			
4					Qbt3	Tuff at 3.5 feet
5						
6				5' to 10' sample interval. Qbt-3 tuff slightly moist with no odor. Pinkish gray (7.5 YR 6/3).		Borehole back filled with hydrated bentonite from 2' to 10 feet and cement caped from 0 to 2 feet.
7						
8						
9	100	PID= NA	RE46-10-11886			
10						**TOTAL DEPTH: 10 ft bgs**

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 Cañada del Buey Aggregate Area of Los Alamos National Laboratory (LANL or the Laboratory). In general, IDW generated during the field investigation was managed in accordance with Standard Operating Procedure (SOP) 5238, Characterization and Management of Environmental Program (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. Waste handling exceptions to SOP-5238 occurred with IDW from hollow-stem auger (HSA) drilling in Solid Waste Management Units (SWMUs) 46-003(f), 46-004(f) and 46-009(a) (Appendix B, Table B-10.0-1).

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 and WCSF amendments are 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 Cañada del Buey 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 3.5 yd^3 of waste was generated and was determined to be nonhazardous, nonradioactive MSW. It was stored in plastic-lined trash cans and disposed of at the Los Alamos County landfill.
- WCSF Waste Stream #2: Drill cuttings consisted of sediment, soil, and rock removed during HSA core-barrel drilling. Approximately 2.25 yd^3 of drill cuttings was 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 in ENV-RCRA-QOP-011.1, Land Application of Drill Cuttings. Cuttings that cannot be land-applied are expected to be low-level waste (LLW) 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 0.75 yd^3 of contact waste was generated and will be recycled through the Laboratory's Green-is-Clean program.
- 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: Approximately 50 yd^3 of nonhazardous industrial steel-reinforced concrete, fiberglass septic tank debris and a small quantity of Qbt 3 tuff was generated SWMUs 46-003(f) and 46-003(g) were removed. Approximately 7 yd^3 of mixed LLW debris from a steel septic tank and siphon tank was generated from SWMU 46-003(e); this septic tank also contains LLW solidified sludge. Waste characterization is pending for approximately 10 yd^3 of steel septic tank debris generated from SWMU 46-003(d). Small quantities of tuff were also generated during the removal of each septic tank.
- WCSF Waste Stream #8: Approximately 150 gal. of liquid was discovered in the 1000-gal. septic tank at SWMU 46-003(e). The liquid was sampled for wasted characterization, and results of the laboratory chemical analyses were combined with due diligence to classify the liquid as LLW. The liquid was pumped into a 550-gal. polyethylene tank and solidified with Waste Lock polymer. The remaining open space in the polyethylene tank was filled with vermiculite and contact waste, and disposed of at TA-54.
- WCSF Waste Stream #9: Approximately 250 gal. of sludge was discovered in the 1000-gal. septic tank at SWMU 46-003(e). The sludge was sampled for waste characterization, and the results of laboratory chemical analyses were combined with due diligence to classify the liquid as LLW. The sludge was solidified inside the septic tank with Waste Lock polymer, and the remaining open space was filled with Visqueen and vermiculite. The tank is scheduled for disposal at Technical Area 54 (TA-54).

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	3.5 yd^3	AK	Plastic bags	Off-site municipal landfill
Drill Cuttings	Industrial	2.25 yd^3	Direct sampling and use of environmental samples	1-yd^3 wrangler bags and 5 gal. buckets	Intended path: Land application or authorized off-site disposal facility
Contact Waste	Industrial	0.75 yd^3	AK and analytical results of site characterization.	55-gal. poly container	Intended path: Recycle through Green-Is-Clean
Concrete, Steel, and Septic Tank Debris	Industrial	50 yd^3	AK and analytical results of site characterization	20-yd^3 rolloff bins	Intended path: Authorized off-site disposal facility
Steel Septic Tank Debris	LLW	10 to 17 yd^3	Direct sampling	20-yd rolloff bins	Intended path: TA-54
Solidified Liquid and vermiculite	LLW	150 gal.	Direct sampling	550-gal. poly container	TA-54
Solidified Sludge Inside Steel Septic Tank and Steel Siphon Tank	LLW	250 gal.	Direct sampling	Septic tank and siphon tank placed in 20-yd rolloff bin	Intended path: TA-54

Attachment D-1

Waste Characterization Strategy Form and Amendments
(on CD included with this document)

Appendix E

Geophysical Surveys

SUNBELT GEOPHYSICS P.O. Box 208 Socorro, New Mexico 87801 (575) 838-2941

Geophysical Investigations for Abandoned Septic Tanks Building 76 and Building 77, TA-46 Los Alamos National Laboratory, New Mexico

Prepared for:
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David A. Hyndman

February 2010

Introduction

Geophysical investigations have been conducted near Building 76 and Building 77 within TA-46 at Los Alamos National Laboratories, New Mexico. The objective of these investigations was to locate relic septic tanks.

The field work for the geophysical investigation was conducted on 4 February 2010. Labor, instrumentation, and technical expertise were provided by Sunbelt Geophysics of Socorro, New Mexico. Guidance and coordination were provided by TerranearPMC of Los Alamos.

Methods

Potential locations for the septic tanks were identified by TerranearPMC. These areas received both qualitative screening and formal surveys. The instruments used were:

Schonstedt magnetic locator (Serial #136193)
Radiodetection line tracer (Serial #C3-34EN-26)
Geonics EM-61 metal detector (Serial #930204)
Sensors & Software 250 MHz ground penetrating radar (Serial #0057-0006)

Formal surveying was conducted over spatial control and data acquisition grids which were established utilizing a transit and tape.

Data from the EM-61 and GPR were transferred to a computer for analysis and mapping. The DAT61 (Geonics Ltd.), Ekko_View (Sensors & Software Ltd.) and the Oasis montaj (Geosoft Ltd.) programs were used for processing and image preparation.

Results

Building 76

An image of the EM-61 data acquired to the southeast of Building 76 is presented in Figure 1. Low response (blue) is background, indicative of little or no buried metal. A strong response (red to pink) is generated by a significant concentration of metal, either buried or at the surface. This image shows a strong response from several observable objects as annotated. A septic tank with metal re-enforcing would be expected to generate a response of at least 20 mV (green). No features consistent with such a septic tank are observed.

Local soil and moisture degraded the GPR performance to less than 3 feet of penetration, unable to detect even the buried culvert seen in Figure 1. No formal GPR survey was made.

Building 77

An image of the EM-61 data acquired to the south of Building 77 is presented in Figure 2. A relatively mild feature, suggestive of a possible septic tank, is seen to the south of the fence. The EM-61 data predicts this feature to be approximately 4 feet deep, but this portion of the survey was conducted along a slope and the depth estimate may be poor. Other features are interpreted as a relatively large buried pipe (storm drain?), a large feature centered of this pipe (covered manhole?), and a possible cut-off pipe pointing toward the possible septic tank to the south of the fence.

The GPR survey detected further subsurface features including a buried non-metallic line and an area of anomalous compaction located near the cut-off pipe. The positions of these features are annotated on Figure 2 and shown on example east – west GPR profiles in Figure 3. The anomalous compaction may be due to a relic septic tank or back-fill from removal of a septic tank. The anomalous compaction could also be from original development of the site or subsequent activities not related to the septic system.

Conclusions

The geophysical investigation near Building 76 detected no features consistent with an abandoned septic tank.

The investigation near Building 77 found a feature consistent with an abandoned septic tank located to the south of the perimeter fence. The on-site position of this feature can be located by reference to the fence post. An area of anomalous subsurface compaction was detected which may be related to the septic system.

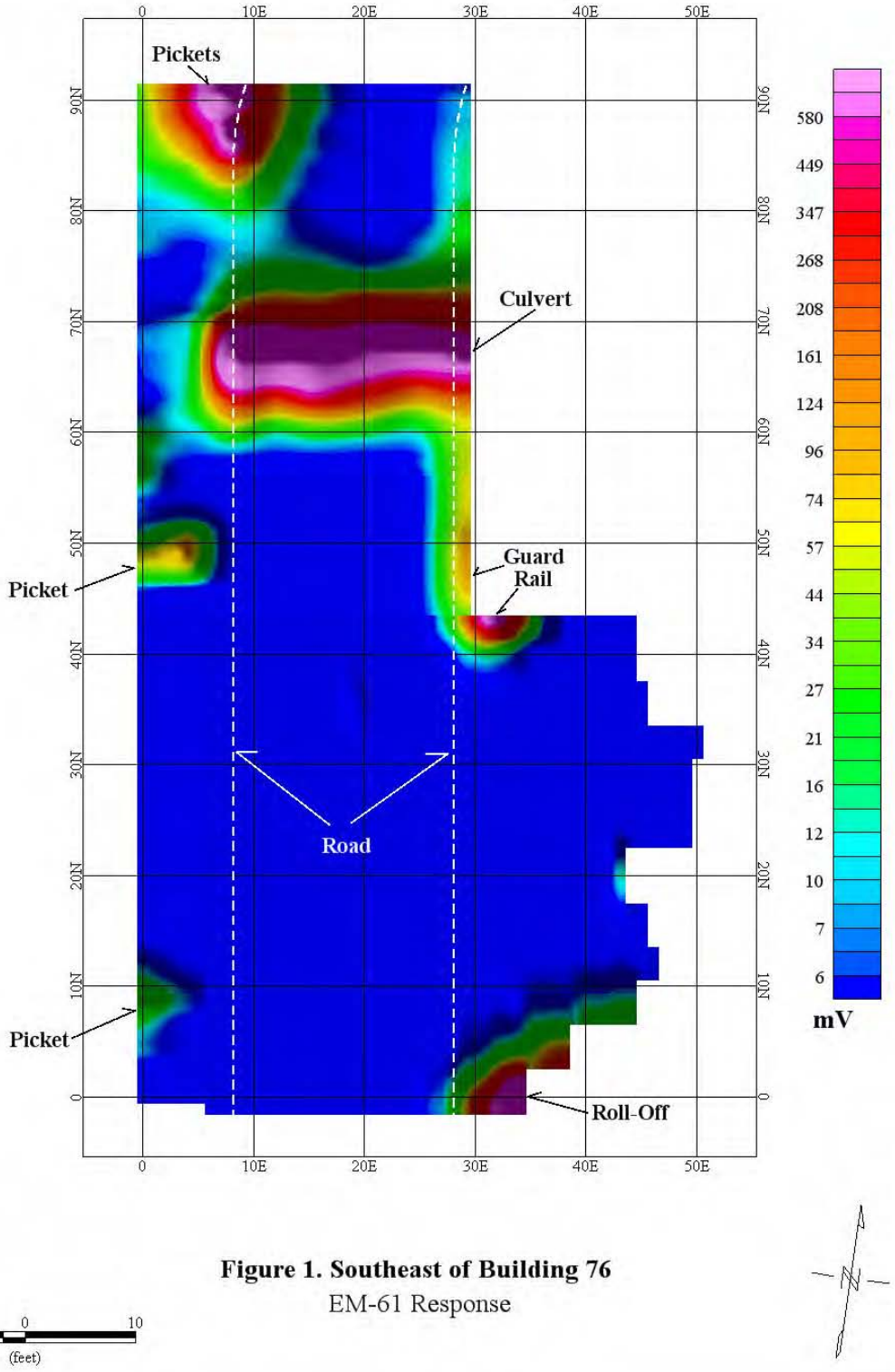


Figure 1. Southeast of Building 76
EM-61 Response

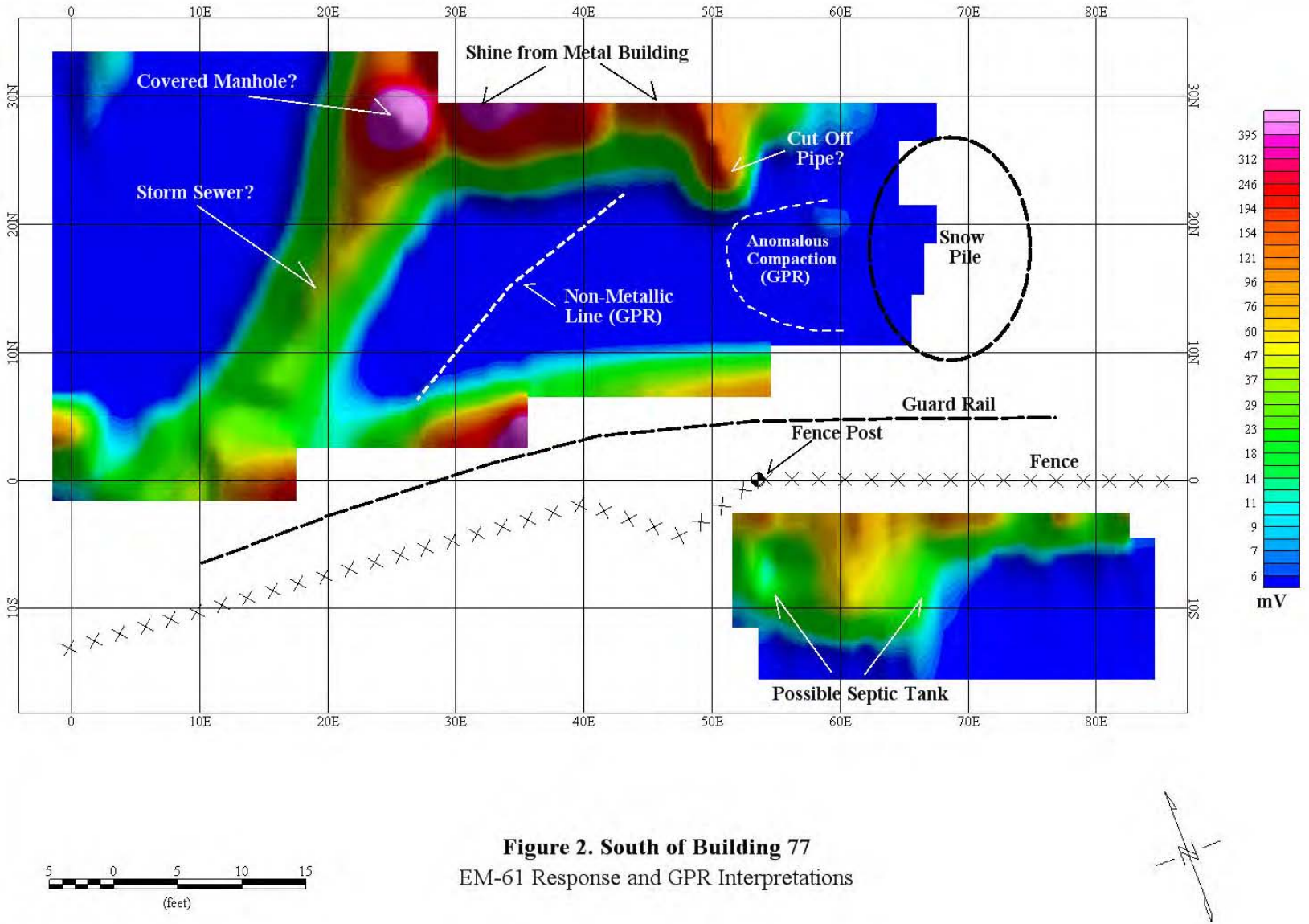


Figure 2. South of Building 77
EM-61 Response and GPR Interpretations

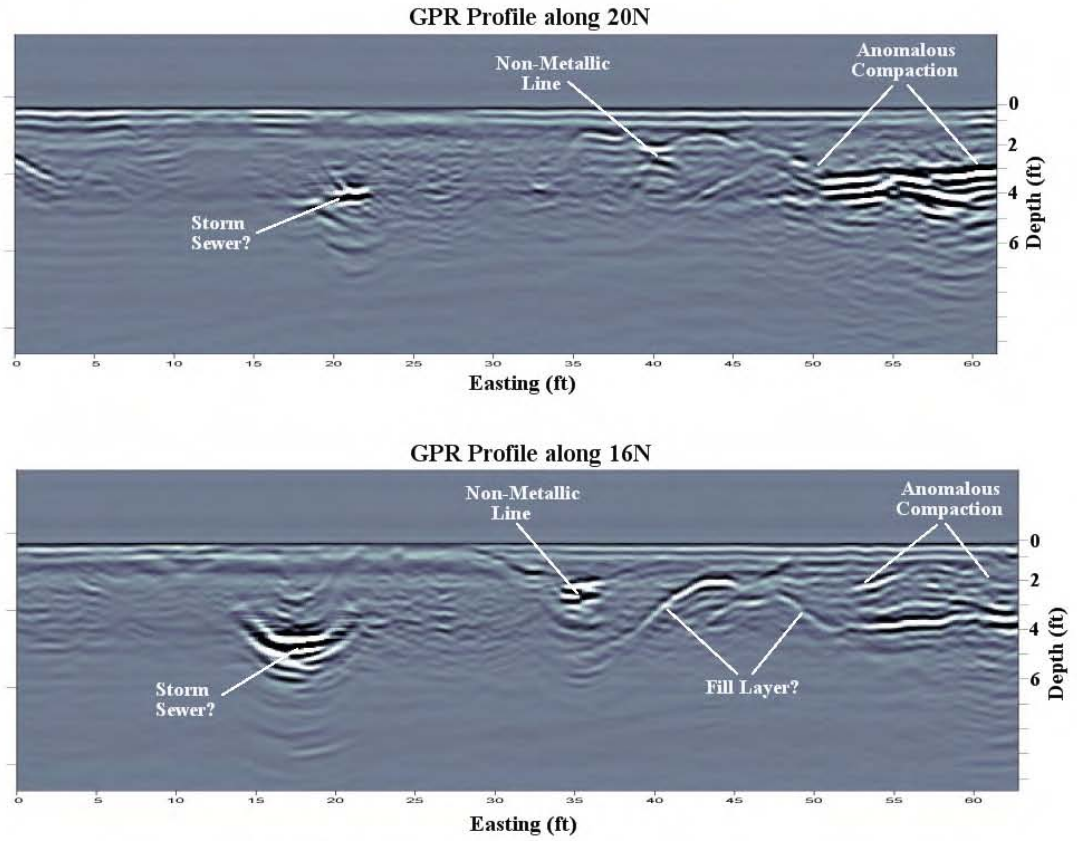


Figure 3. South of Building 77

Sample GPR Profiles

5 0 5 10 15

(feet)

Appendix F

Analytical Program

F-1.0 INTRODUCTION

This appendix discusses the analytical methods and data-quality review for samples collected during investigations at the Upper Cañada del Buey Aggregate Area at Los Alamos National Laboratory (LANL or the Laboratory). Additionally, this appendix gives a summary of 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 Los Alamos National Laboratory's (LANL's) statements of work (SOWs) for analytical laboratories (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962). The results of the QA/QC procedures were used to estimate the accuracy, bias, and precision of the analytical measurements. Samples for QC include method blanks, matrix spikes (MSs), laboratory control samples (LCSs), internal standards, 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; LANL 2008, 109962). Other QC factors, such as sample preservation and holding times, were also assessed in accordance with the requirements outlined in Standard Operating Procedure (SOP) 5056, Sample Containers and Preservation.

The following SOPs, available at http://www.lanl.gov/environment/all/qa/adep.shtml, were used for data validation:

- SOP-5161, Routine Validation of Volatile Organic Data
- SOP-5162, Routine Validation of Semivolatile Organic Compound (SVOC) Analytical Data
- SOP-5163, Routine Validation of Organochlorine Pesticides and Polychlorinated Biphenyls (PCBs) 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-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 during Resource Conservation and Recovery Act facility investigations, other corrective actions, and other investigations. All historical investigation samples were submitted to and analyzed by approved off-site laboratories. These data are determined to be of sufficient quality for decision-making purposes and have been reviewed and revalidated to current QA standards.

F-3.0 INORGANIC CHEMICAL ANALYSES

A total of 769 samples (plus 82 field duplicates) collected within the Upper Cañada del Buey Aggregate Area were analyzed for inorganic chemicals. All 769 samples (plus 82 field duplicates) were analyzed for target analyte list (TAL) metals; 256 samples (plus 32 field duplicates) were analyzed for nitrate; 618 samples (plus 65 field duplicates) were analyzed for perchlorate; and 724 samples (plus 80 field duplicates) were analyzed for total cyanide. The analytical methods used for inorganic chemicals are listed in Table F-1.0-1.

Tables in the investigation report summarize all samples collected and the analyses requested for the investigation of the sites within the Upper Cañada del Buey Aggregate Area. All analyses conducted during the investigation are presented in Appendix G (on DVD).

F-3.1 Inorganic Chemical QA/QC Samples

The use of QA/QC samples is designed to produce measures of the reliability of the data. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. To assess the accuracy and precision of inorganic chemical analyses, LCSs, preparation blanks, MSs, laboratory duplicate samples, interference check samples (ICSs), and serial dilution samples were analyzed as part of the investigation. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) and is described briefly in the sections below. The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For inorganic chemicals in soil or tuff, LCS percent recoveries (%R) should fall within the control limits of 75%–125% (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The preparation blank is an analyte-free matrix to which all reagents are added in the same volumes or proportions as those used in the environmental sample processing; it is extracted and analyzed in the same manner as the corresponding environmental samples. Preparation blanks are used to measure bias and potential cross-contamination. All inorganic chemical results should be below the method detection limit (MDL).

MS samples assess the accuracy of inorganic chemical analyses. These samples are designed to provide information about the effect of the sample matrix on the sample preparation procedures and analytical technique. The MS acceptance criterion is 75%–125%, inclusive, for all spiked analytes (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

Laboratory duplicate samples assess the precision of inorganic chemical analyses. All relative percent differences (RPDs) between the sample and laboratory duplicate should be ±35% for soil (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962).

The ICSs assess the accuracy of the analytical laboratory's interelement and background correction factors used for inductively coupled plasma emission spectroscopy. The ICS %R should be within the acceptance range of 80%–120%. The QC acceptance limits are ±20%.

Serial dilution samples measure potential physical or chemical interferences and correspond to a sample dilution ratio of 1:5. The chemical concentration in the undiluted sample must be at least 50 times the MDL (100 times for inductively coupled plasma mass spectroscopy) for valid comparison. For sufficiently high concentrations, the RPD should be within 10%.

F-3.2 Data Quality Results for Inorganic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

F-3.2.1 Maintenance of COC

SCL/COC forms were 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

One TAL metals result and one cyanide result were qualified as estimated not detected (UJ) because the extraction/analytical holding time are exceeded by less than 2 times the published method for holding times.

Two TAL metals results and one perchlorate result were qualified as estimated and biased low (J-) because the extraction/analytical holding time are exceeded by less than 2 times the published method for holding times.

F-3.2.6 ICVs and CCVs

One TAL metals result was qualified as estimated not detected (UJ) because the ICV and/or CCV were not analyzed at the appropriate method frequency.

One TAL metals result was qualified as estimated (J) because the ICB and/or CCV were not analyzed at the appropriate method frequency.

Thirteen TAL metals results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method-specific limits.

F-3.2.7 Interference Check Sample and/or Serial Dilutions

A total of 30 TAL metals results were qualified as estimated not detected (UJ) because the interference check sample %R value is greater than or equal to 50% and less than 80%.

F-3.2.8 Laboratory Duplicate Samples

One TAL metals result was qualified as estimated not detected (UJ) because the sample and the duplicate sample results were greater than or equal to 5 times the reporting limit (RL), and the duplicate RPD was greater than 35% for soil samples.

A total of 803 TAL metals results were qualified as estimated (J) because the sample and the duplicate sample results were greater than or equal to 5 times the RL, and the duplicate RPD was greater than 35% for soil samples.

Eight TAL metals results were qualified as estimated (J) because the duplicate sample was not prepared and/or analyzed with the samples for unspecified reasons. The duplicate information is missing. Data may not be acceptable for use.

F-3.2.9 Blanks

A total of 209 TAL metals results and 7 cyanide results were qualified as not detected (U) because the sample results are less than or equal to 5 times the concentration of the related analytes in the method blank.

A total of 242 TAL metals results and 1 cyanide result were qualified as not detected (U) because the sample results are less than or equal to the concentration of the related analyte in the initial calibration blank and or continuing calibration blank.

A total of 279 TAL metals results and 9 nitrate results were qualified as not detected (U) because the sample result is less than or equal to 5 times the concentration of the related analyte in the equipment or rinsate blank.

A total of 532 TAL metals results were qualified as estimated (J) because the sample results are greater than 5 times the concentration of the related analytes in the method blank.

F-3.2.10 MS Samples

One perchlorate result was qualified as estimated not detected (UJ) because the MS/MS duplicate (MSD) %R difference was greater than 20%.

A total of 91 TAL metals results, 34 nitrate results, and 10 perchlorate results were qualified as estimated not detected (UJ) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

Four TAL metals 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 273 TAL metals results, 1 cyanide result, and 17 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.

Three perchlorate results were qualified as estimated (J) because a low recovery (%R <75%) was observed for these analytes in the associated spike sample.

A total of 1938 TAL metals results were qualified as estimated and biased high (J+) because a high recovery (%R >125%) was observed for these analytes in the associated spike sample.

F-3.2.11 LCS Recoveries

A total of 35 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.

One perchlorate result was qualified as estimated and biased high (J+) because a high recovery (>125%) was observed for this analyte in the associated laboratory control sample.

F-3.2.12 Detection Limits

Thirteen TAL metals results were qualified as estimated (J) because the sample result was reported as detected between the estimated detection limit (EDL) and the MDL.

A total of 1312 TAL metals results, 85 perchlorate results, nine nitrate results, and 58 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

Two antimony results were qualified as rejected (R) because the associated MS recovery was less than 30%, indicating a low bias.

A total of 34 TAL metals results (4 barium, 6 copper, 17 selenium, 1 manganese, 2 zinc, 2 potassium, and 2 magnesium) and 14 cyanide results were qualified as rejected (R) because the associated MS recovery was less than 10%, indicating an extremely low bias.

Two perchlorate results were qualified as rejected (R) because ion abundance ratios did not meet specifications.

The rejected data were not used to determine the nature and extent of contamination or to assess 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 do not affect the usability of the sampling results.

F-4.0 ORGANIC CHEMICAL ANALYSES

A total of 768 samples (plus 82 field duplicates) collected within the Upper Cañada del Buey Aggregate Area were analyzed for organic chemicals. A total of 670 samples (plus 74 field duplicates) were analyzed for volatile organic chemicals (VOCs); 767 samples (plus 81 field duplicates) were analyzed for semivolatile organic chemicals (SVOCs); 732 samples (plus 80 field duplicates) were analyzed for polychlorinated biphenyls (PCBs); 476 samples (plus 50 field duplicates) were analyzed for pesticides; 162 samples (plus 23 field duplicates) were analyzed for total petroleum hydrocarbon (TPH) diesel range organics (DRO); and 69 samples (plus 3 field duplicates) were analyzed for high explosives (HE). 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 Cañada del Buey 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 measures of the reliability of the data. The results of the QA/QC analyses performed on a sample provide confidence about whether the analyte is present and whether the concentration reported is accurate. Calibration verifications, LCSs, method blanks, MSs, surrogates, and ISs were analyzed to assess the accuracy and precision of organic chemical analyses. Each of these QA/QC sample types is defined in the analytical services SOW (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) 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 upper acceptance limit (UAL).

A surrogate compound (surrogate) is an organic compound used in the analyses of target analytes that is similar in composition and behavior to the target analytes but not normally found in environmental samples. Surrogates are added to every blank, sample, and spike to evaluate the efficiency with which analytes are recovered during extraction and analysis. The recovery percentage of the surrogates must be within specified ranges or the sample may be rejected or assigned a qualifier.

ISs are chemical compounds added to every blank, sample, and standard extract at a known concentration. They are used to compensate for (1) analyte concentration changes that might occur during storage of the extract, and (2) quantitation variations that can occur during analysis. Internal standards are used as the basis for quantitation of target analytes. The %R for ISs should be within the range of 50%–200%.

F-4.2 Data Quality Results for Organic Chemicals

The majority of the analytical results are qualified as not detected (U) because the analytes were not detected by the respective analytical methods. These data do not have any quality issues associated with the values presented.

One VOC result was qualified as not detected (U) because the mass spectra did not meet specifications.

F-4.2.1 Maintenance of COC

SCL/COC forms were maintained properly for all samples analyzed for organic chemicals (Appendix G).

F-4.2.2 Sample Documentation

All samples analyzed for organic chemicals were properly documented on the SCL in the field (Appendix G).

F-4.2.3 Sample Dilutions

A total of 7 PCB results, 1699 SVOC results, and 153 VOC results were qualified as estimated not detected (UJ) because of sample dilutions.

A total of 90 SVOC results and 25 VOC results were qualified as estimated (J) 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

A total of 294 pesticide results, 1110 VOC results, 4 SVOC results, and 84 HE results were qualified as estimated not detected (UJ) because the extraction holding time is exceeded by less than 2 times the published method for holding times.

Fourteen VOC results were qualified as estimated and biased low (J-) because the extraction holding time is exceeded by less than 2 times the published method for holding times.

F-4.2.6 ICVs and CCVs

A total of 13 HE results, 15 PCB results, 308 pesticide results, 4099 SVOC results, and 2058 VOC results were qualified as estimated not detected (UJ) because the ICV and/or CCV were recovered outside the method specific limits.

A total of 30 HE results were qualified as estimated not detected (UJ) the affected analytes were analyzed with a RRF of less than 0.05 in the initial calibration and/or CCV.

A total of 20 SVOC results were qualified as estimated not detected (UJ) because the affected analytes were analyzed with an initial calibration curve that exceeded the percent relative standard deviation (%RSD) criteria and/or the associated multipoint calibration correlation coefficient is less than 0.995.

A total of 1224 SVOC results were qualified as estimated not detected (UJ) because the associated ICV and/or CCV were not analyzed at the appropriate method frequency.

A total of 26 SVOC results were qualified as estimated (J) because the associated ICV and/or CCV were not analyzed at the appropriate frequency.

Two PCB results were qualified as estimated (J) because the multi-component standard was not analyzed within 72 hours of the initial analysis.

Three PCB results, 71 SVOC results, and 44 VOC results were qualified as estimated (J) because the ICV and/or CCV were recovered outside the method specific limits.

F-4.2.7 Surrogate Recoveries

A total of 113 SVOC 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, indicating the potential for a low bias in the results.

Four PCB results, 5 pesticide results, and 42 VOC results were qualified as estimated and biased high (J+) because the surrogate %R value is greater than the UAL, indicating a potential for a high bias in the results and a potential for false positive results.

F-4.2.8 IS Responses

IS response criteria were met for all samples analyzed for organic chemicals.

F-4.2.9 Method Blanks

A total of 55 SVOC results, 60 VOC results, and four TPH-DRO 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 44 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.

A total of 41 SVOC results and 2 VOC results were qualified as estimated (J) because the sample results are greater than five times (10 times for common laboratory contaminants).the concentration of the related analytes in the method blank.

F-4.2.10 MS Samples

A total of 41 TPH-DRO results were qualified as estimated not detected (UJ) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

Two HE results were qualified as estimated not detected (UJ) because the MS/MSD %R difference was greater than 30%.

A total of 33 TPH-DRO results were qualified as estimated (J) because a low recovery (%R <70%) was observed for these analytes in the associated spike sample.

Five TPH-DRO results and one HE result were qualified as estimated and biased high (J+) because the MS/MSD percent recovery was greater than 130%.

F-4.2.11 Laboratory Duplicate Samples

Laboratory duplicates collected for organic chemical analyses indicated acceptable precision for all samples.

F-4.2.12 LCS Recoveries

A total of 117 SVOC results, 12 VOC results, and 18 HE results were qualified as estimated not detected (UJ) because the LCS %R was less than the LAL but greater than10%.

Six SVOC results were qualified as estimated and biased low (J-) because the LCS percent recovery was less than the LAL but greater than10%.

F-4.2.13 PQLs and MDLs

A total of 142 PCB results, 7 pesticide results, 862 SVOC results, 27 TPH-DRO results, and 205 VOC results were qualified as estimated (J) because the sample result was reported as detected between the PQL and the MDL.

F-4.2.14 Rejected Data

A total of 16 SVOC results (benzyl alcohol) were qualified as rejected (R) because a low recovery (<10%) was observed for these analytes in the associated LCSs.

A total of 25 VOC results (6 acetone, 8 butanone[2-], and 11 trichloro-1,2,2-trifluoroethane[1,1,2-]) were qualified as rejected (R) because the affected analytes were analyzed with a relative response factor of less than 0.05 in the initial calibration and/or CCV.

Four VOC results (acetone) were qualified as rejected (R) because the data validator identified quality deficiencies in the reported data that required qualification.

Six HE results (tetryl) were qualified as rejected (R) because the MS/MSD recoveries were less than 10%.

A total of 10 organic results (3 tetrachloroethene, 2 trichloroethane[1,1,1-], 3 trichloroethene, and 2 trichloro-1,2,2-trifluoroethane[1,1,2-]) 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 of contamination or assess 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 do not affect the usability of the sampling results.

F-5.0 RADIONUCLIDE ANALYSES

A total of 768 samples (plus 81 field duplicates) collected within the Upper Cañada del Buey Aggregate Area were analyzed for radionuclides. A total of 738 samples (plus 80 field duplicates) were analyzed for americium-241; 712 samples (plus 77 field duplicates) were analyzed for gamma-emitting radionuclides;

two samples were analyzed for alpha-/beta-emitting radionuclides; 768 samples (plus 81 field duplicates) were analyzed for isotopic plutonium; 370 samples (plus 41 field duplicates) were analyzed for isotopic thorium; 768 samples (plus 81 field duplicates) were analyzed for isotopic uranium; and 9 samples (plus 1 field duplicate) 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 Cañada del Buey 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; LANL 2008, 109962). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to the minimum detectable concentration (MDC). Some sample results were qualified as not detected (U) because the associated sample concentration was less than or equal to 3 times the total propagated uncertainty. This data qualification is related to detection status only, not to the quality of the data.

To assess the accuracy and precision of radionuclide analyses, LCSs, method blanks, MS samples, laboratory duplicate samples, and tracers were analyzed as part of the investigations. Each of these QA/QC sample types is defined in the analytical services SOWs (LANL 1995, 049738; LANL 2000, 071233; LANL 2008, 109962) and is described briefly below.

The LCS serves as a monitor of the overall performance of each step during the analysis, including sample digestion. For radionuclides in soil or tuff, LCS %R should fall between the control limits of 80%–120%.

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; LANL 2008, 109962).

F-5.2 Data Quality Results for Radionuclides

F-5.2.1 Maintenance of COC

SCL/COC forms were maintained properly for all samples (Appendix G).

F-5.2.2 Sample Documentation

All samples were properly documented on the SCL/COC forms in the field (Appendix G).

F-5.2.3 Sample Dilutions

Some samples were diluted for radionuclide analyses. No qualifiers were applied to any radionuclide sample results because of dilutions.

F-5.2.4 Sample Preservation

Preservation criteria were met for all samples analyzed for radionuclides.

F-5.2.5 Holding Times

Holding-time criteria were met for all samples analyzed for radionuclides.

F-5.2.6 Method Blanks

One isotopic plutonium result was qualified as not detected (U) because the associated sample concentration was less than 5 times the concentration of the related analyte in the method blank.

A total of 24 isotopic thorium results and 8 isotopic uranium results were qualified as estimated (J) because the sample results were greater than 5 times the concentration of the related analytes in the method blank.

F-5.2.7 MS Samples

MS criteria were met for all samples analyzed for radionuclides.

F-5.2.8 Tracer Recoveries

A total of 4 isotopic plutonium results, 14 isotopic uranium results, and 5 americium-241 results were qualified as estimated not detected (UJ) because the tracer was less than the LAL but greater than or equal to 10% R.

A total of 21 isotopic thorium results and 40 isotopic uranium results were qualified as estimated and biased low (J-) because the tracer was less than the LAL but greater than or equal to 10% R.

A total of 15 isotopic thorium results and 12 isotopic uranium results were qualified as estimated and biased high (J+) because the tracer %R was greater than the UAL.

F-5.2.9 LCS Recoveries

LCS recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.10 Laboratory Duplicate Samples Recoveries

Laboratory duplicate sample recovery criteria were met for all samples analyzed for radionuclides.

F-5.2.11 Rejected Data

A total of 366 cesium-134 results and 10 cesium-137 results were qualified as rejected (R) because spectral interferences prevented positive identification of the analytes.

The rejected data were not used to determine the nature and extent of contamination or to assess 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 do not affect the usability of the sampling results.

F-6.0 REFERENCES

The following list includes all documents cited in this appendix. Parenthetical information following each reference provides the author(s), publication date, and ER ID. This information 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)

LANL (Los Alamos National Laboratory), June 30, 2008. "Exhibit "D" Scope of Work and Technical Specifications, Analytical Laboratory Services for General Inorganic, Organic, Radiochemical, Asbestos, Low-Level Tritium, Particle Analysis, Bioassay, Dissolved Organic Carbon Fractionation, and PCB Congeners," Los Alamos National Laboratory document RFP No. 63639-RFP-08, Los Alamos, New Mexico. (LANL 2008, 109962)

Table F-1.0-1
Inorganic Chemical, Organic Chemical, and Radionuclide Analytical Methods for Samples Collected in the Upper Cañada del Buey Aggregate Area

Analytical Method	Analytical Description	Analytical Suite
EPA 300.0	Ion chromatography	Anions (nitrate)
EPA 905.0	Gas proportional counting	Strontium-90
EPA SW-846: 6010/6010B	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 (GCMS)	VOCs
EPA TO-15	GC/MS	VOCs
EPA SW-846: 8270 and 8270C	GC/MS	SVOCs
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

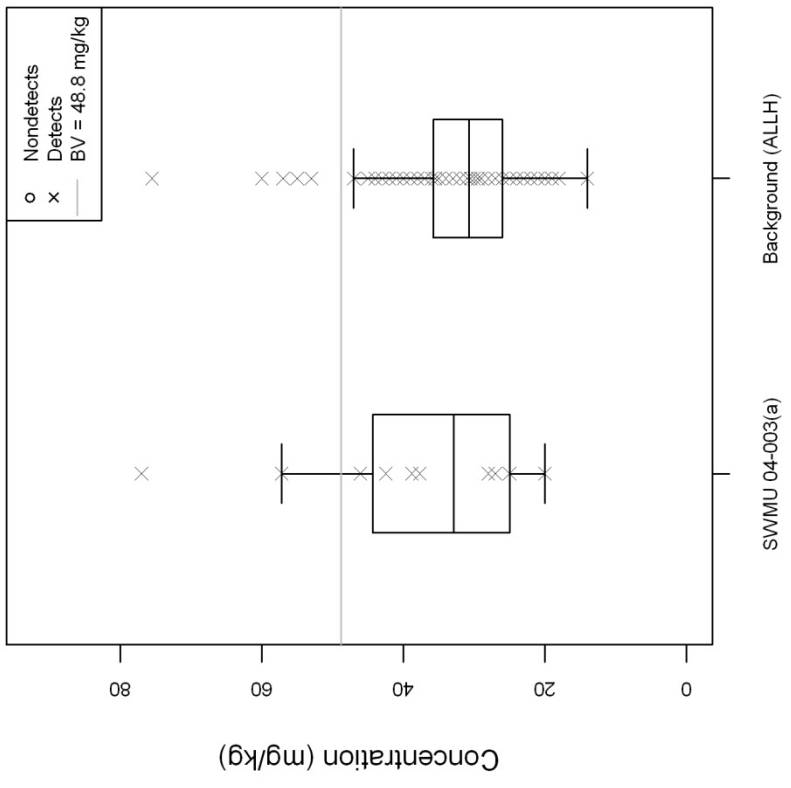
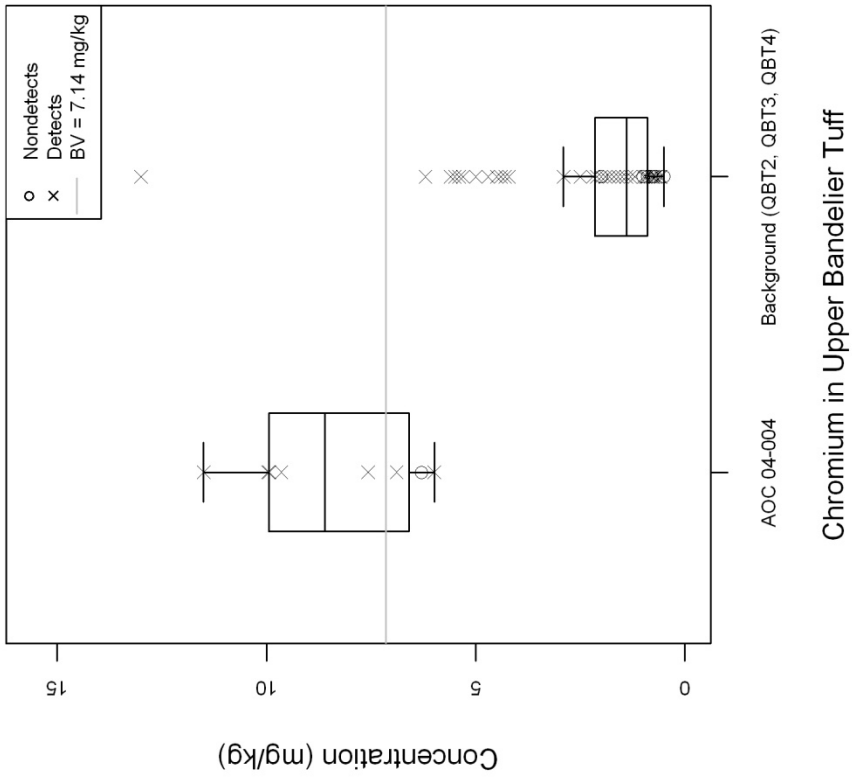


Figure H-1 Box plot for zinc in soil at SWMU 04-003(a)



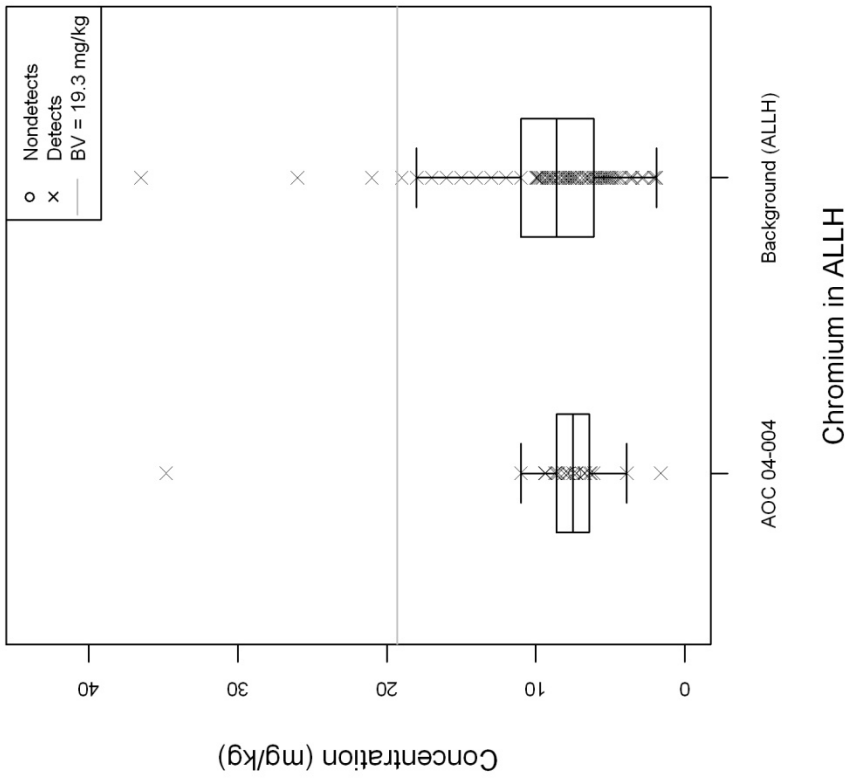
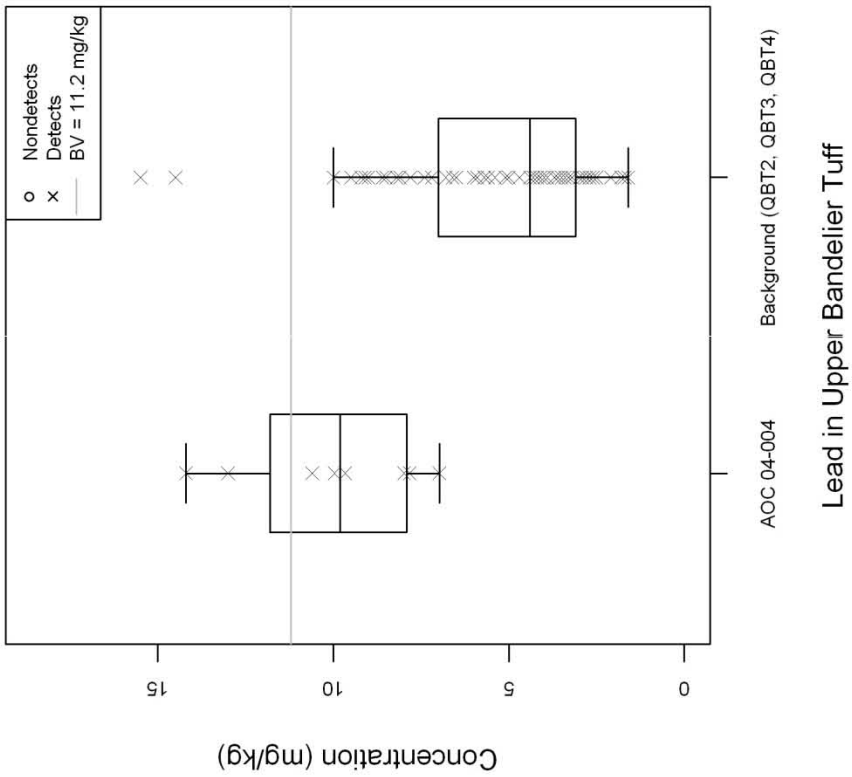


Figure H-2 Box plots for chromium in soil and tuff at AOC 04-004



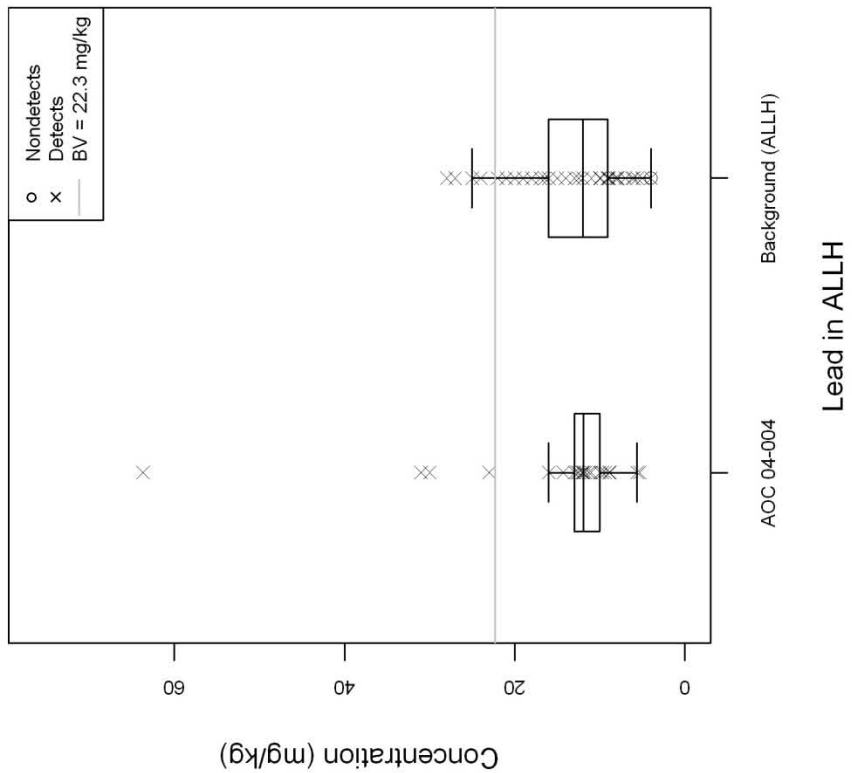


Figure H-3 Box plots for lead in soil and tuff at AOC 04-004

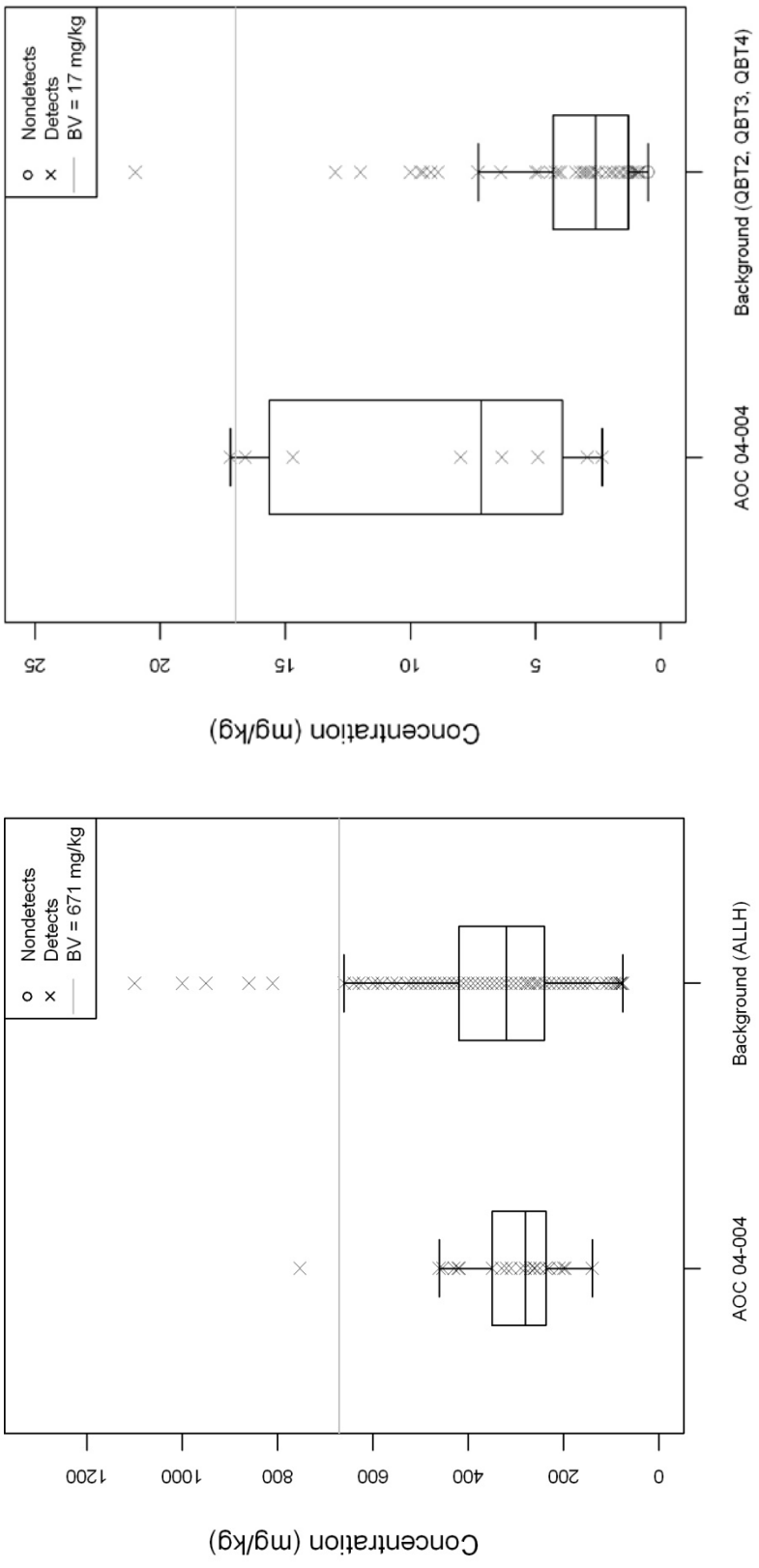


Figure H-4 Box plots for manganese in soil and vanadium in tuff at AOC 04-004

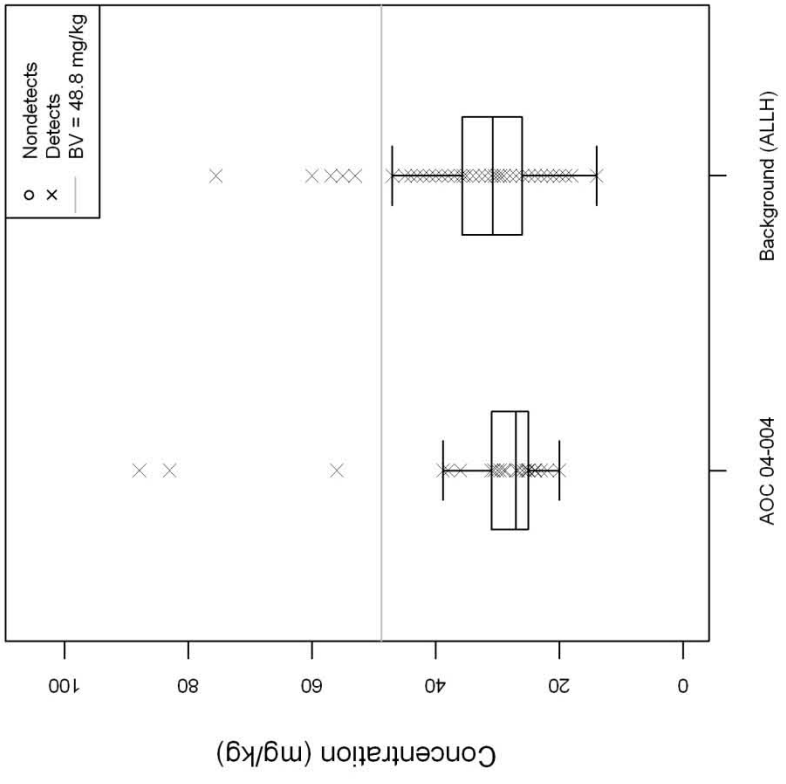
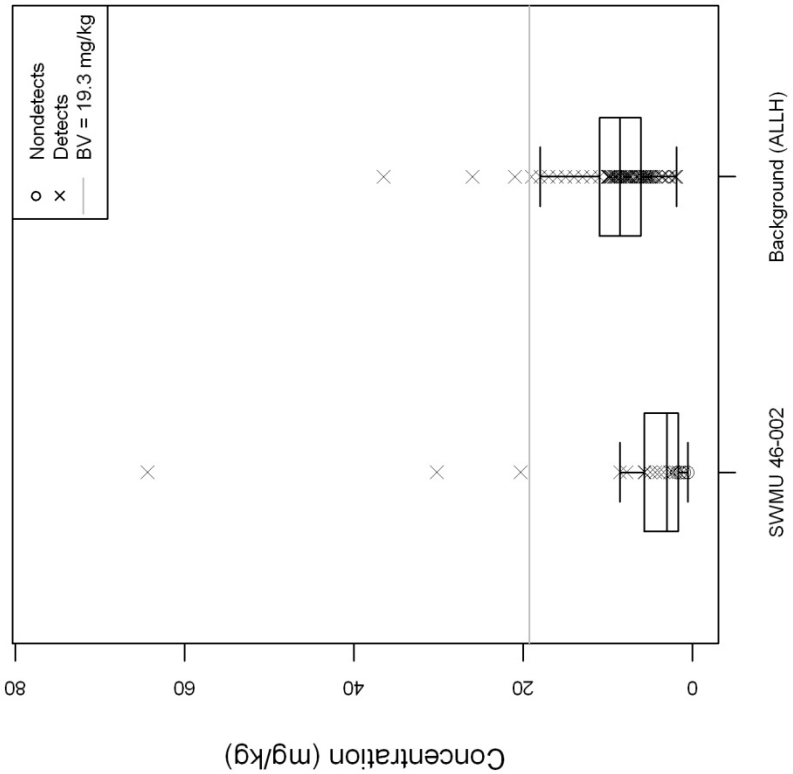


Figure H-5 Box plot for zinc in soil at AOC 04-004



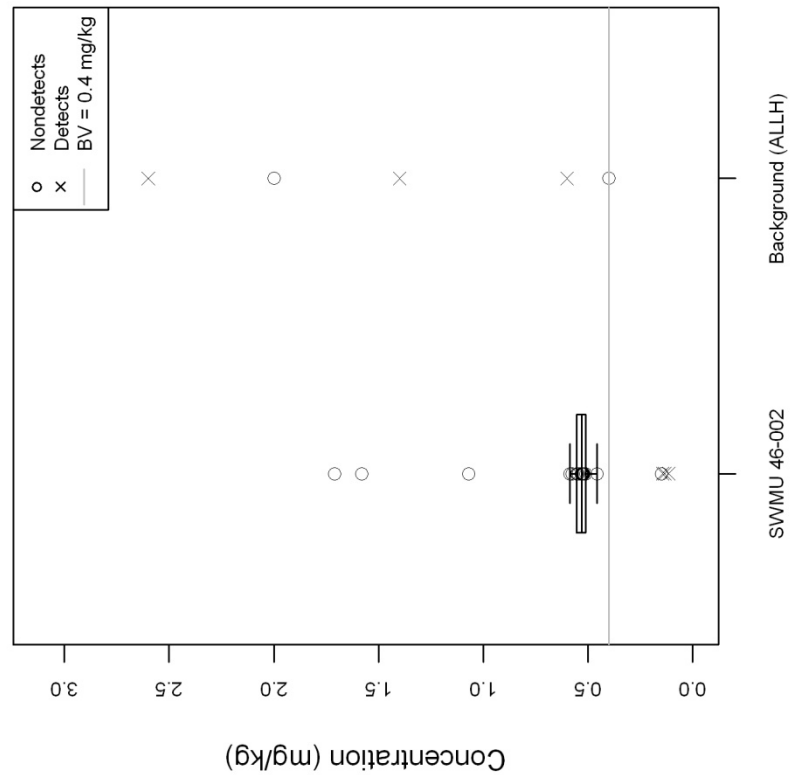
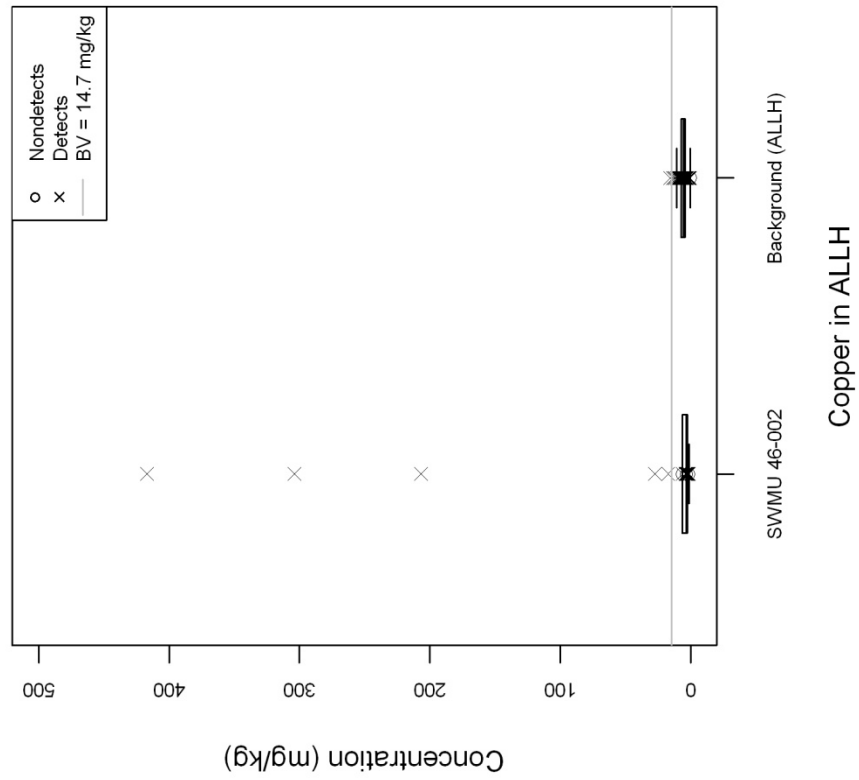


Figure H-6 Box plots for cadmium and chromium in soil at SWMU 46-002



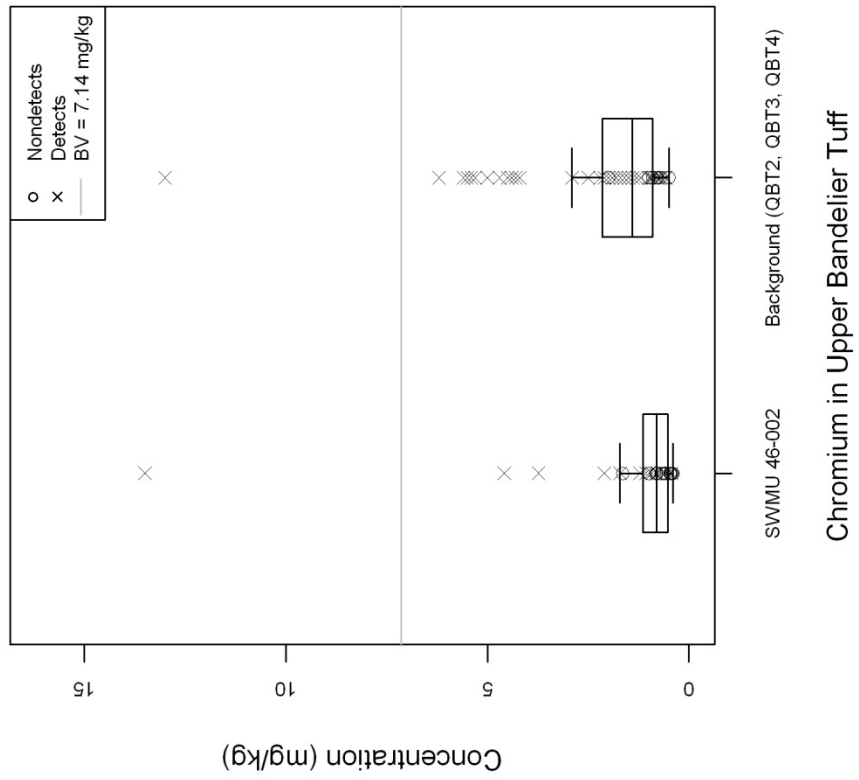
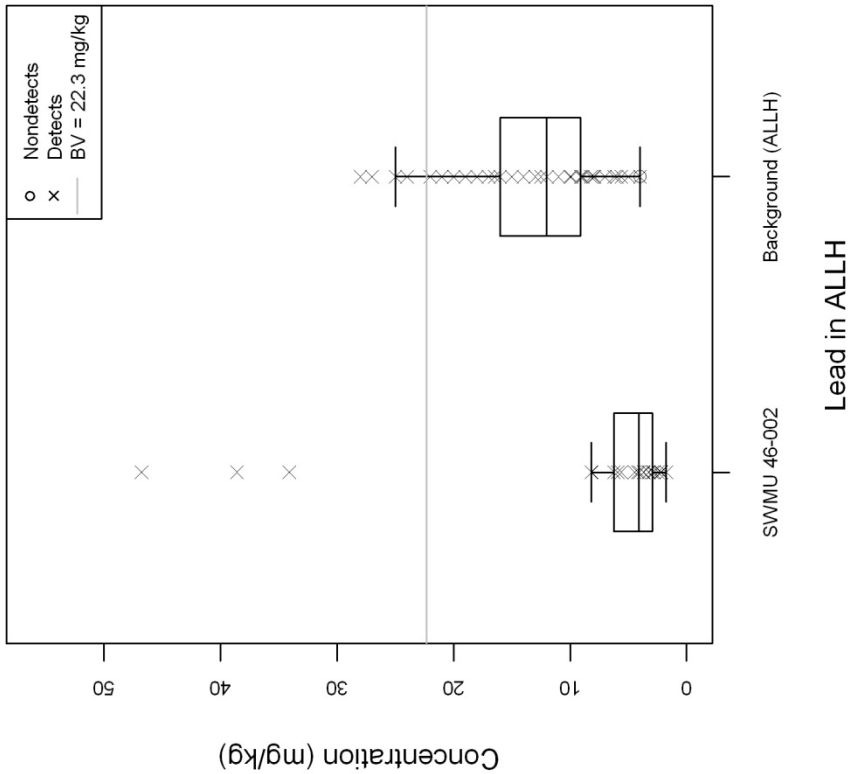


Figure H-7 Box plots for chromium in tuff and copper in soil at SWMU 46-002



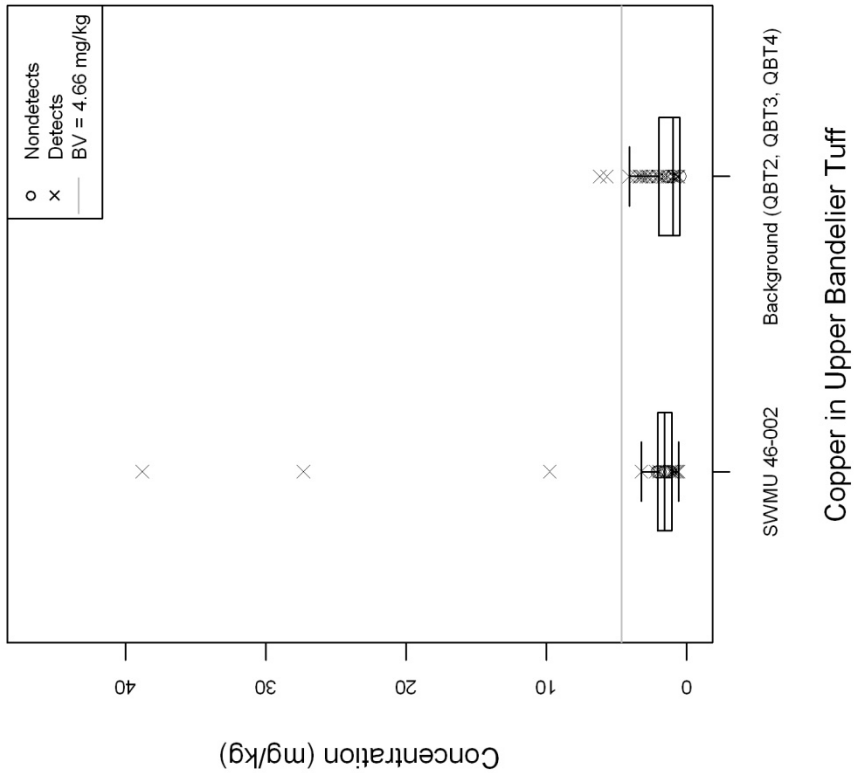
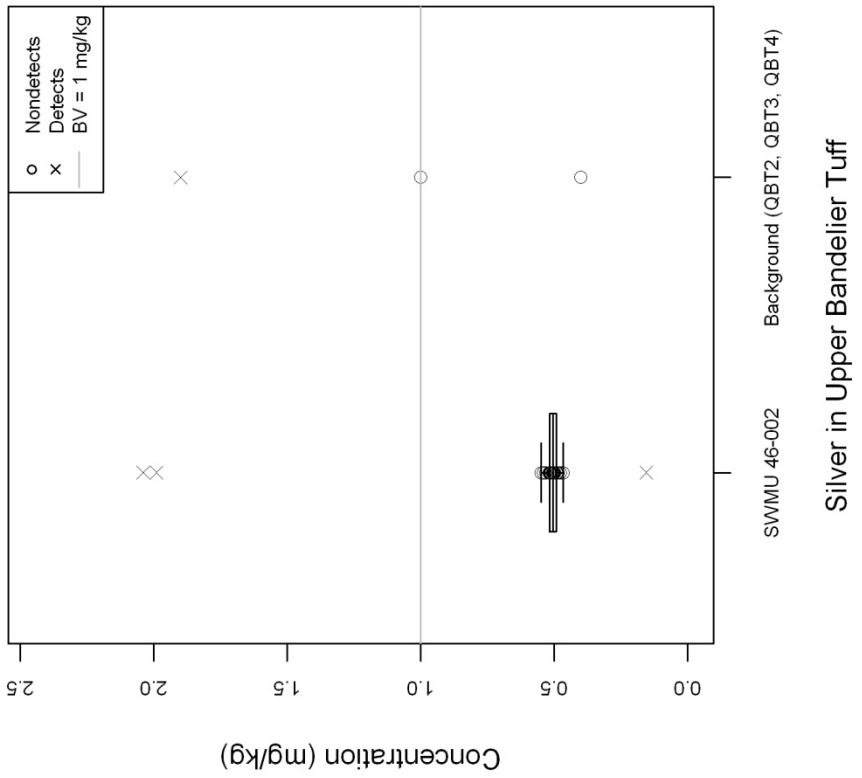


Figure H-8 Box plots for copper in tuff and lead in soil at SWMU 46-002



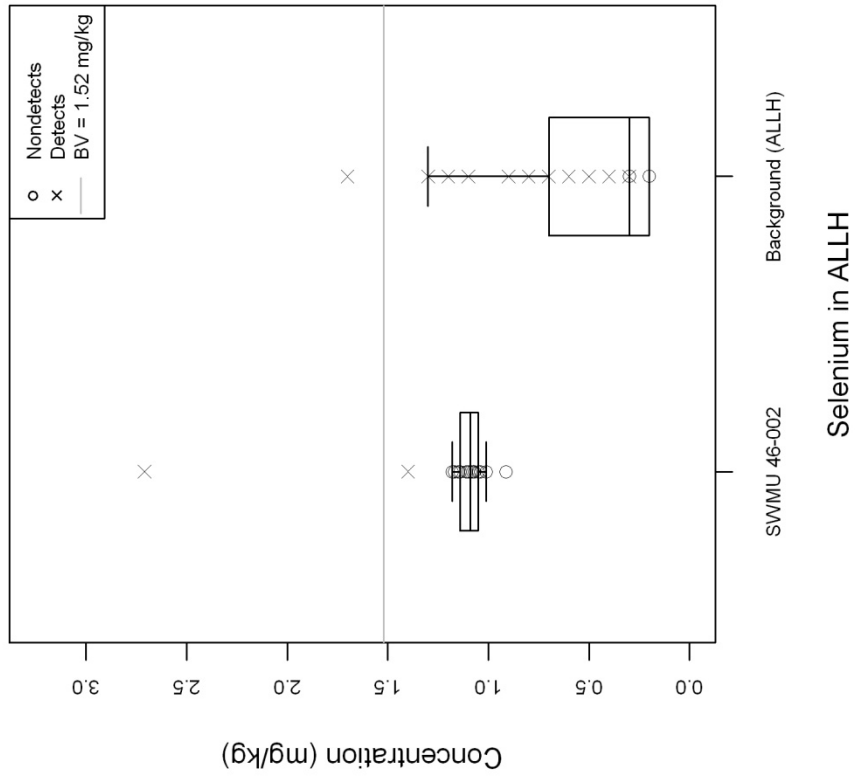


Figure H-9 Box plots for selenium in soil and silver in tuff at SWMU 46-002

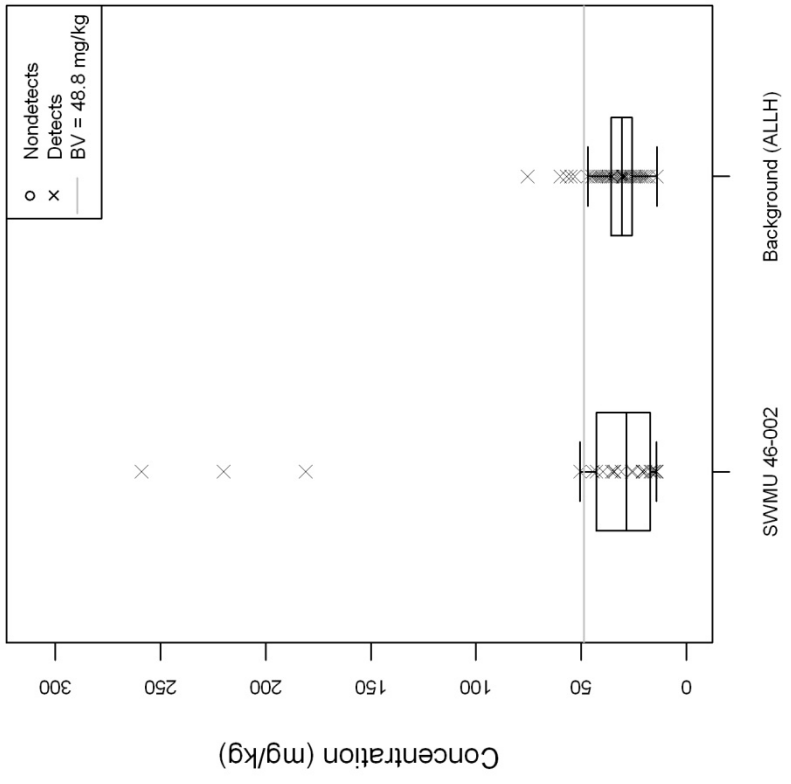


Figure H-10 Box plot for zinc in soil at SWMU 46-002

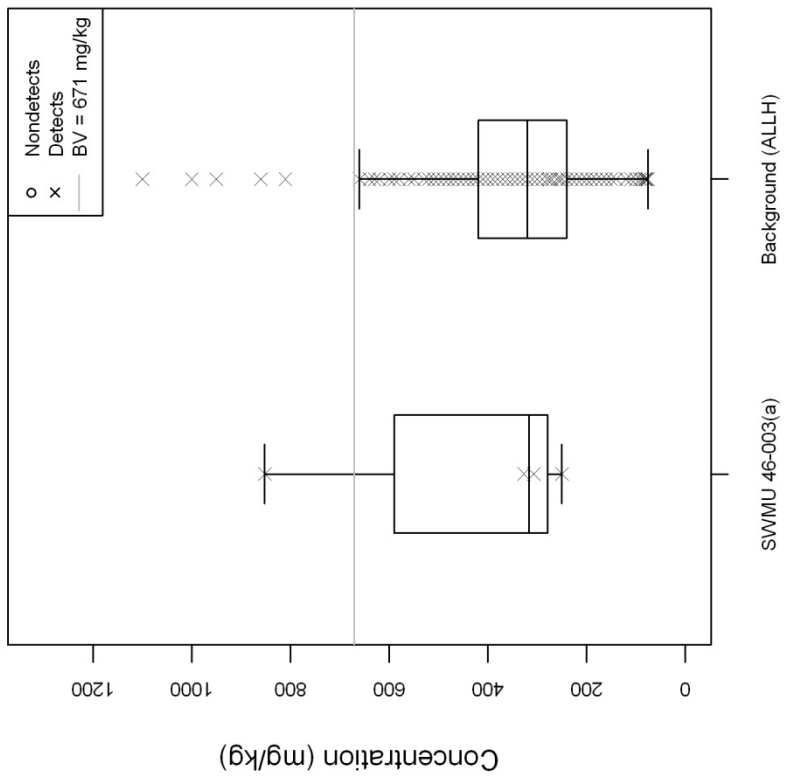


Figure H-11 Box plot for manganese in soil at SWMU 46-003(a)

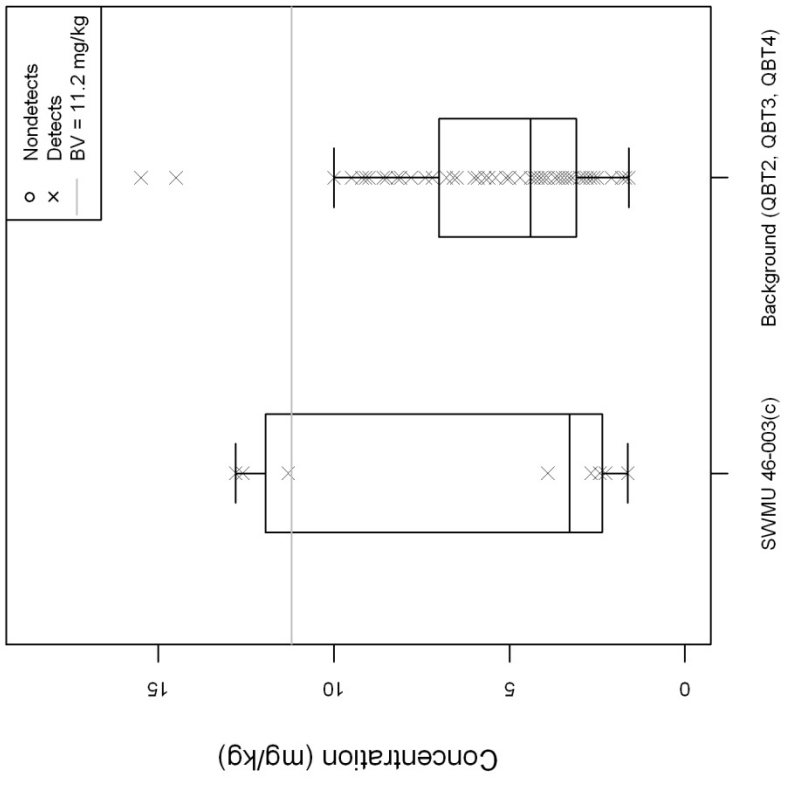


Figure H-12 Box plot for lead in tuff at SWMU 46-003(c)

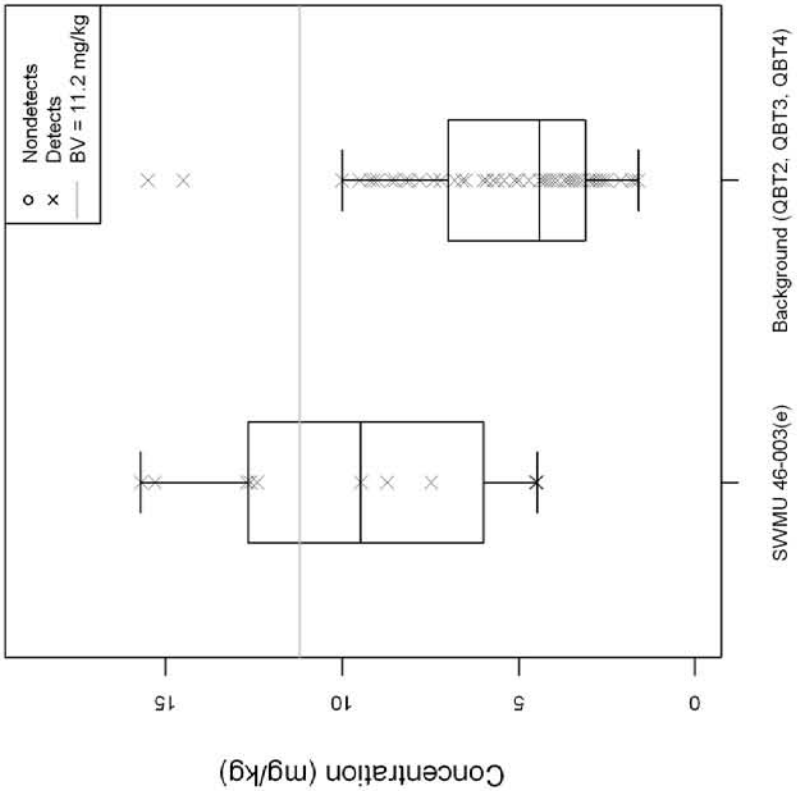
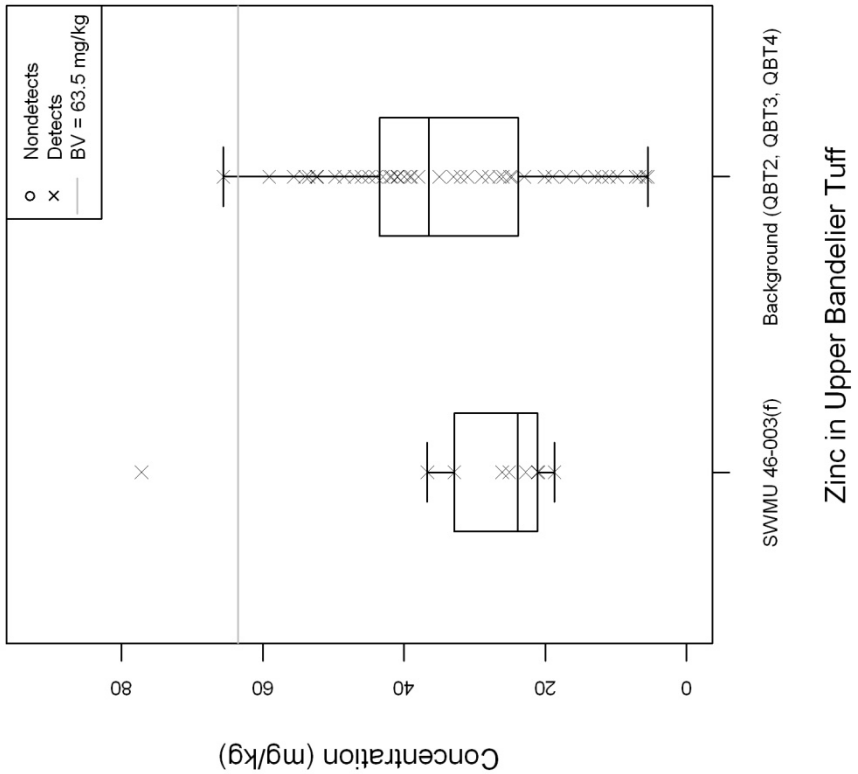


Figure H-13 Box plot for lead in tuff at SWMU 46-003(e)



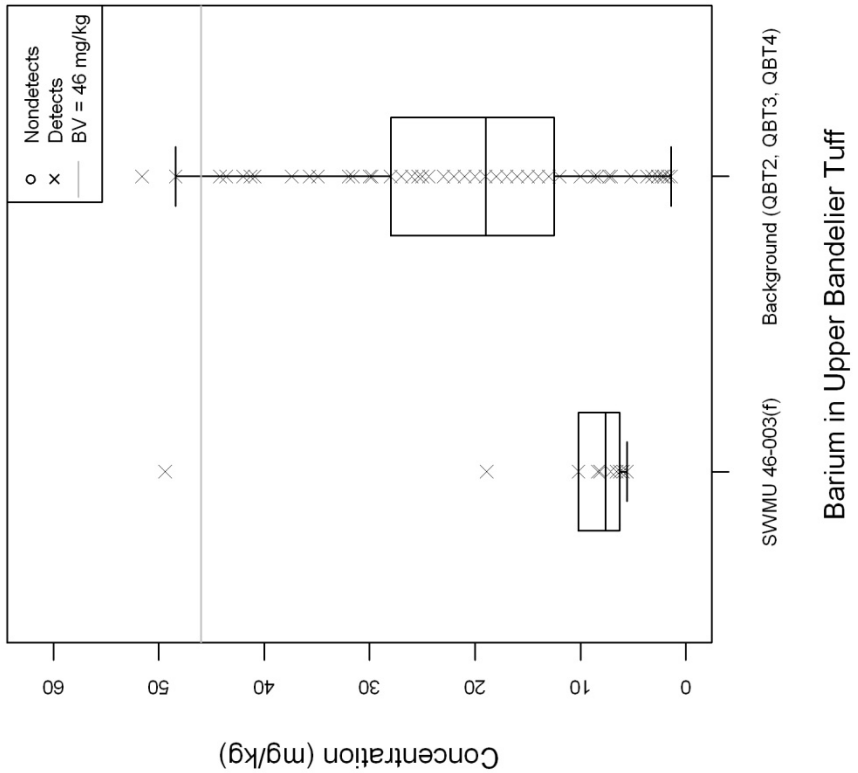


Figure H-14 Box plots for barium and zinc in tuff at SWMU 46-003(f)

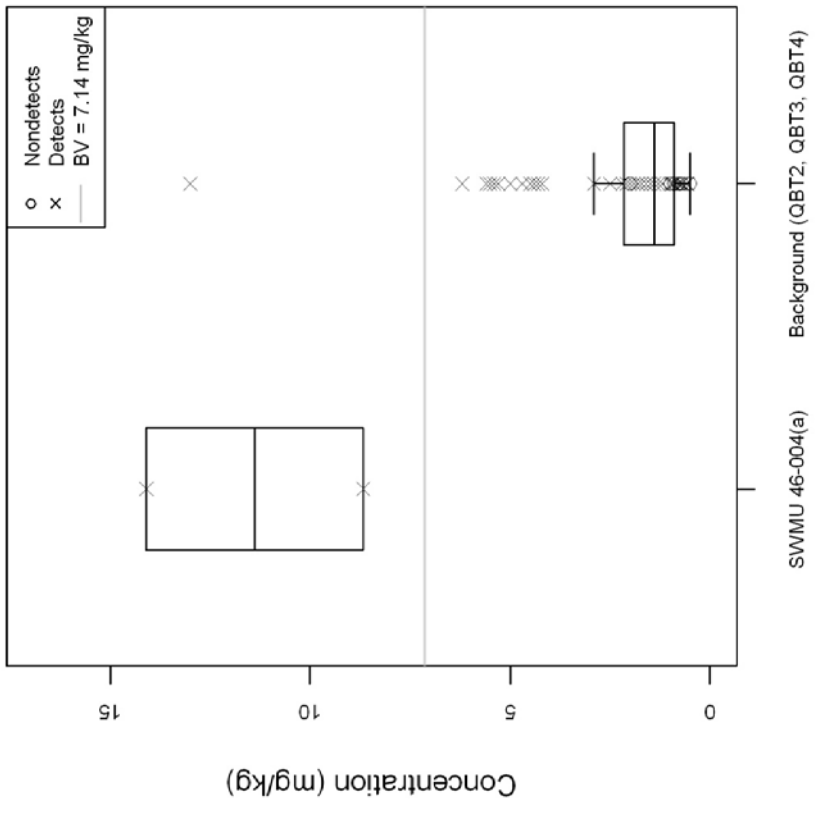


Figure H-15 Box plot for chromium in tuff at SWMU 46-004(a)

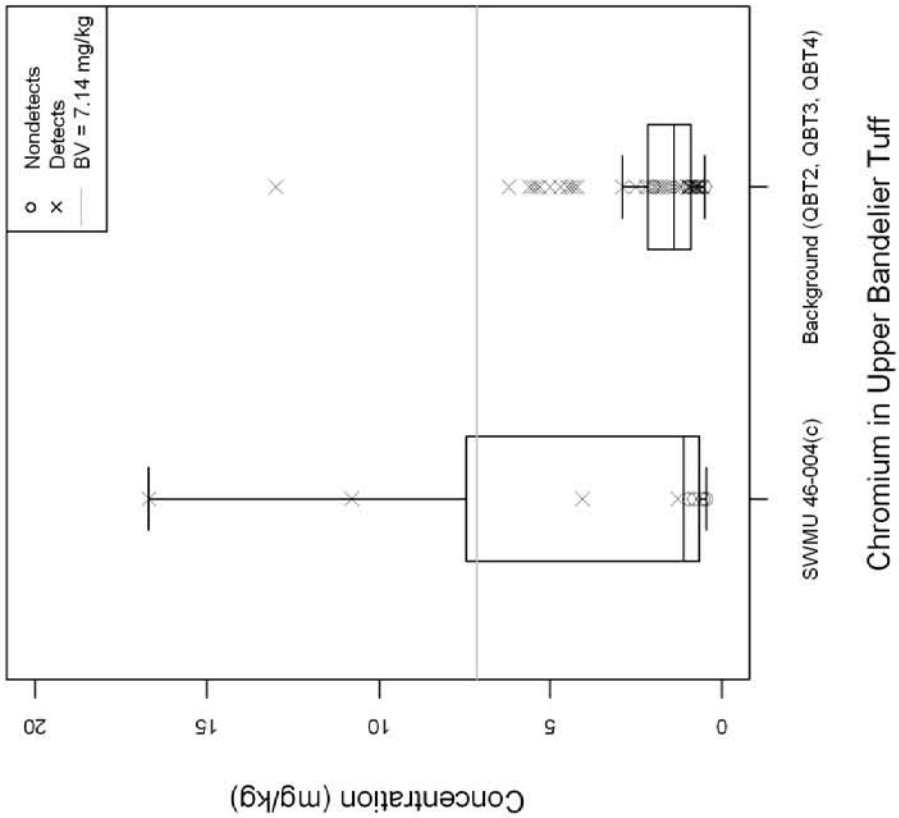


Figure H-16 Box plot for chromium in tuff at SWMU 46-004(c)

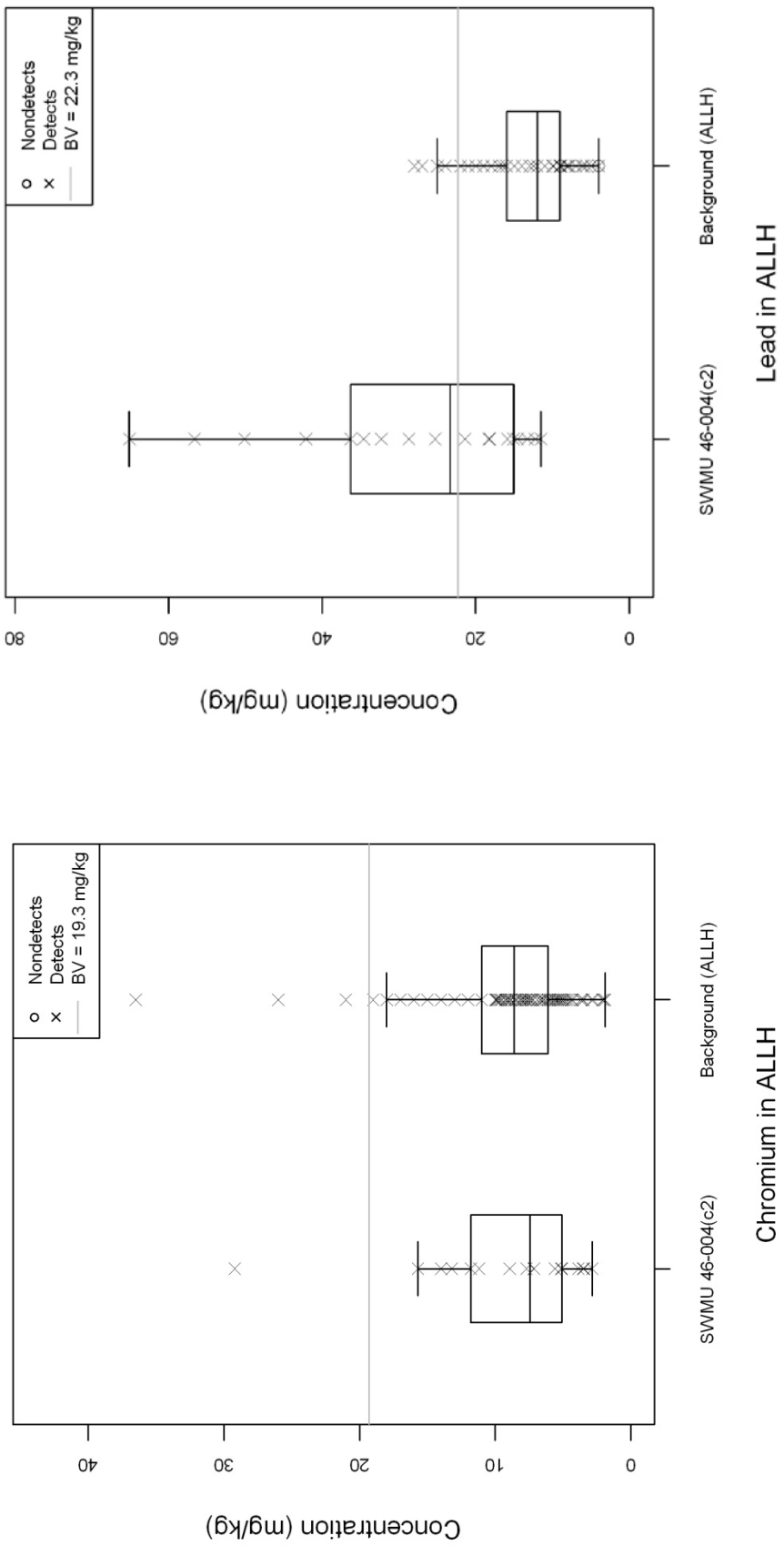


Figure H-17 Box plots for chromium and lead in soil at SWMU 46-004(c2)

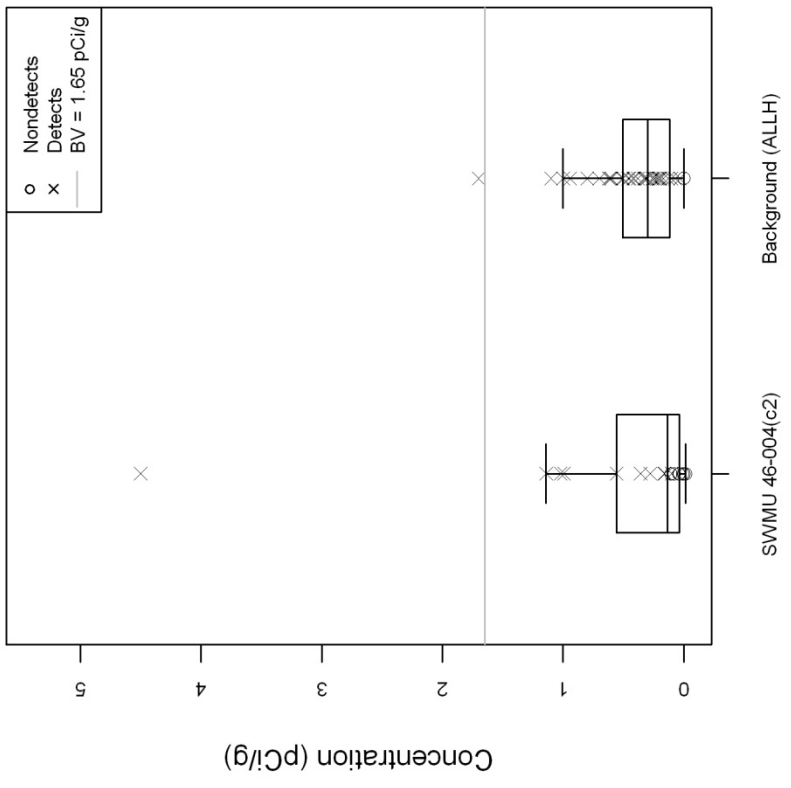


Figure H-18 Box plot for cesium-137 in soil at SWMU 46-004(c2)

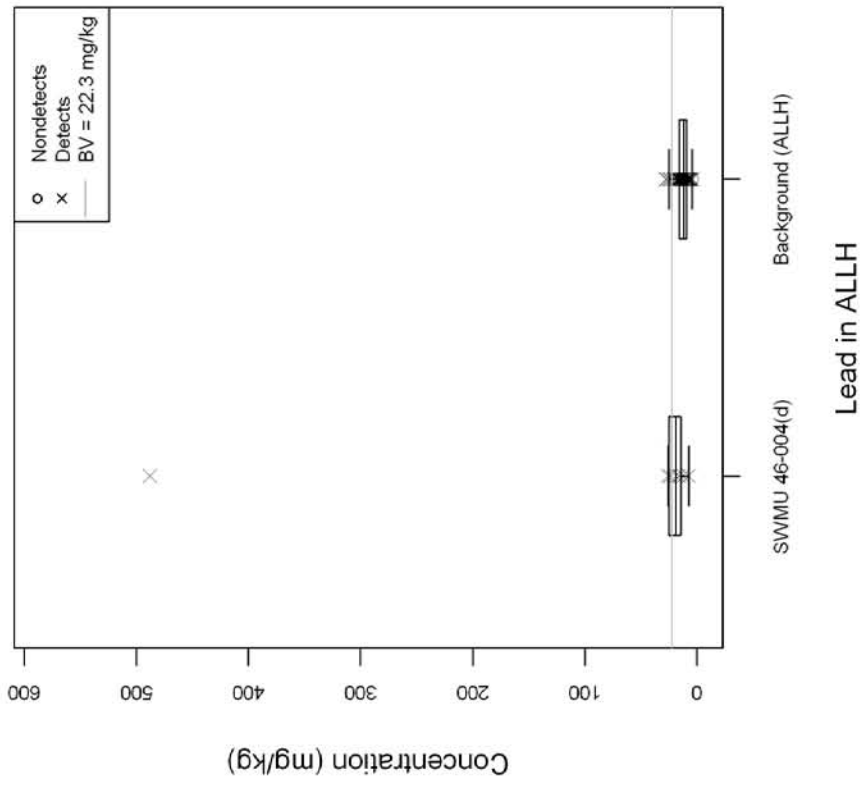


Figure H-19 Box plot for lead in soil at SWMU 46-004(d)

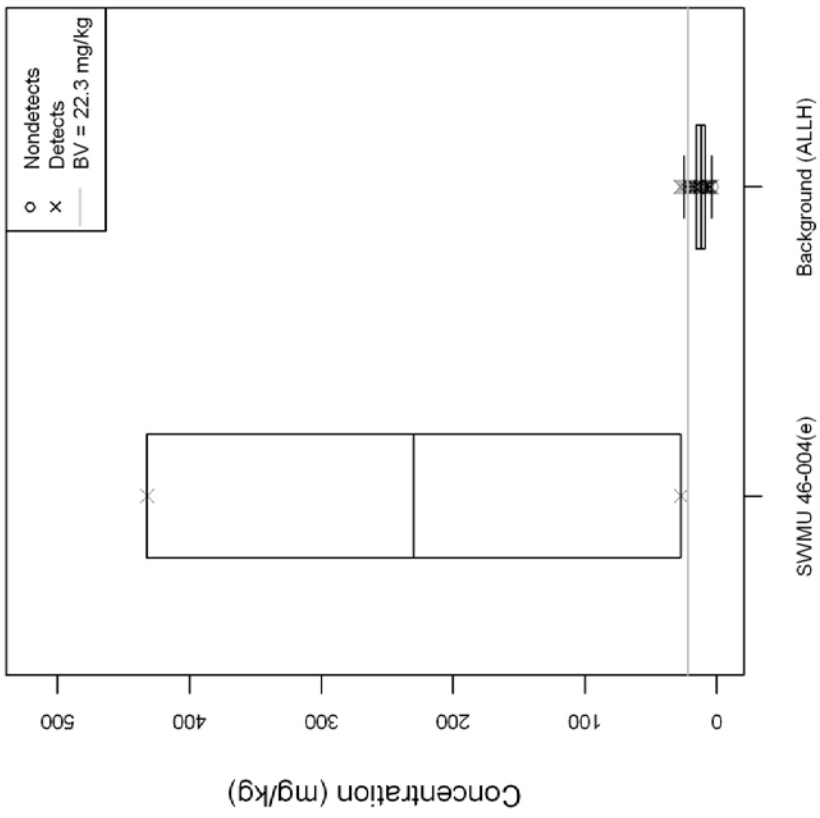
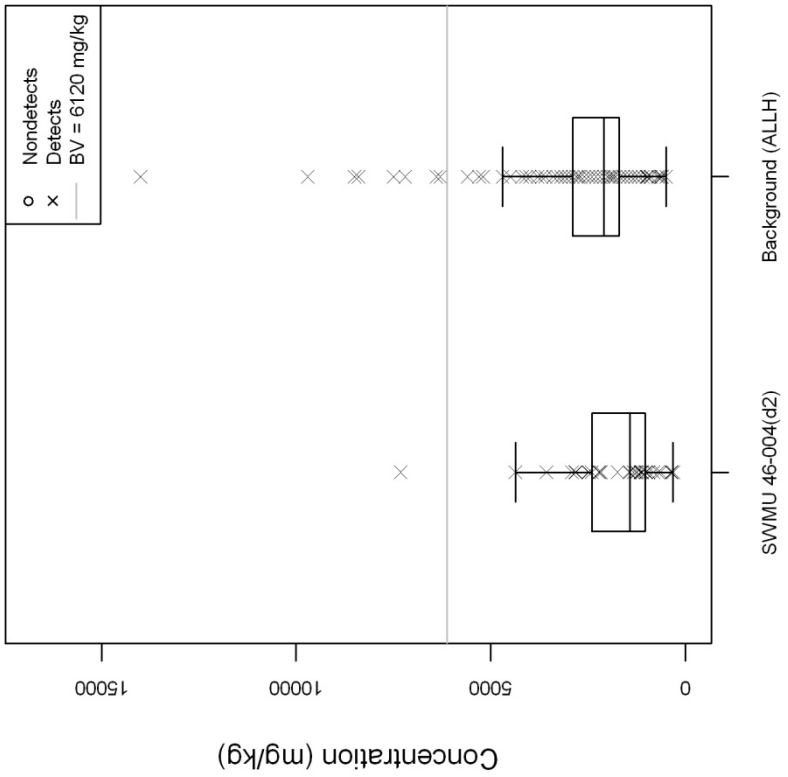


Figure H-20 Box plot for lead in soil at SWMU 46-004(e)



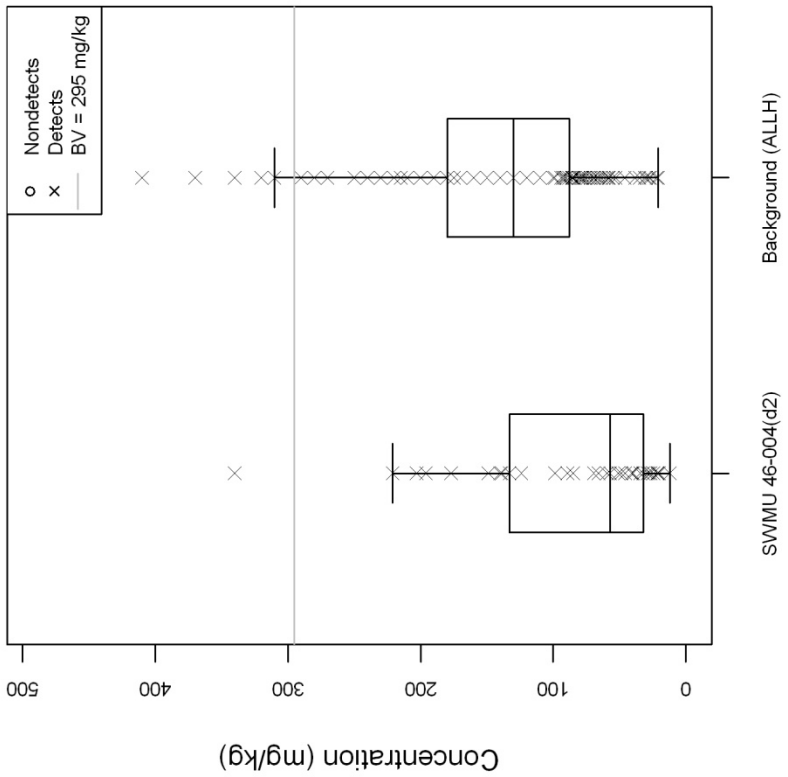


Figure H-21 Box plots for barium and calcium in soil at Consolidated Unit 46-004(d2)-99

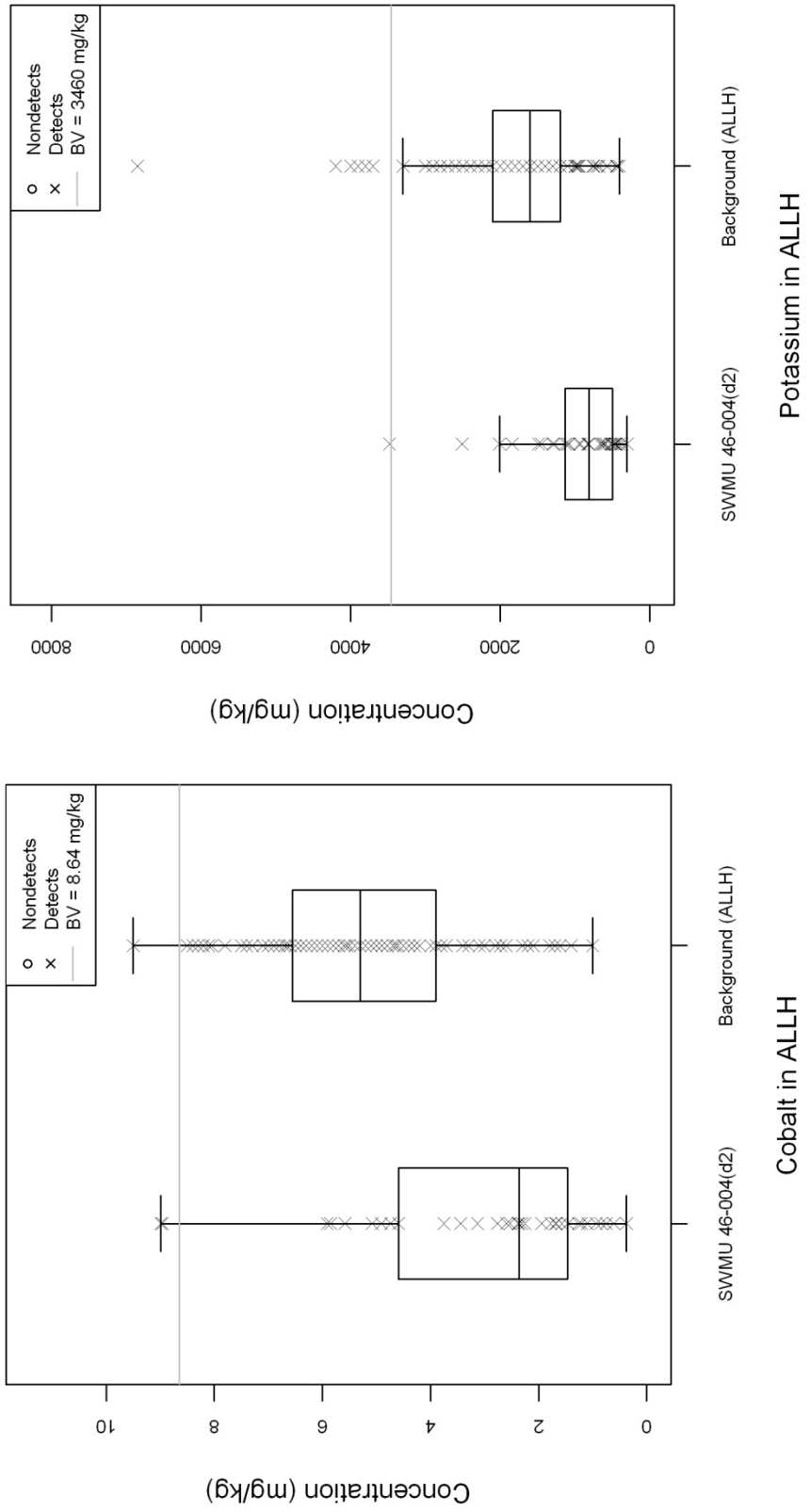


Figure H-22 Box plots for cobalt and potassium in soil at Consolidated Unit 46-004(d2)-99

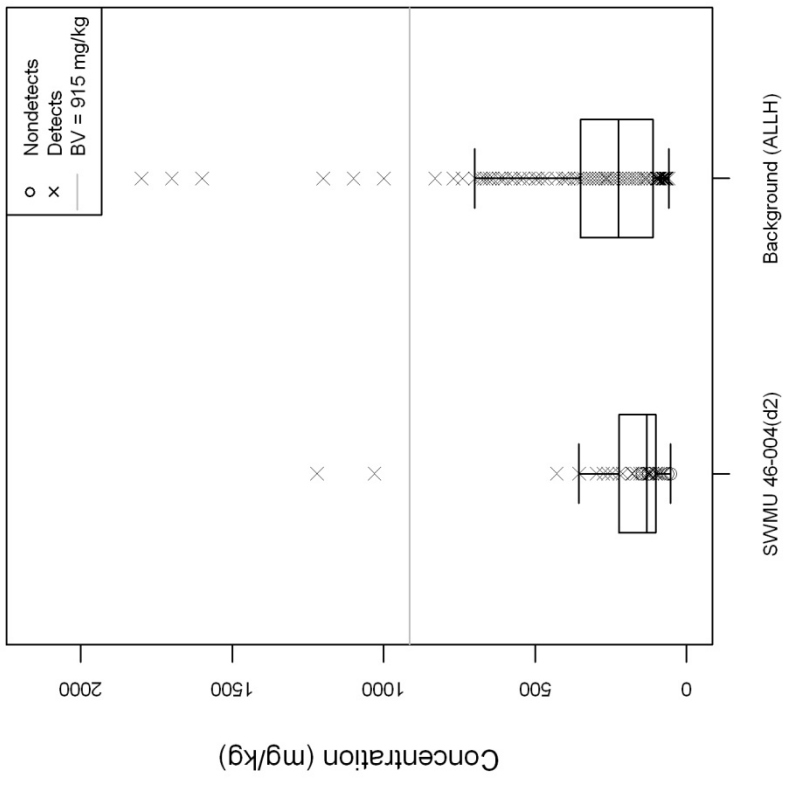


Figure H-23 Box plot for sodium in soil at Consolidated Unit 46-004(d2)-99

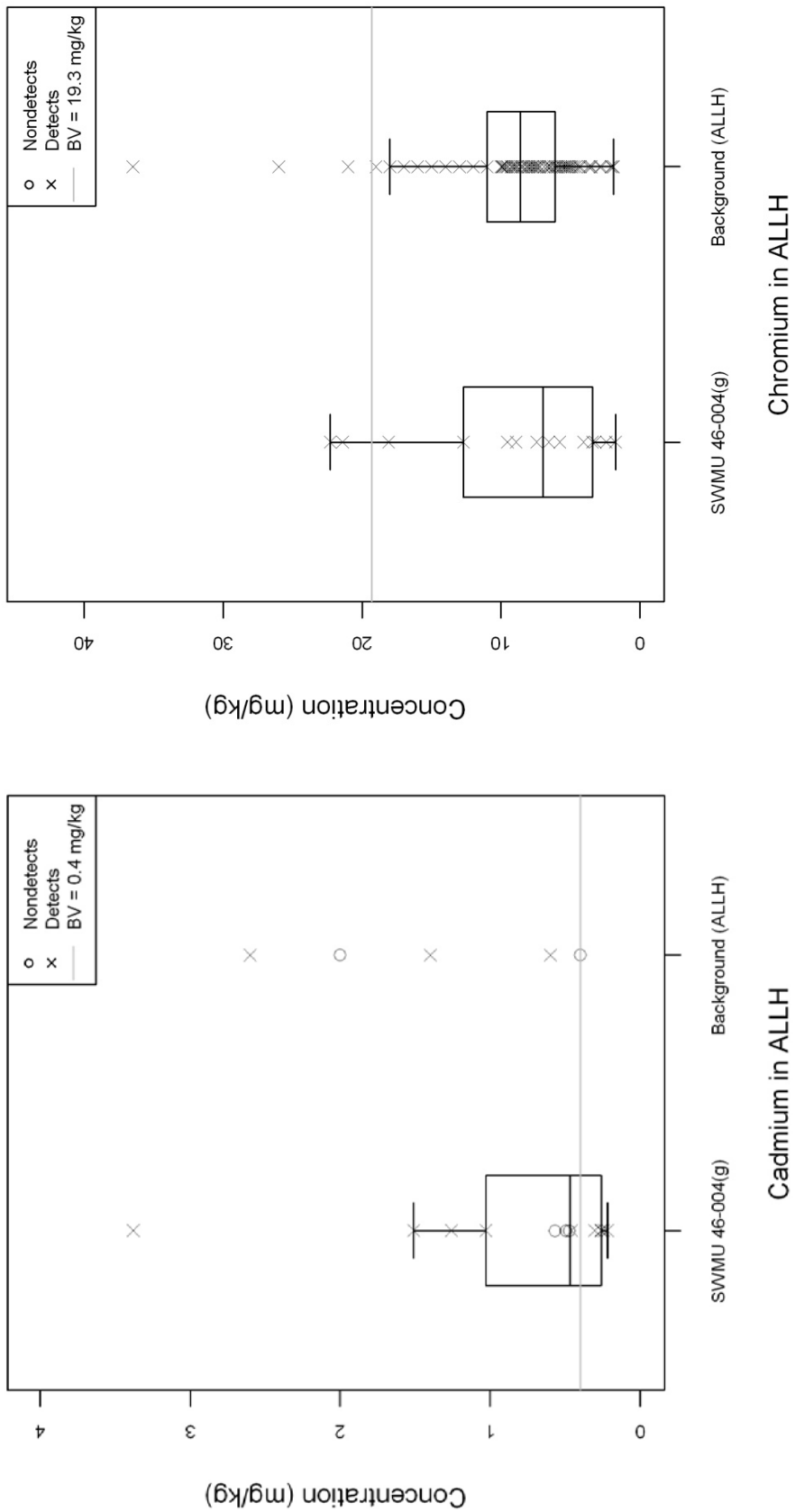


Figure H-24 Box plots for cadmium and chromium in soil at SWMU 46-004(g)

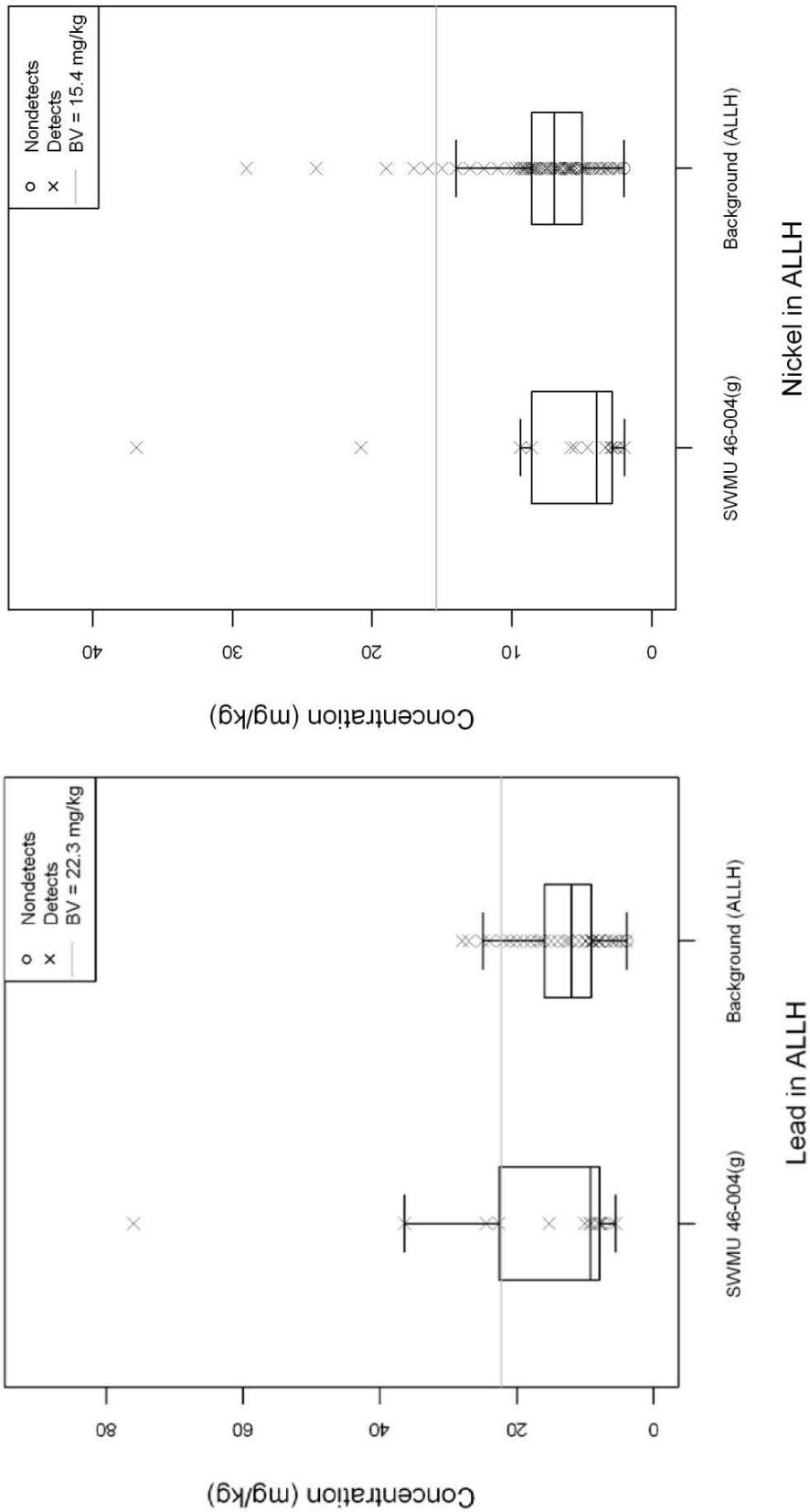


Figure H-25 Box plots for lead and nickel in soil at SWMU 46-004(g)

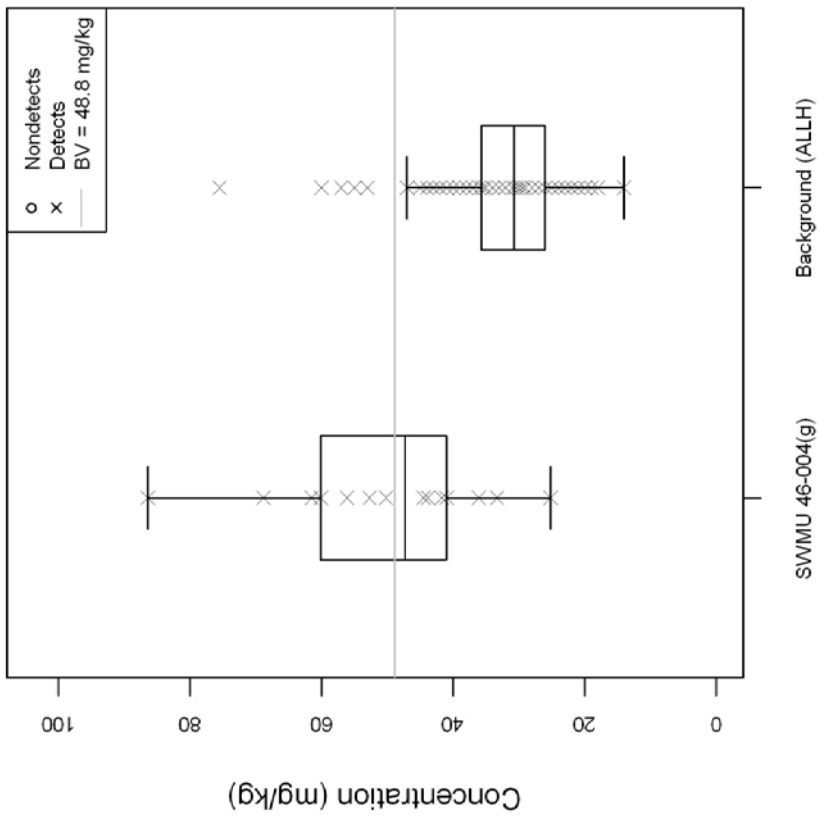


Figure H-26 Box plot for zinc in soil at SWMU 46-004(g)

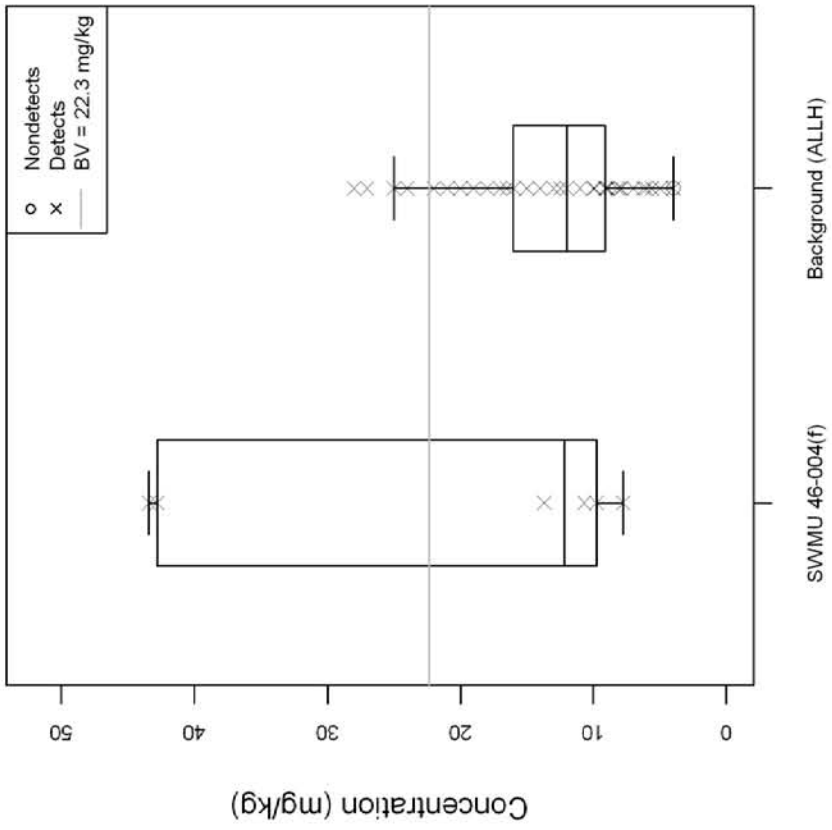
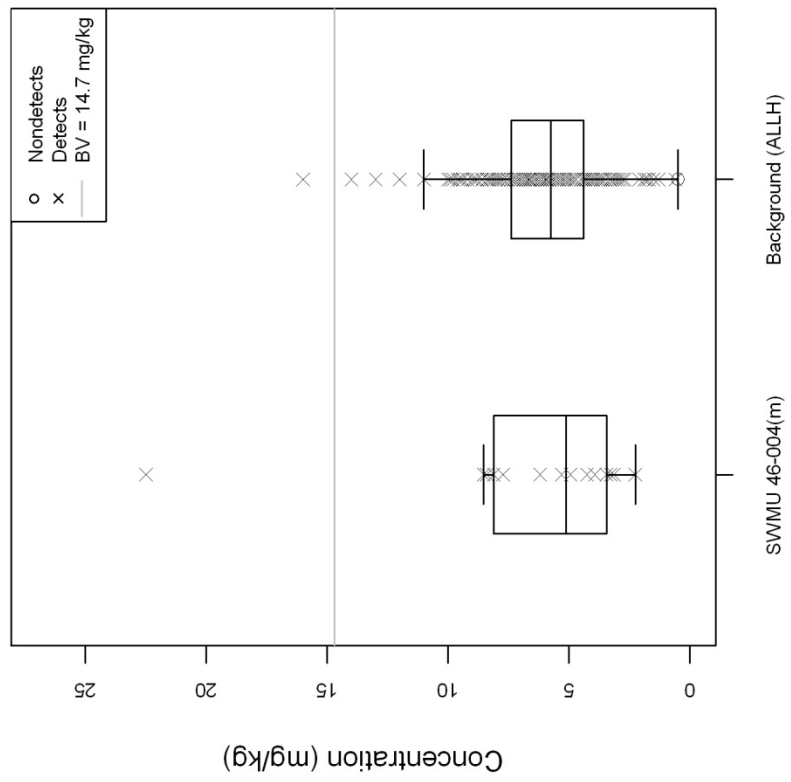


Figure H-27 Box plot for lead in soil at SWMU 46-004(f)



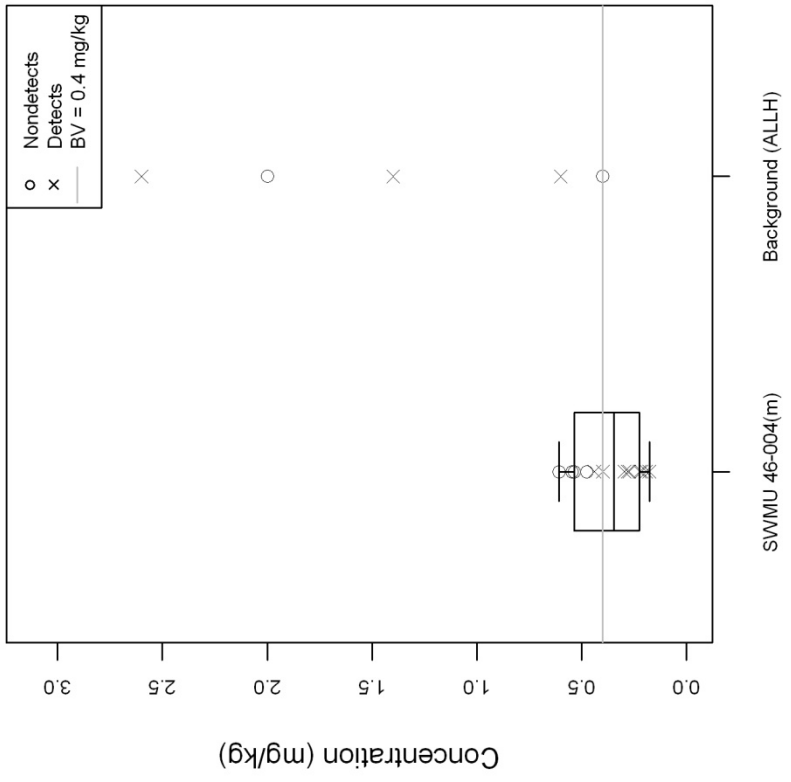
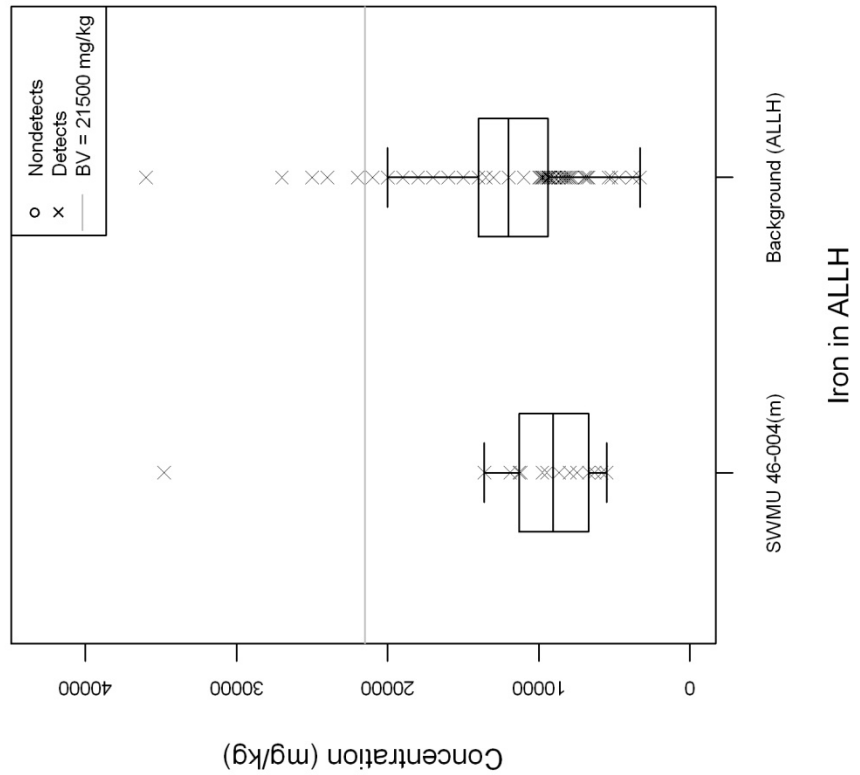


Figure H-28 Box plots for cadmium and copper in soil at SWMU 46-004(m)



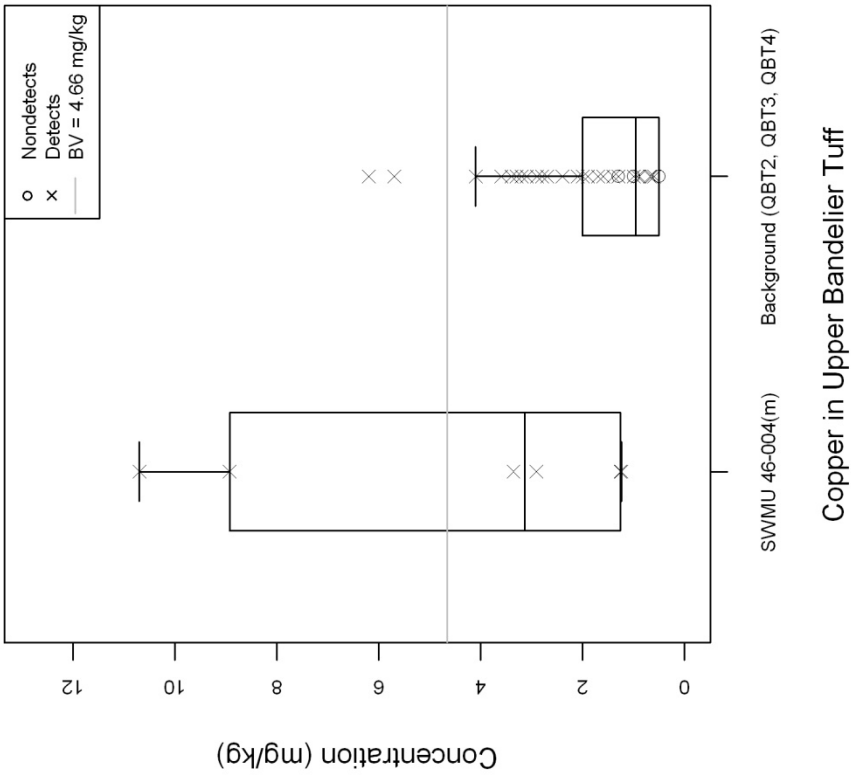
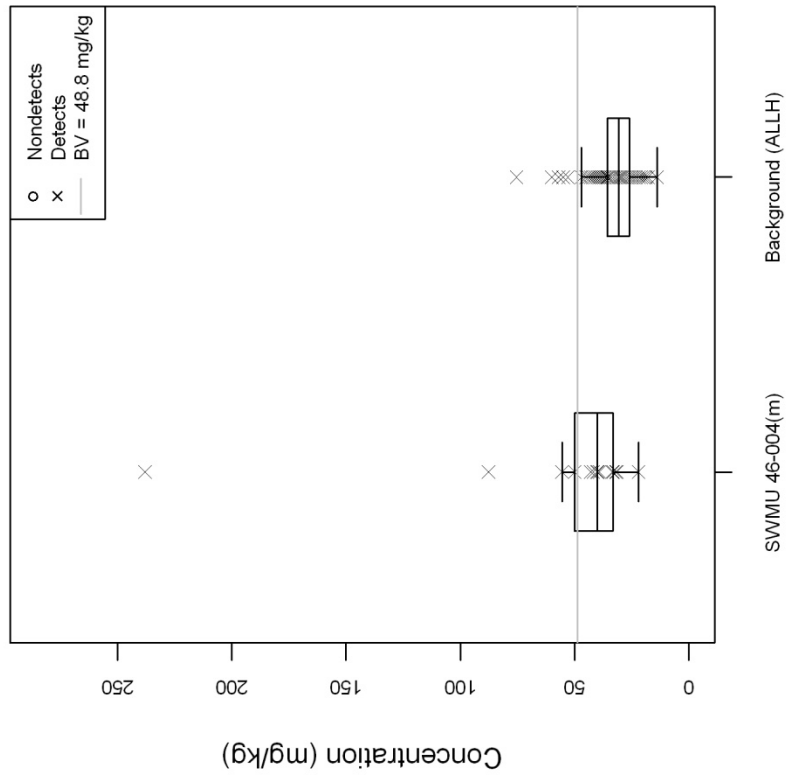


Figure H-29 Box plots for copper in tuff and iron in soil at SWMU 46-004(m)



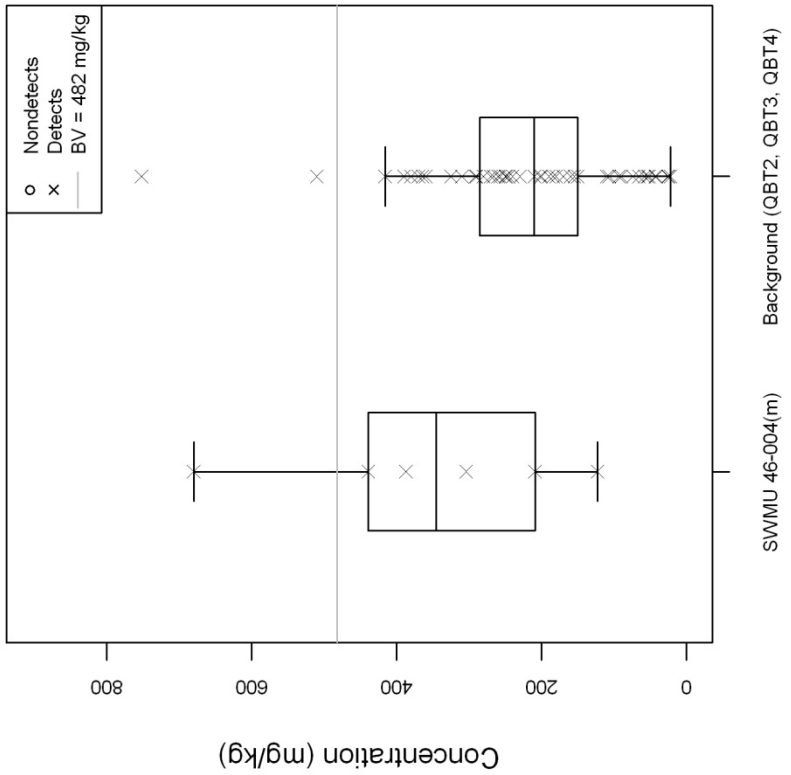


Figure H-30 Box plots for manganese in tuff and zinc in soil at SWMU 46-004(m)

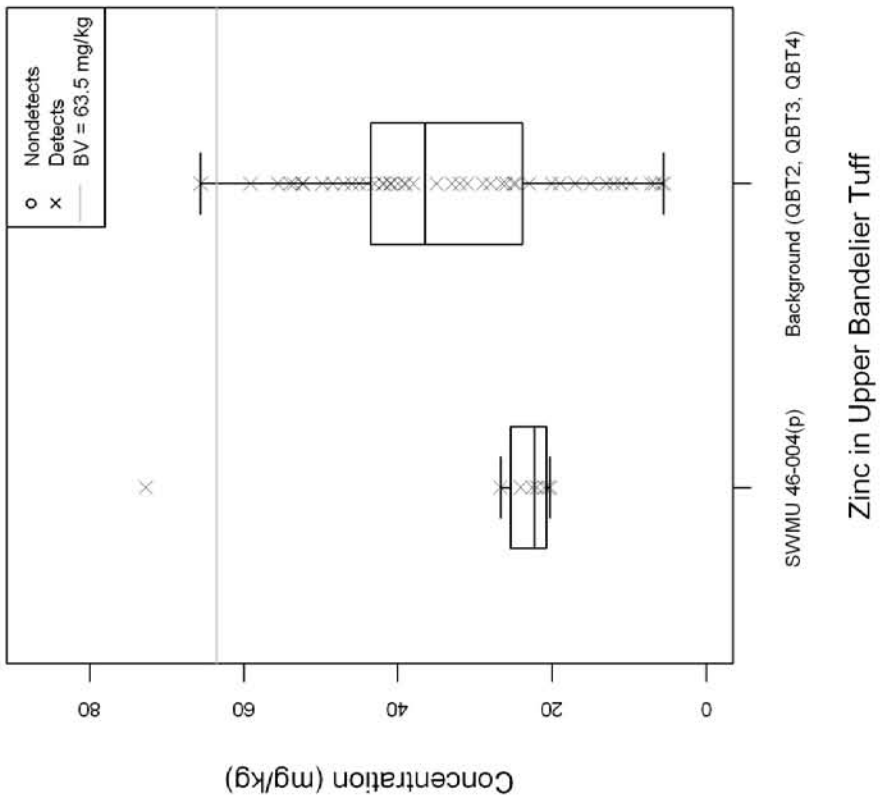
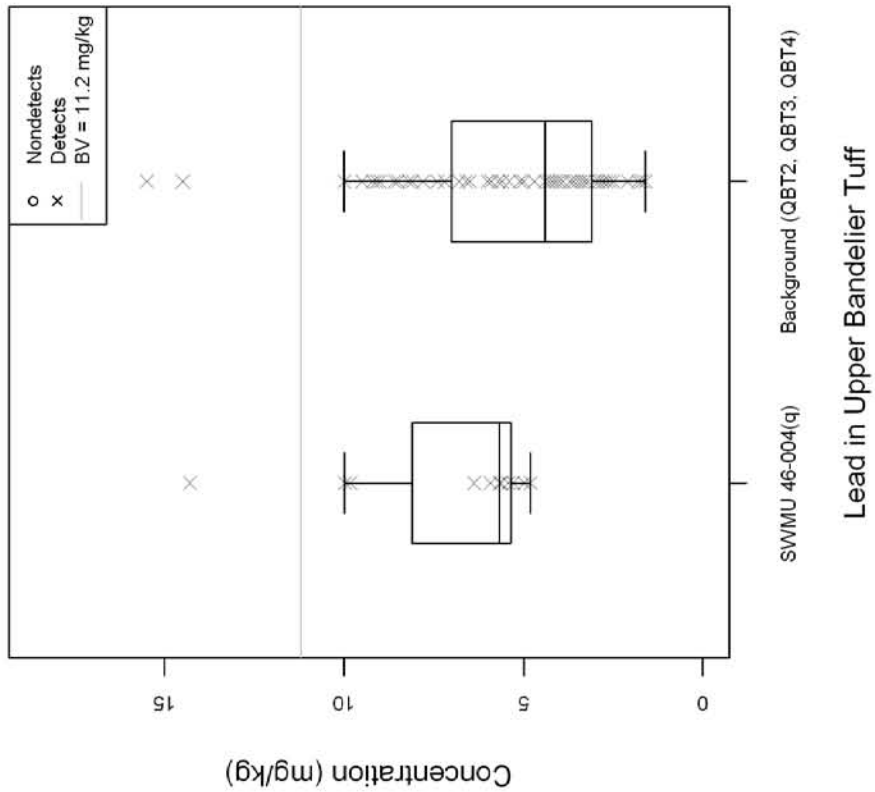


Figure H-31 Box plot for zinc in tuff at SWMU 46-004(p)



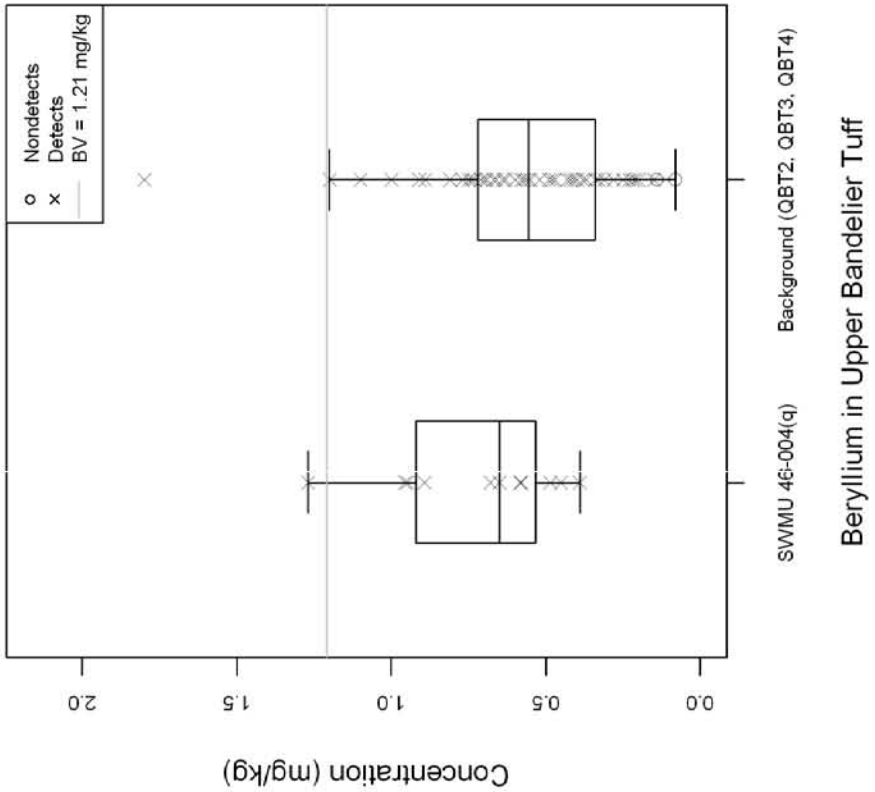


Figure H-32 Box plots for beryllium and lead in tuff at SWMU 46-004(q)

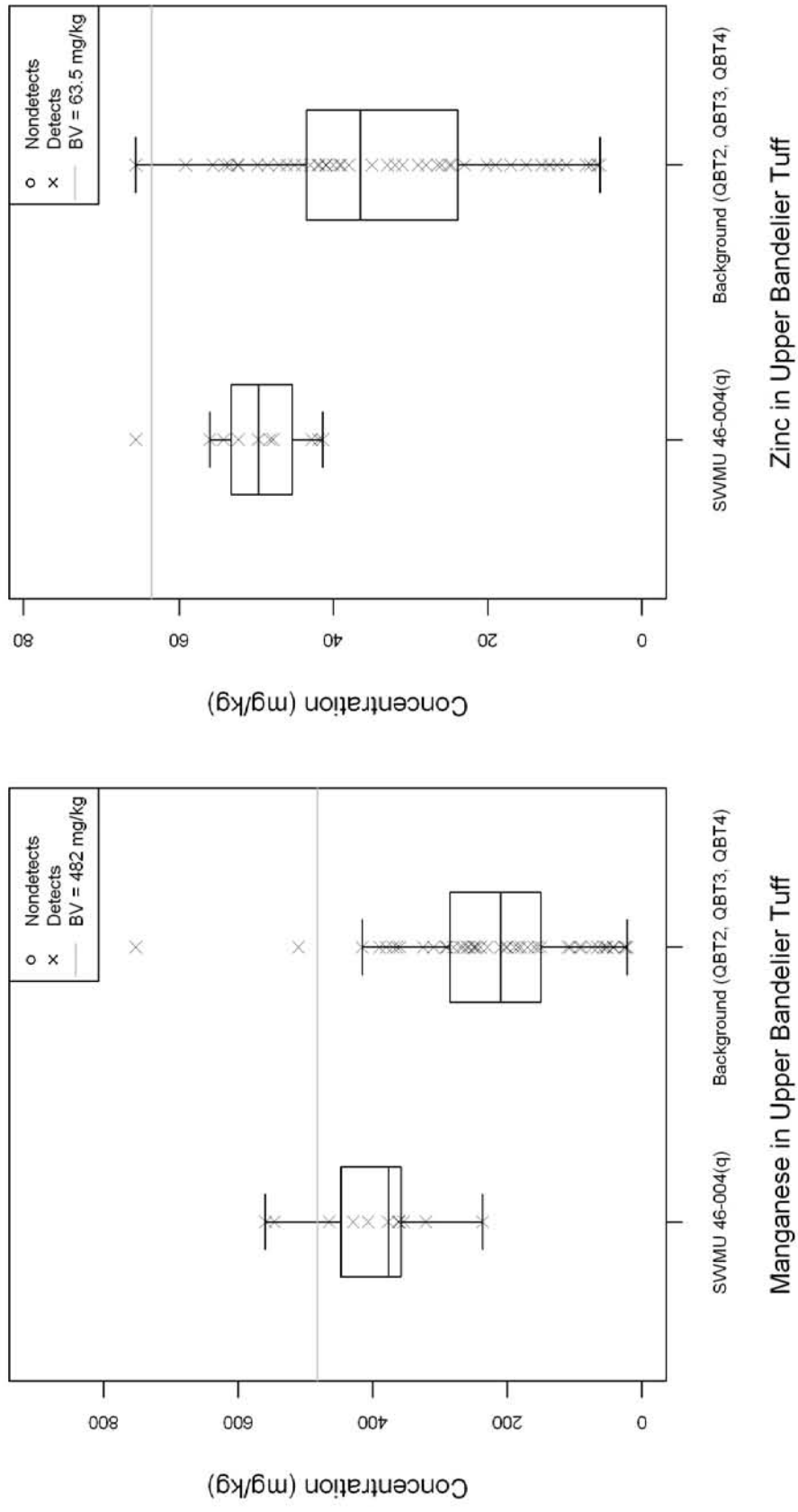


Figure H-33 Box plots for manganese and zinc in tuff at SWMU 46-004(q)

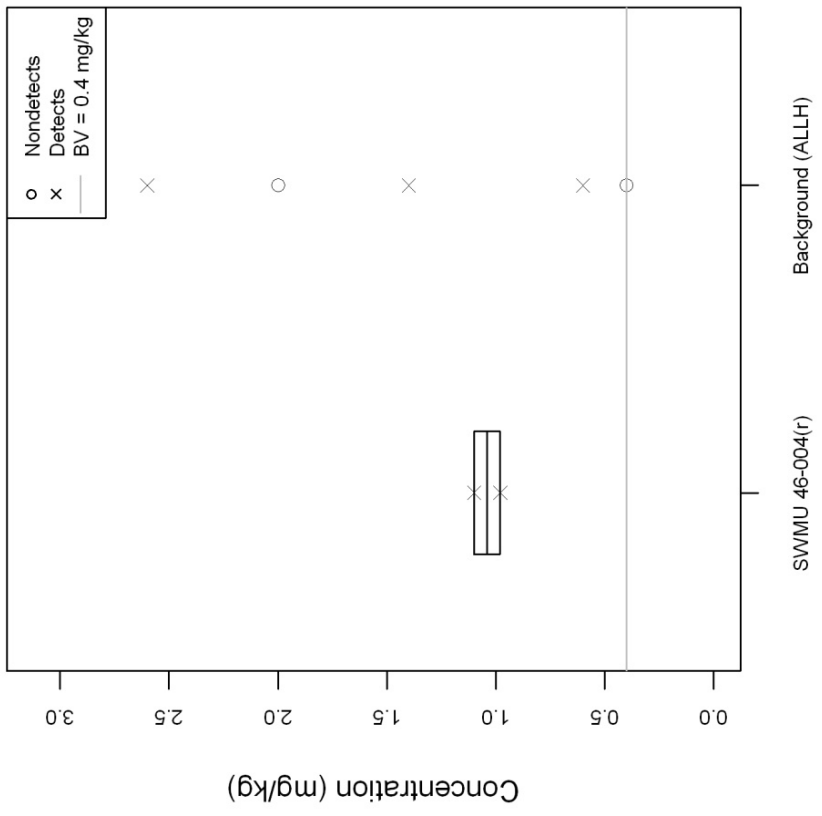


Figure H-34 Box plot for cadmium in soil at SWMU 46-004(r)

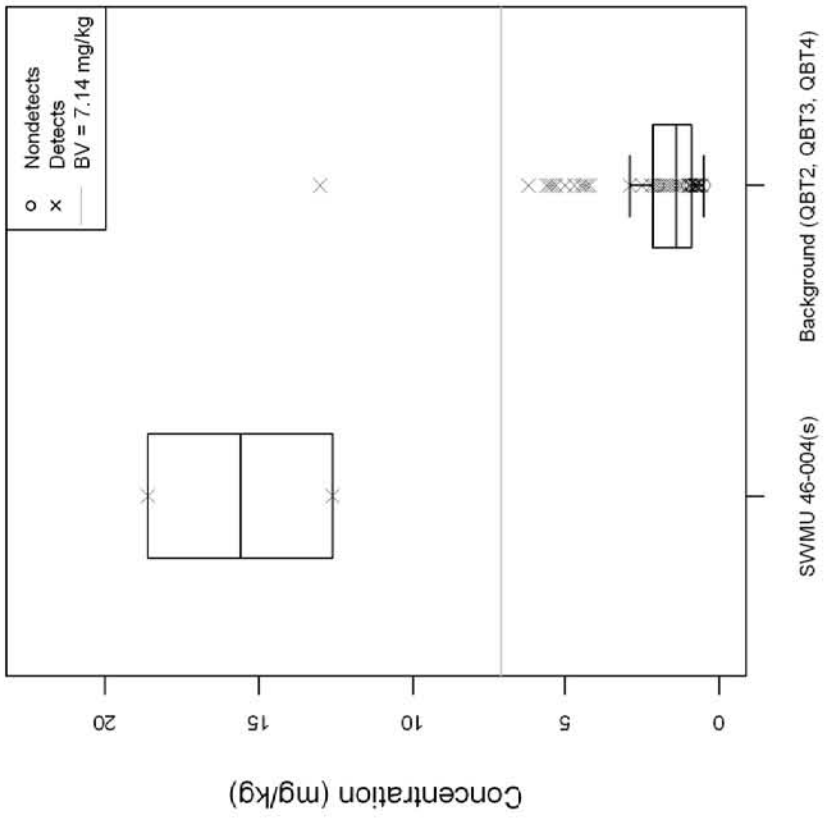


Figure H-35 Box plot for chromium in tuff at SWMU 46-004(s)

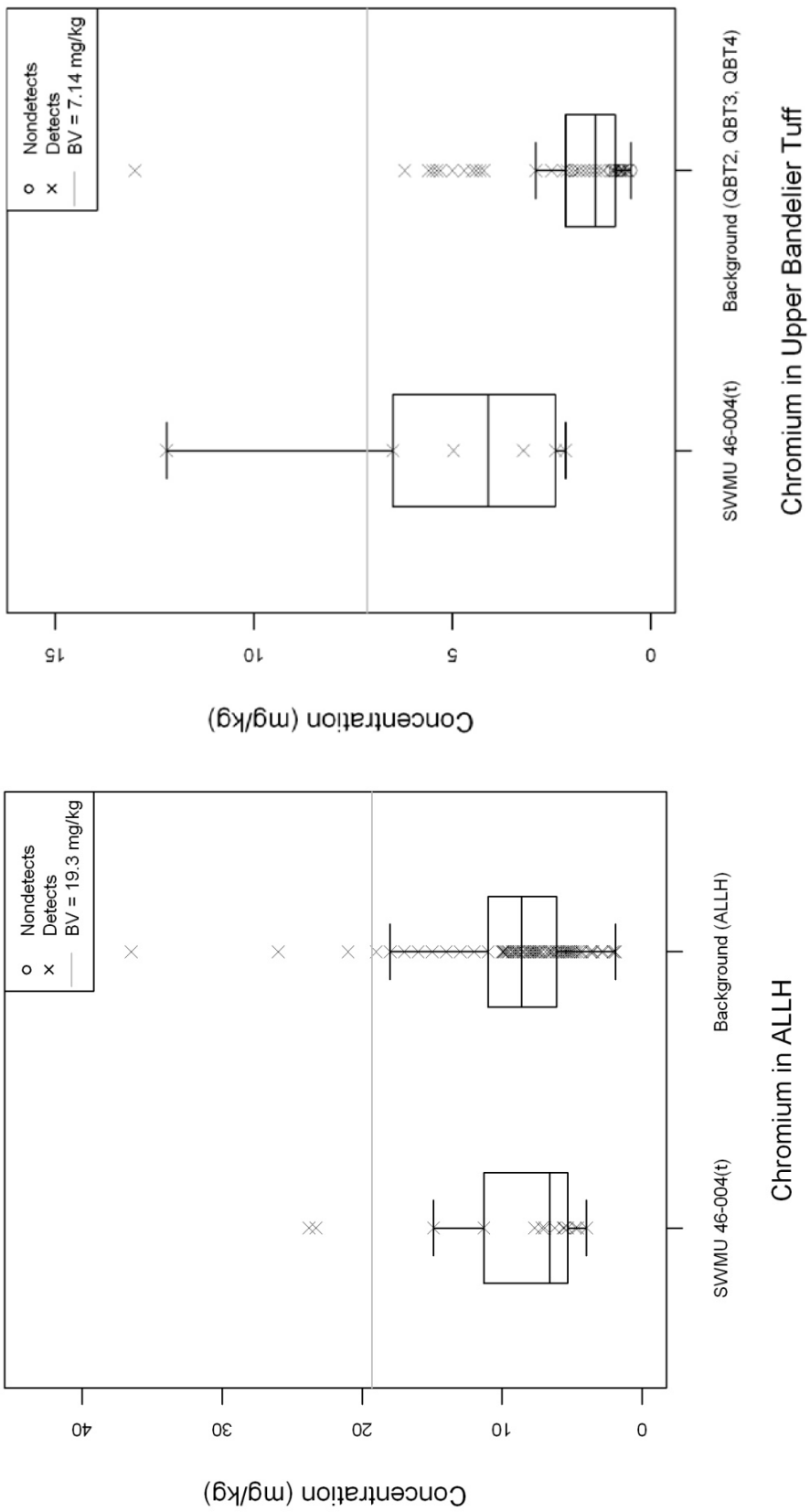
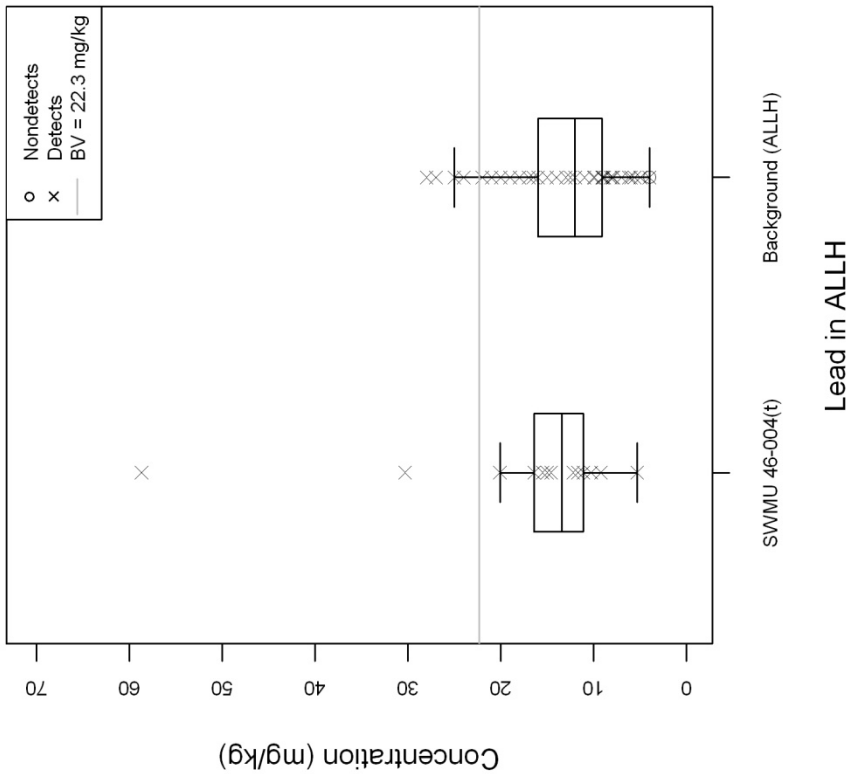


Figure H-36 Box plots for chromium in soil and tuff at SWMU 46-004(t)



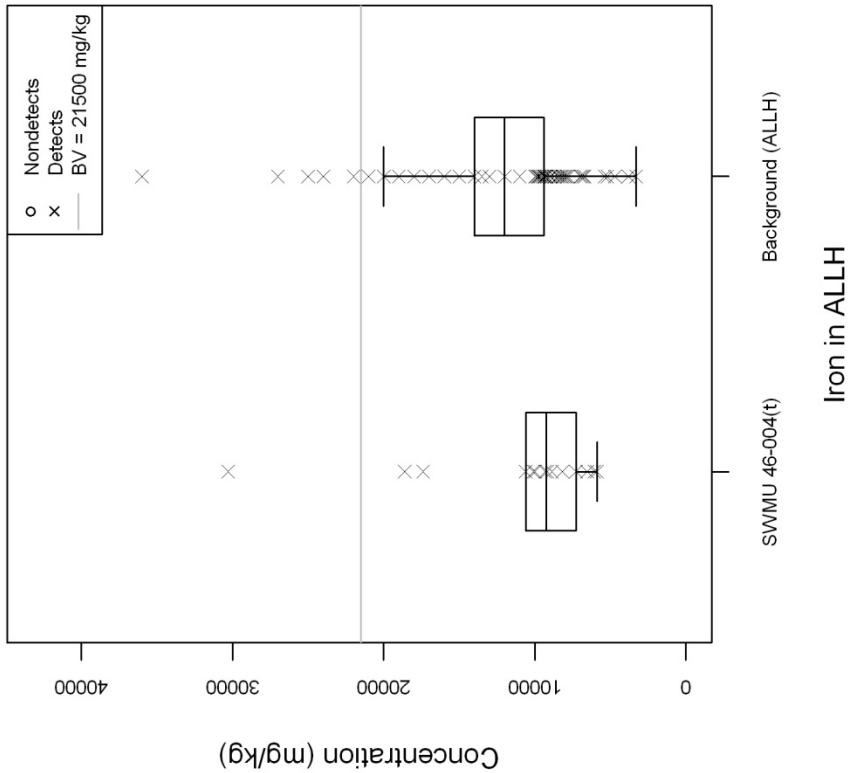
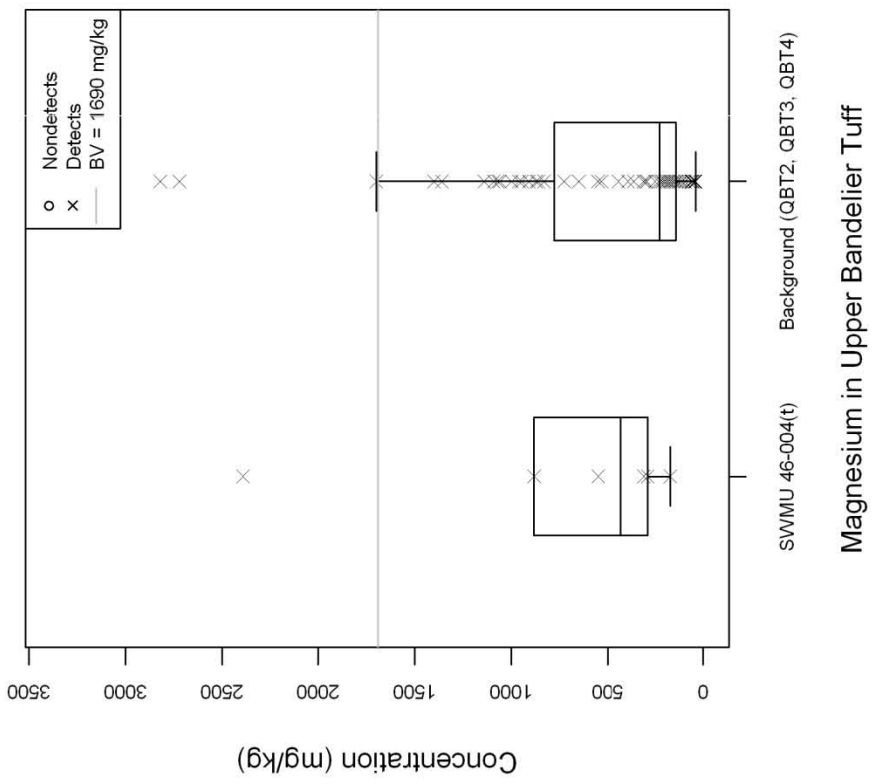


Figure H-37 Box plots for iron and lead in soil at SWMU 46-004(t)



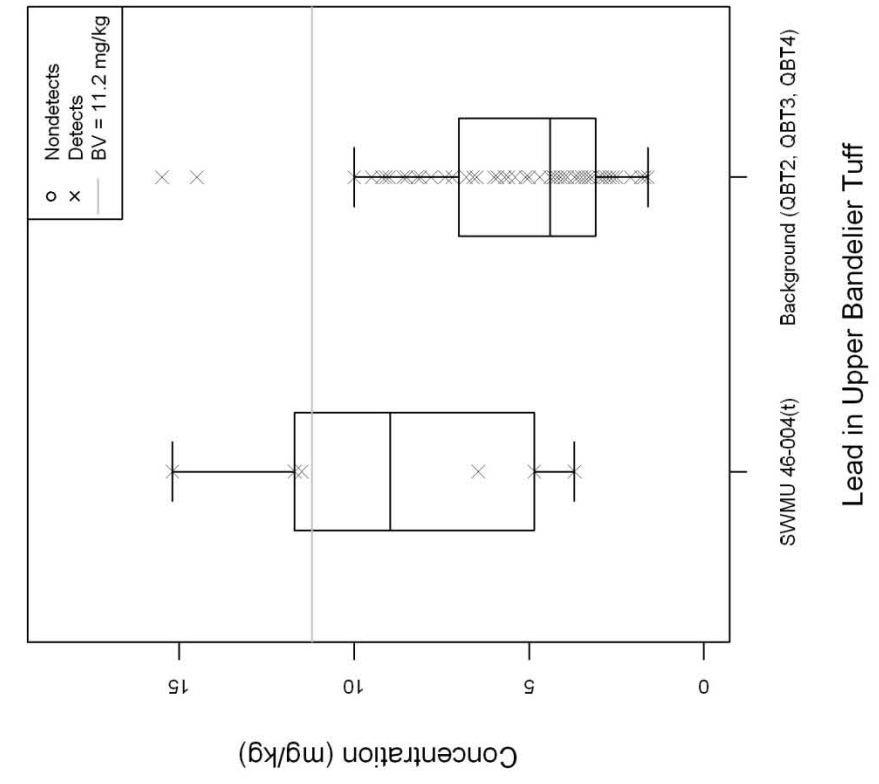
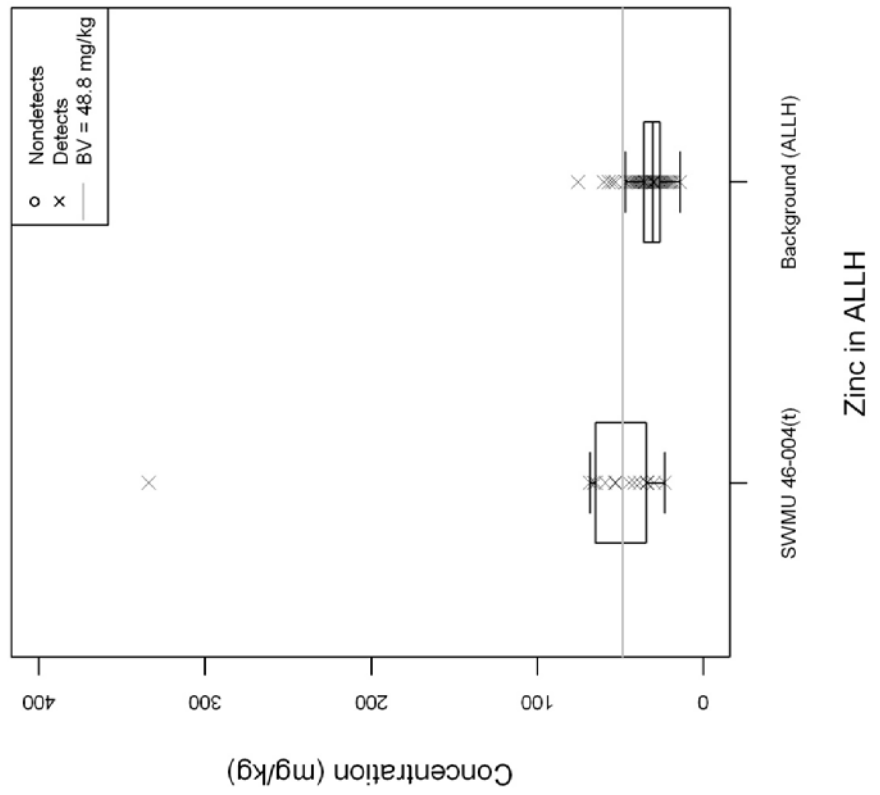


Figure H-38 Box plots for lead and magnesium in tuff at SWMU 46-004(t)



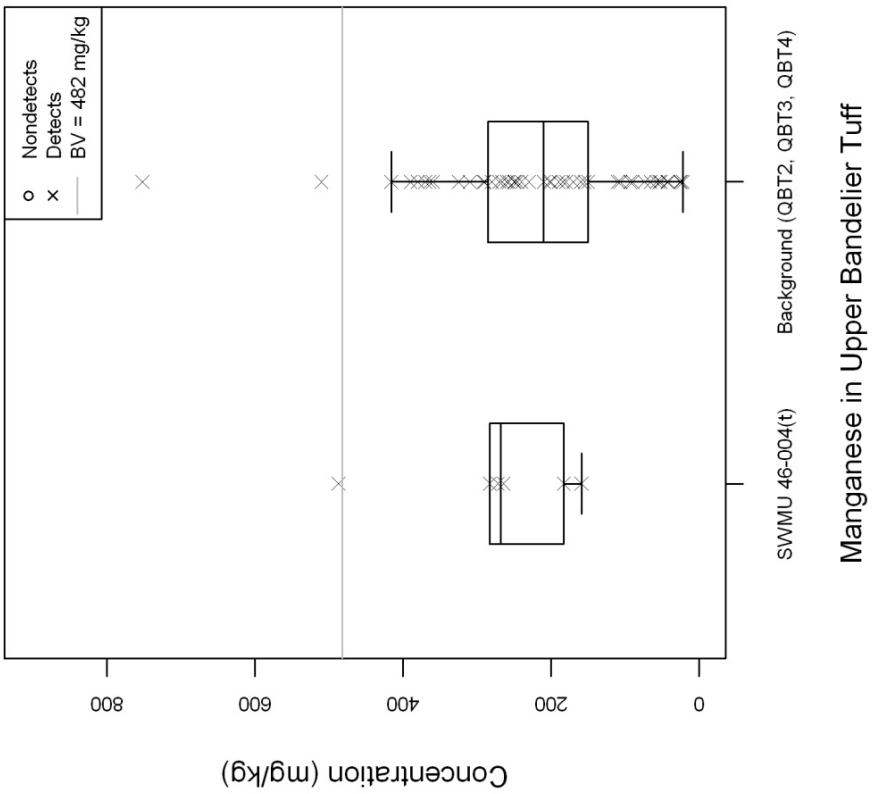
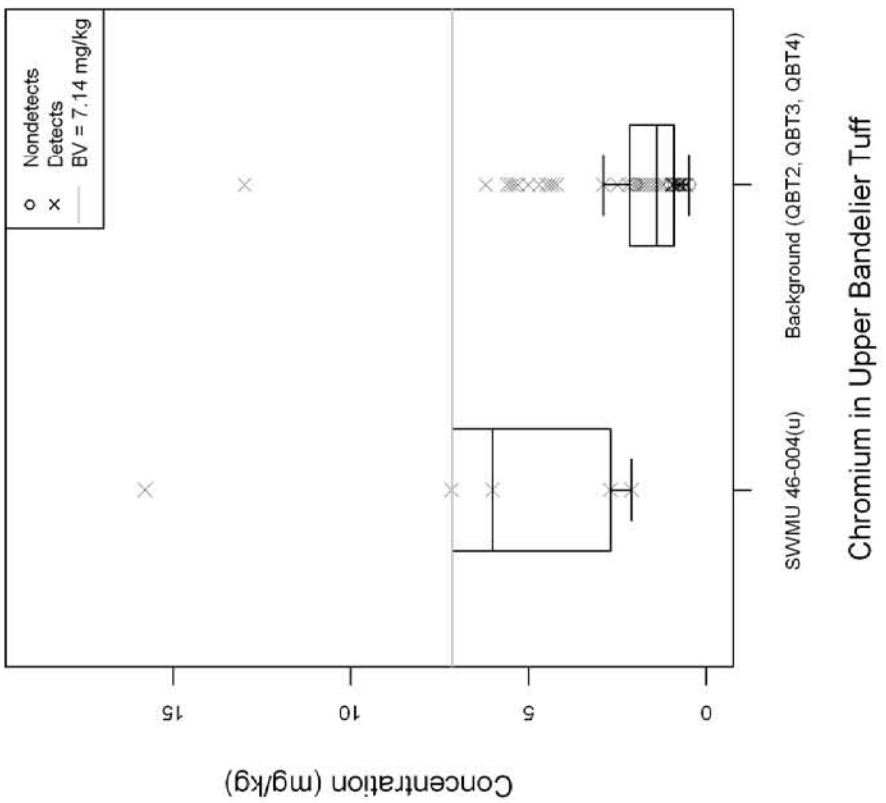


Figure H-39 Box plots for manganese in tuff and zinc in soil at SWMU 46-004(t)



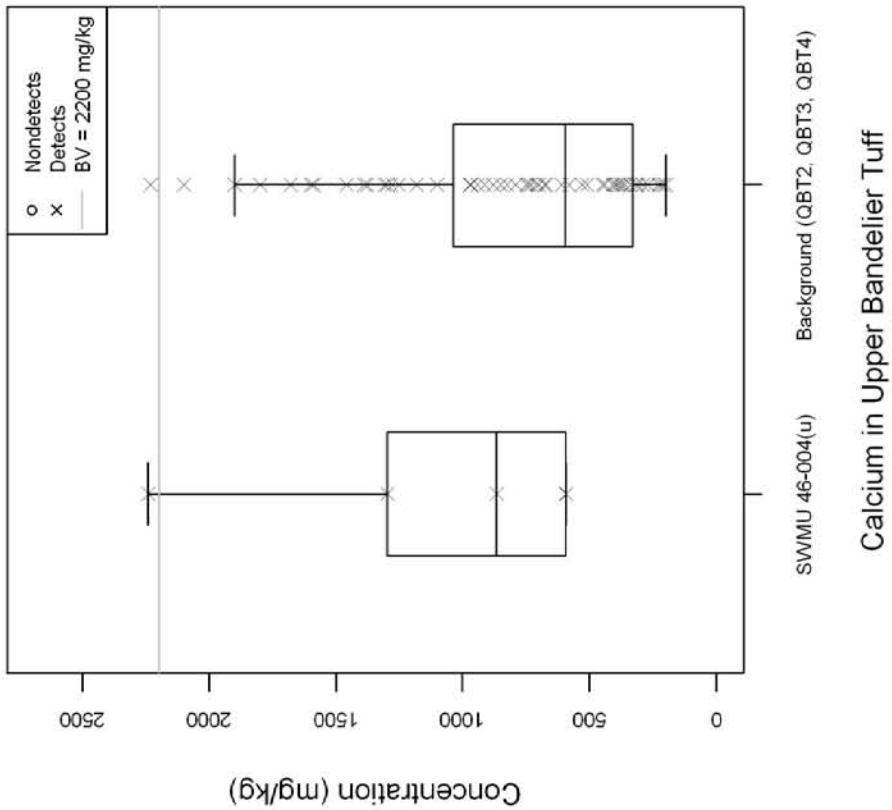
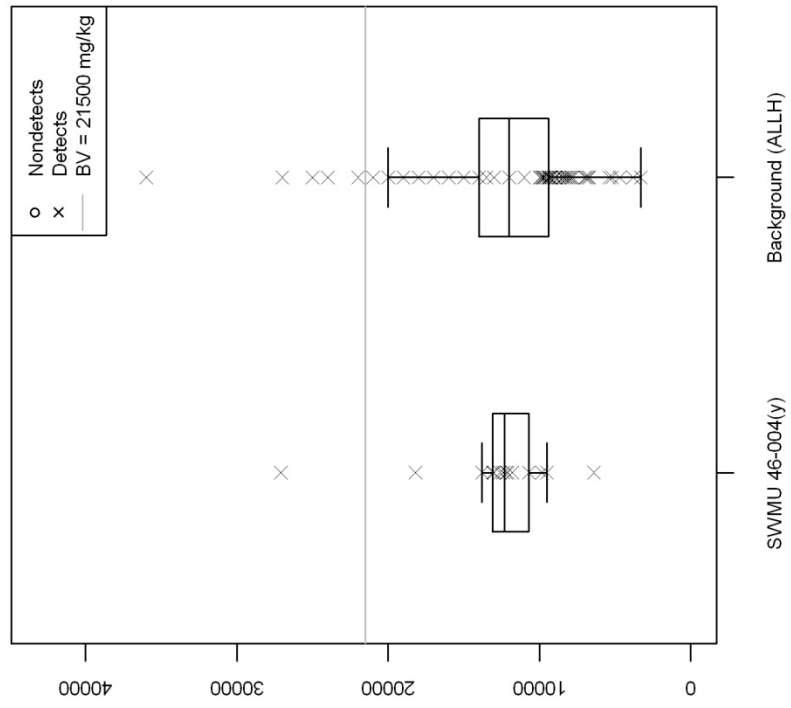


Figure H-40 Box plots for calcium and chromium in tuff at SWMU 46-004(u)



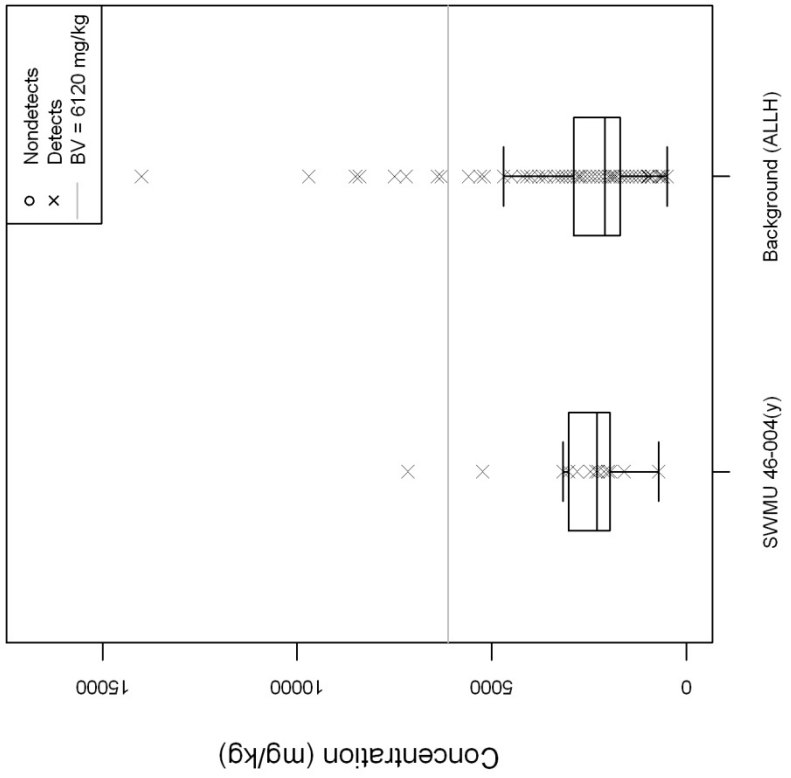


Figure H-41 Box plots for calcium and iron in soil at SWMU 46-004(y)

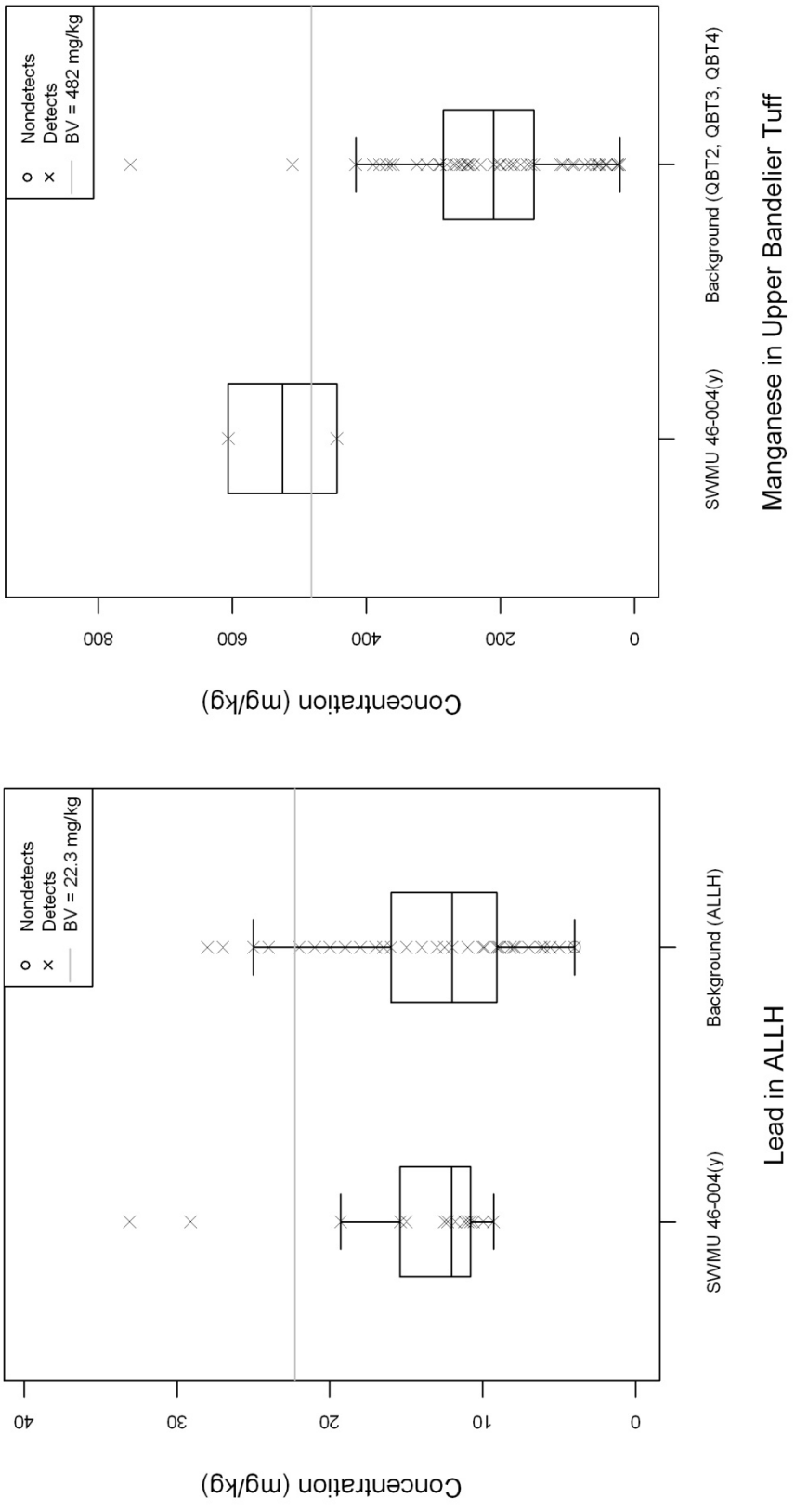
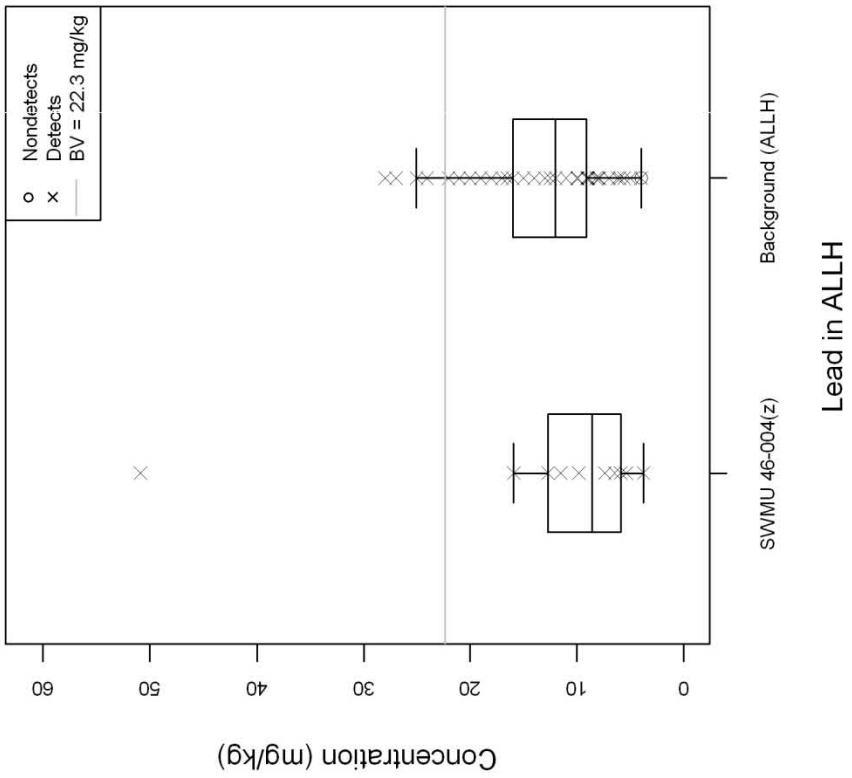


Figure H-42 Box plots for lead in soil and manganese in tuff at SWMU 46-004(y)



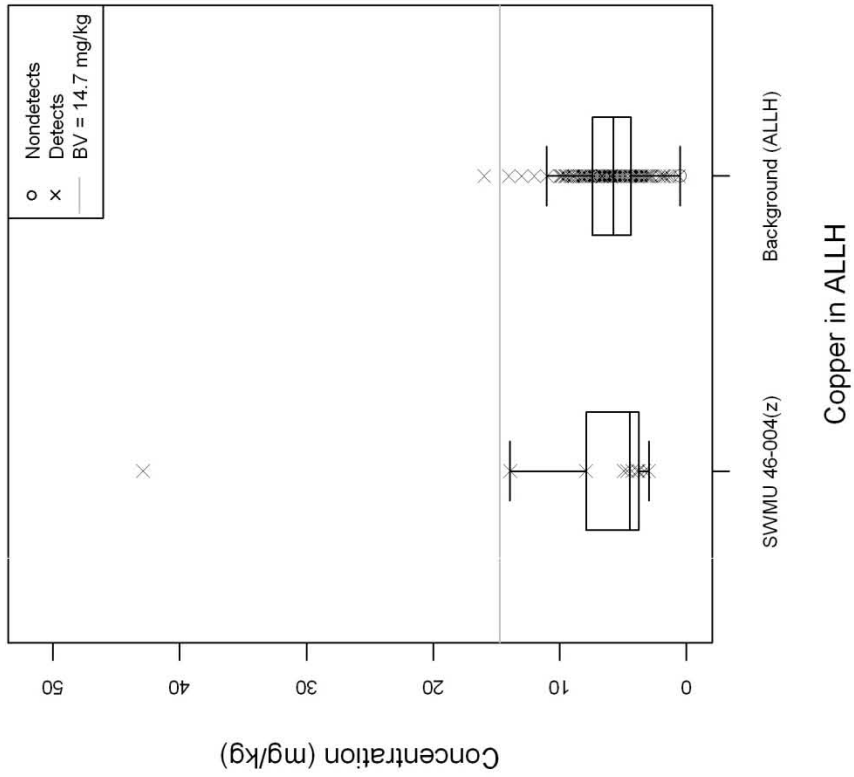
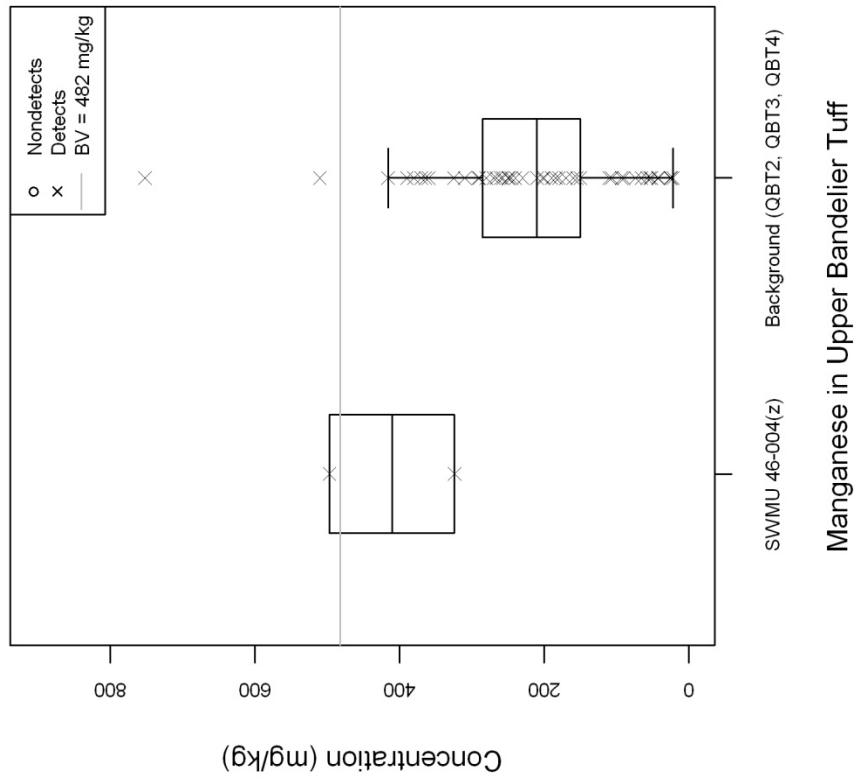


Figure H-43 Box plots for copper and lead in soil at SWMU 46-004(z)



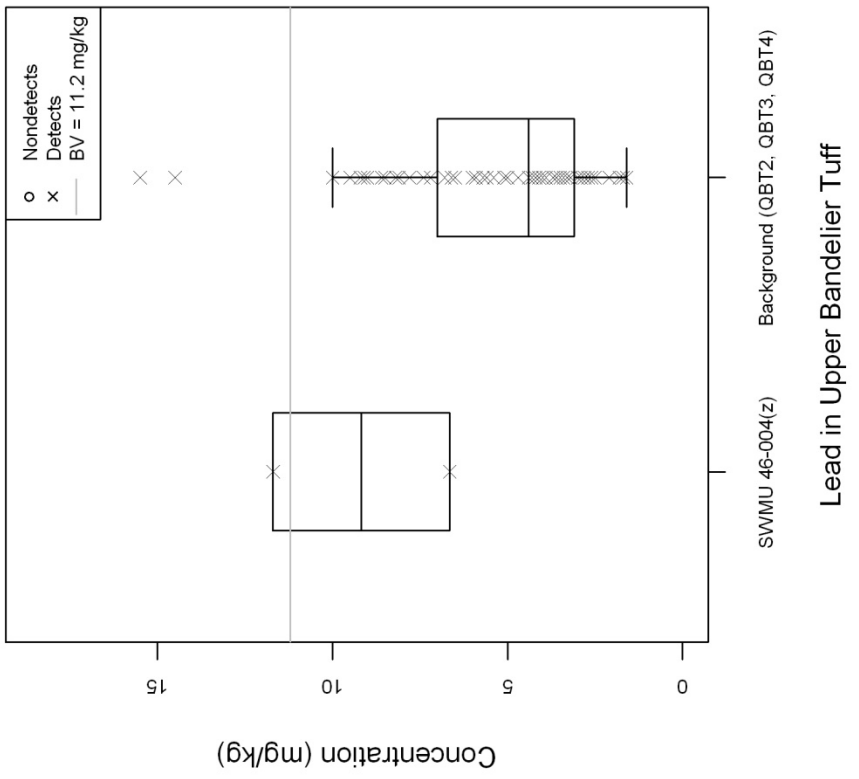


Figure H-44 Box plots for lead and manganese in tuff at SWMU 46-004(z)

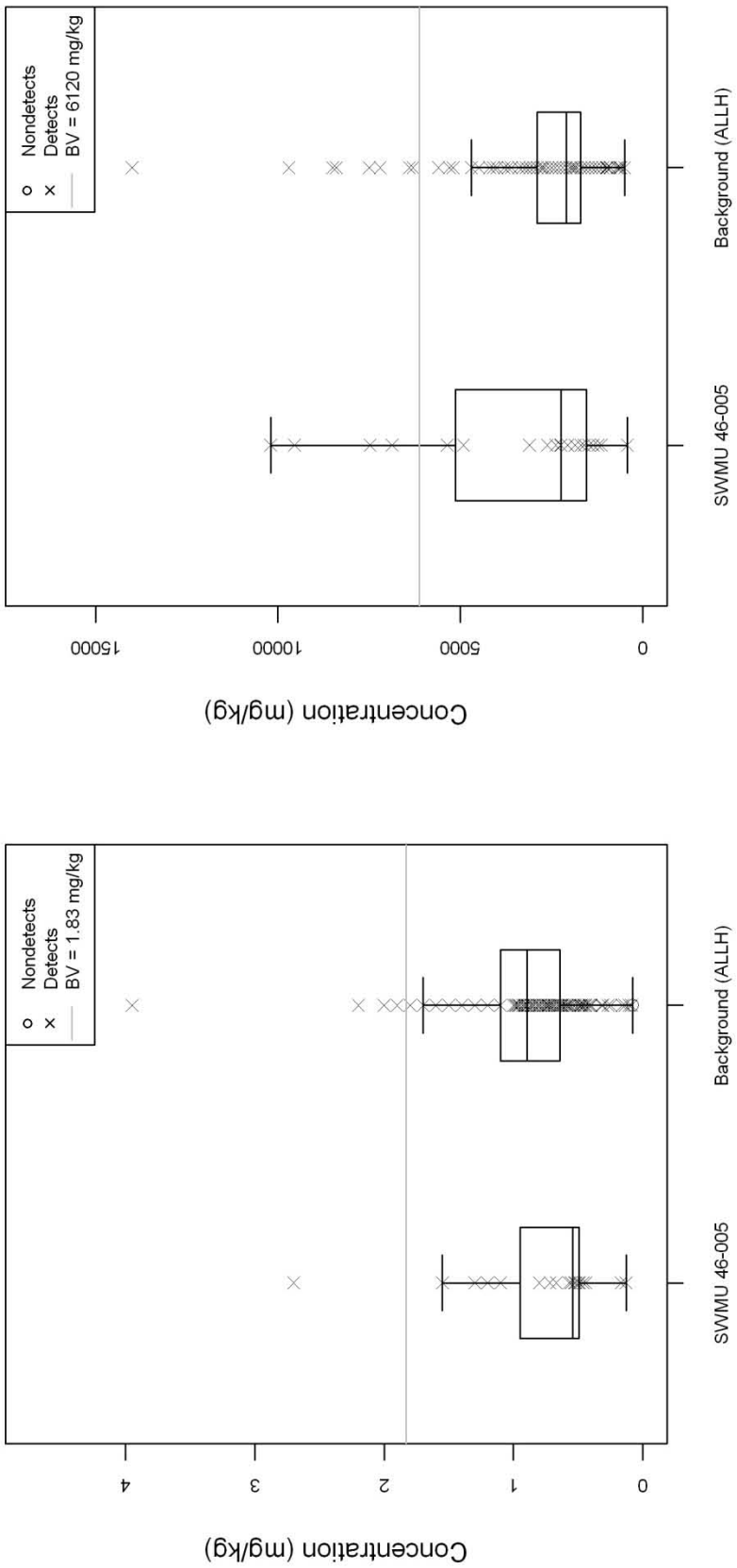
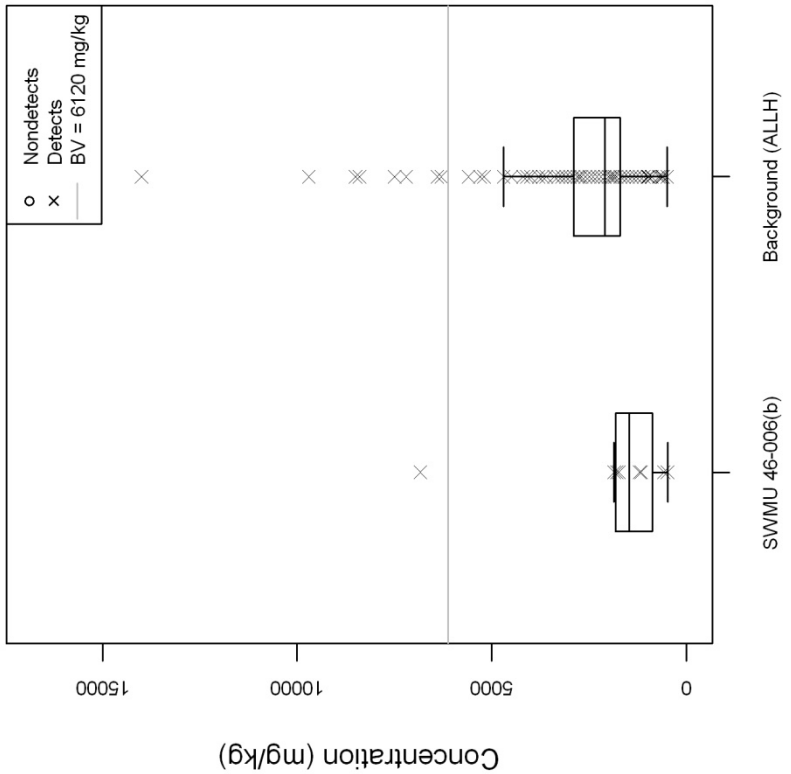


Figure H-45 Box plots for beryllium and calcium in soil at SWMU 46-005



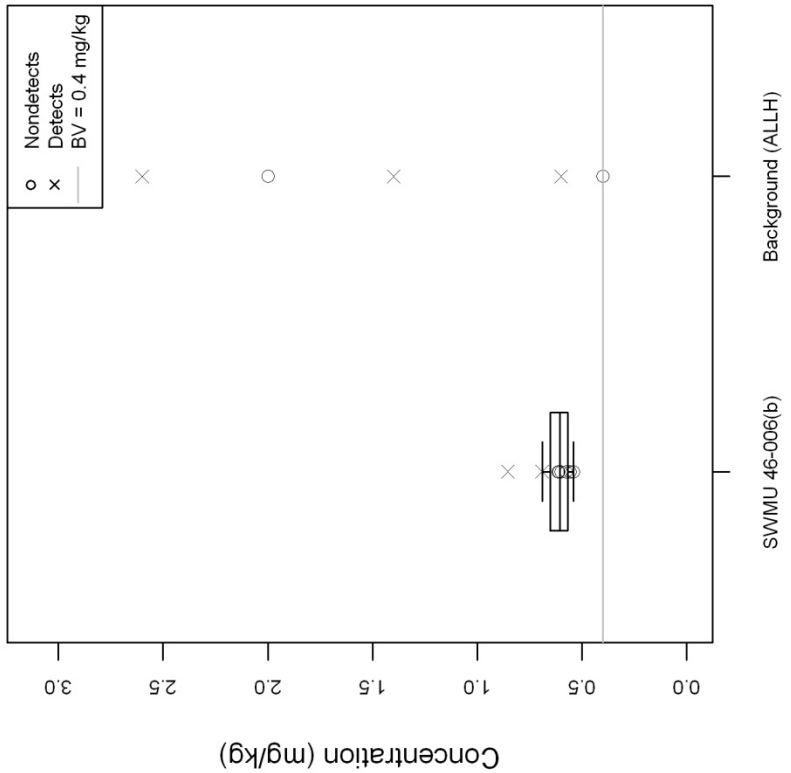
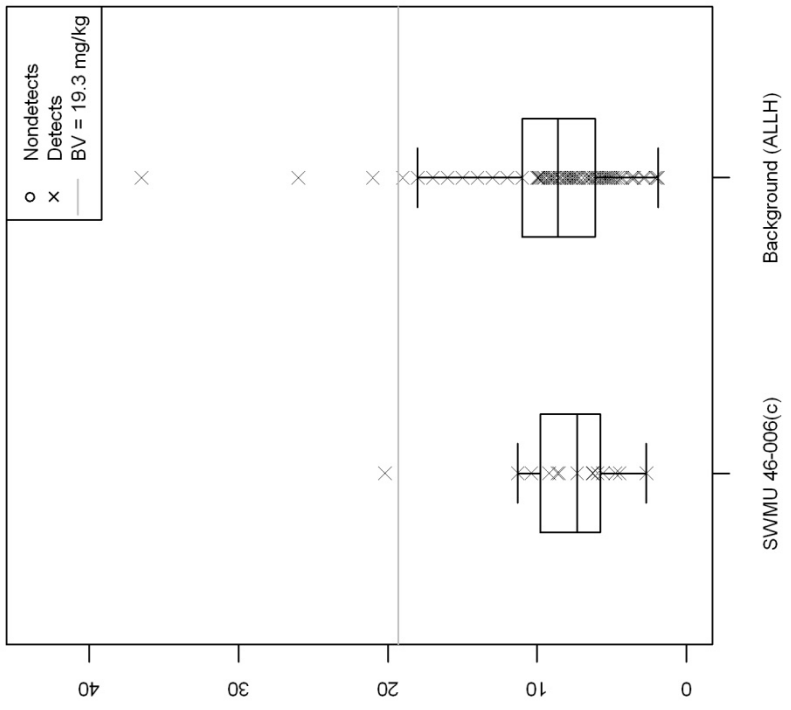


Figure H-46 Box plots for cadmium and calcium in soil at SWMU 46-006(b)

Figure H-47 Box plots for chromium in tuff and zinc in soil at SWMU 46-006(b)



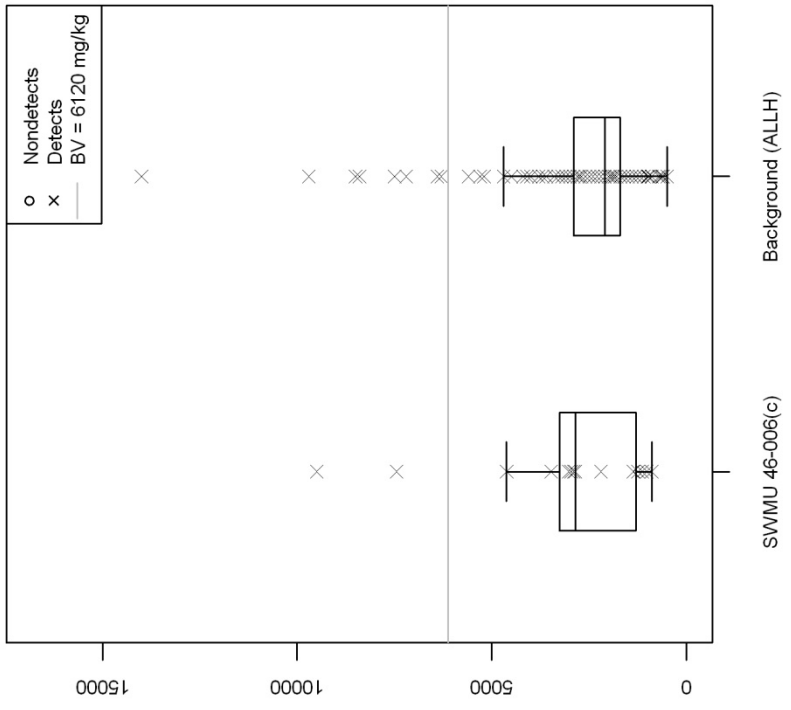


Figure H-48 Box plots for calcium and chromium in soil at SWMU 46-006(c)

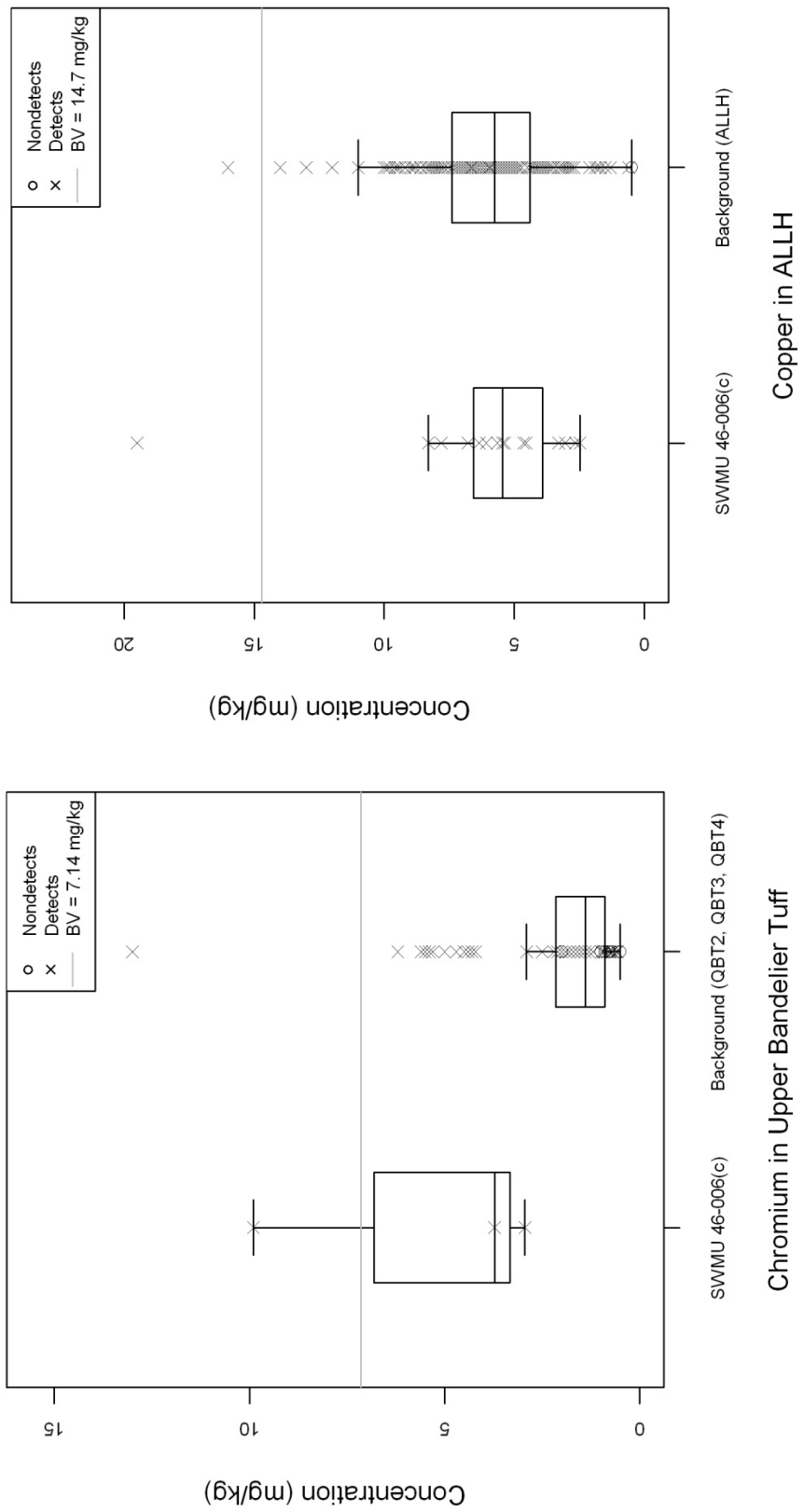
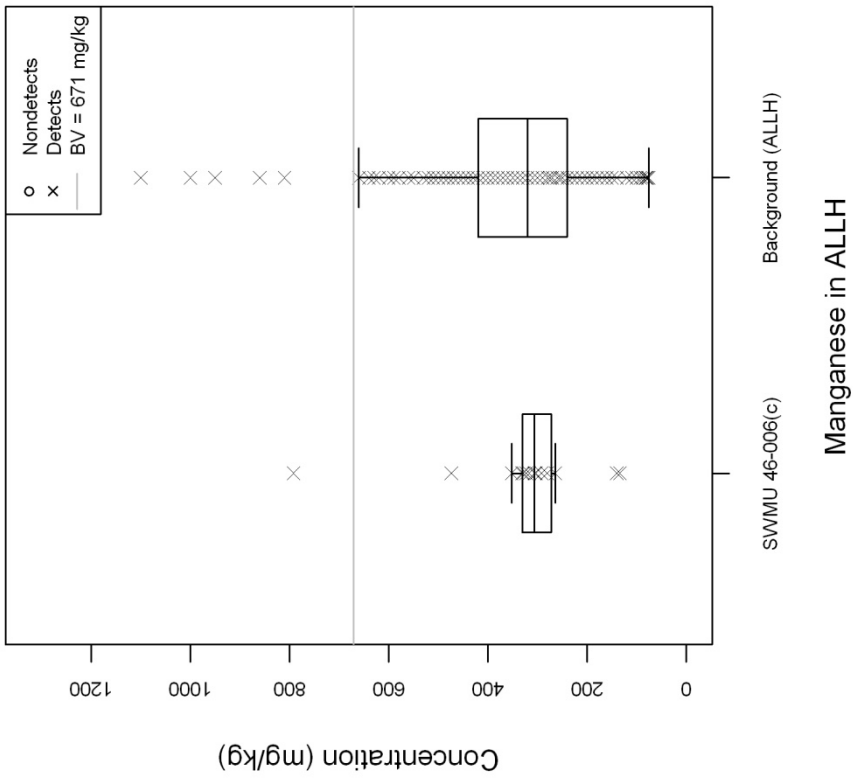


Figure H-49 Box plots for chromium in tuff and copper in soil at SWMU 46-006(c)



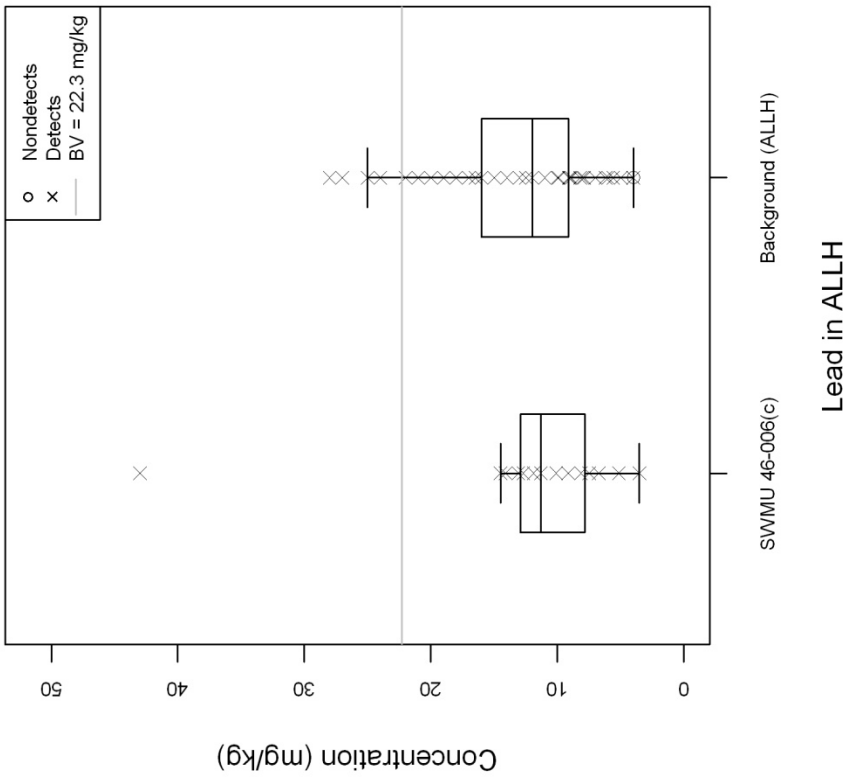


Figure H-50 Box plots for lead and manganese in soil at SWMU 46-006(c)

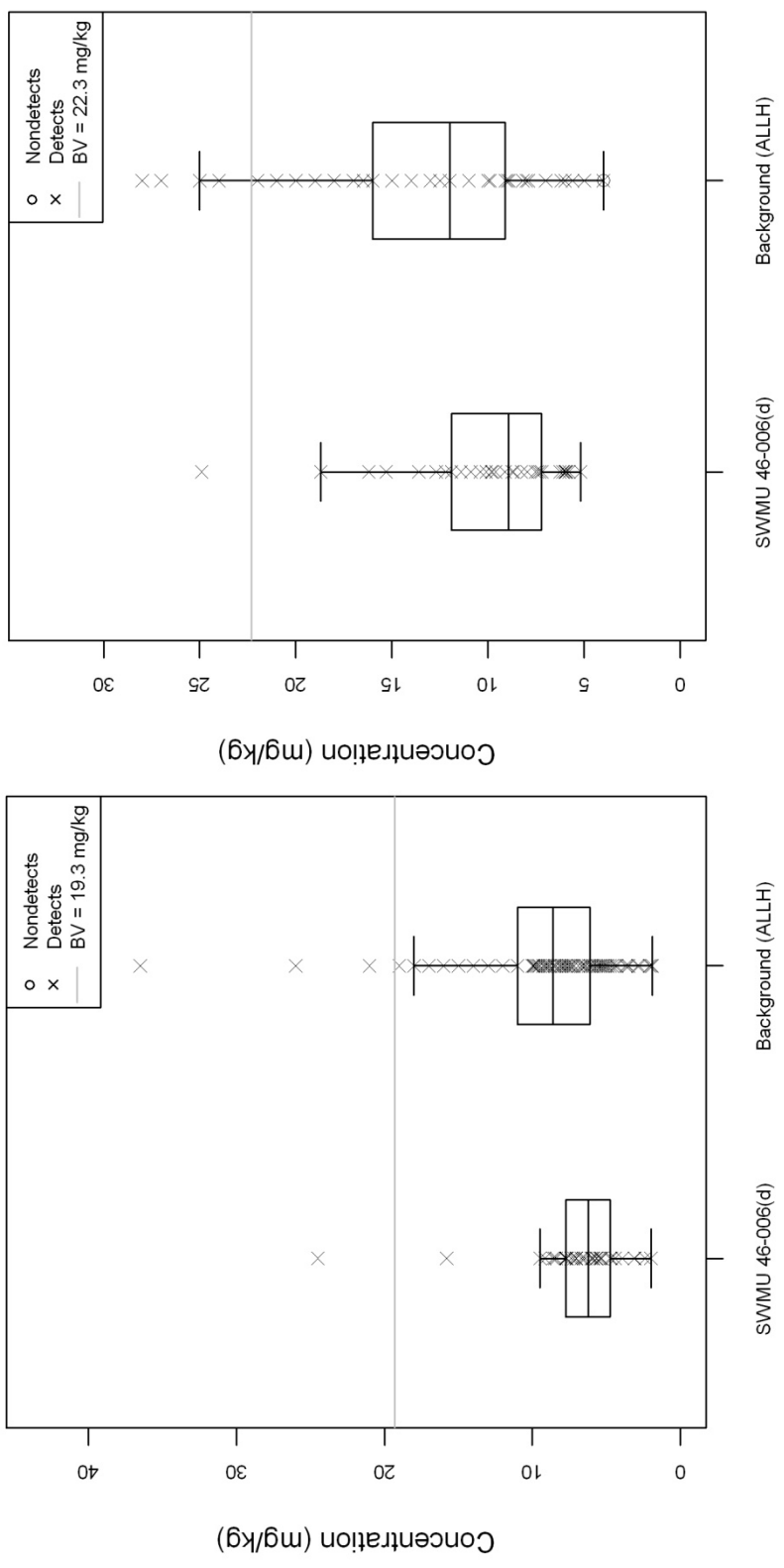


Figure H-51 Box plots for chromium and lead in soil at SWMU 46-006(d)

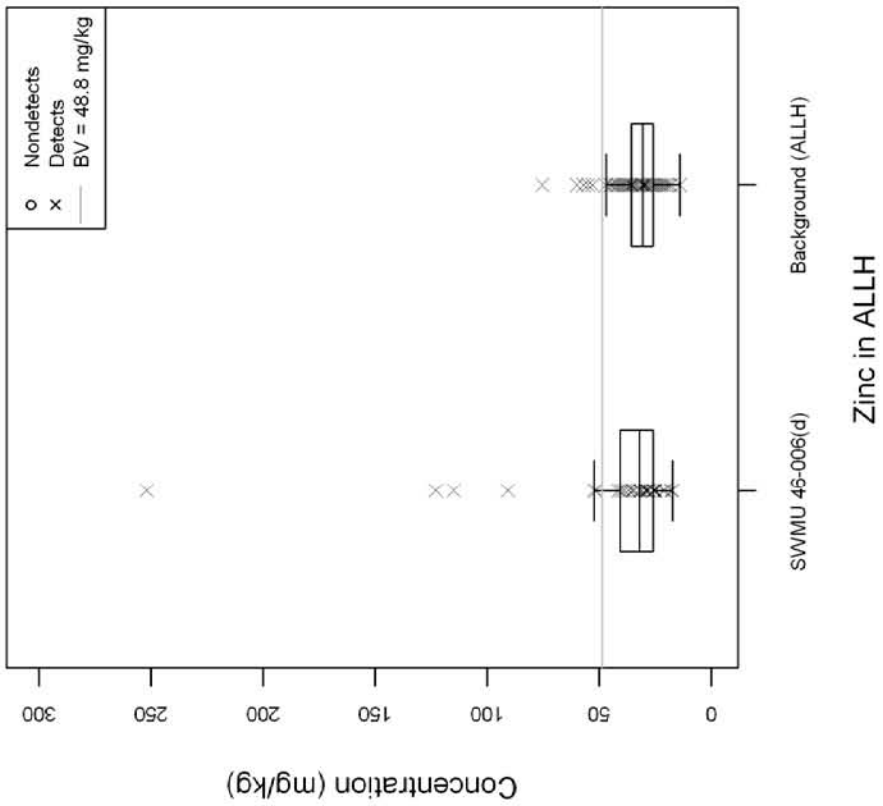


Figure H-52 Box plot for zinc in soil at SWMU 46-006(d)

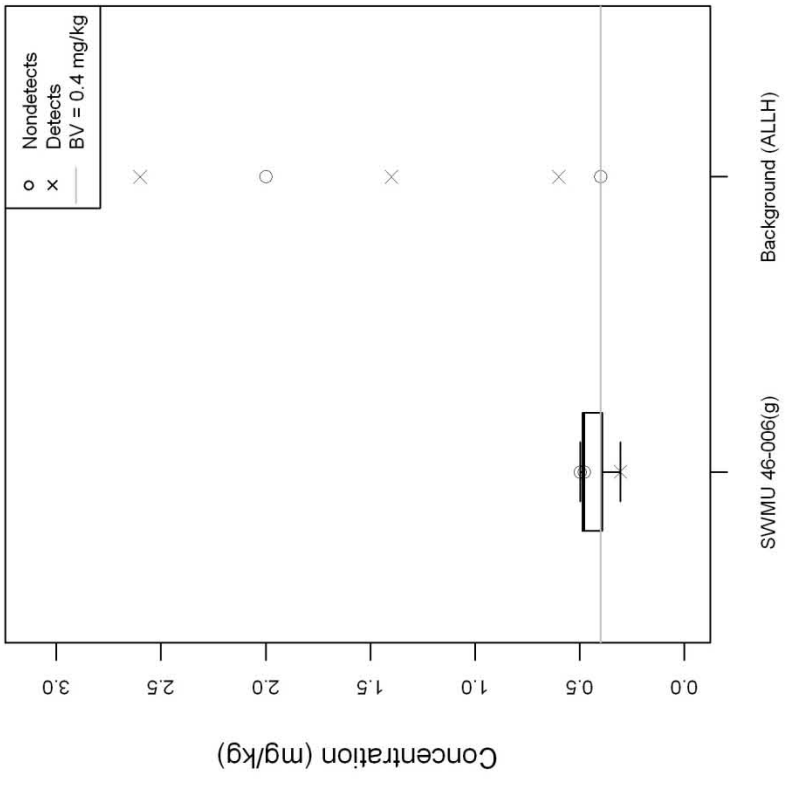
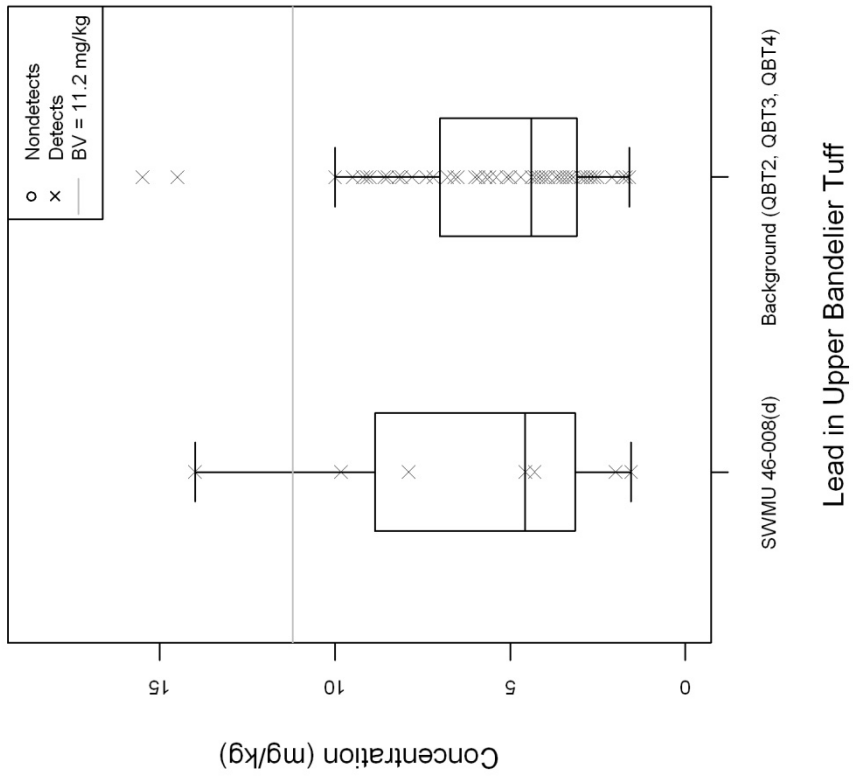


Figure H-53 Box plot for cadmium in soil at SWMU 46-006(g)



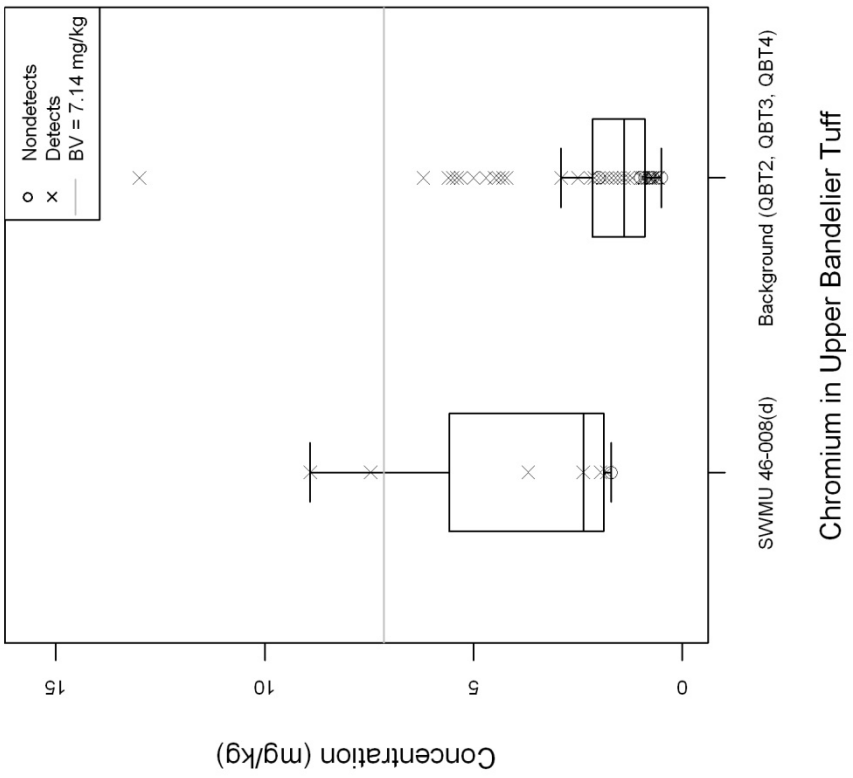


Figure H-54 Box plots for chromium and lead in tuff at SWMU 46-008(d)

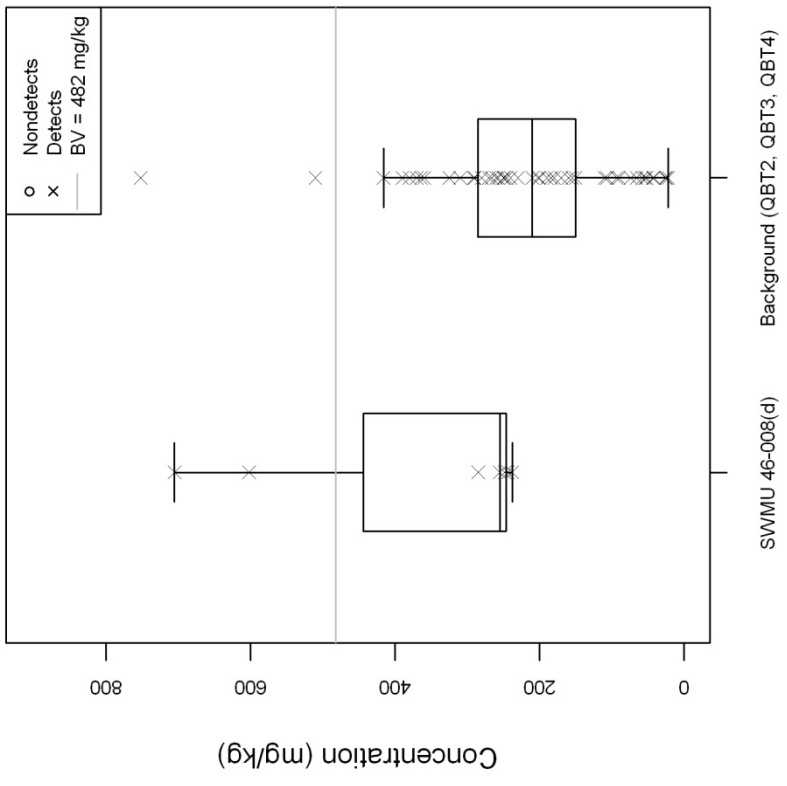


Figure H-55 Box plot for manganese in tuff at SWMU 46-008(d)

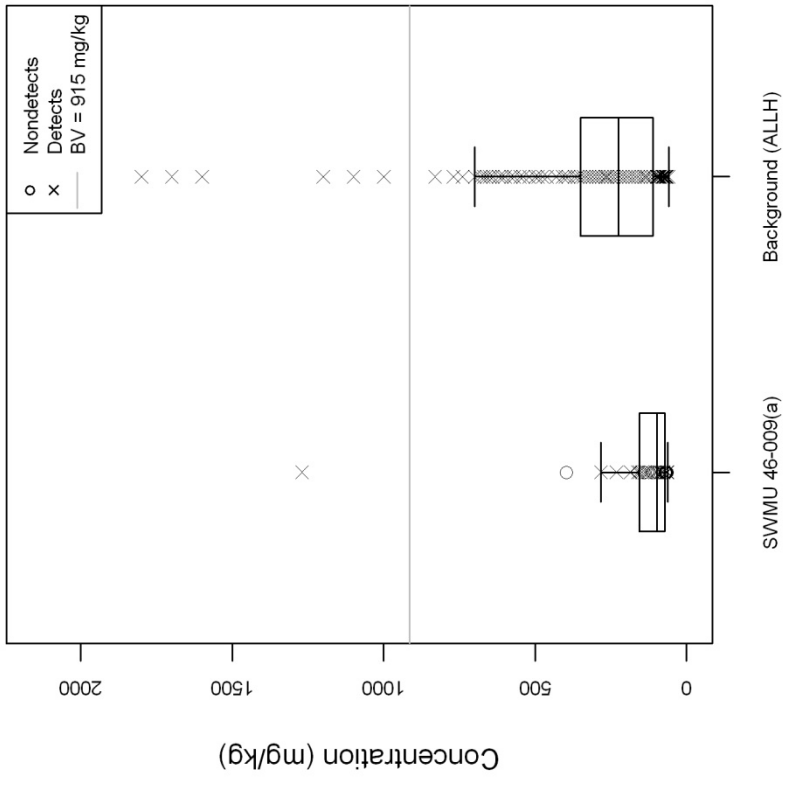


Figure H-56 Box plot for sodium in soil at SWMU 46-009(a)

Table H-1
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 04-003(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Zinc	0.20875	0.07323	n/a*	No

* n/a = Not applicable.

Table H-2
Results of Statistical Tests for
Inorganic Chemicals in Soil at AOC 04-004

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.9499	0.94534	n/a*	No
Lead	0.61262	0.3457	n/a	No
Manganese	0.8214	0.94534	n/a	No
Zinc	0.87214	0.18284	n/a	No

* n/a = Not applicable.

Table H-3
Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 46-002

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	1	0.06705	n/a*	No
Copper	0.99128	0.00106	n/a	Yes
Lead	1	0.06705	n/a	No
Zinc	0.71738	0.06178	n/a	No

* n/a = Not applicable.

Table H-4
Results of Statistical Tests for Inorganic Chemicals in Tuff at SWMU 46-002

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.99787	0.87205	n/a*	No
Copper	0.38584	0.64002	n/a	No

* n/a = Not applicable.

Table H-5
Results of Statistical Tests for
Inorganic Chemicals in Tuff at SWMU 46-003(f)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Barium	0.99162	0.85486	n/a*	No
Zinc	0.90534	0.85034	n/a	No

* n/a = Not applicable.

Table H-6
Results of
Statistical Tests for Inorganic Chemicals
and Radionuclides in Soil at SWMU 46-004(c2)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.68425	0.59791	n/a*	No
Cesium-137	0.93948	0.13935	n/a	No

* n/a = Not applicable.

Table H-7
Results of Statistical Tests for
Inorganic Chemicals in Soil at Consolidated Unit 46-004(d2)-99

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Barium	0.99999	0.96824	n/a*	No
Calcium	0.99961	0.89288	n/a	No
Cobalt	1	0.8177	n/a	No
Potassium	1	0.89132	n/a	No
Sodium	0.99418	0.89132	n/a	No

* n/a = Not applicable.

Table H-8
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-004(g)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.82241	0.15712	n/a*	No
Nickel	0.94429	0.42523	n/a	No

* n/a = Not applicable.

Table H-9
Results of Statistical Tests for Inorganic Chemicals in Soil at SWMU 46-004(m)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Copper	0.68709	0.78753	n/a*	No
Iron	0.9949	0.78753	n/a	No
Zinc	0.00029	n/a	n/a	Yes

* n/a = Not applicable.

Table H-10
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-004(t)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.85324	0.15712	n/a*	No
Iron	0.97152	0.15525	n/a	No
Lead	0.11948	0.15712	n/a	No

* n/a = Not applicable.

Table H-11
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-004(y)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Calcium	0.19835	0.42812	n/a*	No
Iron	0.24482	0.42523	n/a	No
Lead	0.2737	0.42812	n/a	No

* n/a = Not applicable.

Table H-12
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-004(z)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Copper	0.81694	0.23267	n/a*	No
Lead	0.95665	0.63253	n/a	No

* n/a = Not applicable.

Table H-13
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-005

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Beryllium	0.98707	0.63258	n/a*	No
Calcium	0.31933	0.05356	n/a	No

* n/a = Not applicable.

Table H-14
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-006(c)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Calcium	0.44196	0.18162	n/a*	No
Chromium	0.8168	0.81073	n/a	No
Copper	0.75761	0.80889	n/a	No
Lead	0.91111	0.81073	n/a	No
Manganese	0.66747	0.81073	n/a	No

* n/a = Not applicable.

Table H-15
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-006(d)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Chromium	0.99993	0.90032	n/a*	No
Lead	0.99981	0.97066	n/a	No

*n/a = Not applicable.

Table H-16
Results of Statistical Tests for
Inorganic Chemicals in Soil at SWMU 46-009(a)

Analyte	Gehan Test p-Value	Quantile Test p-Value	Slippage p-value	Retain as COPC?
Sodium	1	0.96771	n/a*	No

* n/a = Not applicable.

Appendix I

Risk Assessments

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Figures

Tables

Attachments

I-1.0 INTRODUCTION

This appendix presents the results of the human health and ecological risk-screening assessments conducted in support of the investigation at sites within the Upper Cañada del Buey Aggregate Area. The sites are located on Los Alamos County property proximal to Los Alamos National Laboratory (LANL or the Laboratory) and include Solid Waste Management Units (SWMUs) 46-002, 46-004(m), 46-004(p) 46-006(b), and 46-006(g) and Area of Concern (AOC) C-46-001 located within Technical Area 46 (TA-46). The nature and extent of contamination was defined at six SWMUs within the Upper Cañada del Buey Aggregate Area during the 2010 investigation. Risk-screening assessments were conducted for SWMUs 46-002, 46-004(m), 46-006(b), and 46-006(g). Risk-screening assessments for SWMU 46-004(p) were not conducted because no COPCs were detected in the depth intervals relevant to human health (0–10 ft below ground surface [bgs]). Risk-screening assessments for AOC C-46-001 were not conducted because no COPC were identified at this site.

The four SWMUs for which risk-screening assessments were conducted are a former surface impoundment, a former outfall, a former storage shed, and a storage shed. The SWMUs and AOC are described in section 7 of the investigation report and are summarized below.

I-2.0 TA-46 BACKGROUND

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

I-2.1 Site Descriptions

SWMU 46-002, Surface Impoundment

SWMU 46-002 is a surface impoundment system located at the eastern end of TA-46, southeast of the prototype fabrication building (building 46-77) on the north facing slope of SWSC Canyon. The SWMU consists of a lagoon (structure 46-149) measuring approximately 62 ft × 102 ft × 11 ft deep, associated drainlines, a siphon box, and three sand filters measuring approximately 22 ft × 38 ft × 3 ft deep (LANL 1990, 007513, p. 208). The lagoon and sand filters are lined with butyl rubber. The impoundment system was constructed in the early 1970s to receive sanitary wastewater from buildings within the fenced area of TA-46 (LANL 1993, 020952, p. 5-54). Effluent was discharged to the canyon from a former U.S. Environmental Protection Agency (EPA) National Permit Discharge Elimination System– (NPDES-) permitted outfall (SSS07S). The lagoon also had an overflow outfall that discharged into the canyon. The top 6 in. of sand and sludge from the filters was removed every 2 to 3 mo and disposed of at Material Disposal Area G at TA-54. The sand beneath this top layer was pushed over the side of the canyon, and the filters were replenished with clean sand. The material pushed over the side of the canyon makes up SWMU 46-009(b). In 1990, the siphon box and the sand filters were taken off-line, and the effluent in the lagoon was pumped to another wastewater treatment facility (LANL 1993, 020952, p. 5-56). The lagoon was removed from service in the early 1990s when the TA-46 SWSC plant, located to the south of SWMU 46-002, came online. The outfall from the surface impoundment system was removed from the NPDES permit by 1993 (LANL 1993, 020952, p. 129).

SWMU 46-004(m), Outfall

SWMU 46-004(m) is a former NPDES-permitted outfall (04A013) located approximately 60 ft north of building 46-30. The outfall protrudes from a 10-ft-deep bank on the hillside north of building 46-30. The outfall discharged effluent from an industrial drainline in building 46-30 to a ditch at the foot of the bank. The ditch channeled wastewater to a storm drain culvert that discharges into Cañada del Buey (LANL 1996, 054929, pp. 48–49). Engineering drawings show this industrial drainline received effluent from the roof drains, laboratory sinks, and floor drains in building 46-30 (LANL 1993, 020952, p. 5-124). Building 46-30 was constructed as a hydraulics laboratory and contained a high-bay area with a crane, an actuator test area, and a small machine shop (LANL 1993, 020952, p. 5-7). In December 1995, the outfall was removed from the NPDES permit (LANL 1999, 064617, p. 2-8).

SWMU 46-004(p), Dry Well

SWMU 46-004(p) is an inactive dry well (no structure number) located at TA-46 next to the southwest corner of building 46-1. The dry well consists of corrugated metal pipe, approximately 2 ft in diameter × 10 ft in length, placed vertically in the ground, and covered with a hinged-metal lid. The dry well was originally constructed for the disposal of alkali-metal wastes but was also used to dispose of other chemical wastes from building 46-1. During the late 1950s and early 1960s, solid pieces of cesium or other alkali metals from the operation of cesium-plasma diode were discarded in the dry well; no radioactive cesium-137 was used (LANL 1993, 020952, p. 5-15). Building 46-1 housed offices, two assembly bays, a machine shop, several laboratories for the assembly and checkout of electrical components, general laboratories, and a uranium polishing area (LANL 1993, 020952, p. 5-7).

SWMU 46-006(b), Former Storage Shed

SWMU 46-006(b) is a former storage shed (former structure 46-197) located approximately 40 ft north of the Laser Isotope Support Facility (building 46-41). The shed was installed sometime before 1977, measured 40 ft long × 8 ft wide, and was constructed of plywood on three sides (the north side was open) with a sheet-metal roof. The shed was used for short-term storage of oil drums, vacuum pumps, optical tables, other laboratory equipment, and electrical equipment with polychlorinated biphenyl– (PCB-) containing oil. The site of the shed is paved with asphalt and slopes toward a storm drain to the southeast. During a 1986 site visit of the area, oil was observed to be leaking from under the back of the shed. In addition, an oil spill was observed east of the shed, and discolored soil was observed at the storm drain outfall (LANL 1993, 020952, p. 5-77). The shed was removed in 1990 (LANL 1993, 020952, p. 5-77).

SWMU 46-006(g), Storage Shed

SWMU 46-006(g) is a storage shed located at the west end of building 46-31. The shed is constructed of corrugated steel and measures 10 ft × 20 ft. From 1982 to 1984, the shed housed vacuum pumps used in experiments involving plasma vaporization of depleted uranium powder. The area around the shed is level and paved. Pump oil is known to have been spilled on the floor of the shed (LANL 1996, 054929, p. 194). Because the shed is not weather-tight, rain and snowmelt routinely flood the floor.

AOC C-46-001, Spill Area

AOC C-46-001 is the location of a one-time spill of mercury at TA-46 in the vicinity of building 46-75. On July 22, 1975, 250–500 g (0.55–1.1 lb) of mercury was spilled on the ground near building 46-75 (Ahlquist 1975, 008501). The spill was cleaned up shortly after it occurred. The memorandum documenting the spill does not provide the precise location of where the spill occurred at building 46-75; however, aerial

photos show that the entire area surrounding building 46-75 was paved at the time of the spill (LANL 1993, 020952, p. 5-131).

I-2.2 Sampling Results and Determination of Chemicals of Potential Concern

The data used to identify chemicals of potential concern (COPCs) and to evaluate potential risks to human health and the environment for the Upper Cañada del Buey Aggregate Area sites consisted of all qualified analytical results compiled from both historical sampling activities and the 2010 investigation. Only those data determined to be of decision-level quality following the data-quality assessment (Appendix F) are included in the data sets evaluated in this risk appendix. The data are presented in Appendix G (on CD).

Tables I-2.2-1 to I-2.2-12 summarize the COPCs evaluated for potential risk for each site. Section 5 of the investigation report summarizes the COPC selection process. Inorganic chemicals and radionuclides above background values (BVs) or fallout values (FVs) and detected organic chemicals or radionuclides in tuff are retained as COPCs. The risk-screening assessment(s) for a site included all COPCs detected within the depth interval relevant for each exposure scenario. The depth intervals are 0–10 ft bgs for the residential and construction worker scenarios, 0–5 ft bgs for ecological risk, and 0–1 ft bgs for the industrial scenario. Therefore, the COPCs evaluated for each scenario may differ for the site depending on the depth at which the COPC was detected. Because sampling depths often overlapped during multiple investigations, all samples with a starting depth less than the lower bound of the interval for each scenario were included in the risk assessments.

I-3.0 CONCEPTUAL SITE MODEL

The sites comprising the investigation are of five types. The first type is the former surface impoundment site (SWMU 46-002). This site consists of a lagoon, associated drainlines, a siphon box, three sand filters, and an outfall. COPCs may be found in surface material and may also have migrated into the subsurface. The second type of site is an industrial drainline outfall [SWMU 46-004(m)] that received effluent from the roof drains, laboratory sinks, and floor drains in building 46-30. This SWMU may have released COPCs in the surface and subsurface. The third type of site is two storage sheds, one of which is no longer present [SWMUs 46-006(b) and 46-006(g)]. Similar COPCs may be found at both sites because of leaks from stored materials and occur on the surface and in the subsurface surrounding the structures. The fourth type of site [SWMU 46-004(p)] is an inactive dry well originally constructed for the disposal of alkali-metal wastes but was also used for to dispose of other chemical wastes. The COPCs may be found in subsurface material only. The fifth type of site (AOC C-46-001) is the location of a one-time spill of mercury. COPCs at this site may be found in surface material if present.

I-3.1 Receptors and Exposure Pathways

The primary exposure pathway for human receptors is surface soil and subsurface soil or 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 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 construction worker. The exposure pathways are the same as those for surface soil. Sources, exposure pathways, and receptors are presented in the conceptual site model (Figure I-3.1-1).

The sites within the Upper Cañada del Buey Aggregate Area are in an industrially developed area and provide minimal potential habitat for ecological receptors. For unpaved sites or areas of sites, exposure pathways are complete to surface soil and tuff for ecological receptors. Exposure is assessed across the site to a depth of 0–5 ft. 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. The potential pathways are root uptake by plants 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 was not evaluated because of the lack of surface water features. Sources, exposure pathways, and receptors are presented in the conceptual site model (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 a chemical in the environment; the evaluation of transport addresses the physical processes affecting mobility of a contaminant along a migration pathway. Migration through soil and tuff depends on properties such as soil pH, rate of precipitation or snowmelt, soil moisture content, soil/tuff 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 presented in the report. Results from the deepest samples collected showed either no detected concentrations of COPCs or low or 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 mentioned above. Given how long the contamination has been present in the subsurface, 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) can 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 Cañada del Buey 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 best indication of the potential for future contaminant migration to groundwater is the current vertical distribution of contaminants in the subsurface. Most releases at the Upper Cañada del Buey Aggregate Area are historical (i.e., they occurred decades ago). The regional aquifer beneath the aggregate area is greater than 1000 ft bgs. Therefore, for migration of contaminants to occur from shallow soil to the regional aquifer in a meaningful time frame (e.g., 100 to 1000 yr), significant vertical migration should have already occurred. Sampling has shown that this migration has not occurred, indicating a very low potential for future contaminant migration to groundwater.

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, the potential for ion exchange 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. The chemical and physical properties of the Upper Cañada del Buey Aggregate Area COPCs are presented in Tables I-3.2-1, I-3.2-2, and I-3.2-3.

The primary release and transport mechanisms that may lead to the potential exposure of receptors include

- dissolution and/or particulate transport of surface contaminants from precipitation and runoff,
- airborne transport of contaminated surface soil or particulates,
- continued dissolution and advective/dispersive transport of chemical and radiological contaminants contained in subsurface soil and bedrock,
- biotic perturbation and/or translocation of contaminants in subsurface contaminated media, and
- uptake of contaminants from soil and water by biota.

Contaminant distributions at the sites indicate that after the initial deposition of contaminants from operational activities and historical remediation efforts, elevated levels of contaminants tend to remain concentrated in the vicinity of the original release points.

I-3.2.1 Inorganic Chemicals

In general, and particularly in a semiarid climate such as that found at the sites within the Upper Cañada del Buey Aggregate Area, inorganic chemicals are not highly soluble or mobile in the environment. The primary physical and chemical factors that determine and describe the distribution of inorganic COPCs within the soil and tuff are the water solubility of the inorganic chemical and the soil-water partition coefficient (K_d). Other factors besides the K_d values, such as speciation in soil and oxidation-reduction potential (Eh) potential and pH, also play a role in the likelihood that inorganic chemicals will migrate. The K_d values provide 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 K_d values. Inorganic 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 identified at the Upper Cañada del Buey Aggregate Area sites. Based on this criterion antimony and zinc have a low potential to mobilize and migrate through soil and the vadose zone. The K_d values for copper, cyanide, nitrate, selenium, and silver are less than 40 and may indicate that these inorganic chemicals have a greater potential to mobilize and migrate through soil and the vadose zone. These COPCs are discussed further in the following sections. 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). Information for these inorganic chemicals is also available from the ATSDR website at http://www.atsdr.cdc.gov/toxprofiles/index.asp.

- Copper movement in soil is determined by physical and chemical interactions with the soil components. Most copper deposited in soil is strongly adsorbed and remains in the upper few centimeters. Copper will adsorb to organic matter, carbonate minerals, clay minerals, 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. 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. The average soil pH is 7.2, so leaching of copper is unlikely.
- 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 occurring at low concentrations in subsurface soil is likely to biodegrade under both aerobic and anaerobic conditions. The extent of cyanide is defined.
- Nitrate (and to a lesser degree perchlorate) is highly soluble in water and may migrate with water molecules in saturated soil. As noted above, the subsurface material beneath the Upper Cañada del Buey Aggregate Area sites has low moisture content, which inhibits the mobility of nitrate and perchlorate as well as most other inorganic chemicals.
- 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 average soil pH is 7.2, which indicates that selenium is not likely to migrate.
- 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. The extent of silver is defined at depth.

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 Cañada del Buey Aggregate Area. Physical and chemical properties of organic chemicals are important when evaluating their fate and transport. The following physiochemical property information illustrates some aspects of the fate and transport tendencies of the Upper Cañada del Buey Aggregate Area COPCs. The information is summarized from Ney (1995, 058210).

Water solubility may be 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. Acetone, benzoic acid, hexanone[2-], methylene chloride, and trichloroethene have water solubilities greater than 1000 mg/L.

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 more likely to accumulate or bioaccumulate and persist in the environment, to be slightly prone to biodegradation, and to be metabolized in plants and animals. The COPCs identified as having water solubilities less than 10 mg/L are acenaphthene, anthracene, Aroclor-1242, Aroclor-1248, 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, dibenzofuran, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, phenanthrene, and pyrene.

Vapor pressure is a chemical characteristic used to evaluate the tendency of organic chemicals to volatize. Chemicals with vapor pressure greater than 0.01 millimeters of mercury (mm Hg) 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 toward groundwater. Acetone, butylbenzene[n-], butylbenzene[sec-], ethylbenzene, hexanone[2-], isopropyltoluene[4-], methylene chloride, propylbenzene[1-], trichloroethene, trichloroethane[1,1,1-], tetrachloroethene, toluene, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3] + xylene[1,4-] have vapor pressures greater than 0.01 mm Hg.

Chemicals with vapor pressures less than 0.00001 mm Hg are less likely to volatilize and, therefore, tend to remain immobile. Anthracene, Aroclor-1242, 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, butylbenzylphthalate, chrysene, dibenz[a,h]anthracene, fluoranthene, indeno[1,2,3-cd]pyrene, and pyrene have vapor pressures less than 0.00001 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} is above 1000, the greater the affinity the chemical has for bioaccumulation in the food chain, the greater its potential for sorption in the soil, and the lower its mobility (Ney 1995, 058210). The COPCs with a K_{ow} greater than 1000 include anthracene, Aroclor-1242, 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, dibenzofuran, ethylbenzene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, isopropyltoluene[4-], methylnaphthalene[2-], naphthalene, phenanthrene, pyrene, tetrachloroethene, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3-] + xylene[1,4-]. A K_{ow} of less than 500 indicates high water solubility, high mobility, little to no affinity for bioaccumulation, and degradability by microbes, plants, and animals. Acetone, benzoic acid, hexanone[2-], methylene chloride, and trichlorofluoromethane have a K_{ow} less than 500.

The K_{oc} measures the tendency of a chemical to adsorb to organic carbon in soil. K_{oc} values above 500 L/kg indicate a strong tendency to adsorb to soil, leading to low mobility (NMED 2009, 108070). Anthracene, Aroclor-1242, Aroclor-1248, 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[n-], butylbenzene[sec-], chrysene, dibenzofuran, ethylbenzene, fluoranthene, fluorene, indeno[1,2,3-cd]pyrene, isopropyltoluene[4-], methylene chloride, methylnaphthalene[2-], naphthalene, phenanthrene, pyrene, trichlorofluoromethane, and trimethylbenzene[1,2,4-], and trimethylbenzene[1,3, 5-] have K_{oc} values above 500 L/kg, indicating a very low potential to migrate toward groundwater. The COPCs with K_{oc} values less than 500 L/kg are acetone, benzoic acid, hexanone[2-], methylene chloride, trichloroethene, trichloroethane[1,1,1-], tetrachloroethene, toluene, trichlorofluoromethane, xylene[1,2-], and xylene[1,3-] + xylene[1,4-].

Anthracene, Aroclor-1242, Aroclor-1248, 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, fluorene, phenanthrene, and pyrene are the least mobile and the most likely to bioaccumulate. The more soluble and volatile COPCs acetone, benzoic acid, hexanone[2-], methylene chloride, tetrachloroethene, toluene, trichlorofluoromethane, xylene[1,2-], and xylene[1,2-] + xylene[1,4-] are more mobile but are also more likely to travel toward the atmosphere and not migrate toward groundwater. Because the organic COPCs were detected at low concentrations and the extent is defined, they are not likely to migrate to groundwater.

I-3.2.3 Radionuclides

Radionuclides are generally not highly soluble or mobile in the environment, particularly in the semiarid climate of the Laboratory. The physical and chemical factors that determine the distribution of radionuclides within soil and tuff are the K_d, the pH of the soil and other soil characteristics (e.g., sand or clay content), and the Eh. The interaction of these factors is complex, but K_d values provide 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 values. Radionuclides 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-3.2-3 presents physical and chemical properties of the radionuclide COPCs identified at the Upper Cañada del Buey Aggregate Area sites. Uranium-234, uranium-235/236 and uranium-238 have a very low potential to migrate towards groundwater.

- Uranium is a natural and commonly occurring radioactive element present in nearly all rock and soil. The mobility of uranium in soil and its vertical transport to groundwater depend on properties of the soil such as pH, Eh, concentration of complexing anions, porosity of the soil, soil-particle size, and sorption properties as well as the amount of water available. In general, the actinide nuclides form comparatively insoluble compounds in the environment and are therefore not considered biologically mobile. The actinides are transported in ecosystems mainly by physical and sometimes chemical processes. They tend to attach, sometimes strongly, to surfaces; and tend to accumulate in soil and sediment, which ultimately serve as strong reservoirs. Subsequent movement is largely associated with geological processes such as erosion and sometimes leaching.

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. If an appropriate UCL of the mean could not be calculated or if the UCL exceeded the maximum concentration, the maximum detected concentration (or the maximum detection limit) of the COPC was used as the EPC. Calculation of UCLs of the mean concentrations was done using the U.S. Environmental Protection Agency (EPA) ProUCL 4.00.05 (EPA 2010, 109944), 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 ProUCL software performs distributional tests on the data set for each COPC and calculates the most appropriate UCL based on the distribution of the data set. The UCL for the recommended calculation method was used as the EPC, and the 95% UCL was selected as the representative UCL. Environmental data may have a normal, lognormal, or gamma distribution but are often nonparametric (no definable shape to the distribution). The ProUCL documentation strongly recommends against using the maximum detected concentration for the EPC. However, for COPCs with less than five detected values, the maximum detected concentration was

used to represent the EPC because the resultant statistical estimate may not be reliable. 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-2.2-12. Input and output data files for ProUCL calculations are provided on CD as Attachment I-1.

I-4.0 HUMAN HEALTH RISK-SCREENING ASSESSMENTS

The human health risk screening assessments were conducted for four sites within the Upper Cañada del Buey Aggregate Area where extent is defined. All sites were screened for the industrial scenario using data from 0–1 ft bgs, and the construction worker and residential scenarios using data from 0–10 ft bgs. The human health risk-screening assessments compare either the EPC of each COPC with SSLs for chemicals and screening action levels (SALs) for radionuclides. .

I-4.1 SSLs

Human health risk-screening assessments were conducted using the SSLs obtained from NMED guidance (NMED 2009, 108070) or EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm). The SSL are based on either a cancer risk of 1×10^{-5} or a hazard quotient (HQ) of 1.0. 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 for a COPC, the construction worker SSLs were calculated using toxicity values from EPA regional screening tables (http://www.epa.gov/earth1r6/6pd/rcra_c/pd-n/screen.htm) and exposure parameters from NMED (2009, 108070).Surrogate chemicals were used for some COPCs without a screening value based on structural similarity or because the COPC is a breakdown product (NMED 2003, 081172). Exposure parameters used to calculate the SSLs are presented in Table I-4.1-1.

Radionuclide SALs are used for comparison with radionuclide COPC EPCs and were derived using the residual radioactive (RESRAD) model, Version 6.5 (LANL 2009, 107655). The SALs are based on a 15-mrem/yr dose (DOE 2000, 067489). Exposure parameters used to calculate the SALs are presented in Tables I-4.1-2 and I-4.1-3.

I-4.2 Results of the Human Health Risk Screening Evaluations

The EPC of each COPC was compared with the SSL/SAL for the appropriate scenario. The EPCs for carcinogenic COPCs were divided by the SSL and multiplied by 1×10^{-5}. The sum of the cancer risks were compared with the NMED target cancer risk level of 1×10^{-5} (NMED 2009, 108070). A HQ was generated for each noncarcinogenic 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 (NMED 2009, 108070). The radionuclide EPCs were divided by the SAL and multiplied by 15 mrem/yr. The sum of the doses were compared the U.S. Department of Energy (DOE) target level of 15 mrem/yr (DOE 2000, 067489). The results of the human health screening evaluations are presented in Tables I-4.2-1 to I-4.2-36.

I-4.2.1 SWMU 46-002

The results of the risk-screening assessments for the industrial scenario are presented in Tables I-4.2-1 to I-4.2-3. The total excess cancer risk for the industrial scenario is 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of

1.0 (NMED 2009, 108070). The total dose for the industrial scenario is 0.05 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessments for the construction worker scenario are presented in Tables I-4.2-4 to I-4.2-6. The total excess cancer risk is 5×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the construction worker scenario is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessments for the residential scenario are presented in Tables I-4.2-7 to I-4.2-9. The total excess cancer risk is approximately 2×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.1, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the residential scenario is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.2 SWMU 46-004(m)

The results of the risk-screening assessments for the industrial scenario are presented in Tables I-4.2-10 to I-4.2-12. The total excess cancer risk is 6×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the industrial scenario is 0.04 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessments for the construction worker scenario are presented in Tables I-4.2-13 to I-4.2-15. The total excess cancer risk is 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the construction worker scenario is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

The results of the risk-screening assessments for the residential scenario are presented in Tables I-4.2-16 to I-4.2-18. The total excess cancer risk is approximately 7×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.04, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose for the residential scenario is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489).

I-4.2.3 SWMU 46-004(p)

Human health risk-screening assessments were not conducted for SWMU 46-004(p) because sampling was conducted between 10–26 ft bgs, and no COPCs were identified between 0–10 ft bgs. Therefore, no complete pathways to receptors and no potential unacceptable risk exist at this site.

I-4.2.4 SWMU 46-006(b)

The results of the risk-screening assessments for the industrial scenario are presented in Tables I-4.2-19, I-4.2-20, and I-4.2-25. The total excess cancer risk is 6×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070). Total petroleum hydrocarbon (TPH) diesel range organics (DRO) EPC was compared to the NMED industrial screening guideline for diesel No. 2 (NMED 2006, 094614). The industrial HQ is 0.3, which is below the NMED target HI of 1.0.

The results of the risk-screening assessments for the construction worker scenario are presented in Tables I-4.2-21, I-4.2-22, and I-4.2-26. The total excess cancer risk is approximately 7×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.009, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO EPC was compared with the NMED industrial screening guideline for diesel No. 2 (NMED 2006, 094614). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0.

The results of the risk-screening assessments for the residential scenario are presented in Tables I-4.2-23, I-4.2-24 and I-4.2-27. The total excess cancer risk is approximately 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). TPH-DRO EPC was compared to the NMED residential screening guideline for diesel No. 2 (NMED 2006, 094614). The TPH-DRO HQ is 0.3, which is below the NMED target HI of 1.0.

I-4.2.5 SWMU 46-006(g)

The results of the risk-screening assessments for the industrial scenario are presented in Tables I-4.2-28, I-4.2-29, and I-4.2-34. The total excess cancer risk is 9×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.002, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO EPC was compared with the NMED industrial screening guideline for diesel No. 2 (NMED 2006, 094614). The TPH-DRO HQ is 0.06, which is below the NMED target HI of 1.0.

The results of the risk-screening assessments for the construction worker scenario are presented in Tables I-4.2-30, I-4.2-31, and I-4.2-35. The total excess cancer risk is approximately 7×10^{-9}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.02, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO was identified as a COPC and compared with the NMED industrial screening guideline for diesel No. 2 (NMED 2006, 094614). The TPH-DRO HQ is 0.06, which is below the NMED target HI of 1.0.

The results of the risk-screening assessments for the residential scenario are presented in Tables I-4.2-32, I-4.2-33, and I-4.2-36. The total excess cancer risk is approximately 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.06, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO EPC was compared with the NMED residential screening guideline for diesel No. 2 (NMED 2006, 094614). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0.

I-4.2.6 AOC C-46-001

Human health risk-screening assessments were not conducted for AOC C-46-001 because no COPCs were identified. Therefore, no potential unacceptable risk exists at this site.

I-4.3 Evaluation of Vapor Intrusion

The vapor-intrusion indoor air pathway was not evaluated because VOCs are not and/or were not used at these sites; the sites have only a few VOCs detected (2–10 compounds) with concentrations near or below the estimated quantitation limits (EQLs); detected concentrations are shallow (generally 7 ft or less) and sporadic in nature (five or fewer detections per VOC); some sites [SWMU 46-004(m)] are located on the slope leading into Cañada del Buey; and none of the sites is currently occupied, nor are the sites expected to be in the future. SWMU 46-002 was a surface impoundment system that received sanitary wastewater from buildings within the fenced area of TA-46. SWMU 46-004(m) was a former outfall that

discharged to Cañada del Buey. SWMU 46-006(b) was a former storage shed used for short-term storage of oil drums, vacuum pumps, optical tables, other laboratory equipment, and electrical equipment with PCB-containing oil. SWMU 46-006(g) was a storage shed used in experiments involving plasma vaporization of depleted uranium powder. SWMU 46-004(p) and AOC C-46-001 either did not have any VOCs detected or VOCs were not related to the site operations. These sites also are not, nor were they in the past, used to store solvents and, therefore, no large quantities of VOCs were present. Given these conditions, a VOC plume is not present at any of these sites that would impact the vapor-intrusion pathway.

I-4.4 Uncertainty Analysis

The human health risk-screening assessments are subject to varying degrees and types of uncertainty. Aspects of data evaluation and COPC identification, exposure assessment, toxicity assessment, and the additive approach all contribute to uncertainties in the risk-evaluation process. Each or all of these uncertainties may affect the evaluation results.

I-4.4.1 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. Inorganic chemicals are appropriately identified as COPCs because only those chemicals that are either detected or have detection limits above background are retained for further analysis. However, established BVs may not accurately represent certain subunits of the Bandelier Tuff (e.g., fractured, clay-rich material) that may be encountered during sampling because such data are not included in the background data set. Some inorganic chemicals and radionuclides may also have been retained as COPCs that are not site-related. There are no established BVs for organic chemicals; therefore, all detected organic chemicals are identified as COPCs and are retained for further analysis.

Other uncertainties associated with the inorganic and organic chemicals may include errors in sampling, laboratory analysis, and data analysis. However, because concentrations used in the risk screening evaluations are less than estimated detection or quantitation limits, data evaluation uncertainties are expected to have little effect on the risk screening results.

I-4.4.2 Exposure Assessment

The following exposure assessment uncertainties were identified for the risk assessment: (1) the applicability of the standard scenarios, (2) the assumptions underlying the exposure pathways, and (3) the derivation of EPCs.

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, whether or not a given pathway is complete, 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 (such as are found in NMED 2009, 108070) are combined to estimate exposure for any one pathway, the resulting risk can exceed the 99th 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 cause exposure in the same manner as if they were in soil overestimates the potential risk to receptors.

The exposure time of 9 h versus 8 h for the construction worker radionuclide SALs is intended to account for time spent on-site for lunch but not working because it is assumed a construction worker is more likely to bring a lunch than to go off-site for lunch. This extra hour is overly protective of a construction worker in that during this extra hour the soil ingestion rate, inhalation rate, and particulate emission factor are much lower than during the 8 active work hours. A longer construction work day was assumed for evaluating radionuclide dose with the RESRAD computer code because, unlike chemical intake, radiation dose for all construction exposure pathways is linearly related to the length of time spent in the contaminated area. The chemical SSLs are sufficiently protective and appropriate for this scenario using an 8-h exposure time because, as noted above, the exposure parameters are conservative and no modifications are warranted.

Uncertainty is introduced in the concentration aggregation of data for estimating the EPCs at a site. The use of a UCL is intended to provide a protective, upper-bound estimate of the COPC concentration and is assumed to be representative of 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.

I-4.4.3 Toxicity Assessment

The primary uncertainty associated with the screening values is related to the derivation of toxicity values used in their calculation. Toxicity values (slope factors [SFs] and reference doses [RfDs]) were used to derive the screening values used in this 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.

I-4.4.3.1 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 between other animals and humans in chemical absorption, metabolism, excretion, and toxic response. 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 into each of these steps, resulting in the overestimation of potential risk.

I-4.4.3.2 Individual Variability in the Human Population

For noncarcinogenic effects, the degree of human variability in physical characteristics is important in determining the risks that can be expected at low exposures and in determining the no observed adverse effect level (NOAEL). The NOAEL uncertainty factor approach incorporates a factor of 10 to reflect the possible interindividual variability in 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.

I-4.4.3.3 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.

I-4.4.3.4 Chemical Form of the COPC

COPCs may be bound to the environmental matrix and not available for absorption into the human body. However, the exposure scenarios default to the assumption that the COPCs are bioavailable. This assumption can lead to an overestimation of the total risk.

I-4.4.3.5 Use of Surrogate Chemicals

The use of surrogates for chemicals that do not have EPA-approved or provisional toxicity values also contributes to uncertainty in risk assessment. Surrogates were used to establish toxicity values for benzo[g,h,i]perylene and isopropyltoluene[4-] based on structural similarity or because it is the parent compound (NMED 2003, 081172). The overall impact of surrogates on the risk assessment is minimal because the COPCs were detected at low concentrations and the HQs and cancer risks were minimal.

Iodomethane was detected in one sample (0.00238 mg/kg) at SWMU 46-002 and does not have published toxicity values or a surrogate identified. The infrequency of detection and very low concentration below the EQL indicates that iodomethane does not contribute to the potential risk.

I-4.4.4 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 over- 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-4.5 Interpretation of Human Health Risk Screening Results

I-4.5.1 SWMU 46-002

Industrial Scenario

The total excess cancer risk is 1×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.05 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 8×10^{-7}, based on a comparison with EPA's outdoor worker preliminary remediation goals (PRGs) for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

Construction Worker Scenario

The total excess cancer risk is 5×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 7×10^{-7}, based on a comparison with EPA's outdoor worker PRGs for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

Residential Scenario

The total excess cancer risk is approximately 2×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.1, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 2×10^{-6}, based on a comparison with EPA's residential PRGs for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

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

I-4.5.2 SWMU 46-004(m)

Industrial Scenario

The total excess cancer risk is 6×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.004, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.04 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 4×10^{-7}, based on a comparison with EPA's outdoor worker PRGs for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls). .

Construction Worker Scenario

The total excess cancer risk is 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.01, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.1 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 3×10^{-7}, based on a comparison with EPA's outdoor worker PRGs for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

Residential Scenario

The total excess cancer risk is approximately 7×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.04, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The total dose is 0.2 mrem/yr, which is below the DOE target dose limit of 15 mrem/yr (DOE 2000, 067489). The total dose is equivalent to a total risk of 4×10^{-7}, based on a comparison with EPA's residential PRGs for radionuclides (http://epa-prgs.ornl.gov/radionuclides/download/rad_master_prg_table_pci.xls).

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

I-4.5.3 SWMU 46-004(p)

Human health risk-screening assessments were not conducted for SWMU 46-004(p) because sampling was conducted between 10–26 ft bgs, and no COPCs were identified between 0–10 ft bgs. Therefore, no complete pathways to receptors and no potential unacceptable risk exist at this site.

I-4.5.4 SWMU 46-006(b)

Industrial Scenario

The total excess cancer risk is 6×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.001, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.3, which is below the NMED target HI of 1.0.

Construction Worker Scenario

The total excess cancer risk is approximately 7×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.009, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0.

Residential Scenario

The total excess cancer risk is approximately 3×10^{-6}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.03, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.3, which is below the NMED target HI of 1.0.

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

I-4.5.5 SWMU 46-006(g)

Industrial Scenario

The total excess cancer risk is 9×10^{-8}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.002, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.06, which is below the NMED target HI of 1.0.

Construction Worker Scenario

The total excess cancer risk is approximately 7×10^{-9}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is approximately 0.02, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.06, which is below the NMED target HI of 1.0.

Residential Scenario

The total excess cancer risk is approximately 2×10^{-7}, which is below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070). The HI is 0.06, which is below the NMED target HI of 1.0 (NMED 2009, 108070). The TPH-DRO HQ is 0.1, which is below the NMED target HI of 1.0.

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

I-4.5.6 AOC C-46-001

Human health risk-screening assessments were not conducted for AOC C-46-001 because no COPCs were identified. Therefore, no potential unacceptable risk exists at this site.

I-5.0 ECOLOGICAL RISK SCREENING ASSESSMENTS

The approach for conducting ecological risk screening assessments is described in the "Screening Level Ecological Risk Assessment Methods, Revision 2" (LANL 2004, 087630). The assessment consists of the following four parts: (1) a scoping evaluation, (2) a screening evaluation, (3) an uncertainty analysis, and (4) an interpretation of the results.

I-5.1 Scoping Evaluation

The scoping evaluation establishes the breadth and focus of the screening assessment. The ecological scoping checklists for the four sites evaluated within this aggregate area are useful tools for organizing existing ecological information (Attachment I-2). The information in the scoping checklists is used to determine whether ecological receptors may be affected, identify the types of receptors that may be present, and develop the ecological conceptual site model for each site. The sites are in industrially developed areas.

The scoping portion of the assessment indicated that terrestrial receptors were appropriate for evaluating the concentrations of contaminants in soil and tuff samples. Aquatic receptors were not evaluated because no aquatic communities and no aquatic habitat or perennial source of water exists at any of the sites evaluated. The depth of the regional aquifer (greater than 1000 ft bgs) and the semiarid climate limit 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 (Figure I-3.1-1). 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),
- the desert cottontail (mammalian herbivore),
- the red fox (mammalian carnivore),
- the American robin (avian insectivore, avian omnivore, and avian herbivore), and
- the American kestrel (avian intermediate carnivore and avian carnivore (surrogate for threatened and endangered [T&E] species).

The rationale for these receptors is presented in "Screening Level Ecological Risk Assessment Methods, Revision 2" (LANL 2004, 087630). The ecological screening levels (ESLs) are derived for each of these receptors where information was available. 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 toxicity reference values (TRVs), are presented in the ECORISK Database, Version 2.5 (LANL 2010, 110846).

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 assessment, assessment endpoints are attributes of ecological receptors that may be adversely affected by exposure to hazardous wastes from past operations (EPA 1997, 059370), wherein receptors are populations and communities (EPA 1999, 070086).

The ecological screening assessment is designed 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). The protection of individual organisms within these designated protected species could also be achieved at the population level; the populations of these species tend to be small, and the loss of an individual adversely affects the species.

In accordance with this guidance, the Laboratory developed generic assessment endpoints to ensure that values at all levels of the food chain are considered in the ecological screening process (LANL 1999, 064137). 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 TRVs. Toxicity studies used in the development of TRVs included only those in which the evaluated adverse effect 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 applicability to the ecosystem of concern.

I-5.3 Screening Evaluation

The ecological risk-screening assessments identify chemicals of potential ecological concern (COPECs) based on the comparison of EPCs (with ESLs in accordance with Laboratory guidance [LANL 2004, 087630]). The EPCs are presented in Tables I-2.2-2, I-2.2-5, I-2.2-8, and I-2.2-11, and the derivation is summarized in Section I-3.4. The ESLs for all COPCs and receptors evaluated were obtained from the ECORISK Database, Version 2.5 (LANL 2010, 110846) and are presented in Table I-5.3-1.

The risk-screening assessments involve the calculation of HQs for all COPECs and all screening receptors (LANL 2004, 087630). The HQs are the ratios of the EPCs (UCLs, maximum detected concentrations, or maximum detection limits) to the ESLs. The analysis begins with a comparison of the minimum ESL to the EPC for each COPC. The COPCs with HQs greater than 0.3 are identified as COPECs and are evaluated further. The COPECs are evaluated by receptor with individual HQs for a receptor summed to produce an HI. For the purposes of the ecological screening, it is assumed that nonradionuclides have common toxicological effects. An HI greater than 1.0 requires further assessment to determine if exposure to multiple COPECs results in 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. COPCs without ESLs are retained as COPECs and are evaluated further in the uncertainty section.

Butylbenzene[n-], butylbenzene[sec-], ethylbenzene, isopropyltoluene[4-], nitrate, propylbenzene[1-], perchlorate, TPH-DRO, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-] do not have ESLs for any receptors. As a result, these COPCs are retained as COPECs and discussed in the uncertainty section.

I-5.3.1 SWMU 46-002

The results of the minimum ESL comparisons are presented in Table I-5.3-2. Antimony, copper, cyanide (total), mercury, selenium, silver, Aroclor-1248, Aroclor-1254, benzoic acid, and bis(2-ethylhexyl)phthalate have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-3 presents the HQs and HIs for each receptor/COPEC at SWMU 46-002. All the receptors have HIs greater than 1.0 and are discussed in the uncertainty analysis.

Ethylbenzene, isopropyltoluene[4-], nitrate, perchlorate, xylene[1,2-], and xylene[1,3-]+xylene[1,4-] do not have ESLs for any receptor. As a result, these COPCs are retained as COPECs and discussed in the uncertainty section.

I-5.3.2 SWMU 46-004(m)

The results of the minimum ESL comparisons are presented in Table I-5.3-4. Antimony, copper, mercury, selenium, zinc, acenaphthene, benzo(a)anthracene, and bis(2-ethylhexyl)phthalate have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-5 presents the HQs and HIs for each receptor/COPEC at SWMU 46-004(m). The HI analysis indicates all receptors, except the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed in the uncertainty section.

Xylene [1,3-]+xylene[1,4-] does not have ESLs for any receptor. As a result, this COPC is retained as a COPEC and discussed in the uncertainty section.

I-5.3.3 SWMU 46-004(p)

An ecological risk-screening assessment was not conducted for SWMU 46-004(p) because sampling was conducted between 10–26 ft bgs, and no COPCs were identified between 0–5 ft bgs. Therefore, no complete pathways to ecological receptors and no ecological risk exist at this site.

I-5.3.4 SWMU 46-006(b)

The results of the minimum ESL comparisons are presented in Table I-5.3-6. Antimony, selenium, Aroclor-1254, and bis(2-ethylhexyl)phthalate have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-7 presents the HQs and HIs for each receptor/COPEC at SWMU 46-0006(b). The HI analysis indicates all receptors, except the desert cottontail, earthworm, and the red fox, have HIs greater than 1.0. The COPECs and receptors are discussed in the uncertainty section.

Butylbenzene[n-], butylbenzene[sec-], isopropyltoluene[4-], propylbenzene[1-], TPH-DRO, trimethylbenzene[1,2,4-], trimethylbenzene[1,3,5-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-] do not have ESLs for any receptor. As a result, these COPCs are retained as COPECs and discussed in the uncertainty section.

I-5.3.5 SWMU 46-006(g)

The results of the minimum ESL comparisons are presented in Table I-5.3-8. Antimony, selenium, Aroclor-1254, and Aroclor-1260 have HQs greater than 0.3 and are retained as COPECs.

Table I-5.3-9 presents the HQs and HIs for each receptor/COPEC at SWMU 46-006(g). The HI analysis indicates the robin and deer mouse have HIs greater than 1.0 and the other receptors have HIs less than or equivalent to 1.0. The COPECs and receptors are discussed in the uncertainty section.

TPH-DRO does not have an ESL for any receptor. As a result, TPH-DRO is retained as a COPEC and is discussed in the uncertainty section.

I-5.3.6 AOC C-46-001

An ecological risk-screening assessment was not conducted for AOC C-46-001 because no COPCs were identified. Therefore, no ecological risk exists at this site.

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. The following is a qualitative uncertainty analysis of the issues relevant to evaluating potential ecological risk at each site.

I-5.4.1 Chemical Form

The assumptions used in the ESL derivations are conservative and not necessarily representative of actual conditions. These assumptions include maximum chemical bioavailability, maximum receptor ingestion rates, minimum body weight, and additive effects of multiple COPECs. These factors tend to result in conservative ESL estimates, 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. Toxicological data are typically based on the most toxic and bioavailable chemical species, which are not typically found in the environment. Inorganic, radionuclide, and organic COPECs are generally not 100% bioavailable to receptors in the natural environment because of interference from other natural processes, such as 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 are biased toward overestimating the potential risk to receptors.

I-5.4.2 Exposure Assumptions

The EPCs used in the HQ calculations are the UCLs or the maximum detected concentrations in the soil, fill, or tuff to depths of 5 ft bgs and are conservative estimates of exposure to each COPEC. The sampling efforts 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. These exposure assumptions for terrestrial receptors in the Upper Cañada del Buey Aggregate Area are likely to overestimate potential ecological exposure and risk.

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 probably 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 tend to lead to an overestimation of potential risk.

I-5.4.4 Comparison with Background Concentrations

Although concentrations of inorganic chemicals were detected above background, the UCLs for some inorganic chemicals were similar to the range of background concentrations, indicating no potential risk from exposure across the site. This relationship is presented in Tables I-5.4-1 to I-5.4-4. The UCL is intended to represent the average concentration of a contaminant and the reasonable maximum exposure (RME) over time for a receptor at a site. The RME is the maximum exposure that is reasonably expected to occur at a site and represents the average concentration that is contacted over the exposure period. Although the RME concentration does not reflect the maximum concentration that could be contacted at any one time, it is regarded as a reasonable estimate of the concentration that could be

contacted over time. This is because an assumption of long-term contact with the maximum concentration is generally not reasonable. If the EPCs are similar to the range of background concentrations, then the receptor is exposed to an average concentration, which is comparable to naturally occurring levels across the site. Whether some concentrations are elevated and reflect site releases is incorporated into the UCL calculations. If the EPC is similar to the range of background concentrations, the RME across the site is indistinguishable from background. For example, if the chromium EPC is 15 mg/kg and the ranges of background concentrations are 1.9 to 36.5 mg/kg for soil and 0.25 mg/kg to 13 mg/kg for Qbt 2, Qbt 3, and Qbt 4, the EPC is not a true reflection of potential toxicity. It is also an indication that site concentrations are not substantially different from background concentrations. Therefore, a conclusion that inorganic chemicals with EPCs similar to the range of background concentrations are contributing risk overestimates the potential risk and does not reflect actual exposure and risk.

SWMU 46-002

The ecological screening assessment for this site is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs for some of the inorganic COPECs are similar to the range of background concentrations for soil and tuff, indicating exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-1). Antimony is eliminated as a COPEC because its EPC is similar to the range of background concentrations. Copper, cyanide, mercury, selenium, and silver are retained as COPECs.

SWMU 46-004(m)

The ecological screening assessment for this site is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs for some of the inorganic COPECs are similar to the range of background concentrations for soil and tuff, indicating exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-2). Copper, mercury, and selenium are eliminated as COPECs because their EPCs are similar to the range of background. Antimony and zinc are retained as COPECs. In the cases of selenium and antimony, there were no detected concentrations.

SWMU 46-006(b)

The ecological screening assessment for this site is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs for some of the inorganic COPECs are similar to the range of background concentrations for soil and tuff, indicating exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-3). Antimony and selenium are eliminated as COPECs because their EPCs are similar to the range of background. In the both cases, there were also no detected concentrations.

SWMU 46-006(g)

The ecological screening assessment for this site is based on the exposure of ecological receptors to contamination to a depth of 5 ft bgs. The EPCs for some of the inorganic COPECs are similar to background concentrations for soil and tuff, indicating exposure to these inorganic chemicals across the site is similar to background (Table I-5.4-4). Antimony and selenium are eliminated as COPECs because their EPCs are similar to the range of background. In the both cases, there were also no detected concentrations.

I-5.4.5 Area Use Factors

In addition to the direct comparison of the EPC 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. Because T&E species must be assessed on an individual, basis (EPA 1999, 070086), the AUF is used for the Mexican spotted owl. The kestrel (top carnivore) is used as the surrogate receptor for the Mexican spotted owl. The unadjusted HIs for the kestrel (top carnivore) are less than 1.0 for all sites. The site areas range from 0.002 hectares (ha) to 0.125 ha, and the HR for the Mexican spotted owl is 366 ha. Therefore, the AUFs for the Mexican spotted owl range from 0.0005 to 0.008. Application of the AUFs for the Mexican spotted owl to the HQs for the kestrel (top carnivore) minus the COPECs eliminated based on similarity to background results in adjusted HIs ranging from 0.00000007 to approximately 0.002. Therefore, no potential exists for adverse impacts 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 is to estimate the spatial extent of the area inhabited by the local population that overlaps with the contaminated area. The population area for each receptor is based on the individual receptor home range and its dispersal distance (Bowman et al. 2002, 073475). 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, the median dispersal distance becomes 3.6 times the square root of the HR ($R^2 = 0.91$) (Bowman et al. 2002, 073475). If it is assumed that the receptors can disperse over 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 for each receptor can be derived by $\pi(3.6\sqrt{HR})^2$ or approximately 40HR.

The population area use factor (PAUF) is calculated by dividing the site area by the population area of the receptor. The PAUFs for each site are presented in Tables I-5.4-5, I-5.4-6, I-5.4-7, and I-5.4-8. The HQs are recalculated minus the COPECs eliminated based on similarity to background (section I-5.4.4) and adjusted by multiplying by the PAUFs. If the PAUF is greater than 1, the HQs are not adjusted for that receptor. The HQs for the plant and earthworm are not adjusted by PAUFs because these receptors do not have HRs. The adjusted HIs for each site are presented in Tables I-5.4-9, I-5.4-10, I-5.4-11, and I-5.4-12.

I-5.4.7 LOAEL Analysis

Several sites have adjusted HIs greater than 1.0 for one or more receptors. To address these HIs and reduce the associated uncertainty, a LOAEL analysis was conducted using ESLs calculated based on a LOAEL rather than a NOAEL. The LOAEL-based ESLs were calculated based on toxicity information in the ECORISK Database, Version 2.4 (LANL 2009, 107524) and are presented in Table I-5.4-13, along with the basis for each LOAEL used in the ESL calculations. The analysis addresses some of the uncertainties and conservativeness of the ESLs used in the initial screening assessments. The HI analyses were conducted using the LOAEL-based ESLs. The HQs and HIs calculated for this subset of receptors and COPECs were also adjusted using the PAUFs, if the wildlife receptor HIs exceeded 1.0 using the LOAEL-based ESLs.

I-5.4.8 Site Discussions

SWMU 46-002

The adjusted HIs for SWMU 46-002 (Table I-5.4-9) are less than or equivalent to 1.0 for the kestrel (intermediate and top carnivore), robin (herbivore and omnivore), cottontail, deer mouse, montane shrew, and fox. The adjusted HIs for the other receptors range from 2 to 28. The HIs for the robin (insectivore) are primarily from mercury and bis(2-ethylhexyl)phthalate. The primary COPECs for the earthworm are copper, mercury, and selenium, and for the plant they are is copper and selenium.

The LOAEL analysis results in HIs of 3 for the earthworm and 1 for the plant (Table I-5.4-14). In addition, field observations made during the site visit found no indication of adverse effects on the plant community (Attachment I-2). Because the plant community does not appear to be affected by COPECs, the earthworm population is also probably not affected. Field observations indicated no adverse effects of any kind, and there appears to be a functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals. Therefore, the HIs are not consistent with field observations and do not indicate potential risk to these receptors.

The LOAEL analysis results in an HI of 14 for the robin (insectivore) (Table I-5.4-14). The adjusted LOAEL HI for the robin (insectivore) is 0.1 (Table I-5.4-15). Therefore, the HI does not indicate potential risk to the robin (insectivore).

SWMU 46-004(m)

The adjusted HIs for SWMU 46-004(m) are less than or equivalent to 1.0 for all receptors, except for the plant (Table I-5.4-10). The adjusted HI for the plant is 27 and is primarily from antimony.

The LOAEL analysis results in an HI of 3 for the plant (Table I-5.4-16). The plant HI is from antimony (2.5) and is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the plant. In addition, field observations made during the site visit found no indication of adverse effects on the plant community (Attachment I-2). Field observations indicated no adverse effects of any kind, and there appears to be a functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals. Therefore, the HI does not indicate potential risk to the plant.

SWMU 46-006(b)

The adjusted HIs for SWMU 46-006(b) are less than 1.0 for all receptors (Table I-5.4-11).

SWMU 46-006(g)

The adjusted HIs for SWMU 46-006(g) are less than 1.0 for all receptors (Table I-5.4-12).

I-5.4.9 COPECs without ESLs

Several COPECs do not have ESLs for any receptor in version 2.4 of the ECORISK Database (LANL 2009, 107524) because literature searches for relevant toxicity data for these chemicals have not been completed. In an effort to address this uncertainty and provide a quantitative assessment of potential ecological risk, several online toxicity databases have been searched to determine if any relevant toxicity information is available. The online databases searched were 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, USDA Integrated Pesticide Management Database, American Bird Conservancy Pesticide Toxicity Database, and Oak Ridge National Laboratory Risk Assessment Information System. Toxicity data were obtained for several COPECs and receptors as a result of this online database search, and interim ESLs were calculated. The ESLs are termed interim because the information and calculations are still undergoing review, and the documentation required for the ECORISK Database has not yet been completed. As a result, the ESLs are not yet in the ECORISK Database. Once the development process is completed, the interim ESLs will be finalized and included in the appropriate revision to the ECORISK Database. Although the majority of the COPECs listed did not have any relevant toxicity data in the online databases listed above, a search of the literature continues in an effort to determine if any relevant toxicity information exists.

In the absence of a chemical-specific ESL, COPEC concentrations can be compared to ESLs for a surrogate chemical. Comparison to surrogate ESLs provides an estimate of potential effects of a chemically related compound and a line of evidence to indicate the likelihood that ecological receptors are potentially impacted.

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 often infrequently detected across the site. In these cases, comparisons to residential human health SSLs are presented as part of a qualitative assessment. The comparison of COPEC concentrations to residential human health SSLs is a viable alternative for several reasons. Animal studies are used to infer effects on humans and is the basic premise of modern toxicology (EPA 1989, 008021). In addition, toxicity values derived for the calculation of human health SSLs are often based on potential effects that are more sensitive than the ones used to derive ESLs (e.g., cellular effects for humans versus survival or reproductive effects for terrestrial animals). The EPA also applies uncertainty factors or modifying factors to ensure that the toxicity values are protective (i.e., they are adjusted by uncertainty factors to values much lower than the study results). COPEC concentrations compared with these values are an order of magnitude or more below the SSLs, which corresponds to uncertainty factors of 10 or more. Therefore, it is assumed the differences in toxicity would not be more than an order of magnitude for any given chemical. The relative difference between values provides a weight of evidence that the potential toxicity of the COPC is likely to be low or very low to the receptor(s). The COPECs without ESLs were common to many of the sites and are discussed below for each site.

I-5.4.9.1 SWMU 46-002

No ESLs are available for ethylbenzene, isopropyltoluene[4-], nitrate, perchlorate, xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

Ethylbenzene was detected in four samples, with a maximum detected concentration of 0.00133 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen ethylbenzene and resulted in a maximum HQ of 0.00006. Because the HQ is less than 0.3, ethylbenzene is not retained as a COPEC.

Isopropyltoluene[4-] was detected in one sample at a maximum detected concentration of 0.000948 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen isopropyltoluene[4-] and resulted in a maximum HQ of 0.00004. Because the HQ is less than 0.3, isopropyltoluene[4-] is not retained as a COPEC.

Nitrate was detected in 15 samples with an EPC of 2.019 mg/kg. The NMED residential SSL for nitrate is 100,000 mg/kg, indicating that potential toxicity is very low. In addition, nitrate is naturally occurring and

the detected concentrations likely reflect natural levels. Because of the potential low toxicity and naturally occurring concentrations, nitrate is not retained as a COPEC.

Perchlorate was detected in two samples, with a maximum concentration of 0.000761 mg/kg. The NMED residential SSL of 54.5 mg/kg indicates the potential toxicity of perchlorate is low. Because of the potential low toxicity and the infrequent detection, perchlorate is not retained as a COPEC.

Xylene[1,2-] was detected in one sample at a maximum detected concentration of 0.000561 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the montane shrew) was used to screen xylene[1,2-] and resulted in a maximum HQ of 0.0004. Because the HQ is less than 0.3, xylene[1,2-] is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in five samples with an EPC of 0.00137 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the deer mouse) was used to screen xylene[1,3-]+xylene[1,4-] and resulted in a maximum HQ of 0.001. Because the HQ is less than 0.3, xylene[1,3-]+xylene[1,4-] is not retained as a COPEC.

I-5.4.9.2 SWMU 46-004(m)

No ESLs are available for xylene[1,3-]+xylene[1,4-].

Xylene[1,3-]+xylene[1,4-] was detected in one sample at a maximum detected concentration of 0.000358 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the deer mouse) was used to screen xylene[1,3-]+xylene[1,4-] and resulted in a maximum HQ of 0.0003. Because the HQ is less than 0.3, xylene[1,3-]+xylene[1,4-] is not retained as a COPEC.

I-5.4.9.3 SWMU 46-006(b)

No ESLs are available for butylbenzene[n-], butylbenzene[sec-], isopropyltoluene, propylbenzene[1-], TPH-DRO, trimethylbenzene[1,2,4-], trimethylbenzene[1,2,5-], xylene[1,2-], and xylene[1,3-]+xylene[1,4-].

Butylbenzene[n-] was detected in one sample at a maximum detected concentration of 0.000545 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen butylbenzene[n-] and resulted in a maximum HQ of 0.00002. Because the HQ is less than 0.3, butylbenzene[n-] is not retained as a COPEC.

Butylbenzene[sec-] was detected in one sample at a maximum detected concentration of 0.00073 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen butylbenzene[sec-] and resulted in a maximum HQ of 0.00003. Because the HQ is less than 0.3, butylbenzene[sec-] is not retained as a COPEC.

Isopropyltoluene[4-] was detected in one sample at a maximum detected concentration of 0.000493 mg/kg. The minimum ESL for toluene (23 mg/kg for the montane shrew) was used to screen isopropyltoluene[4-] and resulted in a maximum HQ of 0.00002. Because the HQ is less than 0.3, isopropyltoluene[4-] is not retained as a COPEC.

Propylbenzene[1-] was detected in two samples with a maximum detected concentration of 0.000526 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen propylbenzene[1-] and resulted in a maximum HQ of 0.00002. Because the HQ is less than 0.3, propylbenzene[1-] is not retained as a COPEC.

TPH-DRO was detected in six samples with a maximum concentration of 380 mg/kg and an EPC of 131 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.

Trimethylbenzene[1,2,4-] was detected in two samples with a maximum detected concentration of 0.00375 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen trimethylbenzene[1,2,4-] and resulted in a maximum HQ of 0.0002. Because the HQ is less than 0.3, trimethylbenzene[1,2,4-] is not retained as a COPEC.

Trimethylbenzene[1,3,5-] was detected in two samples at a maximum detected concentration of 0.000995 mg/kg. The minimum ESL for benzene (24 mg/kg for the deer mouse) was used to screen trimethylbenzene[1,3,5-] and resulted in a maximum HQ of 0.0004. Because the HQ is less than 0.3, trimethylbenzene[1,3,5-] is not retained as a COPEC.

Xylene[1,2-] was detected in one sample at a maximum detected concentration of 0.000366 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the deer mouse) was used to screen xylene[1,2-] and resulted in a maximum HQ of 0.0003. Because the HQ is less than 0.3, xylene[1,2-] is not retained as a COPEC.

Xylene[1,3-]+xylene[1,4-] was detected in two samples, with a maximum detected concentration of 0.0058 mg/kg. The minimum ESL for xylene (1.4 mg/kg for the deer mouse) was used to screen xylene[1,3-]+xylene[1,4-] and resulted in a maximum HQ of 0.0004. Because the HQ is less than 0.3, xylene[1,3-]+xylene[1,4-] is not retained as a COPEC.

I-5.4.9.4 SWMU 46-006(g)

No ESLs are available for TPH-DRO.

TPH-DRO was detected in two samples with a maximum concentration of 64 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 Interpretation of Ecological Risk Screening Results

I-5.5.1 Receptor Lines of Evidence

Based on the ecological risk-screening assessments, several COPECs (including COPECs without ESLs) were identified at the Upper Cañada del Buey Aggregate Area sites (Tables I-5.3-2 to I-5.3-9). 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 LOAEL analyses.

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.
- The HI analyses indicated that the HI for the kestrel (top carnivore) was less than 1.0 at SWMU 46-006(g).
- Several COPECs were eliminated because their EPCs were similar to background concentrations.

- The HIs were adjusted by the PAUFs, which is the ratio of the site area to the kestrel's population area. The adjusted HIs are less than 1.0 for the kestrel (top carnivore) for all of the sites.
- The kestrel (top carnivore) is a surrogate for the Mexican spotted owl. The HI was adjusted by the AUF, which is the ratio of the site area to the individual HR. The adjusted HIs are less than 1.0 for all sites (section I-5.4.5).

These lines of evidence support the conclusion that there is no potential ecological risk to the kestrel (top carnivore) or the Mexican spotted owl at the Upper Cañada del Buey Aggregate Area sites.

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, were less than 0.3.
- The HI analyses indicated that the HI for the kestrel (top carnivore) was less than 1.0 at SWMU 46-006(g).
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HIs were adjusted by the PAUFs, which is the ratio of the site area to the kestrel's population area. The adjusted HIs were less than 1.0 for the kestrel (intermediate carnivore) for all sites.

These lines of evidence support the conclusion that no potential ecological risk to the kestrel (intermediate carnivore) exists at the Upper Cañada del Buey Aggregate Area sites.

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.
- The HI analyses indicated the HIs were equivalent to 1.0 at SWMUs 46-006(b) and 46-006(g).
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HIs were adjusted by the PAUFs, which is the ratio of the site area to the robin's population area. The adjusted HIs were less than or equivalent to 1.0 at SWMU 46-002 (herbivore, omnivore), SWMU 46-004(m) (herbivore, insectivore, omnivore), SWMU 46-006(b) (herbivore, insectivore, omnivore), and SWMU 46-006(g) (herbivore, insectivore, omnivore).
- A LOAEL analysis was conducted for SWMU 46-002. The adjusted LOAEL HI was less than 1.0.

These lines of evidence support the conclusion that no potential ecological risk to the robin (all feeding guilds) exists at the Upper Cañada del Buey Aggregate Area sites.

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 HIs were adjusted by the PAUF, which is the ratio of the site area to the deer mouse's population area. The adjusted HIs were less than or equivalent to 1.0 at all sites

These lines of evidence support the conclusion that no potential ecological risk to the deer mouse exists at the Upper Cañada del Buey Aggregate Area sites.

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.
- The HI analyses indicated that the HIs for the cottontail were less than 1 at SWMUs 46-004(m), 46-006(b), and 46-006(g).
- Several COPECs were eliminated because their EPCs were similar to background concentrations.
- The HIs were adjusted by the PAUFs, which is the ratio of the site area to the cottontail's population area. The adjusted HIs were less than 1.0 for the cottontail for all sites.

These lines of evidence support the conclusion that no potential ecological risk to the cottontail exists at the Upper Cañada del Buey Aggregate Area sites.

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 HIs were adjusted by the PAUFs, which is the ratio of the site area to the shrew's population area. The adjusted HIs were less than or equivalent to 1.0 for the shrew at all sites.

These lines of evidence support the conclusion that no potential ecological risk to the montane shrew exists at the Upper Cañada del Buey Aggregate Area sites.

Red Fox (Carnivore)

- Initial screening using the minimum ESLs eliminated a number of COPECs because the HQs for all of the receptors, including the red fox, were less than 0.3.
- The HI analyses indicated that the HIs for the red fox were less than 1.0 at SWMUs 46-004(m), 46-006(b), and 46-006(g).
- The HIs were adjusted by the PAUFs, which is the ratio of the site area to the red fox's population area. The adjusted HIs were less than 1.0 at all sites.

These lines of evidence support the conclusion that no potential ecological risk to the red fox exists at the Upper Cañada del Buey Aggregate Area sites.

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. The adjusted HIs were less than 1 at SWMUs 46-004(m), 46-006(b), and 46-006(g).
- A LOAEL analysis was conducted for SWMU 46-002 and resulted in an HI of 3.
- Field observations made during the site visit and field activities found no indication of adverse impacts on the plant community. Because the plant community does not appear to be affected by COPECs, the earthworm population is also probably not affected. Field observations indicated no adverse effects of any kind, and there appears to be a functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals.

These lines of evidence support the conclusion that no potential ecological risk to the earthworm exists at the Upper Cañada del Buey Aggregate Area sites.

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. The adjusted HIs were less than 1 at SWMUs 46-006(b) and 46-006(g).
- A LOAEL analysis was conducted for SWMUs 46-002 and 46-004(m) and resulted in HIs of 1 and 3, respectively. At SWMU 46-004(m), the potential risk is based on the maximum detection limit. The use of the detection limit substantially overestimates the potential risk to the plant. Antimony was not detected in any sample and had much lower detection limits than the one evaluated.
- The plant communities were evaluated at all sites during site visits. No evidence of adverse impacts of contamination to the plant community based on field observations was found during site visits; the plant community is typical of the surrounding area and appears healthy. Field observations indicated no adverse effects of any kind, and there appears to be functioning ecological habitat for all terrestrial receptors, including plants, invertebrates, birds, and mammals.

These lines of evidence support the conclusion that no potential ecological risk to the plant exists at the Upper Cañada del Buey Aggregate Area sites.

I-5.5.2 COPECs with No ESLs

The COPECs with no ESLs were not evaluated for each receptor. If a surrogate chemical could be identified, the minimum ESL was used to screen the COPEC. If a residential SSL was available, it was used to estimate potential toxicity. All COPECs were eliminated based on these comparisons.

The analysis of COPECs with no ESLs supports the conclusion that there is no potential ecological risk to any receptor at the Upper Cañada del Buey Aggregate Area sites.

I-5.5.3 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 kestrel, robin, deer mouse, desert cottontail, shrew, red fox, earthworm, and plant exists at the sites evaluated within the Upper Cañada del Buey Aggregate Area.

I-6.0 CONCLUSIONS AND RECOMMENDATIONS

I-6.1 Human Health

The human health risk-screening assessments indicated no potential unacceptable risks or doses from COPCs for the industrial, construction worker, and residential scenarios for any of the sites evaluated in the Upper Cañada del Buey Aggregate Area. The total excess cancer risks were below the NMED target risk level of 1×10^{-5} (NMED 2009, 108070) for the industrial, construction worker, and residential scenarios. The HIs for the industrial, construction worker, and residential scenarios were less than the NMED target HI of 1.0 (NMED 2009, 108070). The total doses for the industrial, construction worker, and residential scenarios were below the DOE target dose of 15 mrem/yr. The total equivalent risks ranged from 8×10^{-7} to 4×10^{-7} for the industrial scenario, 7×10^{-7} to 3×10^{-7} for the construction worker scenario, and 4×10^{-7} to 2×10^{-6} for the residential scenario.

In addition, risk-screening assessments for AOC C-46-001 were not conducted because no COPCs were identified. Risk-screening assessments were also not conducted for SWMU 46-004(p) because no COPCs were identified within the depth intervals relevant for exposure to receptors for any scenario. Therefore, no potential unacceptable risks or doses exist from COPCs at these sites.

Sites at TA-46 are not accessible by the public and are not planned for release by 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 Ecology

No potential ecological risks were found for any receptor based on minimum ESL comparisons, HI analyses, and comparisons to background concentrations, potential effects to populations (individuals for T&E species), and LOAEL analyses. These lines of evidence, discussed above for each receptor, and the analysis of COPECs with no ESLs support the conclusion that no potential ecological risks exist at the sites evaluated in the Upper Cañada del Buey Aggregate Area. In addition, no potential ecological risk for any receptor was found for AOC C-46-001 because no COPCs were identified. Risk-screening assessments were not conducted for SWMU 46-004(p) because no COPCs were identified within the depth interval relevant for exposure to ecological receptors. Therefore, no potential risks to ecological receptors from COPCs exist at these sites.

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.

Ahlquist, A.J. (Los Alamos Scientific Laboratory), July 23, 1975. "Mercury Spill at TA-46," Los Alamos Scientific Laboratory memorandum (H8-75-244) to File from A.J. Ahlquist (H-8), Los Alamos, New Mexico. (LASL 1975, 008501)

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)

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), 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), 1996. "Superfund Chemical Data Matrix," EPA/540/R-96/028, Office of Emergency and Remedial Response, Washington, D.C. (EPA 1996, 064708)

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), August 1997. "Exposure Factors Handbook, Volume III, Activity Factors," EPA/600/P-95/002Fc, Office of Research and Development, Washington, D.C. (EPA 1997, 066598)

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), December 2007. "EPA Region 6 Human Health Medium-Specific Screening Levels," U.S. EPA Region 6, Dallas, Texas. (EPA 2007, 099314)

EPA (U.S. Environmental Protection Agency), May 2010. "ProUCL Version 4.00.05 User Guide (Draft)," EPA/600/R-07/038, Office of Research and Development, Washington, D.C. (EPA 2010, 109944)

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. III of IV (TA-26 through TA-50), Los Alamos National Laboratory document LA-UR-90-3400, Los Alamos, New Mexico. (LANL 1990, 007513)

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

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

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), 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), 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), October 2010. "Ecorisk Database (Release 2.5)," on CD, LA-UR-10-6898, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 2010, 110846)

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)

Primary Source	Primary Release Mechanism	Affected Media	Secondary Release Mechanism	Impacted Media	Exposure Pathways	Residential	Construction Worker	Industrial	Biota
Laboratory Operations, Waste Disposal, and Releases to Surface Soil, Subsurface Soil/Tuff, and Sediment	Infiltration Percolation	Groundwater	Domestic Use	Water	None	**O**	**O**	**O**	**O**
			Seeps	Water	None	**O**	**O**	**O**	**O**
	Volatilization	Soil and Tuff	Volatilization	Air	Inhalation	**X**	**X**	**X**	**O**
	Resuspension	Airborne Particulates		Air	Inhalation	**X**	**X**	**X**	**O**
	Direct Release	Surface Soil (0 to 1 ft)		Soil	Ingestion Dermal External Irradiation	**X** **X** **X**	**X** **X** **X**	**X** **X** **X**	**X** **X** **X**
			Erosion	Sediment	Ingestion Dermal External Irradiation	**X** **X** **X**	**X** **X** **X**	**X** **X** **X**	**X** **X** **X**
		Subsurface Soil (1 to 10 ft or 1 to 5 ft)		Soil and Tuff	Ingestion Dermal External Irradiation	**X** **X** **X**	**X** **X** **X**	**O** **O** **O**	**X** **X** **X**
		Subsurface Soil (Below 10 ft or 5 ft)		Soil and Tuff	None	**O**	**O**	**O**	**O**

X = Evaluated in risk screen; major or minor pathway.

O = Not evaluated in risk screen; no pathway.

Figure I-3.1-1 Conceptual site model for human and ecological receptors

Table I-2.2-1
EPCs for SWMU 46-002 for the Industrial Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	19	1	0.406 (U)	1.66 (U)	n/a*	0.608	Maximum detected concentration
Copper	19	17	1.52	417	Nonparametric	171.9	95% KM (Chebyshev)
Cyanide (total)	17	2	0.0701 (J)	0.755 (J-)	n/a	0.755	Maximum detected concentration
Mercury	19	15	0.0052 (J)	3.83	Nonparametric	1.886	95% KM (Chebyshev)
Nitrate	19	10	1.05 (U)	4.64	Gamma	2.182	95% KM (t)
Perchlorate	19	1	0.00076 (J)	0.0025 (U)	n/a	0.00761	Maximum detected concentration
Selenium	19	3	0.912 (U)	2.71	n/a	2.71	Maximum detected concentration
Silver	19	10	0.136 (J)	29.7	Nonparametric	12.98	95% KM (Chebyshev)
Organic Chemicals (mg/kg)							
Aroclor-1248	19	1	0.00348 (U)	0.261	n/a	0.261	Maximum detected concentration
Aroclor-1254	19	4	0.00348 (U)	0.329	n/a	0.329	Maximum detected concentration
Aroclor-1260	19	3	0.00348 (U)	0.185	n/a	0.185	Maximum detected concentration
Benzo(b)fluoranthene	19	1	0.0349 (U)	0.416 (U)	n/a	0.197	Maximum detected concentration
Benzoic acid	19	1	0.699 (UJ)	8.26 (UJ)	n/a	2.53	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	19	2	0.349 (U)	4.06 (U)	n/a	1.43	Maximum detected concentration
Chrysene	19	1	0.0349 (U)	0.416 (U)	n/a	0.165	Maximum detected concentration
Ethylbenzene	19	3	0.000508 (J)	0.00133	n/a	0.00133	Maximum detected concentration
Fluoranthene	19	3	0.0176 (J)	0.406 (U)	n/a	0.285	Maximum detected concentration
Iodomethane	19	1	0.00238 (J)	0.0062 (U)	n/a	0.00238	Maximum detected concentration
Isopropyltoluene[4-]	19	1	0.000948 (J)	0.00125 (U)	n/a	0.000948	Maximum detected concentration
Phenanthrene	19	1	0.0349 (U)	0.416 (U)	n/a	0.186	Maximum detected concentration
Pyrene	19	3	0.0156 (J)	0.406 (U)	n/a	0.254	Maximum detected concentration
Toluene	19	3	0.000824 (J)	0.00266	n/a	0.00266	Maximum detected concentration

Table I-2.2-1 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Xylene[1,2-]	19	1	0.000561 (J)	0.00125 (U)	n/a	0.000561	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	19	3	0.0012 (J)	0.00281	n/a	0.00281	Maximum detected concentration
Radionuclides (pCi/g)							
Uranium-238	19	19	0.472	2.73	Lognormal	1.303	95% Student's-t

Note: Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table I-2.2-2
EPCs for SWMU 46-002 for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	29	1	0.406 (U)	1.66 (U)	n/a*	0.608	Maximum detected concentration
Copper	29	23	1.21	417	Nonparametric	117.2	95% KM (Chebyshev)
Cyanide (total)	24	2	0.0701 (J)	0.755 (J-)	n/a	0.755	Maximum detected concentration
Mercury	29	22	0.0052 (J)	3.83	Nonparametric	1.283	95% KM (Chebyshev)
Nitrate	29	15	1.03 (U)	4.64	Gamma	2.019	95% KM (t)
Perchlorate	29	2	0.000682 (J)	0.0025 (U)	n/a	0.000761	Maximum detected concentration
Selenium	29	3	0.912 (U)	2.71	n/a	2.71	Maximum detected concentration
Silver	29	13	0.136 (J)	29.7	Gamma	5.223	95% KM (t)
Organic Chemicals (mg/kg)							
Aroclor-1248	29	1	0.00343 (U)	0.261	n/a	0.261	Maximum detected concentration
Aroclor-1254	29	7	0.00343 (U)	0.329	Normal	0.0676	95% KM (t)
Aroclor-1260	29	6	0.00343 (U)	0.185	Normal	0.0405	95% KM (t)
Benzo(b)fluoranthene	29	2	0.0189 (J)	0.416 (U)	n/a	0.197	Maximum detected concentration
Benzoic acid	29	1	0.686 (U)	8.26 (UJ)	n/a	2.53	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	29	2	0.343 (U)	4.06 (U)	n/a	1.43	Maximum detected concentration
Chrysene	29	2	0.0165 (J)	0.416 (U)	n/a	0.165	Maximum detected concentration
Ethylbenzene	29	4	0.000402 (J)	0.00133	n/a	0.00133	Maximum detected concentration
Fluoranthene	29	4	0.0176 (J)	0.406 (U)	n/a	0.285	Maximum detected concentration
Iodomethane	29	1	0.00238 (J)	0.0062 (U)	n/a	0.00238	Maximum detected concentration
Isopropyltoluene[4-]	29	1	0.000948 (J)	0.00125 (U)	n/a	0.000948	Maximum detected concentration
Phenanthrene	29	1	0.0228 (J)	0.416 (U)	n/a	0.186	Maximum detected concentration
Pyrene	29	4	0.0156 (J)	0.406 (U)	n/a	0.254	Maximum detected concentration
Toluene	29	5	0.000505 (J)	0.00266	Normal	0.000929	95% KM (t)

Table I-2.2-2 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Xylene[1,2-]	29	1	0.000561 (J)	0.00125 (U)	n/a	0.000561	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	29	5	0.000467 (J)	0.00281	Normal	0.00137	95% KM (t)
Radionuclides (pCi/g)							
Uranium-238	29	29	0.472	2.73	Nonparametric	1.198	95% Student's-t

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-3
EPCs for SWMU 46-002 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	42	1	0.406 (U)	1.66 (U)	n/a*	0.608	Maximum detected concentration
Copper	42	33	0.583 (J)	417	Nonparametric	82.73	95% KM (Chebyshev)
Cyanide (total)	36	2	0.0701 (J)	0.755 (J-)	n/a	0.755	Maximum detected concentration
Mercury	42	25	0.0052 (J)	3.83	Nonparametric	0.905	95% KM (Chebyshev)
Nitrate	42	20	0.995 (U)	4.64	Nonparametric	1.774	95% KM (t)
Perchlorate	42	2	0.000682 (J)	0.0025 (U)	n/a	0.000761	Maximum detected concentration
Selenium	42	3	0.542 (U)	2.71	n/a	2.71	Maximum detected concentration
Silver	42	15	0.136 (J)	29.7	Gamma	3.719	95% KM (t)
Organic Chemicals (mg/kg)							
Acetone	42	1	0.00208 (J)	0.00624 (UJ)	n/a	0.00208	Maximum detected concentration
Aroclor-1248	42	1	0.00335 (U)	0.261	n/a	0.261	Maximum detected concentration
Aroclor-1254	42	10	0.00335 (U)	0.329	Gamma	0.0479	95% KM (t)
Aroclor-1260	42	8	0.00335 (U)	0.185	Gamma	0.0298	95% KM (t)
Benzo(b)fluoranthene	42	2	0.0189 (J)	0.416 (U)	n/a	0.197	Maximum detected concentration
Benzoic acid	42	1	0.67 (UJ)	8.26 (UJ)	n/a	2.53	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	42	2	0.335 (U)	4.06 (U)	n/a	1.43	Maximum detected concentration
Chrysene	42	2	0.0165 (J)	0.416 (U)	n/a	0.165	Maximum detected concentration
Ethylbenzene	42	4	0.000402(J)	0.00133	n/a	0.00133	Maximum detected concentration
Fluoranthene	42	4	0.0176 (J)	0.406 (U)	n/a	0.285	Maximum detected concentration
Hexanone[2-]	42	1	0.00179 (J)	0.00624 (U)	n/a	0.00179	Maximum detected concentration
Iodomethane	42	1	0.00238 (J)	0.0062 (U)	n/a	0.00238	Maximum detected concentration
Isopropyltoluene[4-]	42	1	0.000948(J)	0.00125 (U)	n/a	0.000948	Maximum detected concentration
Phenanthrene	42	2	0.0228 (J)	0.416 (U)	n/a	0.186	Maximum detected concentration

Table I-2.2-3 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Pyrene	42	4	0.0156 (J)	0.406 (U)	n/a	0.254	Maximum detected concentration
Toluene	42	5	0.000505 (J)	0.00266	Normal	0.000873	95% KM (t)
Xylene[1,2-]	42	1	0.000561 (J)	0.00125 (U)	n/a	0.000561	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	42	5	0.000467 (J)	0.00281	Normal	0.00134	95% KM (t)
Radionuclides (pCi/g)							
Uranium-238	42	42	0.472	2.73	Nonparametric	1.136	95% Student's-t

Note: Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table I-2.2-4
EPCs for SWMU 46-004(m) for the Industrial Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	10	0	0.953 (UJ)	1.26 (U)	n/a*	1.26(U)	Maximum detection limit
Copper	10	10	2.26	22.5	Gamma	11.85	95% Approximate Gamma
Mercury	10	5	0.00569	0.199	Normal	0.0875	95% KM(t)
Selenium	10	0	1.02 (U)	1.26 (U)	n/a	1.26(U)	Maximum detection limit
Zinc	10	10	22.1	238	Lognormal	106.3	95% H
Organic Chemicals (mg/kg)							
Acenaphthene	10	1	0.036 (U)	0.403 (U)	n/a	0.207	Maximum detected concentration
Anthracene	10	3	0.0092 (J)	0.428	n/a	0.428	Maximum detected concentration
Aroclor-1254	10	4	0.0026 (J)	0.0403 (U)	n/a	0.0189	Maximum detected concentration
Aroclor-1260	10	2	0.0028 (J)	0.0403 (U)	n/a	0.0069	Maximum detected concentration
Benzo(a)anthracene	10	3	0.0212 (J)	1.07	n/a	1.07	Maximum detected concentration
Benzo(a)pyrene	10	4	0.0135 (J)	1.08	n/a	1.08	Maximum detected concentration
Benzo(b)fluoranthene	10	4	0.0154 (J)	2.1	n/a	2.1	Maximum detected concentration
Benzo(g,h,i)perylene	10	3	0.0203 (J)	0.502	n/a	0.502	Maximum detected concentration
Benzo(k)fluoranthene	10	1	0.0152 (J)	0.403 (U)	n/a	0.0152	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	10	6	0.0811 (J)	4.03 (U)	Nonparametric	0.277	95% KM (t)
Chrysene	10	4	0.0164 (J)	1.11	n/a	1.11	Maximum detected concentration
Dibenzofuran	10	1	0.0838 (J)	4.03 (U)	n/a	0.0838	Maximum detected concentration
Fluoranthene	10	5	0.0177 (J)	2.26	Lognormal	1.288	95% KM (Chebyshev)
Fluorene	10	1	0.036 (U)	0.403 (U)	n/a	0.18	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	10	3	0.0164 (J)	0.536	n/a	0.536	Maximum detected concentration
Methylene chloride	10	1	0.00308 (J+)	0.00647 (U)	n/a	0.00308	Maximum detected concentration
Methylnaphthalene[2-]	10	1	0.0289 (J)	0.403 (U)	n/a	0.0289	Maximum detected concentration

Table I-2.2-4 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Naphthalene	10	1	0.036 (U)	0.403 (U)	n/a	0.0637	Maximum detected concentration
Phenanthrene	10	5	0.012 (J)	1.43	Lognormal	0.818	95% KM (Chebyshev)
Pyrene	10	5	0.0141 (J)	2.37	Lognormal	1.348	95% KM (Chebyshev)
Tetrachloroethene	10	1	0.000432 (J+)	0.00129	n/a	0.0141	Maximum detected concentration
Toluene	10	2	0.00108 (U)	0.00236	n/a	0.00236	Maximum detected concentration
Trichloroethane[1,1,1-]	10	1	0.00108 (U)	0.00255 (J+)	n/a	0.00255	Maximum detected concentration
Trichloroethene	10	2	0.000725 (J)	0.00378 (J+)	n/a	0.00378	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	10	1	0.000358(J+)	0.00259 (U)	n/a	0.00259	Maximum detected concentration
Radionuclides (pCi/g)							
Uranium-234	10	10	0.62	3.14	Lognormal	1.648	95% Student's-t
Uranium-235/236	10	7	0.0363 (U)	0.247	Gamma	0.132	95% KM (Percentile Bootstrap)

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-5
EPCs for SWMU 46-004(m) for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	19	0	0.953 (UJ)	1.26 (U)	n/a*	1.26(U)	Maximum detection limit
Copper	19	19	1.24	22.5	Gamma	8.281	95% Approximate Gamma
Mercury	19	10	0.00569 (J)	0.199	Gamma	0.0573	95% KM (BCA)
Selenium	19	0	1.02 (U)	1.26 (U)	n/a	1.26(U)	Maximum detection limit
Zinc	19	19	22.1	238	Nonparametric	101.2	95% Chebyshev (Mean, SD)
Organic Chemicals (mg/kg)							
Acenaphthene	19	2	0.0354 (U)	0.403 (U)	n/a	0.207	Maximum detected concentration
Anthracene	19	4	0.0092 (J)	0.428	n/a	0.428	Maximum detected concentration
Aroclor-1254	19	7	0.0022 (J)	0.0189 (J)	Normal	0.00748	95% KM (t)
Aroclor-1260	19	2	0.0028 (J)	0.0403 (U)	n/a	0.0069	Maximum detected concentration
Benzo(a)anthracene	19	4	0.0212 (J)	1.07	n/a	1.07	Maximum detected concentration
Benzo(a)pyrene	19	5	0.0135 (J)	1.08	Normal	0.241	95% KM (t)
Benzo(b)fluoranthene	19	5	0.0154 (J)	2.1	Normal	0.437	95% KM (t)
Benzo(g,h,i)perylene	19	4	0.0203 (J)	0.502	n/a	0.502	Maximum detected concentration
Benzo(k)fluoranthene	19	1	0.0152 (J)	0.403 (U)	n/a	0.0152	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	19	8	0.0811 (J)	4.03 (U)	Nonparametric	0.193	95% KM(t)
Chrysene	19	5	0.0164 (J)	1.11	Normal	0.242	95% KM (t)
Dibenzofuran	19	1	0.0838 (J)	4.03	n/a	0.0838	Maximum detected concentration
Fluoranthene	19	6	0.0177 (J)	2.26	Gamma	0.493	95% KM (t)
Fluorene	19	2	0.0354 (U)	0.403 (U)	n/a	0.18	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	19	4	0.0164 (J)	0.536	n/a	0.536	Maximum detected concentration
Methylene chloride	19	1	0.00308 (J+)	0.00647 (U)	n/a	0.00308	Maximum detected concentration
Methylnaphthalene[2-]	19	2	0.0245 (J)	0.403 (U)	n/a	0.0289	Maximum detected concentration

Table I-2.2-5 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Naphthalene	19	2	0.0354 (U)	0.365 (U)	n/a	0.0637	Maximum detected concentration
Phenanthrene	19	6	0.012 (J)	1.43	Gamma	0.33	95% KM (t)
Pyrene	19	6	0.0141 (J)	2.37	Gamma	0.5	95% KM (t)
Tetrachloroethene	19	1	0.000432 (J+)	0.00129 (U)	n/a	4.32E-04	Maximum detected concentration
Toluene	19	2	0.00106 (U)	0.00236	n/a	0.00236	Maximum detected concentration
Trichloroethane[1,1,1-]	19	1	0.00106 (U)	0.00255 (J+)	n/a	0.00255	Maximum detected concentration
Trichloroethene	19	2	0.000725 (J)	0.00378 (J+)	n/a	0.00378	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	19	1	0.000358 (J+)	0.00259 (U)	n/a	3.58E-04	Maximum detected concentration
Radionuclides (pCi/g)							
Uranium-234	19	19	0.616	3.14	Lognormal	1.466	95% Student's-t
Uranium-235	19	12	0.0312 (U)	0.247	Gamma	0.114	95% KM

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-6
EPCs for SWMU 46-004(m) 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	20	1	0.599 (J)	1.26 (U)	n/a*	0.599	Maximum detected concentration
Copper	20	20	1.24	22.5	Gamma	8.022	95% Approximate Gamma
Mercury	20	11	0.00569 (J)	0.199	Gamma	0.0525	95% KM (BCA)
Selenium	20	0	1.02 (U)	1.26 (U)	n/a	1.26(U)	Maximum detection limit
Zinc	20	20	8.34	238	Nonparametric	97.55	95% Chebyshev (Mean SD)
Organic Chemicals (mg/kg)							
Acenaphthene	20	2	0.0354 (U)	0.403 (U)	n/a	0.207	Maximum detected concentration
Anthracene	20	4	0.0092 (J)	0.428	n/a	0.428	Maximum detected concentration
Aroclor-1254	20	7	0.0022 (J)	0.0403 (U)	Normal	0.0072	95% KM (t)
Aroclor-1260	20	2	0.0028 (J)	0.0403 (U)	n/a	0.0069	Maximum detected concentration
Benzo(a)anthracene	20	4	0.0212 (J)	1.07	n/a	1.07	Maximum detected concentration
Benzo(a)pyrene	20	5	0.0135 (J)	1.08	Normal	0.23	95% KM (t)
Benzo(b)fluoranthene	20	5	0.0154 (J)	2.1	Normal	0.416	95% KM (t)
Benzo(g,h,i)perylene	20	4	0.0203 (J)	0.502	n/a	0.502	Maximum detected concentration
Benzo(k)fluoranthene	20	1	0.0152 (J)	0.403 (U)	n/a	0.0152	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	20	8	0.0811 (J)	4.03 (U)	Nonparametric	0.188	95% KM (t)
Chrysene	20	5	0.0164 (J)	1.11	Normal	0.231	95% KM (t)
Dibenzofuran	20	1	0.0838 (J)	4.03 (U)	n/a	0.0838	Maximum detected concentration
Fluoranthene	20	6	0.0177 (J)	2.26	Gamma	0.47	95% KM (t)
Fluorene	20	2	0.0354 (U)	0.403 (U)	n/a	0.18	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	20	4	0.0164 (J)	0.536	n/a	0.536	Maximum detected concentration
Methylene chloride	20	2	0.00252 (J)	0.00647 (U)	n/a	0.00308	Maximum detected concentration
Methylnaphthalene[2-]	20	2	0.0245 (J)	0.403 (U)	n/a	0.0289	Maximum detected concentration
Naphthalene	20	2	0.0354 (U)	0.403 (U)	n/a	0.0637	Maximum detected concentration

Table I-2.2-6 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Phenanthrene	20	6	0.012 (J)	1.43	Gamma	0.315	95% KM (t)
Pyrene	20	6	0.0141 (J)	2.37	Gamma	0.476	95% KM (t)
Tetrachloroethene	20	1	0.000432 (J+)	0.00129	n/a	4.32E-04	Maximum detected concentration
Toluene	20	2	0.00106 (U)	0.00236	n/a	0.00236	Maximum detected concentration
Trichloroethane[1,1,1-]	20	1	0.00106 (U)	0.00255 (J+)	n/a	0.00255	Maximum detected concentration
Trichloroethene	20	2	0.000725 (J)	0.00378 (J+)	n/a	0.00378	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	20	1	0.000358(J+)	0.00259 (U)	n/a	3.58E-04	Maximum detected concentration
Radionuclides (pCi/g)							
Uranium-234	20	20	0.616	3.14	Nonparametric	1.436	95% Student's-t
Uranium-235/236	20	12	0.0281 (U)	0.247	Gamma	0.11	95% KM

Note: Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table I-2.2-7
EPCs for SWMU 46-006(b) for Industrial Scenario

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	5	1	0.42 (J)	1.15 (U)	n/a*	0.665	Maximum detected concentration
Selenium	5	0	1.07 (U)	1.21 (U)	n/a	1.21(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	5	2	0.016 (J)	0.0402 (U)	n/a	0.0162	Maximum detected concentration
Anthracene	5	1	0.019 (J)	0.0402 (U)	n/a	0.0237	Maximum detected concentration
Aroclor-1254	5	1	0.0143 (J)	0.039 (U)	n/a	0.0143	Maximum detected concentration
Benzo(a)anthracene	5	2	0.0365 (U)	0.0929	n/a	0.0929	Maximum detected concentration
Benzo(a)pyrene	5	2	0.0365 (U)	0.102	n/a	0.102	Maximum detected concentration
Benzo(b)fluoranthene	5	2	0.0365 (U)	0.173	n/a	0.173	Maximum detected concentration
Benzo(g,h,i)perylene	5	2	0.0296 (J)	0.0518	n/a	0.0518	Maximum detected concentration
Benzo(k)fluoranthene	5	2	0.0346 (J)	0.0464	n/a	0.0464	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	5	1	0.109 (J)	0.402 (U)	n/a	0.109	Maximum detected concentration
Butylbenzene[n-]	5	1	0.000545 (J+)	0.00121 (U)	n/a	0.000545	Maximum detected concentration
Butylbenzene[sec-]	5	1	0.00073 (J+)	0.00121 (U)	n/a	0.00073	Maximum detected concentration
Chrysene	5	2	0.0365 (U)	0.0949	n/a	0.0949	Maximum detected concentration
Fluoranthene	5	2	0.0134 (J)	0.203	n/a	0.203	Maximum detected concentration
Fluorene	5	1	0.0127 (J)	0.0402 (U)	n/a	0.0127	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	5	2	0.0365 (U)	0.163	n/a	0.163	Maximum detected concentration
Isopropyltoluene[4-]	5	1	0.000493 (J+)	0.00121 (U)	n/a	0.000493	Maximum detected concentration
Methylnaphthalene[2-]	5	1	0.0152 (J)	0.0402 (U)	n/a	0.0152	Maximum detected concentration
Phenanthrene	5	1	0.0365 (U)	0.0878	n/a	0.0878	Maximum detected concentration
Propylbenzene[1-]	5	2	0.000413 (J+)	0.00121 (U)	n/a	0.000526	Maximum detected concentration
Pyrene	5	3	0.0146 (J)	0.245	n/a	0.245	Maximum detected concentration

Table I-2.2-7 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Toluene	5	2	0.000379 (J+)	0.00121 (U)	n/a	0.000399	Maximum detected concentration
Trimethylbenzene[1,2,4-]	5	2	0.00119 (U)	0.00375(J+)	n/a	0.00375	Maximum detected concentration
Trimethylbenzene[1,3,5-]	5	2	0.000517 (J+)	0.00121 (U)	n/a	0.000994	Maximum detected concentration
Xylene[1,2-]	5	1	0.000366 (J+)	0.00121 (U)	n/a	0.000366	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	5	2	0.000362 (J+)	0.00242 (U)	n/a	0.00058	Maximum detected concentration
TPH-DRO	5	4	3.57 (J)	380	n/a	380	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table I-2.2-8
EPCs for SWMU 46-006(b) for Ecological Risk

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Inorganic Chemicals (mg/kg)							
Antimony	10	5	0.42 (J)	1.15 (U)	n/a*	0.605	95% KM (t)
Selenium	10	0	1.07 (U)	1.21 (U)	n/a	1.21(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	10	2	0.016 (J)	0.0413 (U)	n/a	0.0162	Maximum detected concentration
Acetone	10	1	0.00241 (J)	0.00622 (U)	n/a	0.00241	Maximum detected concentration
Anthracene	10	2	0.019 (J)	0.0413 (U)	n/a	0.0237	Maximum detected concentration
Aroclor-1242	10	1	0.00366 (U)	0.0401 (U)	n/a	0.0107	Maximum detected concentration
Aroclor-1254	10	3	0.0016 (J)	0.039 (U)	n/a	0.0143	Maximum detected concentration
Benzo(a)anthracene	10	2	0.0364 (U)	0.0929	n/a	0.0929	Maximum detected concentration
Benzo(a)pyrene	10	2	0.0364 (U)	0.102	n/a	0.102	Maximum detected concentration
Benzo(b)fluoranthene	10	2	0.0364 (U)	0.173	n/a	0.173	Maximum detected concentration
Benzo(g,h,i)perylene	10	2	0.0296 (J)	0.0518	n/a	0.0518	Maximum detected concentration
Benzo(k)fluoranthene	10	2	0.0346 (J)	0.0464	n/a	0.0464	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	10	1	0.109 (J)	0.413 (U)	n/a	0.109	Maximum detected concentration
Butylbenzene[n-]	10	1	0.000545 (J+)	0.00124 (U)	n/a	0.000545	Maximum detected concentration
Butylbenzene[sec-]	10	1	0.00073(J+)	0.00124 (U)	n/a	0.00073	Maximum detected concentration
Chrysene	10	2	0.0364 (U)	0.0949	n/a	0.0949	Maximum detected concentration
Fluoranthene	10	4	0.0134 (J)	0.203	n/a	0.203	Maximum detected concentration
Fluorene	10	1	0.0127 (J)	0.0413 (U)	n/a	0.0127	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	10	2	0.0364 (U)	0.163	n/a	0.163	Maximum detected concentration
Isopropyltoluene[4-]	10	1	0.000493 (J+)	0.00124 (U)	n/a	0.000493	Maximum detected concentration
Methylnaphthalene[2-]	10	1	0.0152 (J)	0.0413 (U)	n/a	0.0152	Maximum detected concentration

Table I-2.2-8 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Phenanthrene	10	1	0.0364 (U)	0.0878	n/a	0.0878	Maximum detected concentration
Propylbenzene[1-]	10	2	0.000413(J+)	0.00124 (U)	n/a	0.000526	Maximum detected concentration
Pyrene	10	4	0.0146 (J)	0.245	n/a	0.245	Maximum detected concentration
Toluene	10	2	0.000379 (J+)	0.00124 (U)	n/a	0.000399	Maximum detected concentration
Trimethylbenzene[1,2,4-]	10	2	0.0011 (U)	0.00375 (J+)	n/a	0.00375	Maximum detected concentration
Trimethylbenzene[1,3,5-]	10	2	0.000517(J+)	0.00124 (U)	n/a	0.000995	Maximum detected concentration
Xylene[1,2-]	10	1	0.000366(J+)	0.00124 (U)	n/a	0.000366	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	10	2	0.000362(J+)	0.00249 (U)	n/a	0.00058	Maximum detected concentration
TPH-DRO	10	6	3.28 (J)	380	Gamma	131	95% KM (BCA)

Note: Data qualifiers are defined in Appendix A.

*n/a = Not applicable.

Table I-2.2-9
EPCs for SWMU 46-006(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	10	5	0.42 (J)	1.15 (U)	n/a*	0.605	95% KM (t)
Selenium	10	0	1.07 (U)	1.21 (U)	n/a	1.21(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Acenaphthene	10	2	0.016 (J)	0.0413 (U)	n/a	0.0162	Maximum detected concentration
Acetone	10	1	0.00241 (J)	0.00622 (U)	n/a	0.00241	Maximum detected concentration
Anthracene	10	2	0.019 (J)	0.0413 (U)	n/a	0.0237	Maximum detected concentration
Aroclor-1242	10	1	0.00366 (U)	0.0401 (U)	n/a	0.0107	Maximum detected concentration
Aroclor-1254	10	3	0.0016 (J)	0.039 (U)	n/a	0.0143	Maximum detected concentration
Benzo(a)anthracene	10	2	0.0364 (U)	0.0929	n/a	0.0929	Maximum detected concentration
Benzo(a)pyrene	10	2	0.0364 (U)	0.102	n/a	0.102	Maximum detected concentration
Benzo(b)fluoranthene	10	2	0.0364 (U)	0.173	n/a	0.173	Maximum detected concentration
Benzo(g,h,i)perylene	10	2	0.0296 (J)	0.0518	n/a	0.0518	Maximum detected concentration
Benzo(k)fluoranthene	10	2	0.0346 (J)	0.0464	n/a	0.0464	Maximum detected concentration
Bis(2-ethylhexyl)phthalate	10	1	0.109 (J)	0.413 (U)	n/a	0.109	Maximum detected concentration
Butylbenzene[n-]	10	1	0.000545(J+)	0.00124 (U)	n/a	0.00545	Maximum detected concentration
Butylbenzene[sec-]	10	1	0.00073 (J+)	0.00124 (U)	n/a	0.00073	Maximum detected concentration
Chrysene	10	2	0.0364 (U)	0.0949	n/a	0.0949	Maximum detected concentration
Fluoranthene	10	4	0.0134 (J)	0.203	n/a	0.203	Maximum detected concentration
Fluorene	10	1	0.0127 (J)	0.0413 (U)	n/a	0.0127	Maximum detected concentration
Indeno(1,2,3-cd)pyrene	10	2	0.0364 (U)	0.163	n/a	0.163	Maximum detected concentration
Isopropyltoluene[4-]	10	1	0.000493(J+)	0.00124 (U)	n/a	0.000493	Maximum detected concentration
Methylnaphthalene[2-]	10	1	0.0152 (J)	0.0413 (U)	n/a	0.0152	Maximum detected concentration
Phenanthrene	10	1	0.0364 (U)	0.0878	n/a	0.0878	Maximum detected concentration
Propylbenzene[1-]	10	2	0.000413(J+)	0.00124 (U)	n/a	0.000526	Maximum detected concentration

Table I-2.2-9 (continued)

COPC	Number of Analyses	Number of Detects	Minimum Concentration	Maximum Concentration	Distribution	EPC	EPC Method
Pyrene	10	4	0.0146 (J)	0.245	n/a	0.245	Maximum detected concentration
Toluene	10	2	0.000379(J+)	0.00124 (U)	n/a	0.000399	Maximum detected concentration
Trimethylbenzene[1,2,4-]	10	2	0.0011 (U)	0.00375 (J+)	n/a	0.00375	Maximum detected concentration
Trimethylbenzene[1,3,5-]	10	2	0.000517 (J+)	0.00124 (U)	n/a	0.000995	Maximum detected concentration
Xylene[1,2-]	10	1	0.000366 (J+)	0.00124 (U)	n/a	0.000366	Maximum detected concentration
Xylene[1,3-]+Xylene[1,4-]	10	2	0.000362(J+)	0.00249 (U)	n/a	0.00058	Maximum detected concentration
TPH-DRO	10	6	3.28 (J)	380	Gamma	131	95% KM (BCA)

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-10
EPCs for SWMU 46-006(g) 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	0.956 (U)	1.09 (U)	n/a*	1.09(U)	Maximum detection limit
Selenium	3	0	0.991 (U)	1.07 (U)	n/a	1.07(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Aroclor-1254	3	1	0.018 (U)	0.0244	n/a	0.0244	Maximum detected concentration
Aroclor-1260	3	1	0.018 (U)	0.0512	n/a	0.0512	Maximum detected concentration
TPH-DRO	3	1	35.7 (U)	64 (J)	n/a	64	Maximum detected concentration
Toluene	3	3	0.000629 (J)	0.00351	n/a	0.00351	Maximum detected concentration
Trichloroethene	3	2	0.000505 (J)	0.00164	n/a	0.00164	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-11
EPCs for SWMU 46-006(g) 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	0.956 (U)	1.1 (U)	n/a*	1.1(U)	Maximum detection limit
Selenium	6	0	0.991 (U)	1.1 (U)	n/a	1.1(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Aroclor-1242	6	1	0.0015 (J)	0.192 (U)	n/a	0.0015	Maximum detected concentration
Aroclor-1254	6	1	0.00366 (U)	0.0244	n/a	0.0244	Maximum detected concentration
Aroclor-1260	6	1	0.00366 (U)	0.0512	n/a	0.0512	Maximum detected concentration
TPH-DRO	6	2	35.7(U)	64(J)	n/a	64	Maximum detected concentration
Toluene	6	4	0.000629 (J)	0.00351	n/a	0.00351	Maximum detected concentration
Trichloroethene	6	2	0.000505 (J)	0.00164	n/a	0.00164	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-2.2-12
EPCs for SWMU 46-006(g) 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	0.956 (U)	1.1 (U)	n/a*	1.1(U)	Maximum detection limit
Selenium	6	0	0.991 (U)	1.1 (U)	n/a	1.1(U)	Maximum detection limit
Organic Chemicals (mg/kg)							
Aroclor-1242	6	1	0.0015 (J)	0.192 (U)	n/a	0.0015	Maximum detected concentration
Aroclor-1254	6	1	0.00366 (U)	0.0244	n/a	0.0244	Maximum detected concentration
Aroclor-1260	6	1	0.00366 (U)	0.0512	n/a	0.0512	Maximum detected concentration
TPH-DRO	6	2	35.7(U)	64(J)	n/a	64	Maximum detected concentration
Toluene	6	4	0.000629 (J)	0.00351	n/a	0.00351	Maximum detected concentration
Trichloroethene	6	2	0.000505 (J)	0.00164	n/a	0.00164	Maximum detected concentration

Note: Data qualifiers are defined in Appendix A.
*n/a = Not applicable.

Table I-3.2-1
Physical and Chemical Properties of Inorganic COPCs

COPC	K_d[a] (cm^3/g)	Water Solubility[a,b] (g/L)
Antimony	45	Insoluble
Copper	35	Insoluble
Cyanide (total)	9.9	na[c]
Mercury	52	Insoluble
Nitrate	0.0356	Soluble
Perchlorate	na	245
Selenium	5	Insoluble
Silver	8.3	Insoluble
Zinc	62	Insoluble

[a] Information from http://rais.ornl.gov/cgi-bin/tools/TOX_search?select=chem_spef.

[b] Denotes reference information from http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

[c] na = Not available.

Table I-3.2-2
Physical and Chemical Properties of Organic COPCs

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)
Acenaphthene	3.6E+00 [b]	6.12E+03	3.92E+00[b]	2.5E-03[b]
Acetone	1.00E+06[b]	1.98E+00	-2.40E-01[b]	2.31E+02[b]
Anthracene	4.34E-02[b]	2.04E+04	4.45E+00[b]	2.67E-06[b]
Aroclor-1242	2.77E-01	7.81E+04	6.29E+00	8.63E-05
Aroclor-1248	6.34E+00	7.65E+04	1.0E-01	4.94E-04
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(a)pyrene	1.62E-03[b]	7.87E+05	6.13E+00[b]	5.49E-09[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]
Benzo(k)fluoranthene	8.00E-04[b]	7.87E+05	6.1E+00[b]	9.65E-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]
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]
Dibenzofuran	3.10E+00	1.13E+04	4.12E+00	2.48E-03
Ethylbenzene	1.69E+02	4.46E+02	3.15E+00	9.60E+00
Fluoranthene	2.06E-01[c]	7.09E+04[c]	5.16E+00[c]	9.22E-06[c]
Fluorene	1.89E+00b	1.13E+04	4.18E+00[b]	8.42E-04b
Hexanone[2-]	1.75E+04	1.30E+01	1.38E+00	1.16E+01
Indeno(1,2,3-cd)pyrene	1.90E-04[b]	2.68E+06	6.70E+00[b]	1.25E-10[b]
Iodomethane	na[d]	na	na	na
Isopropyltoluene[4-]	2.34E+01[b]	na	4.10E+00[b]	1.64E+00[b]
Methylene chloride	1.30E+04[b]	2.37E+01	1.30E+00b	4.30E+02[b]
Methylnaphthalene[2-]	2.46E+01	2.98E+03	3.86E+00	5.50E-02
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
Trichloroethane{1,1,1-]	1.29E+03[c]	4.86E+01[c]	2.49E+00	1.24E+02
Trichloroethene	1.28E+03	6.07E+01	2.42E+00	6.90E+01

Table I-3.2-2 (continued)

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)
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[1,2-]	1.78E+02	3.83E+02	3.12E+00	7.99E+00
Xylene[1,3-]+Xylene[1,4-]	1.06E+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-3.2-3
Physical and Chemical Properties of Radionuclide COPCs

COPC	Soil-Water Partition Coefficient, K_d[a] (cm^3/g)	Water Solubility[b] (g/L)
Uranium-234	0.4	Insoluble
Uranium-235/236	0.4	Insoluble
Uranium-238	0.4	Insoluble

[a] Superfund Chemical Data Matrix (EPA 1996, 064708).

[b] http://www.epa.gov/superfund/sites/npl/hrsres/tools/scdm.htm.

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 h/d	8 h/d	8 h/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/d	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-4.1-2
Parameters Values Used to in the SAL Calculations for Radionuclides, Residential

Parameters	Residential, Child	Residential, Adult
Inhalation rate (m^3/yr)	3652.5[a]	7305[b]
Mass loading (g/m^3)	1.5×10^{-7} [c]	1.5×10^{-7} [c]
Outdoor time fraction	0.2236[d]	0.0599[e]
Indoor time fraction	0.7347[f]	0.8984[g]
Soil ingestion (g/yr)	73[h]	36.5[i]

[a] Calculated as [10 m^3/d × 350 d/yr] / [indoor + outdoor time fractions], where 10 m^3/d is the daily inhalation rate of a child (NMED 2009, 108070).

[b] Calculated as [20 m^3/d × 350 d/yr] / [indoor + outdoor time fractions], where 20 m^3/d is the daily inhalation rate of an adult (NMED 2009, 108070).

[c] Calculated as [1/ $6.6 \times 10^{+9}$ m^3/kg] × 1000 g/kg, where $6.6 \times 10^{+9}$ m^3/kg is the particulate emission factor (NMED 2009, 108070).

[d] Calculated as [5.6 h/d × 350 d/yr] / 8766 h/yr, where 5.6 h/d is an estimate of time spent outdoors for a 3- to 11-yr-old child (EPA 1997, 066598, section 15.4-1).

[e] Calculated as [1.5 h/d × 350 d/yr] / 8766 h/yr, where 1.5 h/d is an estimate of time spent outdoors for an adult 12 yr and older (EPA 1997, 066598, section 15.4-1).

[f] Calculated as [24–5.6 h/d × 350 d/yr] / 8766 h/yr.

[g] Calculated as [24–1.5 h/d × 350 d/yr] / 8766 h/yr.

[h] Calculated as [0.2 g/d × 350 d/yr] / [indoor + outdoor time fractions], where 0.2 g/d is the child soil-ingestion rate (NMED 2009, 108070).

[i] Calculated as [0.1 g/d × 350 d/yr] / [indoor + outdoor time fractions], where 0.1 g/d is the adult soil-ingestion rate (NMED 2009, 108070).

Table I-4.1-3
Parameter Values Used to Calculate
Radionuclide SALs for the Industrial and Construction Worker Scenarios

Parameters	Industrial, Adult	Construction Worker, Adult
Inhalation rate (m^3/yr)	19,481[a]	19,478[b]
Mass loading (g/m^3)	1.5×10^{-7c}	0.0004[d]
Outdoor time fraction	0.2053[e]	0.2567[f]
Indoor time fraction	0	0
Soil ingestion (g/yr)	97.4[g]	321[h]

[a] Calculated as [20 m^3/d × 225 d/yr] / [indoor + outdoor time fractions], where 20 m^3/d is the daily inhalation rate of an adult and 225 d/yr is the exposure frequency (NMED 2009, 108070).

[b] Calculated as [20 m^3/d × 250 d/yr] / [indoor + outdoor time fractions], where 20 m^3/d is the daily inhalation rate of an adult and 250 d/yr is the exposure frequency (NMED 2009, 108070).

[c] Calculated as [1/ $6.6 \times 10^{+9}$ m^3/kg] × 1000 g/kg, where $6.6 \times 10^{+9}$ m^3/kg is the particulate emission factor (NMED 2009, 108070).

[d] Calculated as [1/ $2.1 \times 10^{+6}$ m^3/kg] × 1000 g/kg, where $2.1 \times 10^{+6}$ m^3/kg is the particulate emission factor (NMED 2009, 108070).

[e] Calculated as [8 h/d × 225 d/yr] / 8766 h/yr, where 8 h/d is an estimate of the average length of the work day.

[f] Calculated as [9 h/d × 250 d/yr] / 8766 h/yr, where 9 h/d is an estimate of the average length of the work day, including a 1-h break.

[g] Calculated as [0.1 g/d × 225 d/yr] / [indoor + outdoor time fractions], where 0.1 g/d is the adult soil ingestion rate (NMED 2009, 108070).

[h] Calculated as [0.33 g/d × 250 d/yr] / [indoor + outdoor time fractions], where 0.33 g/d is the adult soil ingestion rate NMED 2009, 108070).

Table I-4.2-1
Industrial Carcinogenic Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Excess Cancer Risk
Aroclor-1248	0.261	8.26	3E-07
Aroclor-1254	0.329	8.26	4E-07
Aroclor-1260	0.185	8.26	2E-07
Benzo(b)fluoranthene	0.197	23.4	8E-08
Bis(2-ethylhexyl)phthalate	1.43	1370	1E-08
Chrysene	0.165	2340	7E-10
Ethylbenzene	0.00133	385	3E-11
Total Excess Cancer Risk			**1E-06**

*SSLs from NMED (2009, 108070).

Table I-4.2-2
Industrial Noncarcinogenic Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Industrial SSL[a] (mg/kg)	HQ
Antimony	0.608	454	1E-03
Copper	171.9	45400	4E-03
Cyanide (Total)	0.755	22700	3E-05
Mercury	1.886	310[b]	6E-03
Nitrate	2.182	1820000	1E-06
Perchlorate	0.0076	795	1E-05
Selenium	2.71	5680	5E-04
Silver	12.98	5680	2E-03
Benzoic acid	2.53	2500000[b]	1E-06
Fluoranthene	0.285	24400	1E-05
Isopropyltoluene[4-]	0.000948	14900[c]	6E-08
Phenanthrene	0.186	20500	9E-06
Pyrene	0.254	18300	1E-05
Toluene	0.00266	57900	5E-08
Xylene[1,2-]	0.000561	31500	2E-08
Xylene[1,3-]+Xylene[1,4-]	0.00281	3610[d]	8E-07
HI			**0.01**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene SSL used as a surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-3
Industrial Radionuclide Screening Evaluation for SWMU 46-002

COPC	EPC (pCi/g)	Industrial SAL* (pCi/g)	Dose (mrem/yr)
Uranium-238	1.303	430	0.05
		Total Dose	**0.05**

* SALs from LANL (2009, 107655).

Table I-4.2-4
Construction Worker Carcinogenic Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Construction Worker SSL* (mg/kg)	Cancer Risk
Aroclor-1248	0.261	75.8	3E-08
Aroclor-1260	0.0298	75.8	4E-09
Benzo(b)fluoranthene	0.197	213	9E-09
Chrysene	0.165	20600	8E-11
Ethylbenzene	0.00133	6630	2E-12
		Total Excess Cancer Risk	**5E-08**

* SSLs from NMED (2009, 108070).

Table I-4.2-5
Construction Worker Noncarcinogenic
Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Construction Worker SSL[a] (mg/kg)	HQ
Acetone	0.00208	263000	8E-09
Antimony	0.608	124	5E-03
Aroclor-1254	0.0479	4.36	1E-02
Benzoic acid	2.53	952000[b]	3E-06
Bis(2-ethylhexyl)phthalate	1.43	4760	3E-04
Copper	82.73	12400	7E-03
Cyanide (total)	0.755	6190	1E-04
Fluoranthene	0.285	8910	3E-05
Hexanone[2-]	0.00179	1150[b]	2E-06
Isopropyltoluene[4-]	0.000948	10300[c]	9E-08
Mercury	0.905	92.9[b]	1E-02
Nitrate	1.774	496000	4E-06
Perchlorate	0.000761	217	4E-06
Phenanthrene	0.186	7150	3E-05
Pyrene	0.254	6680	4E-05
Selenium	2.71	1550	2E-03
Silver	3.719	1550	2E-03
Toluene	0.000873	21100	4E-08
Xylene[1,2-]	0.000561	27500	2E-08
Xylene[1,3-]+Xylene[1,4-]	0.00134	3130[d]	4E-07
		HI	**0.03**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] Isopropylbenzene SSL used as surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-6
Construction Worker Radionuclide Screening Evaluation for SWMU 46-002

COPC	EPC (pCi/g)	Construction Worker SAL* (pCi/g)	Dose (mrem/yr)
Uranium-238	1.136	160	0.1
		Total Dose	**0.1**

* SALs from LANL (2009, 107655).

Table I-4.2-7
Residential Carcinogenic Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1248	0.261	2.22	1E-06
Aroclor-1260	0.0298	2.22	1E-07
Benzo(b)fluoranthene	0.197	6.21	3E-07
Bis(2-ethylhexyl)phthalate	1.43	347	4E-08
Chrysene	0.165	621	3E-09
Ethylbenzene	0.00133	69.7	2E-10
Total Excess Cancer Risk			**2E-06**

* SSLs from NMED (2009, 108070).

Table I-4.2-8
Residential Noncarcinogenic Screening Evaluation for SWMU 46-002

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Acetone	0.00208	67500	3E-08
Antimony	0.608	31.3	2E-02
Aroclor-1254	0.0479	1.12	4E-02
Benzoic acid	2.53	245000[b]	1E-05
Copper	82.73	3130	3E-02
Cyanide (Total)	0.755	1560	5E-04
Fluoranthene	0.285	2290	1E-04
Hexanone[2-]	0.00179	210[b]	9E-06
Isopropyltoluene[4-]	0.000948	3210[c]	3E-07
Mercury	0.905	23[b]	4E-02
Nitrate	1.774	125000	1E-05
Perchlorate	0.000761	54.8	1E-05
Phenanthrene	0.186	1830	1E-04
Pyrene	0.254	1720	1E-04
Selenium	2.71	391	7E-03
Silver	3.719	391	1E-02
Toluene	0.000873	5570	2E-07
Xylene[1,2-]	0.000561	9550	6E-08
Xylene[1,3-]+Xylene[1,4-]	0.00134	1090[d]	1E-06
HI			**0.1**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Isopropylbenzene SSL used as surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-9
Residential Radionuclide Screening Evaluation for SWMU 46-002

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Uranium-238	1.136	87	0.2
		Total Dose	**0.2**

* SALs from LANL (2009, 107655).

Table I-4.2-10
Industrial Carcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Excess Cancer Risk
Aroclor-1254	0.0189	8.26	2E-08
Aroclor-1260	0.0069	8.26	8E-09
Benzo(a)anthracene	1.07	23.4	5E-07
Benzo(a)pyrene	1.08	2.34	5E-06
Benzo(b)fluoranthene	2.1	23.4	9E-07
Benzo(k)fluoranthene	0.0152	234	6E-10
Bis(2-ethylhexyl)phthalate	0.277	1370	2E-09
Chrysene	1.11	2340	5E-09
Indeno(1,2,3-cd)pyrene	0.536	23.4	2E-07
Methylene chloride	0.00308	1090	3E-11
Naphthalene	0.0637	252	3E-09
Tetrachloroethene	0.0141	36.4	4E-09
Trichloroethene	0.00378	253	1E-10
		Total Excess Cancer Risk	**6E-06**

* SSLs from NMED (2009, 108070).

Table I-4.2-11
Industrial Noncarcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Industrial SSL[a] (mg/kg)	HQ
Antimony	1.26(U)	454	3E-03
Copper	11.85	45400	3E-04
Mercury	0.0875	310[b]	3E-04
Selenium	1.26(U)	5680	2E-04
Zinc	106.3	341000	3E-04
Acenaphthene	0.207	36700	6E-06
Anthracene	0.428	183000	2E-06
Benzo(g,h,i)perylene	0.502	18300[c]	3E-05
Dibenzofuran	0.0838	1000[b]	8E-05
Fluoranthene	1.288	24400	5E-05
Fluorene	0.18	24400	7E-06
Methylnaphthalene[2-]	0.0289	4100[b]	7E-06
Phenanthrene	0.818	20500	4E-05
Pyrene	1.348	18300	7E-05
Toluene	0.00236	57900	4E-08
Trichloroethane[1,1,1-]	0.00255	77100	3E-08
Xylene[1,3-]+Xylene[1,4-]	0.00259	3610[d]	7E-07
		HI	**0.004**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[c] Pyrene SSL used as a surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-12
Industrial Radionuclide Screening Evaluation for SWMU 46-004(m)

COPC	EPC (pCi/g)	Industrial SAL* (pCi/g)	Dose (mrem/yr)
Uranium-234	1.648	1500	0.02
Uranium-235/236	0.132	87	0.02
		Total Dose	**0.04**

* SALs from LANL (2009, 107655).

Table I-4.2-13
Construction Worker Carcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Construction Worker SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.0069	75.8	9E-10
Benzo(a)anthracene	1.07	213	5E-08
Benzo(a)pyrene	0.23	21.3	1E-07
Benzo(b)fluoranthene	0.416	213	2E-08
Benzo(k)fluoranthene	0.0152	2060	7E-11
Chrysene	0.231	20600	1E-10
Indeno(1,2,3-cd)pyrene	0.536	213	3E-08
Tetrachloroethene	0.000432	338	1E-11
Trichloroethene	0.00378	4600	8E-12
		Total Excess Cancer Risk	**2E-07**

* SSLs from NMED (2009, 108070).

Table I-4.2-14
Construction Worker Noncarcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Construction Worker SSL[a] (mg/kg)	HQ
Antimony	0.599	124	5E-03
Copper	8.022	20600	4E-04
Mercury	0.0525	92.9[b]	6E-04
Selenium	1.26(U)	1550	8E-04
Zinc	97.55	92900	1E-03
Acenaphthene	0.207	18600	1E-05
Anthracene	0.428	66800	6E-06
Aroclor-1254	0.0072	4.36	2E-03
Benzo(g,h,i)perylene	0.502	6680[c]	8E-05
Bis(2-ethylhexyl)phthalate	0.188	4760	4E-05
Dibenzofuran	0.0838	238[b]	4E-04
Fluoranthene	0.47	8910	5E-05
Fluorene	0.18	8910	2E-05
Methylene chloride	0.00308	10600	3E-07
Methylnaphthalene[2-]	0.0289	1240[b]	2E-05
Naphthalene	0.0637	702	9E-05
Phenanthrene	0.315	7150	4E-05
Pyrene	0.476	6680	7E-05
Toluene	0.00236	21100	1E-07
Trichloroethane[1,1,1-]	0.00255	64300	4E-08
Xylene[1,3-]+Xylene[1,4-]	0.000358	3130[d]	1E-07
		HI	**0.01**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] Construction worker SSL calculated using toxicity value from EPA regional screening tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm) and equation and parameters from NMED (2009, 108070).

[c] Pyrene SSL used as surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-15
Construction Worker Radionuclide Screening Evaluation for SWMU 46-004(m)

COPC	EPC (pCi/g)	Construction Worker SAL* (pCi/g)	Dose (mrem/yr)
Uranium-234	1.436	220	0.1
Uranium-235/236	0.11	43	0.04
		Total Dose	**0.1**

* SALs from LANL (2009, 107655).

Table I-4.2-16
Residential Carcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1260	0.0069	2.22	3E-08
Benzo(a)anthracene	1.07	6.21	2E-06
Benzo(a)pyrene	0.23	0.621	4E-06
Benzo(b)fluoranthene	0.416	6.21	7E-07
Benzo(k)fluoranthene	0.0152	62	2E-09
Bis(2-ethylhexyl)phthalate	0.188	347	5E-09
Chrysene	0.231	621	4E-09
Indeno(1,2,3-cd)pyrene	0.536	6.21	9E-07
Methylene chloride	0.00308	199	2E-10
Naphthalene	0.0637	45	1E-08
Tetrachloroethene	0.000432	6.99	6E-10
Total Excess Cancer Risk			**7E-06**

* SSLs from NMED (2009, 108070).

Table I-4.2-17
Residential Noncarcinogenic Screening Evaluation for SWMU 46-004(m)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Antimony	0.599	31.3	2E-02
Copper	8.022	3130	3E-03
Mercury	0.0525	23[b]	2E-03
Selenium	1.26(U)	391	3E-03
Zinc	97.55	23500	4E-03
Acenaphthene	0.207	3440	6E-05
Anthracene	0.428	17200	2E-05
Aroclor-1254	0.0072	1.12	6E-03
Benzo(g,h,i)perylene	0.502	1720[c]	3E-04
Dibenzofuran	0.0838	78[b]	1E-03
Fluoranthene	0.47	2290	2E-04
Fluorene	0.18	2290	8E-05
Methylnaphthalene[2-]	0.0289	310[b]	9E-05
Phenanthrene	0.315	1830	2E-04
Pyrene	0.476	1720	3E-04
Toluene	0.00236	5570	4E-07
Trichloroethane[1,1,1-]	0.00255	21800	1E-07
Xylene[1,3-]+Xylene[1,4-]	0.000358	1090[d]	3E-07
		HI	**0.04**

[a] SSLs from NMED (2009, 108070), unless otherwise noted.

[b] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm.

[c] Pyrene SSL used as surrogate based on structural similarity.

[d] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-18
Residential Radionuclide Screening Evaluation for SWMU 46-004(m)

COPC	EPC (pCi/g)	Residential SAL* (pCi/g)	Dose (mrem/yr)
Uranium-234	1.436	170	0.1
Uranium-235/236	0.11	17	0.1
		Total Dose	**0.2**

* SALs from LANL (2009, 107655).

Table I-4.2-19
Industrial Carcinogenic
Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Excess Cancer Risk
Aroclor-1254	0.0143	8.26	2E-08
Benzo(a)anthracene	0.0929	23.4	4E-08
Benzo(a)pyrene	0.102	2.34	4E-07
Benzo(b)fluoranthene	0.173	23.4	7E-08
Benzo(k)fluoranthene	0.0464	234	2E-09
Bis(2-ethylhexyl)phthalate	0.109	1370	8E-10
Chrysene	0.0949	2340	4E-10
Indeno(1,2,3-cd)pyrene	0.163	23.4	7E-08
Total Excess Cancer Risk			**6E-07**

* SSLs from NMED (2009, 108070).

Table I-4.2-20
Industrial Noncarcinogenic Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Industrial SSL[a] (mg/kg)	HQ
Anthracene	0.0237	183000	1E-07
Benzo(g,h,i)perylene	0.0518	18300[b]	3E-06
Antimony	0.665	454	1E-03
Acenaphthene	0.0162	36700	4E-07
Butylbenzene[n-]	0.00545	610[c]	9E-06
Butylbenzene[sec-]	0.00073	450[c]	2E-06
Fluoranthene	0.203	24400	8E-06
Fluorene	0.0127	24400	5E-07
Isopropyltoluene[4-]	0.000493	14900[d]	3E-08
Methylnaphthalene[2-]	0.0152	4100[e]	4E-06
Phenanthrene	0.0878	20500	4E-06
Propylbenzene[1-]	0.000526	21000[e]	3E-08
Pyrene	0.245	18300	1E-05
Selenium	1.21(U)	5680	2E-04
Toluene	0.000399	57900	7E-09
Trimethylbenzene[1,2,4-]	0.00375	260[e]	1E-05
Trimethylbenzene[1,3,5-]	0.000995	10000[e]	1E-07
Xylene[1,2-]	0.00036	31500	1E-08
Xylene[1,3-]+Xylene[1,4-]	0.00058	3610[f]	2E-07
		HI	**0.001**

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] SSL from EPA (2007, 099314).

[d] Isopropylbenzene SSL used as surrogate based on structural similarity.

[e] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-21
Construction Worker Carcinogenic Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Construction Worker SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0107	75.8	1E-09
Benzo(a)anthracene	0.0929	213	4E-09
Benzo(a)pyrene	0.102	21.3	5E-08
Benzo(b)fluoranthene	0.173	213	8E-09
Benzo(k)fluoranthene	0.0464	2060	2E-10
Chrysene	0.0949	20600	5E-11
Indeno(1,2,3-cd)pyrene	0.163	213	8E-09
		Total Excess Cancer Risk	**7E-08**

* SSLs from NMED (2009, 108070).

Table I-4.2-22
Construction Worker Noncarcinogenic
Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Construction Worker SSL[a] (mg/kg)	HQ
Antimony	0.605	124	5E-03
Selenium	1.21(U)	1550	8E-04
Acenaphthene	0.0162	18600	9E-07
Acetone	0.00241	263000	9E-09
Anthracene	0.0237	66800	4E-07
Aroclor-1254	0.0143	4.36	3E-03
Benzo(g,h,i)perylene	0.0518	6680[b]	8E-06
Bis(2-ethylhexyl)phthalate	0.109	4760	2E-05
Butylbenzene[n-]	0.000545	20100[c]	3E-08
Butylbenzene[sec-]	0.00073	18000[c]	4E-08
Fluoranthene	0.203	8910	2E-05
Fluorene	0.0127	8910	1E-06
Isopropyltoluene[4-]	0.000493	10300[d]	5E-08
Methylnaphthalene[2-]	0.0152	1240[c]	1E-05
Phenanthrene	0.0878	7150	1E-05
Propylbenzene[1-]	0.000526	20100[c]	3E-08
Pyrene	0.245	6680	4E-05
Toluene	0.000399	21100	2E-08
Trimethylbenzene[1,2,4-]	0.00375	257[c]	1E-05
Trimethylbenzene[1,3,5-]	0.000995	3100[c]	3E-07
Xylene[1,2-]	0.000366	27500	1E-08
Xylene[1,3-]+Xylene[1,4-]	0.00058	3130[e]	2E-07
		HI	**0.009**

[a] SSLs from NMED (2009, 108070).

[b] Pyrene SSL used as 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).

[d] Isopropylbenzene SSL used as surrogate based on structural similarity.

[e] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-23
Residential Carcinogenic Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0107	2.22	5E-08
Benzo(a)anthracene	0.0929	6.21	1E-07
Benzo(a)pyrene	0.102	0.621	2E-06
Benzo(b)fluoranthene	0.173	6.21	3E-07
Benzo(k)fluoranthene	0.0464	62	7E-09
Bis(2-ethylhexyl)phthalate	0.109	347	3E-09
Chrysene	0.0949	621	2E-09
Indeno(1,2,3-cd)pyrene	0.163	6.21	3E-07
Total Excess Cancer Risk			**3E-06**

* SSLs from NMED (2009, 108070).

Table I-4.2-24
Residential Noncarcinogenic Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Residential SSL[a] (mg/kg)	HQ
Antimony	0.605	31.3	2E-02
Selenium	1.21	391	3E-03
Acenaphthene	0.0162	3440	5E-06
Acetone	0.00241	67500	4E-08
Anthracene	0.0237	17200	1E-06
Aroclor-1254	0.0143	1.12	1E-02
Benzo(g,h,i)perylene	0.0518	1720[b]	3E-05
Butylbenzene[n-]	0.000545	140[c]	4E-06
Butylbenzene[sec-]	0.00073	110[c]	7E-06
Fluoranthene	0.203	2290	9E-05
Fluorene	0.0127	2290	6E-06
Isopropyltoluene[4-]	0.000493	3210[d]	2E-07
Methylnaphthalene[2-]	0.0152	310[e]	5E-05
Phenanthrene	0.0878	1830	5E-05
Propylbenzene[1-]	0.000526	3400	2E-07
Pyrene	0.245	1720	1E-04
Toluene	0.000399	5570	7E-08
Trimethylbenzene[1,2,4-]	0.00375	62[e]	6E-05
Trimethylbenzene[1,3,5-]	0.000995	780[e]	1E-06
Xylene[1,2-]	0.000366	9550	4E-08
Xylene[1,3-]+Xylene[1,4-]	0.00058	1090[f]	5E-07
		HI	**0.03**

[a] SSLs from NMED (2009, 108070) unless otherwise noted.

[b] Pyrene SSL used as surrogate based on structural similarity.

[c] SSL from EPA (2007, 099314).

[d] Isopropylbenzene SSL used as surrogate based on structural similarity.

[e] SSL from EPA regional tables (http://www.epa.gov/region06/6pd/rcra_c/pd-n/screen.htm).

[f] Xylenes SSL used as surrogate based on structural similarity.

Table I-4.2-25
Industrial TPH Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Construction Worker* (mg/kg)	HQ
TPH-DRO	380	1120	0.3
		HI	**0.3**

* Screening guidelines for diesel No. 2 from NMED (2006, 094614).

Table I-4.2-26
Construction Worker TPH Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Construction Worker* (mg/kg)	HQ
TPH-DRO	131	1120	0.1
		HI	**0.1**

* Screening guidelines for industrial diesel No. 2 from NMED (2006, 094614).

Table I-4.2-27
Residential TPH Screening Evaluation for SWMU 46-006(b)

COPC	EPC (mg/kg)	Residential* (mg/kg)	HQ
TPH-DRO	131	520	0.3
		HI	**0.3**

* Screening guidelines for diesel No. 2 from NMED (2006, 094614).

Table I-4.2-28
Industrial Carcinogenic Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Excess Cancer Risk
Aroclor-1254	0.0244	8.26	3E-08
Aroclor-1260	0.0512	8.26	6E-08
Trichloroethene	0.00164	253	6E-11
		Total Excess Cancer Risk	**9E-08**

* SSLs from NMED (2009, 108070).

Table I-4.2-29
Industrial Noncarcinogenic Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Industrial SSL* (mg/kg)	Hazard Quotient
Antimony	1.09(U)	454	2E-03
Selenium	1.07(U)	5680	2E-04
Toluene	0.00351	57,900	6E-08
		HI	**0.002**

* SSLs from NMED (2009, 108070).

Table I-4.2-30
Construction Worker Carcinogenic Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Construction Worker SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0015	75.8	2E-10
Aroclor-1260	0.0512	75.8	7E-09
Trichloroethene	0.00164	4600	4E-12
		Total Excess Cancer Risk	**7E-09**

* SSLs from NMED (2009, 108070).

Table I-4.2-31
Construction Worker Noncarcinogenic
Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Construction Worker SSL* (mg/kg)	Hazard Quotient
Antimony	1.1(U)	124	9E-03
Selenium	1.1(U)	1550	7E-04
Aroclor-1254	0.0244	4.36	6E-03
Toluene	0.00351	21,100	2E-07
		HI	**0.02**

* SSLs from NMED (2009, 108070).

Table I-4.2-32
Residential Carcinogenic Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Cancer Risk
Aroclor-1242	0.0015	2.22	7E-09
Aroclor-1260	0.0512	2.22	2E-07
Trichloroethene	0.00164	45.7	4E-10
		Total Excess Cancer Risk	**2E-07**

* SSLs from NMED (2009, 108070).

Table I-4.2-33
Residential Noncarcinogenic Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Residential SSL* (mg/kg)	Hazard Quotient
Antimony	1.1(U)	31.3	4E-02
Selenium	1.1(U)	391	3E-03
Aroclor-1254	0.0244	1.12	2E-02
Toluene	0.00351	5570	6E-07
		HI	**0.06**

* SSLs from NMED (2009, 108070).

Table I-4.2-34
Industrial TPH Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Industrial* (mg/kg)	HQ
TPH-DRO	64	1120	0.06
		HI	**0.06**

* Screening guidelines for diesel No. 2 from NMED (2006, 094614).

Table I-4.2-35
Construction Worker TPH Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Construction Worker* (mg/kg)	HQ
TPH-DRO	64	1120	0.06
		HI	**0.06**

* Screening guidelines for industrial diesel No. 2 from NMED (2006, 094614).

Table I-4.2-36
Residential TPH Screening Evaluation for SWMU 46-006(g)

COPC	EPC (mg/kg)	Residential* (mg/kg)	HQ
TPH-DRO	64	520	0.1
		HI	**0.1**

* Screening guidelines for diesel No. 2 from NMED (NMED 2006, 094614).

Table I-5.3-1
ESLs 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
Copper	110	1600	38	15	22	64	270	80	70	38	3800
Cyanide (total)	0.61	1.4	0.1	0.1	0.1	340	740	na	na	310	5200
Mercury	0.082	0.28	0.07	0.013	0.022	3	22	0.05	34	1.7	46
Selenium	8.5	140	1.5	1.1	1.3	1.1	3	7.7	0.1	0.92	110
Silver	52	2200	30	7.2	11	77	490	na	0.05	44	13000
Zinc	180	1400	200	27	48	290	3000	190	10	160	10000
Organic Chemicals (mg/kg)											
Acenaphthene	na	na	na	na	na	160	490	na	0.25	120	6200
Acetone	1200	30000	7.5	170	14	1.2	1.4	na	na	15	2900
Anthracene	na	na	na	na	na	310	1100	na	na	210	5800
Aroclor-1242	0.26	1.4	1	0.041	0.079	0.76	30	na	na	0.38	16
Aroclor-1248	0.2	0.34	1	0.041	0.079	0.014	0.59	na	na	0.0072	0.075
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	na	3	45
Benzo(a)pyrene	45	64	5.2	7	6	15	50	na	na	9.6	68
Benzo(b)fluoranthene	na	na	na	na	na	52	130	na	na	38	250
Benzo(g,h,i)perylene	na	na	na	na	na	47	540	na	na	24	94
Benzo(k)fluoranthene	na	na	na	na	na	100	350	na	na	62	400

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)
Benzoic acid	na	na	na	na	na	1.3	4.2	na	na	1	350
Bis(2-ethylhexyl)phthalate	0.045	0.033	20	0.02	0.04	1.1	2700	na	na	0.59	1.2
Chrysene	na	na	na	na	na	3.1	6.5	na	na	2.4	46
Dibenzofuran	na	na	na	na	na	na	na	na	6.1	na	na
Fluoranthene	na	na	na	na	na	38	260	38	na	22	360
Fluorene	na	na	na	na	na	340	1100	4.1	na	250	9300
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	110	590	na	na	62	270
Iodomethane	0.44	20	0.038	0.062	0.047	na	na	na	na	na	na
Methylene chloride	na	na	na	na	na	2.6	3.4	na	1600	9	1700
Methylnaphthalene[2-]	na	na	na	na	na	3.8	16	na	na	2.5	130
Naphthalene	1100	6300	37	170	61	0.34	0.45	na	1	0.96	42
Phenanthrene	na	na	na	na	na	15	59	34	na	10	290
Pyrene	190	460	71	34	46	32	110	18	na	22	360
Tetrachloroethene	na	na	na	na	na	0.36	8.8	na	10	0.18	31
Toluene	na	na	na	na	na	25	61	na	200	23	3100
Trichloroethane[1,1,1-]	na	na	na	na	na	400	1800	na	na	260	50000
Trichloroethene	na	na	na	na	na	55	170	na	na	42	6400
Radionuclides (pCi/g)											
Uranium-234	120000	190000	48000	14000	14000	91000	96000	51	14000	94000	45000
Uranium-235	10000	10000	9000	6400	6400	5100	5100	55	4000	5100	4800
Uranium-238	4100	4200	3900	3400	3400	2100	2100	55	1800	2100	2000

Note: Values from ECORISK Database, Version 2.5 (LANL 2010, 110846).

* na = Not available.

Table I-5.3-2
Minimum ESL Comparison for SWMU 46-002

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	0.608	0.05	Plant	**12**
Copper	117.2	15	American robin (insectivore)	**7.8**
Cyanide (total)	0.755	0.1	American robin (herbivore)	**7.6**
Mercury	1.283	0.013	American robin (insectivore)	**99**
Selenium	2.71	0.52	Plant	**5.2**
Silver	5.223	2.6	American robin (insectivore)	**2**
Organic Chemicals (mg/kg)				
Aroclor-1248	0.261	0.0072	Montane shrew	**36**
Aroclor-1254	0.0676	0.041	American robin (insectivore)	**1.6**
Aroclor-1260	0.0405	0.14	Red fox	0.29
Benzo(b)fluoranthene	0.197	18	Plant	0.011
Benzoic acid	2.53	1	Montane shrew	**2.5**
Bis(2-ethylhexyl)phthalate	1.43	0.02	American robin (insectivore)	**72**
Chrysene	0.165	2.4	Montane shrew	0.069
Fluoranthene	0.285	10	Earthworm	0.029
Iodomethane	0.00238	0.038	American robin (herbivore)	0.063
Phenanthrene	0.186	5.5	Earthworm	0.034
Pyrene	0.254	10	Earthworm	0.025
Toluene	0.000929	23	Montane shrew	0.00004
Radionuclides (pCi/g)				
Uranium-238	1.198	55	Earthworm	0.022

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-3
HI Analysis for SWMU 46-002

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												
Antimony	0.608	na*	na	na	na	na	**1.3**	0.21	0.0078	**12**	**2.3**	0.014
Copper	117.2	**1.1**	0.073	**3.1**	**7.8**	**5.3**	**1.8**	**0.43**	**1.5**	**1.7**	**3.1**	0.031
Cyanide (total)	0.755	**1.6**	**1.3**	**7.6**	**7.6**	**7.6**	0.0022	0.001	na	na	0.0024	0.00034
Mercury	1.283	**16**	**4.6**	**18**	**99**	**58**	**0.43**	0.058	**26**	0.038	**0.75**	0.028
Selenium	2.71	**0.48**	0.028	**2.7**	**3.6**	**3.1**	**3.3**	**1.3**	**0.66**	**5.2**	**4.1**	0.032
Silver	5.223	0.27	0.0062	**0.47**	**2**	**1.2**	0.22	0.035	na	0.0093	**0.37**	0.0013
Organic Chemicals												
Aroclor-1248	0.261	**1.3**	**0.77**	**0.26**	**6.4**	**3.3**	**19**	**0.44**	na	na	**36**	**3.5**
Aroclor-1254	0.0676	**0.4**	**0.31**	0.052	**1.6**	**0.85**	0.077	0.0013	na	0.00042	0.15	**0.45**
Benzoic acid	2.53	na	na	na	na	na	**1.9**	**0.6**	na	na	**2.5**	0.0072
Bis(2-ethylhexyl)phthalate	1.43	**32**	**43**	0.072	**72**	**36**	**1.3**	0.00053	na	na	**2.4**	**1.2**
HI		**53**	**50**	**33**	**200**	**120**	**29**	**3**	**28**	**19**	**52**	**5**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.3-4
Minimum ESL Comparison for SWMU 46-004(m)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	1.26(U)	0.05	Plant	**25**
Copper	8.281	15	American robin (insectivore)	**0.55**
Mercury	0.0573	0.013	American robin (insectivore)	**4.4**
Selenium	1.26(U)	0.52	Plant	**2.4**
Zinc	101.2	48	American robin (insectivore)	**2.1**
Organic Chemicals (mg/kg)				
Acenaphthene	0.207	0.25	Plant	**0.83**
Anthracene	0.428	6.8	Plant	0.063
Aroclor-1254	0.00748	0.041	American robin (insectivore)	0.18
Aroclor-1260	0.0069	0.14	Red fox	0.049
Benzo(a)anthracene	1.07	3	Montane shrew	**0.36**
Benzo(a)pyrene	0.241	53	Montane shrew	0.0045
Benzo(b)fluoranthene	0.437	18	Plant	0.024
Benzo(g,h,i)perylene	0.502	24	Montane shrew	0.021
Benzo(k)fluoranthene	0.0152	62	Montane shrew	0.00025
Bis(2-ethylhexyl)phthalate	0.193	0.02	American robin (insectivore)	**9.7**
Chrysene	0.242	2.4	Montane shrew	0.1
Dibenzofuran	0.0838	6.1	Plant	0.014
Fluoranthene	0.493	10	Earthworm	0.049
Fluorene	0.18	3.7	Earthworm	0.049
Indeno(1,2,3-cd)pyrene	0.536	62	Montane shrew	0.0086
Methylene chloride	0.00308	2.6	Deer mouse	0.0012
Methylnaphthalene[2-]	0.0289	2.5	Montane shrew	0.012
Naphthalene	0.0637	1	Plant	0.064
Phenanthrene	0.33	5.5	Earthworm	0.06
Pyrene	0.5	10	Earthworm	0.05
Tetrachloroethene	0.000432	0.18	Montane shrew	0.0024
Toluene	0.00236	23	Montane shrew	0.0001
Trichloroethane[1,1,1-]	0.00255	260	Montane shrew	0.0000098
Trichloroethene	0.00378	42	Montane shrew	0.00009
Radionuclides (pCi/g)				
Uranium-234	1.466	51	Earthworm	0.029
Uranium-235	0.114	55	Earthworm	0.0021

Note: Bolded values indicate HQ greater than 0.3

Table I-5.3-5
HI Analysis for SWMU 46-004(m)

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												
Antimony	1.26(U)	na*	na	na	na	na	**2.6**	**0.43**	0.016	**25**	**4.8**	0.028
Copper	8.281	0.075	0.0052	0.22	**0.55**	**0.38**	0.13	0.031	0.1	0.12	0.22	0.0022
Mercury	0.0573	**0.7**	0.2	**0.82**	**4.4**	**2.6**	0.019	0.0026	**1.1**	0.0017	0.034	0.0012
Selenium	1.26(U)	0.23	0.013	**1.3**	**1.7**	**1.4**	**1.5**	**0.6**	**0.31**	**2.4**	**1.9**	0.015
Zinc	101.2	**0.32**	0.042	0.29	**2.1**	**1.2**	**0.6**	0.056	**0.84**	**0.63**	**1**	0.017
Organic Chemicals												
Acenaphthene	0.207	na	na	na	na	na	0.0013	0.00042	na	**0.83**	0.0017	0.000033
Benzo(a)anthracene	1.07	0.023	0.017	0.21	0.15	0.18	**0.31**	0.17	na	0.059	**0.36**	0.033
Bis(2-ethylhexyl)phthalate	0.193	**4.3**	**5.8**	0.0097	**9.7**	**4.8**	0.18	0.000071	na	na	**0.33**	0.16
HI		**6**	**6**	**3**	**18**	**10**	**5**	1	**2**	**29**	**9**	0.3

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.3-6
Minimum ESL Comparison for SWMU 46-006(b)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	0.605	0.05	Plant	**12**
Selenium	1.21(U)	0.52	Plant	**2.3**
Organic Chemicals (mg/kg)				
Acenaphthene	0.0162	0.25	Plant	0.065
Acetone	0.00241	1.2	Deer mouse	0.002
Anthracene	0.0237	6.8	Plant	0.0035
Aroclor-1242	0.0107	0.041	American robin (insectivore)	0.26
Aroclor-1254	0.0143	0.041	American robin (insectivore)	**0.35**
Benzo(a)anthracene	0.0929	3	Montane shrew	0.031
Benzo(a)pyrene	0.102	53	Montane shrew	0.0019
Benzo(b)fluoranthene	0.173	18	Plant	0.0096
Benzo(g,h,i)perylene	0.0518	24	Montane shrew	0.0022
Benzo(k)fluoranthene	0.0464	62	Montane shrew	0.00075
Bis(2-ethylhexyl)phthalate	0.109	0.02	American robin (insectivore)	**5.5**
Chrysene	0.0949	2.4	Montane shrew	0.04
Fluoranthene	0.203	10	Earthworm	0.02
Fluorene	0.0127	3.7	Earthworm	0.0034
Indeno(1,2,3-cd)pyrene	0.163	62	Montane shrew	0.0026
Methylnaphthalene[2-]	0.0152	2.5	Montane shrew	0.0061
Phenanthrene	0.0878	5.5	Earthworm	0.016
Pyrene	0.245	10	Earthworm	0.025
Toluene	0.000399	23	Montane shrew	0.000017

Note: Bolded values indicate HQ greater than 0.3

Table I-5.3-7
HI Analysis for SWMU 46-006(b)

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												
Antimony	0.605	na*	na	na	na	na	**1.3**	0.21	0.0078	**12**	**2.3**	0.013
Selenium	1.21(U)	0.22	0.012	**1.2**	**1.6**	**1.4**	**1.5**	**0.58**	**0.3**	**2.3**	**1.8**	0.014
Organic Chemicals												
Aroclor-1254	0.0143	0.084	0.065	0.011	**0.35**	0.18	0.016	0.00028	na	0.000089	0.033	0.095
Bis(2-ethylhexyl)phthalate	0.109	**2.4**	**3.3**	0.0055	**5.5**	**2.7**	0.099	0.00004	na	na	0.18	0.091
HI		**3**	**3**	1	**7**	**4**	**3**	0.8	0.3	**14**	**4**	0.2

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* na = Not available.

Table I-5.3-8
Minimum ESL Comparison for SWMU 46-006(g)

COPC	EPC	ESL	Receptor	HQ
Inorganic Chemicals (mg/kg)				
Antimony	1.1(U)	0.05	Plant	**22**
Selenium	1.1(U)	0.52	Plant	**2.1**
Organic Chemicals (mg/kg)				
Aroclor-1242	0.0015	0.041	American robin (insectivore)	0.037
Aroclor-1254	0.0244	0.041	American robin (insectivore)	**0.6**
Aroclor-1260	0.0512	0.14	Red fox	**0.37**
Toluene	0.00351	23	Montane shrew	0.00015
Trichloroethene	0.00164	42	Montane shrew	0.000039

Note: Bolded values indicate HQ greater than 0.3.

Table I-5.3-9
HI Analysis for SWMU 46-006(g)

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												
Antimony	1.1(U)	na*	na	na	na	na	**2.3**	**0.38**	0.014	**22**	**4.2**	0.024
Selenium	1.1(U)	0.2	0.011	**1.1**	**1.5**	**1.3**	**1.3**	**0.52**	0.27	**2.1**	**1.7**	0.013
Organic Chemicals												
Aroclor-1254	0.0244	0.14	0.11	0.019	**0.6**	**0.31**	0.028	0.00047	na	0.00015	0.055	0.16
Aroclor-1260	0.0512	0.014	0.011	0.0011	0.058	0.03	0.0026	0.000017	na	na	0.0051	**0.37**
HI		0.4	0.1	1	**2**	**2**	**4**	0.9	0.3	**24**	**6**	0.6

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 46-002

COPEC	EPC (mg/kg)	Soil Background Concentrations[a] (mg/kg)	Tuff Background Concentrations[a] (mg/kg)
Antimony	0.608	0.1–1.0	0.5[b]
Copper	117.2	0.25–16	0.25–6.2
Cyanide	0.755	0.5[b]	0.5[b]
Mercury	1.283	0.05–0.1	0.1[b]
Selenium	2.71	0.1–1.7	0.1–0.105
Silver	5.223	1.0[b]	0.2–1.9

Note: Bolded COPECs are greater than background.

[a] Background concentrations from LANL (1998, 059730).

[b] BV used.

Table I-5.4-2
Comparison of EPCs with
Background Concentrations for SWMU 46-004(m)

COPEC	EPC (mg/kg)	Soil Background Concentrations[a] (mg/kg)	Tuff Background Concentrations[a] (mg/kg)
Antimony	1.26(U)	0.1–1	0.05–0.4
Copper	8.281	0.25–16	0.25–6.2
Mercury	0.0573	0.05–0.1	0.1[b]
Selenium	1.26(U)	0.1–1.7	0.1–0.105
Zinc	101.2	14–75.5	5.5–65.6

Note: Bolded COPECs are greater than background.

[a] Background concentrations from LANL (1998, 059730).

[b] BV used.

Table I-5.4-3
Comparison of EPCs with
Background Concentrations for SWMU 46-006(b)

COPEC	EPC (mg/kg)	Soil Background Concentrations* (mg/kg)	Tuff Background Concentrations* (mg/kg)
Antimony	0.605	0.1–1	0.05–0.4
Selenium	1.21(U)	0.1–1.7	0.1–0.105

* Background concentrations from LANL (1998, 059730).

Table I-5.4-4
Comparison of EPCs with
Background Concentrations for SWMU 46-006(g)

COPEC	EPC (mg/kg)	Soil Background Concentrations* (mg/kg)	Tuff Background Concentrations* (mg/kg)
Antimony	1.1 (U)	0.1–1	0.05–0.4
Selenium	1.1 (U)	0.1–1.7	0.1–0.105

* Background concentrations from LANL (1998, 059730).

Table I-5.4-5
PAUFs for Ecological Receptors for SWMU 46-002

Receptor	Home Range[a] (ha)	Population Area (ha)	PAUF[b]
American Kestrel	106	4240	2.9E-05
American Robin	0.42	16.8	0.0074
Deer Mouse	0.077	3	0.042
Desert Cottontail	3.1	124	0.001
Montane Shrew	0.39	15.6	0.008
Red Fox	1038	41,520	3.0E-06

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.125 ha) divided by the population area. If a PAUF is greater than 1, no adjustment is made.

Table I-5.4-6
PAUFs for Ecological Receptors for SWMU 46-004(m)

Receptor	Home Range[a] (ha)	Population Area (ha)	PAUF[b]
American Kestrel	106	4240	7.8E-06
American Robin	0.42	16.8	0.0019
Deer Mouse	0.077	3	0.011
Desert Cottontail	3.1	124	0.00027
Montane Shrew	0.39	15.6	0.0021
Red Fox	1038	41,520	7.9E-07

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.033 ha) divided by the population area. If a PAUF is greater than 1, no adjustment is made.

Table I-5.4-7
PAUFs for Ecological Receptors for SWMU 46-006(b)

Receptor	Home Range[a] (ha)	Population Area (ha)	PAUF[b]
American Kestrel	106	4240	1.7E-06
American Robin	0.42	16.8	4.2E-04
Deer Mouse	0.077	3	0.0023
Desert Cottontail	3.1	124	5.6E-05
Montane Shrew	0.39	15.6	4.5E-04
Red Fox	1038	41,520	1.7E-07

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.007 ha) divided by the population area. If a PAUF is greater than 1, no adjustment is made.

Table I-5.4-8
PAUFs for Ecological Receptors for SWMU 46-006(g)

Receptor	Home Range[a] (ha)	Population Area (ha)	PAUF[b]
American Kestrel	106	4240	4.7E-07
American Robin	0.42	16.8	1.2E-04
Deer Mouse	0.077	3	6.7 E-04
Desert Cottontail	3.1	124	1.6E-05
Montane Shrew	0.39	15.6	1.3 E-04
Red Fox	1038	41,520	4.8E-08

[a] Values from EPA (1993, 059384).

[b] PAUF is calculated as the area of the site (0.002 ha) divided by the population area. If a PAUF is greater than 1, no adjustment is made.

Table I-5.4-9
Adjusted HIs at SWMU 46-002

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)												
Copper	117.2	3.2E-05	2.5E-05	0.023	0.058	0.039	0.075	4.3E-04	**1.5**	**1.7**	0.025	9.3E-08
Cyanide (total)	0.755	4.7E-05	4.4E-04	0.057	0.057	0.057	9.2E-05	1E-06	na*	na	1.9E-05	1E-09
Mercury	1.283	4.7E-04	0.0016	0.13	**0.74**	**0.43**	0.018	5.8E-05	**26**	0.038	0.006	8.4E-08
Selenium	2.71	1.4E-05	9.6E-06	0.02	0.027	0.023	0.14	0.0013	**0.66**	**5.2**	0.033	9.6E-08
Silver	5.223	8.0E-06	2.1E-06	0.0035	0.015	0.0089	0.0092	3.5E-05	na	0.0093	0.003	3.9E-09
Organic Chemicals (mg/kg)												
Aroclor-1248	0.261	3.8E-05	2.6E-04	0.0019	0.048	0.025	**0.79**	4.4E-04	na	na	0.29	1.1E-05
Aroclor-1254	0.0676	1.2E-05	1.1E-04	3.9E-04	0.012	0.0063	0.0032	1.3E-06	na	4.2E-04	0.0012	1.4E-06
Benzoic Acid	2.53	na	na	na	na	na	0.079	0.0006	na	na	0.02	2.2E-08
Bis(2-ethylhexyl)phthalate	1.43	9.4E-04	0.015	5.4E-04	**0.54**	0.27	0.054	5.3E-07	na	na	0.019	3.6E-06
Adjusted HI		0.002	0.02	0.2	**2**	0.9	1	0.003	**28**	**7**	0.4	0.00002

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-10
Adjusted HIs at SWMU 46-004(m)

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)												
Antimony	1.26(U)	na*	na	na	na	na	0.029	1.1E-04	0.016	**25**	0.01	2.2E-08
Zinc	101.2	2.5E-06	3.8E-06	5.7E-04	0.0041	0.0024	0.0066	1.5E-05	**0.84**	**0.63**	0.0021	1.4E-08
Organic Chemicals (mg/kg)												
Acenaphthene	0.207	na	na	na	na	na	1.4E-05	1.1E-07	na	**0.83**	3.6E-06	2.6E-11
Benzo(a)anthracene	1.07	na	na	na	na	na	0.0034	4.5E-05	na	0.059	7.6E-04	2.6E-08
Bis(2-ethylhexyl)phthalate	0.193	3.3E-05	5.2E-04	1.9E-05	0.019	0.0094	0.002	1.9E-08	na	na	0.0007	1.3E-07
Adjusted HI		4.0E-05	5.0E-04	6.0E-04	0.02	0.01	0.04	2.0E-04	0.9	**27**	0.01	2.0E-07

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* na = Not available.

Table I-5.4-11
Adjusted HIs at SWMU 46-006(b)

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)
Organic Chemicals (mg/kg)												
Aroclor-1254	0.0143	1.4E-07	1.1E-07	1.8E-08	5.8E-07	3E-07	2.6E-08	4.6E-10	na*	1.5E-10	5.4E-08	1.6E-06
Bis(2-ethylhexyl)phthalate	0.109	4.0E-06	5.4E-06	9.1E-09	9.1E-06	4.5E-06	1.6E-07	6.6E-11	na	na	3E-07	1.5E-07
Adjusted HI		4.0E-06	06.0E-06	3E-08	10E-06	5E-06	2E-07	5E-10	na	2E-10	4E-07	3.0E-07

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-12
Adjusted HIs at SWMU 46-006(g)

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)
Organic Chemicals (mg/kg)												
Aroclor-1254	0.0244	6.6E-08	5.2 E-08	9E-09	2.8E-07	1.5E-07	1.3E-08	2.2E-10	na*	7.1E-11	2.6E-08	7.5 E-08
Aroclor-1260	0.0512	6.6E-09	5.2E-09	5.2E-10	2.7E-08	1.4E-08	1.2E-09	8E-12	na	na	2.4E-09	1.7 E-07
Adjusted HI		7.0 E-08	6.0 E-08	1E-08	3E-07	2E-07	1E-08	2E-10	na	7E-11	3E-08	3.0 E-07

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

* na = Not available.

Table I-5.4-13
Summary of LOAEL-Based ESLs for Terrestrial Receptors

COPEC	Receptor	LOAEL-Based TRV	Unit	LOAEL-Based ESL (mg/kg soil)	Rationale for Deriving LOAELs/ Lowest Observed Effect Concentration
Antimony	Plant	0.5	mg/kg	5.0E-01	The lowest observed effect concentration (LOEC) is derived from a LOEC with an unspecified exposure duration by applying an uncertainty factor of 0.1. The no observed effect concentration (NOEC) was derived from the same LOEC, except an uncertainty factor of 0.01 was applied.
Copper	Earthworm	530	mg/kg	5.3E+02	LOEC is extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf). Applied an uncertainty factor of 5 for maximum allowable toxic concentrations (MATCs) and 10 for effect concentration (EC) 20s and calculated the geometric mean.
	Plant	497	mg/kg	4.9E+02	LOEC is extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_copper.pdf). Applied an uncertainty factor of 5 for MATCs and 10 for EC20s and calculated the geometric mean.
Mercury	American Robin (insectivore)	0.19	mg/kg/d	1.3E-01	LOAEL was derived from an LD50 by applying an uncertainty factor of 0.1. The NOAEL was derived from the same lethal dose 50 as the LOAEL, except an uncertainty factor of 0.01 was applied.
	Earthworm	0.5	mg/kg	5.0E-01	LOEC is equal to a LOEC taken directly from the literature. The NOEC was derived from this LOEC by applying an uncertainty factor 0.1.
Selenium	Earthworm	41	mg/kg	4.1E+01	LOEC is from the literature. The NOEC is derived from this LOEC by applying an uncertainty factor of 0.1.
	Plant	3.4	mg/kg	3.4E+00	LOEC extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_selenium.pdf). Applied uncertainty factor of 5 for MATCs and 10 for EC20s and calculated geometric mean.
Zinc	Plant	810	mg/kg	8.1E+02	LOEC is extrapolated from EPA geometric mean NOEC data set (http://www.epa.gov/ecotox/ecossl/pdf/eco-ssl_zinc.pdf). Applied an uncertainty factor of 5 for MATCs and calculated the geometric mean.
Acenaphthene	Plant	0.25	mg/kg	2.5E-01	LOEC is extrapolated from an EC50 by applying an uncertainty factor of 0.1. The NOEC is extrapolated from the same EC50, except an uncertainty factor of 0.01 was applied.
Bis(2-ethylhexyl)phthalate	American Robin (insectivore)	11	mg/kg/d	2.0E-01	LOAEL extrapolated from a NOAEL by applying an uncertainty factor of 10.

Table I-5.4-14
HI Analysis Using LOAEL-Based ESLs for SWMU 46-002

COPECs	EPC (mg/kg)	American Robin (insectivore)	Earthworm	Plant
Copper	117.2	n/a*	0.2	0.2
Mercury	1.283	**7**	**3**	n/a
Selenium	2.71	n/a	0.07	0.8
Bis(2-ethylhexyl)phthalate	1.43	**7**	n/a	n/a
	HI	**14**	**3**	1

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-15
Adjusted HI Analysis for LOAEL-Based ESLs for SWMU 46-002

COPECs	EPC (mg/kg)	American Robin (insectivore)
Mercury	0.138	0.05
Bis(2-ethylhexyl)phthalate	0.119	0.05
	Adjusted HI	0.1

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.
* n/a = Not applicable.

Table I-5.4-16
HI Analysis Using LOAEL-Based ESLs for SWMU 46-004(m)

COPECs	EPC (mg/kg)	Plant
Antimony	1.26(U)	**2.5**
Zinc	101.2	0.1
Acenaphthene	0.207	0.08
	HI	**3**

Note: Bolded values indicate HQ greater than 0.3 or HI greater than 1.0.

Attachment I-1

ProUCL Files
(on CD included with this document)

Attachment I-2

Ecological Scoping Checklist for
Upper Cañada del Buey Aggregate Area

I1-1.0 PART A—SCOPING MEETING DOCUMENTATION

Site ID	**Upper Cañada del Buey Aggregate Area**
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.	Sources of potential contamination in the Upper Cañada del Buey Aggregate Area include Technical Area 46 (TA-46) and TA-52. These TAs and their associated areas of concern (AOCs) and solid waste management units (SWMUs) are located on mesa tops adjacent to Cañada del Buey. Mechanisms of contaminant release to the Upper Cañada del Buey Aggregate Area include contaminant releases from upgradient mesa-top septic systems, outfalls, drywells, container storage areas, surface disposal areas, lagoons, and contaminants mobilized by storm runoff. This checklist describes the conditions at the six locations in the Upper Cañada del Buey Aggregate Area where the nature and extent of contamination are defined: AOC C-46-001, SWMU 46-002, SWMU 46-004(m) SWMU 46-004(p), SWMU 46-006(b), and SWMU 46-006(g).
List of Primary Impacted Media **(Indicate all that apply.)**	**Surface soil –** Yes **Surface water/sediment –** No **Subsurface –** Yes **Groundwater –** No **Other, explain –** No perennial reaches occur in the Upper Cañada del Buey Aggregate Area, but runoff during intense summer storms and snowmelt events could carry contaminants into surface waters that drain off-site.
Vegetation class based on GIS vegetation coverage **(Indicate all that apply.)**	**Water –** No **Bare Ground/Unvegetated –** Yes **Spruce/fir/aspen/mixed conifer –** Yes **Ponderosa pine –** Yes **Piñon juniper/juniper savannah –** Yes **Grassland/shrubland –** Yes **Developed –** Yes **Burned –** Yes The Upper Cañada del Buey Aggregate Area complex, in general, has been disturbed and consists primarily of industrial infrastructure interspersed with soil intermixed with patches of bedrock and weedy vegetation. There are numerous paved surfaces and roadways throughout the area. The dominant overstory vegetation type in the adjacent canyon area is ponderosa pine, with minor vegetation components of oak, piñon, and juniper. The understory contains mostly native and nonnative grasses and early successional species indicative of disturbance, with a few shrubs and forbs. Habitat fragmentation throughout the Upper Cañada del Buey Aggregate Area is high. The general habitat quality in undisturbed canyon areas proximal to the AOC and SWMUs is sufficient to support grazing and foraging by terrestrial receptors, but fragmentation, industrialization, and low-quality habitat are characteristic of the sites evaluated.
Is T&E Habitat Present? **If applicable, list species known or suspected to use the site for breeding or foraging.**	No threatened and endangered (T&E) species habitat is present at AOC C-46-001, SWMU 46-002, SWMU 46-004(m) SWMU 46-004(p), SWMU 46-006(b), and SWMU 46-006(g) However, the Mexican spotted owl is likely to nest, roost, and forage at varying levels in some reaches containing suitable habitat within Cañada del Buey (Keller 2009, 106613).

Provide list of Neighboring/ Contiguous/ Up-gradient sites, include a brief summary of COPCs and form of releases for relevant sites and reference map as appropriate. **(Use information to evaluate need to aggregate sites for screening.)**	The Upper Cañada del Buey Aggregate Area consists of 83 SWMUs and AOCs. The work plan for the Upper Cañada del Buey Aggregate Area (LANL 2008, 105038.17) provides a comprehensive discussion of contiguous and upgradient SWMUs/AOCs that potentially discharge to the watershed. The six sites described in this ecological scoping checklist [AOC C-46-001, SWMU 46-002, SWMU 46-004(m) SWMU 46-004(p), SWMU 46-006(b), and SWMU 46-006(g)] have been defined in terms of the lateral and vertical extent of contamination for inorganic chemicals, organic chemicals, and radionuclides. The list of COPCs is presented in the main text.
Surface Water Erosion Potential Information **Summarize information including the terminal point of surface water transport, slope, and surface water run-on sources.**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain (<10% slope). Surface water transport and erosion potential is considerably higher on the steep slopes. The floor of Cañada del Buey is the terminal point for surface water transport via runoff from the mesa tops in the Upper Cañada del Buey Aggregate Area.

I1-2.0 PART B—SITE VISIT DOCUMENTATION

I1-2.1 AOC C-46-001

Site ID	**AOC C-46-001**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** none **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** high
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Site is paved with asphalt and concrete. Weedy grasses and forbs are in small unpaved areas between structures.
Are ecological receptors present at the site? **(yes/no/uncertain)** **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.**	No. Structures and pavement preclude use by terrestrial receptors.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain (<10% slope).

Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Storm events may produce ephemeral stream drainage downgradient. **Groundwater:** No **Air:** No.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	No.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No. Industrialized conditions preclude habitat and site use by terrestrial receptors.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport. This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Soil and tuff data provide adequate information to support characterization of the nature and extent of contamination at AOC C-46-001. Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for AOC C-46-001.
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Soil and tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	AOC C-46-001 is located immediately adjacent to Building 46-75 in an area dominantly covered with cobble, asphalt, and concrete. No viable habitat for terrestrial receptors is located within the vicinity of this site.

I1-2.2 SWMU 46-002

Site ID	**SWMU 46-002**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** high **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** low
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Open ponderosa pine, piñon, juniper, shrub oak, cottonwood, and grasses. Paved surfaces and roads are located adjacent to the site
Are ecological receptors present at the site? **(yes/no/uncertain)** **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. The vegetation at the site is healthy and varied and the habitat is sufficient to support foraging of terrestrial receptors. The following wildlife has been observed or known to be present while conducting field work at the site: bobcat, elk, mule deer, coyotes, rabbits, mice, chipmunks, squirrels, and birds.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain, however surface water transport and erosion potential is considerably higher on the steep slopes. Canyon bottoms serve as the terminal point for surface water transport via runoff from the mesa tops in Cañada del Buey.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Ephemeral stream drainage downgradient. **Groundwater:** No **Air:** Yes. Surface contamination may be dispersed by wind though vegetation and forest litter inhibits this process substantially.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	No.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport.
This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Soil and tuff data provide adequate information to support characterization of the nature and extent of contamination at SWMU 46-002. Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for SWMU 46-002.
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Soil and tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	The site is highly vegetated with ponderosa pine, fir, oak, juniper, piñon, chamisa, grasses, and various herbaceous plants.

I1-2.3 SWMU 46-004(m)

Site ID	**SWMU 46-004(m)**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** high **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** high
Field notes on the GIS vegetation class to assist in verifying the Arcview information	Surface cover varies from asphalt pavement at mesa-top to significant and viable habitat on the side slope of Cañada del Buey. Ponderosa pine, fir, oak, willow, mullein, grasses and forbs are present on the canyon side slope within this SWMU. The canyon side slope area is fire affected.
Are ecological receptors present at the site? **(yes/no/uncertain)** **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. Downgradient vegetation is sufficient for supporting foraging of terrestrial receptors. The following wildlife has been observed or known to be present while conducting field work at the site: bobcat, elk, mule deer, coyotes, rabbits, mice, chipmunks, squirrel, and birds.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport is high on the hillside associated with SWMU 46-004(m). Surface water transport and erosion is evident, and erosion control systems are in place. The floor of Cañada del Buey serves as the terminal point for surface water transport via runoff from SWMU 46-004(m).
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Ephemeral stream drainage downgradient. **Groundwater:** No **Air:** Yes. Surface contamination may be dispersed by wind though vegetation and forest litter inhibits this process substantially.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	Yes. Erosion control systems are employed on the canyon side slope at SWMU 46-004(m) to control downgradient flow of potential contaminants from the paved mesa top.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport.
This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Soil and tuff data provide adequate information to support characterization of the nature and extent of contamination at SWMU 46-004(m). Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for SWMU 46-004(m).
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Soil and tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	SWMU 46-004(m) is located in an area affected by the Cerro Grande fire. Erosion control measures are in place at the site to prevent further erosion and downgradient movement of potential contamination.

I1-2.4 SWMU 46-004(p)

Site ID	**SWMU 46-004(p)**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** none **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** high
Field notes on the GIS vegetation class to assist in verifying the Arcview information	No vegetation is present at SWMU 46-004(p).
Are ecological receptors present at the site? **(yes/no/uncertain)** **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.**	No. SWMU 46-004(p) is an asphalt parking lot and is not vegetated, precluding use by wildlife.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain (<10% slope).
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Ephemeral stream drainage downgradient. **Groundwater:** No **Air:** No.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	No.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport.
This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Tuff data provide adequate information to support characterization of the nature and extent of contamination at SWMU 46-004(p). Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for SWMU 46-004(p).
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	SWMU 46-004(p) is situated in an asphalt parking lot adjacent to Building 46-1, is unvegetated, and does not support terrestrial receptors.

I1-2.5 SWMU 46-006(b)

Site ID	**SWMU 46-006(b)**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** none **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** high
Field notes on the GIS vegetation class to assist in verifying the Arcview information	SWMU 46-006(b) is an asphalt parking lot with sparse weedy species present along a chain-link fence.
Are ecological receptors present at the site? **(yes/no/uncertain)** **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.**	No. SWMU 46-006(b) is asphalt surrounded by sparse grass and forbs. Site habitat is likely not sufficient to support foraging of terrestrial receptors.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain (<10% slope). Surface water transport and erosion potential is considerably higher on the steep slopes. The floor of Cañada del Buey serves as the terminal point for surface water transport via runoff from the mesa top.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Ephemeral stream drainage downgradient. **Groundwater:** No **Air:** No.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	Two boreholes are located in close proximity to SWMU 46-006(b).
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport. This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Soil and tuff data provide adequate information to support characterization of the nature and extent of contamination at SWMU 46-006(b). Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for SWMU 46-006(b).
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Soil and tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	SWMU 46-006(b) is a former structure and does not support terrestrial receptors.

I1-2.6 SWMU 46-006(g)

Site ID	**SWMU 46-006(g)**
Date of Site Visit	10/7/2010
Site Visit Conducted by	Jenifer Linville, Maurice Shendo

Receptor Information:

Estimate cover	**Relative vegetative cover (high, medium, low, none) =** none **Relative wetland cover (high, medium, low, none) =** none **Relative structures, asphalt, etc., cover (high, medium, low, none) =** high
Field notes on the GIS vegetation class to assist in verifying the Arcview information	No vegetation is present at SWMU 46-006(g).
Are ecological receptors present at the site? **(yes/no/uncertain)** **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.**	No. SWMU 46-006(g) is a structure located adjacent to Building 46-31. The area around SWMU 46-006(g) is paved and does not support habitat for ecological receptors.

Contaminant Transport Information:

Surface water transport **Field notes on the erosion potential, including a discussion of the terminal point of surface water transport (if applicable).**	Surface water transport and erosion potential on the mesa top is considered low because of the relatively flat terrain (<10% slope). Surface water transport and erosion potential is considerably higher on the steep slopes. Canyon bottoms serve as the terminal point for surface water transport via runoff from the mesa tops.
Are there any off-site transport pathways (surface water, air, or groundwater)? **(yes/no/uncertain)** **Provide explanation**	**Surface Water:** Yes. Ephemeral stream drainage downgradient. **Groundwater:** No **Air:** No.

Ecological Effects Information:

Physical Disturbance **(Provide list of major types of disturbances, including erosion and construction activities, review historical aerial photos where appropriate.)**	No.
Are there obvious ecological effects? **(yes/no/uncertain)** **Provide explanation and apparent cause (e.g., contamination, physical disturbance, other).**	No.

No Exposure/Transport Pathways:

If there are no complete exposure pathways to ecological receptors onsite and no transport pathways to offsite 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 likelihood that future construction activities could make contamination more available for exposure or transport.
This section does not apply.

Adequacy of Site Characterization:

Do existing or proposed data provide information on the nature and extent of contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if the maximum value was captured by existing sample data.)**	Yes. Soil and tuff data provide adequate information to support characterization of the nature and extent of contamination at SWMU 46-006(g). Samples were collected from representative locations within the mapped geomorphic units. Analytical suites for these samples are adequate to cover the potential contaminant sources. Lateral and vertical extent of contamination are defined for SWMU 46-006(g).
Do existing or proposed data for the site address potential transport pathways of site contamination? **(yes/no/uncertain)** **Provide explanation** **(Consider if other sites should aggregated to characterize potential ecological risk.)**	Yes. Soil and tuff data are adequate to characterize potential contaminant transport pathways.
Provide additional field notes on the site setting and potential ecological receptors.	SWMU 46-006(g) is a structure surrounded by pavement and does not support terrestrial receptors.

I1-3.0 PART C—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-me/mol and molecular weight <200 g/mol).**

Answer (likely/unlikely/uncertain): Unlikely

Provide explanation: Volatile chemicals were not detected at high concentrations**.**

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): Likely

Provide explanation: No high levels of surface contamination are documented however contaminated near-surface soils could reach burrowing mammals at unpaved locations.

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 PRS 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): Unlikely

Provide explanation: There are no nearby aquatic communities that could be impacted by runoff from the sites.

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 via 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 is no alluvial or perched water beneath the sites and there are no nearby springs or seeps.

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: There is no alluvial or perched water beneath the sites and there are no nearby springs or seeps.

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: Mass wasting would not be a release mechanism because areas where there are steeper slopes near the mesa edge are composed of consolidated tuff. Erosion is minimal at mesa top locations and is mitigated with control systems at SWMU 46-004(m).

Question G:

Could airborne contaminants interact with receptors through respiration of vapors?

- **Contaminants must be present as volatiles in the air.**
- **Consider the importance of inhalation of vapors for burrowing animals.**
- **Foliar uptake of organic 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: Volatile organics, if present, were detected at very low concentrations.

Question H:

Could airborne contaminants interact with plants through deposition of particulates or with animals through 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: 2

Terrestrial Animals: 2

Provide explanation: Deposition of particulates on plants may be an exposure pathway to terrestrial receptors. Inhalation of resuspended dust is also a viable pathway for surface contaminants; however, most contamination is in the subsurface.

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: Contamination is mostly in the subsurface and at depths that could be taken up by plant roots.

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: Some contaminants are known to bioaccumulate, however, most contamination is present at the subsurface and not accessible to animals**.**

Question K:

Could contaminants interact with receptors via 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: Foraging and grooming activities may result in exposure to terrestrial receptors via incidental ingestion**.** However, most contamination is present in the subsurface and not accessible to receptors.

Question L:

Could contaminants interact with receptors through dermal contact with surficial soils?

- **Significant exposure via 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: 1

Provide explanation: Exposure via dermal contact is possible for terrestrial receptors, most contamination is present in the subsurface and not accessible to receptors.

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: 1

Terrestrial Animals: 1

Provide explanation: There are no gamma-emitting radionuclides detected above background or fallout values at the AOC or SWMUs evaluated.

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: 1

Provide explanation: There are no surface water bodies present at the sites.

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 surface water bodies present at the sites.

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 water bodies present at the sites.

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 water bodies present at the sites.

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: 2

Terrestrial Animals: 1

Provide explanation: There are no gamma-emitting radionuclides detected at the sites**.**

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 water bodies present at the sites.

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 water bodies present at the sites.

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 water bodies present at the sites.

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, thus 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):

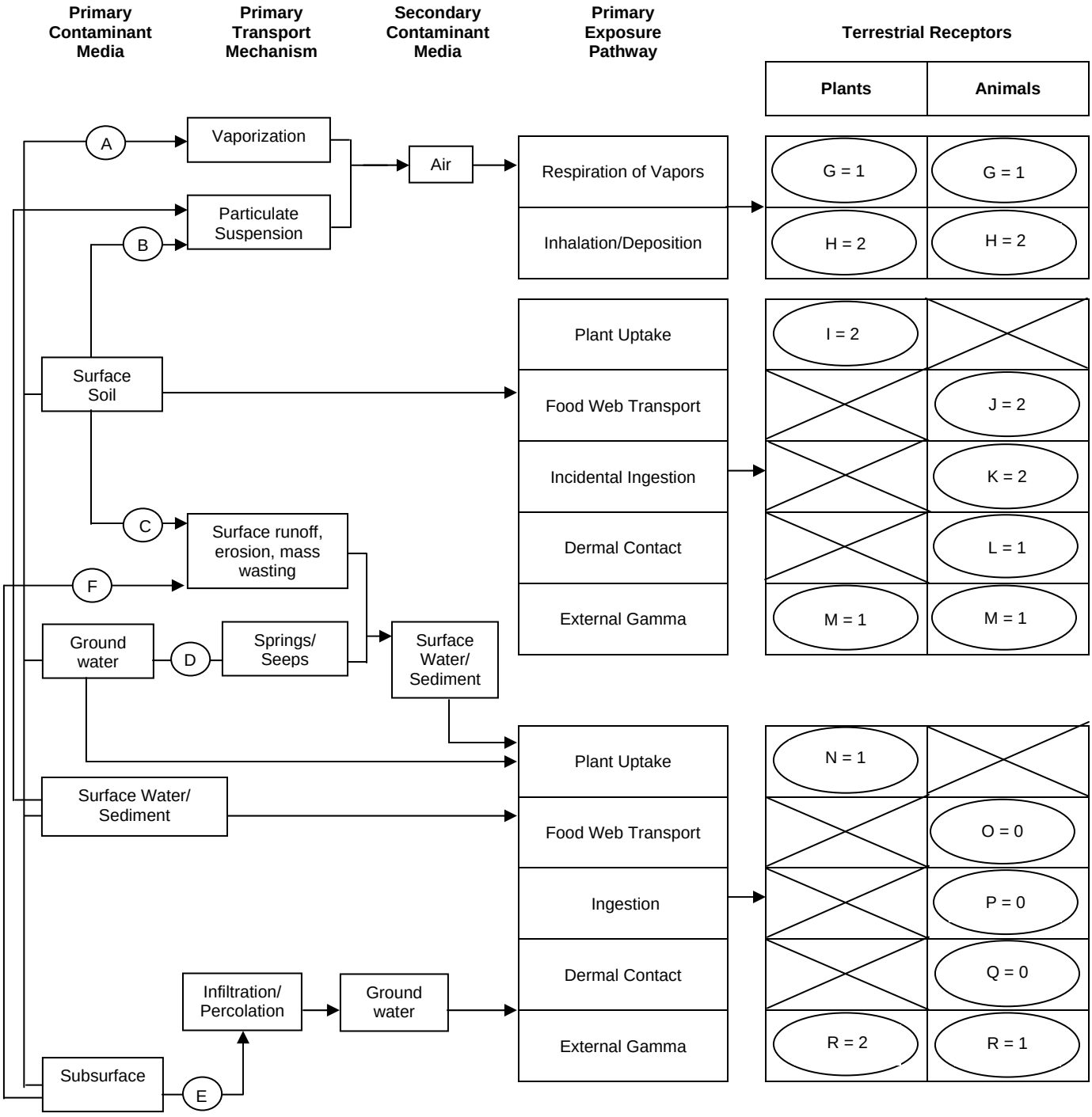
Aquatic Plants: 0

Aquatic Animals: 0

Provide explanation: There are no water bodies present at the sites.

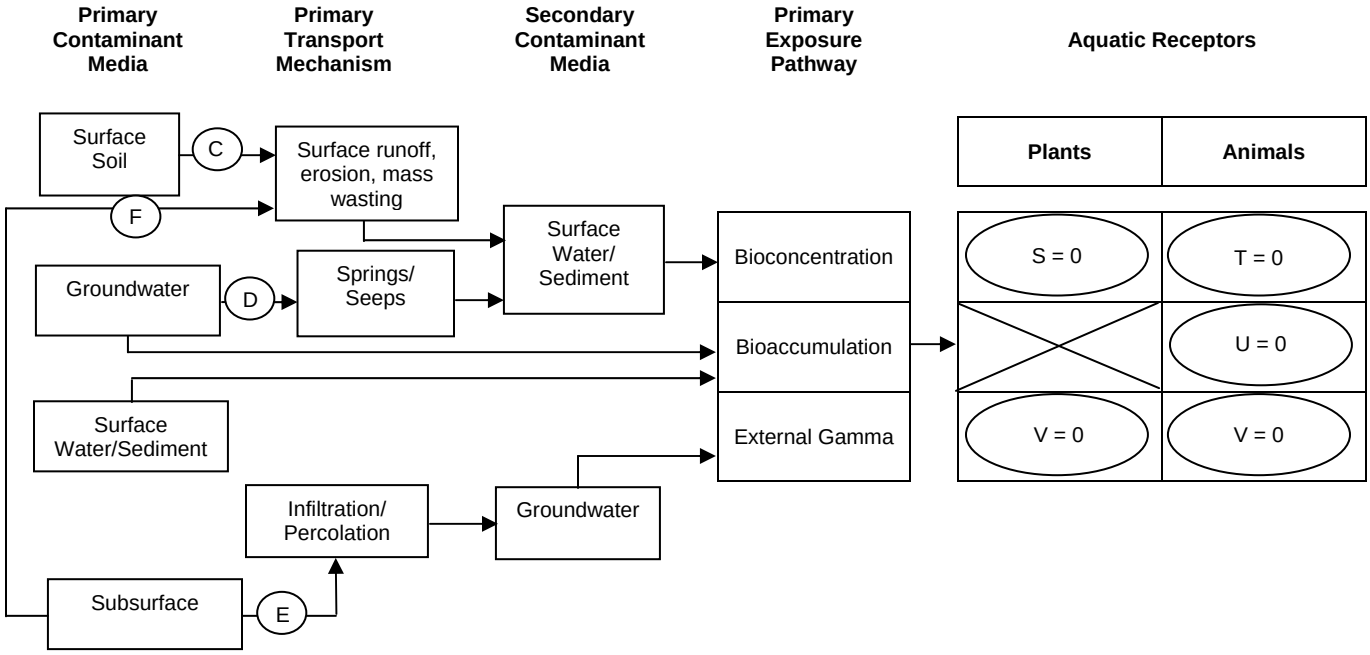
NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Terrestrial Receptors
Ecological Pathways Conceptual Exposure Model



NOTE:
Letters in circles refer to questions on the Scoping Checklist

Ecological Scoping Checklist
Aquatic Receptors
Ecological Pathways Conceptual Exposure Model



Signatures and certifications:

Checklist completed by (provide name, organization, and phone number):

Name (printed): Jenifer Linville
Name (signature): Jenifer Linville
Organization: TerranearPMC
Phone number: 505-663-7149
Date Completed: October 7, 2010

Verification by another party (provide name, organization, and phone number):

Name (printed): Richard J. Mirenda
Name (signature): Richard J. Mirenda
Organization: Los Alamos National Laboratory, EP-ET-ER
Phone number: 505-665-6953

I1-4.0 REFERENCES

The following list includes all documents cited in this attachment. 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.

Keller, D., June 22, 2009. "Review of Reaches in the Cañada del Buey System for Threatened and Endangered Species Habitat for the Purpose of Ecological Screening/Risk Assessment," Los Alamos National Laboratory memorandum (ENV-EAQ:09-145) to S. Reneau (EES-16) from D. Keller (ENV-EAQ), Los Alamos, New Mexico. (Keller 2009, 106613)

LANL (Los Alamos National Laboratory), September 2008. "Investigation Work Plan for Upper Cañada del Buey Aggregate Area, Revision 1," Los Alamos National Laboratory document LA-UR-08-6122, Los Alamos, New Mexico. (LANL 2008, 105038.17)

Appendix J

Supplemental Information on
Solid Waste Management Unit 52-001(d)

[redacted] [redacted] [redacted]

Return To Library > Records 2 > ERID-101000 through ERID-101499 > ERID-101365 1) E-MAIL FROM LINDA NONNO TO NEELAM DHAWAN REGARDING SUPPLEMENTAL INFORMATION FOR 52-001(d)

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Other Document Number(s): *(separate multiple values with semicolons)*	SWMU-52-001(d)
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101365

neelam.dhawan@state.nm.us, 02:35 PM 4/15/2008, Supplemental Information for SWMU 52-001(d)

To: neelam.dhawan@state.nm.us
From: Linda Nonno <lnonno@lanl.gov>
Subject: Supplemental Information for SWMU 52-001(d)
Cc: mcinroy@lanl.gov
Bcc:
Attached: C:\Documents and Settings\103484\Desktop\Supplemental Information for SWMU 52-001(d).doc;

Hi Neelam!

I had a little bit of extra time last week, so I started to try and wrap up some of the permit mod requests and NFA proposal loose ends that are still outstanding. For the March 1995 request for permit modification, LANL still owes NMED supplemental information for SWMU 52-001(d). We've assembled a fair amount of information and I've attached an electronic copy for your review. It contains a detailed background section to help refresh your memory about where we stand with this site. Let me know what you think.

I'll give you a follow-up phone call in a few weeks to check if you've had the time to look it over.

Thanks.

Linda

Linda Nonno
Environmental Programs Directorate
Waste & Environmental Services Division
Remedy Services Group
Los Alamos National Laboratory

MS M992
Phone: 505-665-0725
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Supplemental Information for SWMU 52-001(d)

Background

SWMU 52-001(d) was identified in the 1990 SWMU report (LANL 1990, 007514) as part of a group of four sites designated "UHTREX Waste Treatment." These sites are associated with the Ultra High Temperature Reactor Experiment (UHTREX), which was a helium-cooled nuclear research reactor constructed in the mid-1960s and operated from 1967 to 1968. The reactor and associated equipment were located in building 52-0001. The reactor was operated to conduct research and develop high-temperature, gas-cooled reactor technology and new nuclear fuels. After the reactor was shut down, the nuclear fuel was removed and the facility underwent decontamination and decommissioning (D&D) in 1989 so it could be used for other purposes. D&D activities included removing radioactively contaminated equipment from inside the building [including the equipment associated with SWMU 52-001(d)], decontaminating the inside of building 52-0001, and removing associated structures outside the main reactor building. Building 52-0001 currently houses offices and laboratories.

SWMUs 52-001(a, b, and c) consisted of equipment located outside the main UHTREX building (building 52-0001). SWMU 52-001(a) consisted of air filter banks located in a subsurface pit. The helium coolant from the UHTREX nuclear reactor circulated through these filters to remove fission-product particulates. The filters were removed and the pit decontaminated and backfilled in 1989. SWMU 52-001(b) was identified as the heat dump building (52-0015) and SWMU 52-001(c) as the heat dump pad (52-0016). These units contained fans and coils that were used to cool the helium secondary reactor coolant. These units were also removed in 1989. SWMU 52-001(d) was identified as the sump pump room, duct work, filters, and hot cells located within building 52-0001. Contaminated equipment was removed from building 52-0001 in 1989, and the interior of the building was decontaminated to allow other uses.

SWMUs 52-001(a–d) were proposed for no further action (NFA) in the 1992 RFI work plan for OU 1129 (LANL 1992, 007666). EPA reviewed the work plan and issued a notice of deficiency (NOD) (EPA 1993, 010023). EPA had no NOD comments on the NFA proposal for these sites and indicated that a Class III permit modification request should be submitted for these sites. These four sites were included in the Class III permit modification request submitted by LANL to NMED in March 1995 (LANL 1995, 045365). These sites were proposed for NFA under the current definition of NFA criterion 5 (the site was characterized or remediated in accordance with applicable state and/or federal regulations, and the available data indicate that contaminants pose an acceptable level of risk under current and projected future land use).

NMED reviewed the permit modification request and issued a notice of determination (NMED 1996, 055815). In this notice, NMED determined that SWMUs 52-001(a, b, and c) were suitable for a Class III permit modification but that SWMU 52-001(d) was not. The NMED comment for SWMU 52-001(d) stated "Information based on sampling should be presented to indicate whether a release of hazardous constituents to the environment has occurred." LANL issued a response to the notice of determination (LANL 1997, 055510). LANL's response clarified that all equipment associated with SWMU 52-001(d) was completely contained within the building; thus, there was no potential for contaminants to have been released to the environment. No further comments on LANL's response were received from NMED. In February 2002, LANL withdrew some of the sites that had not been approved from the March 1995 Class III permit modification request (LANL 2002, 071447). SWMU 52-001(d) was not withdrawn from the request, but LANL indicated that supplemental information to support NFA of this site would be provided to NMED. The following is supplemental information related to the potential for releases to the environment from SWMU 52-001(d) to demonstrate this site is appropriate for NFA.

Potential for Releases to the Environment

Historical documents associated with building 52-0001 were reviewed to identify hazardous materials present in the building and the potential for releases from SWMU 52-001(d). A general discussion of hazardous materials in the building is provided below, followed by more detailed discussion of the areas associated with SWMU 52-001(d) (i.e., sump pump room, ductwork, filters, and hot cells).

An evaluation of the hazards in building 52-0001 was presented in the 1988 D&D Project Plan for UHTREX (LANL 1988, 008728). The information in the D&D plan identified relatively few hazardous materials in the building. The most common hazardous material was lead bricks and shot, which had been used to provide radiation shielding. Other hazardous materials included asbestos insulation on piping and mercury in switches. All these materials were removed from the building during 1989 D&D activities.

According to engineering drawings of building 52-0001, two sumps are located in the building's sump pump room (room 303). One sump, constructed of reinforced concrete, is used to collect sanitary wastewater from toilets, sinks, and floor drains located in the nonradiological areas of the building. The second sump, constructed of reinforced concrete with a stainless-steel liner, collected the radioactive liquid waste generated throughout the building. Neither sump contains drains. Sanitary wastewater is pumped from the sanitary waste sump using a sewage ejector into a drainline, which formerly was connected to a septic system [SWMU 52-002(a)]. Currently, the drainline is connected to the Sanitary Waste Water System at TA-46. The second sump (no longer active) collected low-level radioactive wastewater from floor drains, floor sinks, and wall drains located within the radiological areas of the building. A submersible pump was used to pump wastewater from this sump to neutralization tanks and a pump station [AOC 52-003(a)] located outside the building. From there, the wastewater was pumped through a buried waste line [AOC 52-003(b)] to TA-50. The equipment in the sump pump room associated with the operation of the reactor was removed during D&D activities in 1989. The remaining equipment was radiologically decontaminated.

Ducts were used to control air flow through radiological areas within the building. Air from the reactor and fuel handling areas was sent through the filter banks [SWMU 52-001(a)] before being discharged through a 100-ft-tall stack (structure 52-007) located outside the building. Air from the secondary containment area surrounding the reactor was sent through high-efficiency particulate air (HEPA) filters before being discharged through the 100-ft-tall stack. Air from the hot-cell areas was sent through HEPA filters before it was discharged from the building. The stack and associated ducting were removed during D&D activities in 1989.

The hot-cell facilities consisted of room 211 (the cell operator area), room 212 (the transfer lock), and room 213 (the transfer cell). The hot cells contained remotely operated hoists and manipulators that were used to remove fuel and other materials from the reactor area. The hot cells were constructed of thick, reinforced concrete to provide radiation shielding. Some hot-cell areas were also lined with steel. During D&D activities in 1989, equipment was removed from the hot-cell rooms, and the rooms were radiologically decontaminated. Room 211 is now used as an office area, and rooms 212 and 213 are used as an experimental area and laboratory space.

Conclusions

Based on the design and operation of the facilities and equipment associated with SWMU 52-001(d), historical releases of contaminants to the environment would not have occurred. These facilities and equipment were located within a building that housed a nuclear reactor and that was designed specifically to prevent uncontrolled releases (e.g., constructed of several-feet-thick concrete walls). Liquid wastes generated in the building were collected by the sanitary or liquid radioactive waste sumps before they were discharged from the building. These discharges went directly to other SWMUs [i.e., SWMUs 52-002(a), 52-003(a), and 52-003(b)]. Thus, any releases outside the building would be associated with these other SMWUs. Any airborne releases inside the building would have been captured by the ventilation system and treated by filtration before they were discharged to the atmosphere. The equipment inside building 52-0001 associated with SWMU 52-001(d) was decontaminated or removed during D&D activities in 1989.

Based on the considerations described above, SWMU 52-001(d) is appropriate for NFA under the current definition of NFA criterion 3 (no release to the environment of hazardous waste has occurred, nor is likely to occur in the future). Also, any releases from the liquid waste system outside the building would be associated with other SWMUs and investigated as those SWMUs. Therefore, sampling of SWMU 52-001(d) is not necessary to support the NFA determination.

References

EPA (U.S. Environmental Protection Agency), June 15, 1993. "Notice of Deficiency for RFI Work Plan Operable Unit 1129, Los Alamos National Laboratory (LANL), NM0890100515," U.S. Environmental Protection Agency letter to J.C. Vozella (DOE-LAAO Acting Chief) from W.K. Honker (EPA Region 6), Dallas, Texas. (EPA 1993, 010023)

LANL (Los Alamos National Laboratory), September 12, 1988. "UHTREX Decommissioning Project, Project Plan," draft, Los Alamos National Laboratory, Los Alamos, New Mexico. (LANL 1988, 008728)

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), May 1992. "RFI Work Plan for Operable Unit 1129," Los Alamos National Laboratory document LA-UR-92-800, Los Alamos, New Mexico. (LANL 1992, 007666)

LANL (Los Alamos National Laboratory), March 1995. "Request for Permit Modification, Units Proposed for NFA," Los Alamos National Laboratory document LA-UR-95-767, Los Alamos, New Mexico. (LANL 1995, 045365)

LANL (Los Alamos National Laboratory), March 1997. "Response to Notice of Determination for Requests for Permit Modification: Units Proposed for No Further Action, March and September 1995," Los Alamos National Laboratory document LA-UR-97-763, Los Alamos, New Mexico. (LANL 1997, 055510)

LANL (Los Alamos National Laboratory), February 11, 2002. "Withdrawal of Solid Waste Management Units (SWMUs) from the March 1995, September 1995, and September 1996 Requests for Permit Modification (LA-UR-95-767, LA-UR-95-3319, and LA-UR-96-3357, Respectively)," Los Alamos National Laboratory letter (ER2002-0110) to J. Young (NMED-HWB) from J.A. Canepa (ER Program Manager) and M. Johansen (DOE-LASO), Los Alamos, New Mexico. (LANL 2002, 071447)

NMED (New Mexico Environment Department), December 10, 1996. "Notice of Determination Requests for Permit Modification Units Proposed for No Further Action March and September 1995," New Mexico Environment Department memorandum to T. Taylor (DOE), and H. Jansen (EM/ER) from R.S. Dinwiddie (NMED-HRMB), Santa Fe, New Mexico. (NMED 1996, 055815)